Alaska Department of Transportation & Public Facilities

PART **A**

REQUEST FOR PROPOSALS PACKAGE

(Procurement per Article 3 of AS 36.30)

TABLE OF CONTENTS

Form 25A270, Part A - Request for Proposals (RFP)
" " Part B - Submittal Checklist
" " Part C - Evaluation Criteria
" " Part D - Proposal Form
Certification of Eligibility (Ethics Act)
Form 25A257, Pre-Audit Statement
Form 25A269, Indemnification & Insurance

Statement of Services

Other: Appendix A General Conditions

PCB-Contaminated Soil Removal Work Plan dated January 2015

ISSUING OFFICE

Agency Contact & Phone No.....: Matt Tanaka, P.E. (907) 269-0824
Contracting Division.....: State of Alaska Department of Transportation & Public Facilities, Statewide Public Facilities

PROJECT

RFP NUMBER.....: 25172001
Project Numbers-State/Federal.....: N/A / N/A
Project Site (City, Village, etc.).....: Aniak, Alaska
Project Title & Contract Description .....: Aniak PCB-Contaminated Soil Removal

This state funded contract is for removal of PCB contaminated soil in Aniak Alaska in accordance with a PCB-Contaminated Soil Removal work Plan. Work includes developing remediation plans, acquiring permits, excavating, sampling, containerizing, shipping, and disposing of contaminated soils, and developing a Remedial Action Report.

SCHEDULE & PAYMENT

Anticipated period for performance-Begin/End: November 2016 – December 2018

Estimated amount of proposed contract:

- ☐ Less than $200,000
- ☐ $200,000 to $250,000
- ☐ $250,000 to $500,000
- ☐ $500,000 to $1,000,000
- ☒ $1,000,000 or greater

SUBMITTAL DEADLINE AND LOCATION

OFFERORS ARE RESPONSIBLE TO ASSURE DELIVERY PRIOR TO DEADLINE (2 AAC 12.250).
ONLY PROPOSALS RECEIVED PRIOR TO THE FOLLOWING DATE AND TIME WILL BE OPENED.

DATE: **October 4, 2016** PREVAILING TIME: **4:00 PM**

HAND DELIVER ONLY DIRECTLY TO FOLLOWING LOCATION (and person, if named):
Sharon Smith, P.E., Chief of Contracts
AK Department of Transportation & Public Facilties
4111 Aviation Avenue
Anchorage, AK 99502

IMPORTANT NOTICE: If you downloaded this solicitation from the State's Website, you must self-register for the planholders list to receive subsequent addenda. Failure to register may adversely affect your proposal. It is the Offeror's responsibility to insure that he has received all addenda affecting this RFP.

PART

A

SELECTION PROCEDURE

1. Competitive Sealed Proposals will be evaluated by a committee (2 AAC 12, Article 4). Evaluation of responses to criteria set forth in Part C results in a numerical score for each proposal. Each criterion in Part C has an assigned weight for this RFP which demonstrates its relative importance. The total of all weights is 100 (100%). Each one- percent weight equates to a range of 0-5 points per Evaluator. The maximum points (score) obtainable for any proposal is equal to the product of 500 multiplied by the number of Evaluators.

2. Scoring of proposals will be accomplished as follows:

2.1 Each Evaluator will individually read and rate each Offeror's response to each criterion described in Part C - Section I - Technical Proposal. Ratings will be based solely on contents of proposal and in compliance with the Contracting Agency's standard Instructions for Evaluation Committee. Except as may be stated within any criterion description in Part C, a rating of "5" = Best Response from all Offerors; "4" to "1" = Progressively Less Responsive; "0" = Non-Responsive. Ratings are multiplied by the assigned weights for each criterion to obtain criteria scores.

2.2 After completion of individual ratings in Part C, Section 1, Technical Proposal, the Evaluation Committee will meet to discuss proposals. Evaluators may then alter their ratings; however, any changes shall be based solely on the criteria set forth in Part C.

2.2 After scoring Part C - Section I - Technical Proposal, criteria scores for Part C - Section II - Preferences, and Section III - Price (if applicable), will be calculated based on criteria descriptions.

2.4 The total score for each Offeror will be obtained by summing the scores determined for each criterion in Sections I, II and III of Part C. The order of ranking for negotiations shall be as follows: highest scored Offeror will be ranked first, next highest scored second, and etcetera.

3. Evaluators may discuss factual knowledge of, and may investigate Offerors' and proposed Subcontractors' prior work experience and performance, including projects referenced in proposal, available written evaluations, etcetera, and may contact listed references or other persons knowledgeable of a Contractor's and/or a Subcontractor's past performance. Factors such as overall experience relative to the proposed contract, quality of work, control of cost, and ability to meet schedules may be addressed. If any issues of significant concern to the proposed contract are discovered, the Committee may:

3.1 Provide written recommendations for consideration during contract negotiations;

3.2 Conduct discussions in accordance with paragraph 4, below.

4. The Committee may decide to conduct discussions (or "interviews") with responsible Offerors whose proposals are determined to be reasonably susceptible of being selected for award for the purpose of clarification to assure full understanding of, and responsiveness to, the solicitation requirements (AS 36.30.240 & 2 AAC 12.290). Offerors selected by the Committee for discussions may be permitted to submit Best and Final Offers (BAFO) for final Committee Evaluation. After discussions and any BAFO's, Evaluators will determine the final scoring and ranking for contract negotiations by evaluating written and oral responses using only the criteria set forth in Part C of this RFP (2 AAC 12.260(b)).

5. All Offerors will be advised of the Offeror selected for award after completion of the evaluation process in a Notice of Intent to Award. TECHNCAL AND PRICE PROPOSALS WILL NOT BE DISCLOSED TO THE PUBLIC OR TO COMPETING OFFERORS UNTIL AFTER A NOTICE ON INTENT TO AWARD IS ISSUED.

PART

A

NOTICES

1. The Contracting Agency is an equal opportunity employer.

2. Copies of contract documents are available for review at the Contracting Agency's office. Offerors located outside the general vicinity of the Contracting Agency's office may telephone the Agency Contact identified on page one of this Part A for a discussion of such items.

General Conditions of the Professional Services Agreement are contained in the Small Procurement Standard Provisions Booklet, which is located on the Department's website under "Procurement".

The General Conditions are the **same** for both Competitive Sealed Proposals and Small Procurements.

3. Offerors are specifically advised that a contract shall not be in effect until a written agreement is executed by an authorized agent of the Contracting Agency. The Contracting Agency shall not be liable for any cost incurred by an Offeror in response to this solicitation, including any work done, even in good faith, prior to execution of a contract and issuance of a Notice to Proceed.

4. The Contracting Agency expressly reserves the right to waive minor informalities, negotiate changes or reject any and all proposals and to not award the proposed contract, if in its best interest. "Minor Informalities" means matters of form rather than substance which are evident from the submittal, or are insignificant matters that have a negligible effect on price, quantity, quality, delivery, or contractual conditions and can be waived or corrected without prejudice to other Offerors (2 AAC 12.990).

5. All proposals shall be open for public inspection (AS 36.30.230) after a Notice of Intent to Award is issued. Offerors should not include proprietary information in proposals if such information should not be disclosed to the public. Any language within a submittal purporting to render all or portions of a proposal confidential will be disregarded. Proprietary information which may be provided after award will be confidential if expressly agreed to by the Contracting Agency (AS 36.30.230).

6. Substitution for any personnel named in a proposal may result in termination of negotiations.

7. If it is discovered that a selected Offeror is in arrears on taxes due the State of Alaska, a contract may not be awarded until the Alaska Department of Revenue approves the payment provisions for the contract.

8. **Offerors and proposed subcontractors shall be in compliance with the statutory requirements for Alaska business licensing and professional registrations included in the certification statement on Page 2 of Part D in this RFP package.**

9. **PRICE COMPETITION**: Price cannot be an Evaluation Criterion in accordance with Article 3 of AS 36.30 for services that must be performed only by Architects, Engineers or Land Surveyors (A/E or LS) licensed in the State of Alaska, UNLESS the provisions of AS 36.30.270(d) apply; i.e., unless the services required are repetitious in nature, and the nature and amount of services required are thoroughly defined by measurable and objective standards to reasonably enable firms or persons making proposals to compete with a clear understanding and interpretation of the services required. If price is a factor, a majority of the evaluation committee must be registered in Alaska to perform architectural, engineering, or land surveying services.

9.1 If the services performed do not require an A/E or LS, then all Offerors including any A/E or LS must provide Price Proposals in accordance with AS 36.30.270(b) and 2 AAC 12.260(c).

9.2 Price (or any estimate of labor hours) cannot be an Evaluation Criterion for contracts that will receive federal funding (FAA) per 49 CFR 18.36(t), AC 150/5100-14D. For FAA exceptions: see AC 150/5100/14D, para 2-4(c).

10. An audit of the selected Offerors' and proposed Subcontractors' cost accounting systems and business records may be required to ascertain if systems are adequate for segregating contract costs; to establish a maximum allowable Indirect Cost Rate for the Agency's negotiator; and to investigate the accuracy of proposed labor rates and unit prices. In order

not to unduly delay contract negotiation or award, be prepared to submit Pre-Audit Statement, DOT&PF Form 25A257 immediately for your firm and any subcontract which may exceed $250,000. For contract amounts less than $250,000, the Contracting Agency may require the Offeror and proposed Subcontractor to submit the Pre-Audit Statement if deemed necessary to determine allowable costs under Title 23 CFR requirements. If selected for negotiation, failure to submit properly completed Pre-Audit Statement(s) in a timely manner may disqualify an Offeror from further consideration. Information from Pre-Audit Statements and any Audit conducted for the Contracting Agency is considered proprietary and will be confidential.

11. Standard insurance provisions for Worker's Compensation, General and Automobile Liability, and Professional Liability are contained in DOT&PF Form 25A269, Indemnification and Insurance. Coverages may be modified under very limited circumstances. Offeror should not assume any modification of coverages.

12. Professional Liability Insurance for the proposed contract: ☐ is not required
☒ is required as shown on DOT&PF Form 25A269.

13. The proposed contract ☐ will ☒ will not be a Federally Assisted Program of the U.S. Department of Transportation. If it will be an assisted program, then the Offeror shall insert the following notification in all subcontract solicitations for bids or proposals pertinent to this RFP:

"In accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, CFR, U.S. Department of Transportation (U.S. DOT), Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. DOT issued pursuant to such Act, in any Subcontract entered into pursuant to this RFP, Disadvantaged Business Enterprise firms will be afforded full opportunity to submit bids or proposals and will not be discriminated against on the grounds of race, color, sex, or national origin, in consideration for an award.

14. Pre-proposal Conference: ☒ None ☐ As follows:

15. Special Notices:

15.1 Per Alaska Statute (AS) 36.30.210(e): An Alaska Business License is required of Contractors who do business in Alaska at time of award. To qualify for the Alaska Offerors' Preference, under AS 36.30.321, an Offeror shall have a valid Alaska business license as a prerequisite to proposal. Information regarding applying for an Alaska Business License can be found on-line at http://commerce.alaska.gov/dnn/cbpl/Home.aspx or by calling 1-907-465-2550. The business license must be in the name of the company under which the proposal is submitted.

15.2 The Contracting Agency has unique insurance requirements for this project. Read carefully Appendix D Indemnification and Insurance.

15.3 The PCB-Contaminated Soil Removal Work Plan schedule is superseded by the schedule in Appendix B Statement of Services.

PART

B

SUBMITTAL CHECKLIST

Offeror may use left margin to check off items when completed.

Prime Contractor shall have a current Alaska Business License on date of submittal, reference item 1, page 2, Part D.

[ ] 1. Offerors must carefully review this RFP Package for defects and questionable material and become familiar with submittal requirements. Submit written comments to the address shown under "Submittal Deadline and Location" on page 1 of Part A - RFP. Substantive issues will be addressed in a written addendum to all RFP recipients on record. Failure to comply with directions may result in lower score and may eliminate a submittal from consideration. Protests based on alleged improprieties or ambiguities in a solicitation may be disallowed at the discretion of the Contracting Agency if the protest is not received in writing at least ten Agency work days prior to the Submittal Deadline (AS 36.30.565).

[ ] 2. Review Part A - RFP and the proposed Statement of Services and any other attached or referenced materials. If no Statement of Services is attached, telephone the Agency contact person identified on page 1 of Part A.

[ ] 3. Review Part C - Evaluation Criteria. Read each criterion in light of the proposed Statement of Services. Note any project specific criteria which may have been added or any changes to standard criteria descriptions which may have been made. Be aware of the assigned weight for each criterion. If a weight is not entered for any criterion on Part C, notify the Agency contact person. Plan your proposal to address the applicable criteria. Criteria Responses shall not exceed the number of pages stated below.

[ ] 4. Prepare a distinct Response for each criterion that has a weight more than zero. Failure to respond directly to any criteria weighted more than zero will result in an evaluation score of zero for that criteria. Any Responses to criteria weighted zero will be disregarded. Acceptable Responses must be specific and directly related to the Contracting Agency's proposed Statement of Services. Marketing brochures, federal standard forms 330s, marketing resumes, and other non-project specific materials will be discarded without evaluation and should not be submitted.

[ ] 5. ***Each criterion Response must be titled, numbered and assembled in the order in which the criteria are listed in Part C***, so the criterion to which information applies shall be plainly evident. Material not so identified or assembled may be discarded without evaluation.

[ ] 6. Price ☒ is ☐ is not an evaluation criterion for the proposed contract.

If Price is a Criterion, prepare ***Billing Rates and/or Price Proposals*** as described in Criteria #5 and/or #6.

[ ] 7. Complete all entries on Part D - Proposal Form. Note the statutory requirements for Alaska business licenses and professional registrations and be sure to sign and date the Certification. Copies of licenses and registrations may be provided with submittal, and will not count in the requirements of #8 below.

[ ] 8. Attach Criteria Responses (***except any Billing Rates or Price Proposals***) to Part D - Proposal Form. The maximum number of attached pages (***each printed side equals one page***) for Criteria Responses shall not exceed: **10**. Attached page limit does not include the four-page Part D - Proposal Form, or any Billing Rates or Price Proposals.

Criteria Responses shall be presented in ***8-1/2" X 11" format***, except for a minimal number of larger sheets (e.g. 11" x 17") that may be used (e.g. for schedules) if they are folded to 8-1/2" X 11" size. Large sheets will count as multiple pages at 93.5 square inches or fraction thereof per page, unless otherwise noted.

CAUTION: Criteria Responses which do not comply with the required page limit or presentation size, may result in disqualification. Further, small print or typeface that is difficult to read may negatively influence evaluation of your submittal and affect scoring for "Quality of Proposal."

CHECKLIST IS CONTINUED NEXT PAGE

[ ] 9. N/A

[ ] 10. Parts A, B and C of Form 25A270 and the proposed Statement of Services shall not be returned to the Contracting Agency. ***Submittals shall consist of the following applicable items assembled as follows and in the order listed:***

[ ] 10.1 Completed Part D - Proposal Form (generally at least one copy with original signature) and Responses to all evaluation criteria -- ***except Billing Rates, Price Proposals*** -- attached. Each copy shall be fastened with one staple in the upper left corner. No other form of binding shall be used and no cover and no transmittal letter will be included. **CAUTION**: Failure to comply with this instruction will negatively influence evaluation of Submittal.

[ ] 10.2 Number of copies of Part D (***all pages***) and Criteria Responses (***except Billing Rates, and Price Proposals***) required is: **5**

[ ] 10.3 If ***Billing Rates and/or Price Proposals*** are required, ***one copy*** bound with one staple in the upper left corner separately enclosed in a sealed envelope marked on the outside to identify it as a ***Billing Rates or Price Proposal*** and the names of the Project and Offeror. Each ***Billing Rates or Price Proposal*** must be signed and dated by the person who prepares it (may be different signatures for each Subcontractor).

[ ] 10.4 If Item 9, above, is completed for this RFP Package, any submittal items described therein. Unless otherwise stated, one copy only, bound appropriately.

[ ] 10.5 Pre-Audit Statement, DOT&PF Form 25A257, shall ***not*** be provided with Submittal. (See Notice #10 on page 3 of Part A - RFP.)

[ ] 10.6 **CAUTION:** If you replicate (other than by photocopy) Part D or any form in lieu of completing the forms provided by the Contracting Agency, provide a signed certification that lists such forms and attests that they are exact replicas of that issued by the Contracting Agency. Changed forms may result in rejection at the Contracting Agency's discretion. Any alteration - other than completion of the required entries - may be cause for rejection without recourse.

[ ] 11. Deliver ***submittals in one sealed package*** to the location and before the submittal deadline cited in Part A - RFP. ***Mark the outside of the package*** to identify the Project and the Offeror. Proposals must be received prior to the specified date and time. Late proposals will not be opened (2 AAC 12.250).

PART

C

EVALUATION CRITERIA

Criteria with a weight of zero are not applicable and should be disregarded. If a weight is not indicated for any criterion, telephone the Agency Contact person identified at the top of page 1 of Part A - RFP.

SECTION I - TECHNICAL PROPOSAL

1. Methods

1. Weight: 5

Response must outline the methods for accomplishing the proposed contract or, if methodology is contained in the proposed Statement of Services, address its adequacy. Describe what, when, where, how, and in what sequence the work will be done. Address how proximity to the Project site, *particular* geographic familiarity, experience, and capabilities of your firms (Offeror and Proposed Subcontractors) and Project Staff might *specifically* contribute to the proposed methods. Identify the amount and type of work to be performed by any Subcontractors. Consider how each task may be carried out; what services or interaction required from/with the Contracting Agency; etcetera. Suggest alternatives, if appropriate. Identify any **distinct and substantive qualifications** for undertaking the proposed contract such as the availability of specialized equipment or unique approaches or concepts **relevant to the required services** which the firms may use.

2. Management

2. Weight: 5

Response must describe the administrative and operational structures that will be used for performing the proposed contract. For example consider: who will have overall responsibility for the contract? Who will have direct responsibility for specific disciplines? What will the lines of authority be? For any individual who would be in "responsible-charge" (reference AS 08.48) as an Architect or Chemical, Civil (including Structural), Electrical, Mechanical, Mining or Petroleum Engineer, or Land Surveyor, so state and list his/her Alaska professional registration number. A graphic depiction is preferred in your response to this criterion. Additionally, the Contracting Agency may want to inspect work products in progress and have a close ongoing working relationship with your Project Staff. Accordingly, your response should also identify where the various contract services will be performed, and how communications will be maintained between your Project Staff, the Contracting Agency, and (as applicable) any other government agencies or the public.

3. Proposed Project Staff

3. Weight: 5

Response must name the individuals to perform the following **FUNCTIONS** plus any other professional/technical functions you deem essential to perform the services (where specific professional functions are not deemed necessary, please so indicate):

1. Contract Management (contract compliance)
2. Project Management (single point-of-contact directly engaged in contract performance)
3. Engineering (Senior/Junior)
4. Environmental Science
5. Chemistry/Sample Analysis
6. Geology
7. Industrial Hygiene
8. Safety Management
9. Hazardous Material Handling
10. Surveying

Continued Next Page

Describe the work to be performed by the individuals you name to perform essential functions and detail their specific qualifications and substantive **experience directly related to the proposed contract.** A response prepared specifically for this proposal is required. Marketing resumes often include non-relevant information which may detract from the evaluation of proposal. Lists of projects are not useful. Focus on individual's specific duties and responsibilities and how project experience is relevant to the proposed contract.

For each person named, identify their: employer, professional discipline or job classification and state of residency. List at least 3 professional references (contact persons and telephone numbers) for each person.

SECTION II - PREFERENCES

4. Alaska Bidder (Offeror) Preference **49 CFR 18.36(c)(2) & 2 AAC 12.260(e)** **Weight shall be "0" if any federal funding, otherwise weight shall be at least "10".**	**4. Weight: 10**

To be granted this preference:

1) ***Response must certify that Offeror meets the following requirements per AS 36.30.990***
   (A) Firm holds a current Alaska Business License;
   (B) Proposal is submitted under the name as appearing on the Firm's current Alaska Business License;
   (C) Firm has maintained a place of business within Alaska, staffed by the Firm or an employee of the Firm, for a period of six months immediately preceding the date of the offer;
   (D) Firm is incorporated or qualified to do business under the laws of the State of Alaska, is a sole proprietorship, and the proprietor is a resident of Alaska, is a limited liability company organized under AS 10.50 and all members are residents of Alaska, or is a partnership under AS 32.05, AS 32.06, or AS 32.11 and all partners are residents of Alaska; and
   (E) If the Firm is a Joint Venture, it is composed entirely of entities that qualify under (A) - (D).

2) ***Offeror must designate the Alaska Bidder (Offeror) Preference on page one of Part D.***

Response will be scored: Rating x Number of Evaluators x Weight = Criterion Score. Rating will be as follows:

An Alaska Offeror's preference (i.e. a Rating of 5) will be assigned to the proposal of an Offeror who qualifies as an Alaska bidder using the criteria in 1), above.

No Alaska Offeror's preference (i.e. a Rating of 0) will be assigned to the proposal of an Offeror who does not certify that it qualifies as an Alaska bidder or who does not qualify as an Alaska bidder using the criteria in 1), above.

PART

C

SECTION III - PRICE

If price is not an Evaluation Criterion, weights for both Criterion #5 and #6 shall be "0". If price is an Evaluation Criterion, the sum of weights for Criterion #5 and #6 shall be at least "10", and all Offerors shall submit Price Proposals in the specified format(s).

See item #9, under Notices in Part A - RFP, regarding statutory and regulatory provisions about price competition and item #10.3, in Part B - Submittal Checklist, regarding procedure for submittal of Billing Rates and/or Price Proposals. Cost terminology is explained on page 2 of the Pre-Audit Statement (DOT&PF Form 25A257).

CAUTION: Submittal of Offeror's or Subcontractor's "standard" rate schedules or other pricing documents which are not in required format will be non-responsive if they do not allow direct comparison with other responsive proposals.

Rates and costs proposed by the Offeror selected for contract negotiations may be investigated for reasonableness and allocability in accordance with AS 36.30.400, .420 & .480, 2 AAC 12.550 and the contract cost principles in 48 CFR Part 31. Unsupported rates and costs may be disallowed or result in termination of negotiations, or contract award. All proposed rates and the negotiated contract rates will be public information.

5. Labor Billing Rates (Required Format) | **5. Weight: 5**

Provide a proposed total hourly Billing Rate (i.e. inclusive of Direct Cost of Direct Labor, all Indirect Costs, and Fee) only for each of the job **FUNCTIONS** listed below. Note: Some of these functions may be performed by one or more employees of the Offeror or Subcontractors; consequently, an individual might be billed under the contract at different rates appropriate to the functions performed. ***Only the maximum rate paid to any individual for each listed job function*** - regardless of employer (Offeror or Subcontractor) - ***must be provided and will be considered for this response***. Rates for lower paid individuals or for other job functions, if any, will be addressed during contract negotiations.

1. Contract Management	(Estimated at 1% of total labor effort)
2. Project Management	(Estimated at 7% of total labor effort)
3. Engineering (Senior/Junior)	(Estimated at 20% of total labor effort)
4. Environmental Science	(Estimated at 20% of total labor effort)
5. Chemistry/Sample Analysis	(Estimated at 10% of total labor effort)
6. Geology	(Estimated at 10% of total labor effort)
7. Safety Management	(Estimated at 10% of total labor effort)
8. Industrial Hygiene	(Estimated at 10% of total labor effort)
9. Hazardous Material Handling	(Estimated at 10% of total labor effort)
10. Surveying	(Estimated at 2% of total labor effort)

*In accordance with the submittal Checklist ('rfp-b'), item 10.3, *Billing Rates must* be signed and dated by the person who prepares it (may be different signatures for each Subcontractor)

Response will be scored as follows: The maximum hourly rates proposed for the job functions listed above will be multiplied by the percentage of total labor effort (estimated above) and then summed to obtain an aggregate rate for each Offeror. If more than one rate is provided for any job function, only the highest rate will be used. Each Offeror's score will be calculated using the following equation - except that the ***score will be zero if a rate for each listed function is not provided by an Offeror.***

(Lowest aggregate rate from all Offerors) x (MPP)* = *Offeror's Criterion Score*
(Offeror's aggregate rate)

**MPP = Maximum Possible Points = (5) x (Number of Evaluators) x (Weight)*

If no federal funding, then per AS 36.30.250(b), aggregate rates shall be reduced for the above calculation by the following applicable percentages when the rates are from Offerors that ***designate preferences on page one of Part D.***

- ALASKA BIDDER (OFFEROR) PREFERENCE [2 AAC 12.260(d)]..... 5%
- ALASKA VETERAN-OWNED BUSINESS PREFERENCE [AS 36.30.175] (maximum $5000)..... 5%

and only ONE of the following:

- EMPLOYMENT PROGRAM PREFERENCE [AS 36.30.170(c)] 15%
- DISABLED SOLE PROPRIETOR OR 50% DISABLED EMPLOYEES [AS 36.30.170(e & f)] 10%

To claim employment or disabled preference, Offeror must be on the appropriate Alaska Division of Vocational Rehabilitation list at the time designated for opening (i.e., receipt) of proposals.

6. Total Price (Required Format)	**6. Weight: 70**

The Contracting Agency will provide the required format for the Total Price in an addendum.

Alaska Department of Transportation & Public Facilities
PROPOSAL FORM

PART **D**

THIS FORM MUST BE THE FIRST PAGE OF PROPOSAL. Attach criteria responses as explained in Part B - Submittal Checklist. No transmittal letter or cover sheet will be used.

PROJECT

Project Numbers-State/Federal ..... : N/A
Project Title ..... : Aniak PCB-Contaminated Soil Removal
RFP No. ..... : 25172001

OFFEROR (CONTRACTOR)

Contractor ..... :

Street ..... :
P.O. Box ..... :
City, State, Zip ..... :
Alaska Business License Number ..... :
Federal Tax Identification No. ..... :
DOT&PF DBE Certification No. (if any) ..... :
Individual(s) to sign contract ..... :
Title(s) ..... :
Type of business enterprise (check one) .... : [ ] Corporation in the state of.. :
[ ] Individual [ ] Partnership [ ] Other(specify) ..... :

ALASKA STATUTORY PREFERENCES (IF NO FEDERAL FUNDING)

Check the applicable preferences that you claim for the proposed contract (reference Criteria 11, 12 & 13 in Part C):
[ ] Alaska Bidder (Offeror) **AND>>** [ ] Veterans **AND>>** [ ]Employment Program or [ ] Disabled Persons

PROPOSED SUBCONTRACTOR(S)

Service, Equipment, etc.	Subcontractor & Office Location	AK Business License No.	DOT&PF DBE Certification No.

CERTIFICATIONS

I certify: that I am a duly authorized representative of the Contractor; that this Submittal accurately represents capabilities of the Contractor and Subcontractors identified herein for providing the services indicated; and, that the requirements of the Certifications on page 2 and 3 of this Part D for 1) Alaska Licenses/Registrations, 2) Insurance, 3) Federal-Aid Contracts exceeding $100,000, 4) Cost and Pricing Data, 5) Trade Restrictions/Suspension/Debarment, 6) Foreign Contracting, 7) DBE Commitment, and 8) Former Public Officer - will be complied with in full. These Certifications are material representations of fact upon which reliance will be placed if the proposed contract is awarded. Failure to comply with these Certifications is a fraudulent act. The Contracting Agency is hereby authorized to request any entity identified in this proposal to furnish information deemed necessary to verify the reputation and capabilities of the Contractor and Subcontractors. This proposal is valid for at least ninety days.

Signature ..... : _____
Name ..... : Date:
Title ..... : Telephone (voice):
(fax):
Email Address:

PART

D

CERTIFICATION FOR ALASKA BUSINESS LICENSES AND REGISTRATIONS

Contractor and all Subcontractors shall comply with the following applicable requirements of Alaska Statutes:

1. **Alaska Business License** (Form 08-070 issued under AS 43.70) at the time contract is awarded as required by AS 36.30.210(e) for Contractor and all Subcontractors. In accordance with Administrative Manual, Section 81.120, proof of application for an Alaska Business license will satisfy this requirement. Per AAM 81.120, acceptable evidence that the offeror possesses a valid Alaska business license consists of any one of the following:
   a. Copy of the Alaska business license.
   b. A canceled check that demonstrates payment for the Alaska business license fee.
   c. A copy of the Alaska business license application with a receipt stamp from the State's business license office.
   d. A sworn notarized affidavit that the bidder/offeror applied and paid for the Alaska business license.
   e. Other forms of evidence acceptable to the Department of Law.

2. **Certificate of Registration** for each individual to be in "responsible charge" (AS 08.48.341(14)) for Architecture, Engineering or Land Surveying (Form 08-2407 issued under AS 08.48.211) issued prior to submittal of proposal. Associates, consultants, or specialists under the supervision of a registered individual in "responsible charge" are exempt from registration requirements (AS 08.48.331).

3. **Certificate of Authorization for Corporate Practice** for incorporated Contractors and incorporated Subcontractors for Architecture, Engineering or Land Surveying (Form 08-2407 issued under AS 08.48.241). Corporations offering to provide Architectural, Engineering or Land Surveying services do not need to be registered for such disciplines at the time proposal is submitted provided they obtain corporate registration before contract award (AS 08.48.241).

4. **Certificate of Incorporation** (Alaska firms) or **Certificate of Authorization for Foreign Firm** ("Out-of-State" firms). All corporations, regardless of type of services provided, must have one of the certificates (AS 10.06.218 and other sections of Title 10.06 - Alaska Corporations Code).

5. **Current Board of Director's Resolution** for incorporated Contractors and incorporated Subcontractors for Architecture, Engineering or Land Surveying (reference AS 08.48.241) which names the person(s) designated in "responsible charge" for each discipline. Such persons shall be licensed in Alaska and shall participate as project staff in the Contract/Subcontracts.

6. **All partners** in a Partnership to provide Architectural, Engineering, or Land Surveying **must be legally registered in Alaska** prior to submittal of proposal for at least one of those disciplines (AS 08.48.251) which the Partnership offers.

7. **Joint Ventures**, regardless of type of services provided, must be licensed/registered in the legal name of the Joint Venture as used in this proposal (AS 43.70.020 and 43.70.110(4)).

8. **Contracts for Architecture, Engineering or Land Surveying** may not be awarded to individuals, corporations or partnerships not in compliance, respectively, with the provisions of paragraph 2, 3, and 6, above (AS 36.90.100).

[For information about licensing, Offerors may contact the Alaska Department of Commerce and Economic Development, Division of Occupational Licensing at P.O. Box 110806, Juneau, AK 99811-0806, or at Telephone (907) 465-2550, or at Internet address: http://commerce.alaska.gov/dnn/cbpl/Home.aspx]

CERTIFICATION FOR INSURANCE

Contractor will ensure that it and all Subcontractors have insurance coverage to effectuate the requirements of DOT&PF Form 25A269, Indemnification and Insurance.

CERTIFICATION FOR FEDERAL-AID CONTRACTS EXCEEDING $100,000

The individual signing this proposal certifies to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid, by or on behalf of the Contractor, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the Contractor shall complete and submit Standard Form-LLL, Disclosure of Lobbying Activities, in accordance with its instructions. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

This certification is a material representation of fact upon which reliance will be placed if the proposed contract is awarded. Submission of this certification is a prerequisite for making or entering into the proposed contract imposed by Section 1352, Title 31, U.S. Code. The Contractor also agrees by submitting this proposal that Contractor shall require that the language of this certification be included in all lower tier subcontracts which exceed $100,000 and that all such Subcontractors shall certify and disclose accordingly.

CERTIFICATION - COST AND PRICING DATA

In accordance with AS 36.30.400, any cost and pricing data submitted herewith, or in any future price proposals for the proposed contract, will be accurate, complete and current as of the date submitted and will continue to be accurate and complete during the performance of the contract, if awarded.

The contractor certifies that all costs submitted in a current or future price proposal are allowable In accordance with the cost principles of the Federal Acquisition Regulations of Title 48, Code of Federal Regulations (CFR), Part 31 and that the price proposal does not include any costs which are expressly unallowable under the cost principles of the FAR of 48 CFR 31. In addition, all known material transactions or events that have occurred affecting the firm's ownership, organization and indirect costs rates have been disclosed.

CERTIFICATION – TRADE RESTRICTIONS AND SUSPENSION AND DEBARMENT

The individual signing this proposal certifies to the best of his or her knowledge that the Contractor and any subcontractors are in compliance with DOT&PF 25A262 Appendix A, General Conditions, Article A25 and Article A26.

CERTIFICATION - FOREIGN CONTRACTING

By signature on this solicitation, the offeror certifies that all services provided under this contract by the contractor and all subcontractors shall be performed in the United States. If the offeror cannot certify that all work is being performed in the United States, the offeror must contact the Contracts Officer to request a waiver at least 10 days prior to proposal deadline. The offeror must provide with their submission a detailed description of the portion of work being performed outside the United States, where, by whom, and the reason the waiver is necessary. Failure to comply with this requirement may cause the state to reject the bid or proposal as non-responsive, or cancel the contract.

CERTIFICATION – DBE COMMITMENT

For federal-aid projects with DBE goals: if the Contractor submits a utilization report that proposes to use certified DBE's in the performance of work, the Contractor certifies that every effort will be made to meet or exceed the proposed percentage.

In addition, the Contractor certifies that a Consultant Registration form shall be submitted to the DBE/Civil Rights Office for their firm and each subconsultant prior to award.

CERTIFICATION – FORMER PUBLIC OFFICER

Any proposer listing as a member of the proposer's team a current public officer or a former public officer who has left state service within the past two years must submit a sworn statement from that individual that the Alaska Executive Branch Ethics Act does not prohibit his or her participation in this project. If a proposer fails to submit a required statement, the proposal may be deemed nonresponsive or nonresponsible, and rejected, depending upon the materiality of the individual's proposed position.

The Ethics Act bars a public officer who leaves state service from representing, advising or assisting a person for compensation regarding a matter –

that was under consideration by the administrative unit in which the officer served, <u>and</u> in which the officer participated personally and substantially through the exercise of official action,

<u>for two years after leaving state service</u>. See AS 39.52.180(a). "Public officer" includes a state employee, a member of a state board and commission, and a trustee of the Exxon Valdez Oil Spill Trust. "Official action" means a recommendation, decision, approval, disapproval, vote, or other similar action or inaction. Possible remedies for violating the bar include penalties against the former public officer and voiding the state grant, contract or lease in which the former public officer is involved.

Additionally, former public officers may not disclose or use information acquired in the course of their official duties that could in any way result in a benefit to the former public officers or their families, if the information has not been disseminated to the public or is confidential by law, without appropriate authorization. *See* AS 39.52.140.

Each current or former public officer is responsible for determining whether he or she may serve in the listed capacity on this project without violating the Ethics Act. A form that a former public officer may use to certify their eligibility is attached. Current public officers may seek advice from their designated ethics supervisors concerning the scope and application of the Ethics Act. Former public officers may, in writing, request advice from the Office of the Attorney General, Ethics Attorney concerning the application of the Ethics Act to their participation in this project. It is the responsibility of the individual and the proposer to seek resolution in a timely manner of any question concerning the individual's eligibility.

Former Employee's Certification of Eligibility
Under the Alaska Executive Branch Ethics Act
(AS 39.52.140, AS 39.52.180)

I am a former employee of the State of Alaska and left state service within the last two years. My last position with the state was [*job title*] with the [*name of state agency and administrative unit*]. I propose to work on [*describe state contract or other matter*] on behalf of [*name of current employer*]. This work will not involve any matter (a) that was under consideration by the state administrative unit that I served, and (b) in which I participated personally and substantially during my state service through the exercise of official action ("official action" means a recommendation, decision, approval, disapproval, vote, or other similar action or inaction). I am therefore eligible to participate in this [*contract or matter*] under the Alaska Executive Branch Ethics Act. I also understand that as a former public officer I may not disclose or use information acquired in the course of my official duties that could in any way result in a benefit to me or my family, if the information has not been disseminated to the public, or that is confidential by law, without appropriate authorization.

I certify under penalty of perjury that the foregoing is true.

Dated: _____, 20__, at _____, Alaska.

_____
[*name of former state employee*]

STATE OF ALASKA)
) ss.
_____ JUDICIAL DISTRICT)

On this _____ day of _____, 20__, [*name of former state employee*], whom I know to be the individual described in and who executed this certification, personally appeared before me and acknowledged that [s]he signed the certification as [her or his] free and voluntary act.

IN WITNESS WHEREOF, I have placed my signature and affixed my official seal.

_____
Notary Public in and for Alaska
My commission expires: _____

If no notary or other official (judge, magistrate, U.S. postmaster or municipal clerk) is available, omit the notary certificate and include the following statement in the text: A notary or other official empowered to administer oaths is unavailable.

PRE-AUDIT STATEMENT

(Confidential when completed)

Submit this form, completed and with required attachments, ***only*** if specifically requested, and ***only*** to the following address: DOT&PF, Attn: Office of Internal Review, PO Box 196900, Anchorage, AK 99519-6900 OR to fax number: (907) 269-0733. Confidentiality may not be ensured if delivered otherwise.

Evaluation of this statement may preclude the necessity for a comprehensive on-site audit of Contractor's records. Entries may be handwritten, if legible.

1. Identify your financial year including beginning and ending dates.....:

2. List your actual costs, by the following categories, for your most recently ended fiscal year. Cost Terminology is defined on the reverse.

   2a. Direct Labor..... $

   2b. Attach a Trial Balance with grouping of accounts used to arrive at the following Indirect Cost amounts:
   Fringe Benefits.....$
   General & Administrative Expenses .....$

   Sum..... $

   2c. Indirect Cost Rate (Sum of 2b / 2a) ..... Percent (%):

3. If your records have been audited within the last two years by a government agency, attach a copy of the Audit Report.

4. Attach copies of your most recent Internal and Audited (if performed by other than the Contracting Agency) Financial Statements.

5. Are your accounting methods for recording contract costs based on a job or project identified cost system?
   [ ] Yes [ ] No If your response is "No", attach an explanation of your project cost accounting system.

6. If you charge projects based on unit rates (e.g.: for computer time, laboratory tests, copies or equipment use, etc.) attach a list of such items and unit rates.

7. Do you offset revenue received from unit rate payments against the applicable Indirect Cost Accounts?
   [ ] Yes [ ] No

If you have questions concerning this document, please telephone our Auditors at (907) 269-0715.

CERTIFICATION

I certify that I am a duly authorized representative of the Contractor and that information and materials enclosed within this statement accurately represent financial records of the office listed below.

Signature: _____ Date: _____
Name: Telephone:
Title: Fax:
Contractor: Email:

Office Address for which this Submittal is made:

Street:
P.O. Box:
City, State, Zip:

Address where Accounting Records are maintained, if not at Office Address:
:
:
:

COST TERMINOLOGY

DIRECT LABOR - Base salary or wages paid to employees charged directly to contracts or projects.

OTHER DIRECT COSTS - Actual costs of other than Direct Labor. Some examples of Other Direct Costs are subcontracts, equipment (company owned or rented), unit rate items and reimbursable expenses (travel, computer charges, reproduction, etc.).

INDIRECT COST RATE – A computed rate developed by adding all of a firm's general and administrative costs, and all other indirect costs, then dividing by a base value, usually direct labor dollars to get a percentage. This rate is normally compiled based on the consultant's applicable fiscal year.

INDIRECT COSTS - Indirect costs consist of allowable expenses which, because of their incurrence for common or joint cost objectives, must be prorated (allocated) to jobs or contracts using a specified Indirect Cost Rate. A cost objective is a function, organizational subdivision, contract, project or work unit for which cost data is accumulated under the Contractor's accounting system. Generally, Indirect Costs are segregated into the following categories: Fringe Benefits and General & Administrative Expenses .

Fringe Benefits - Costs for items such as:

Workers' Compensation Insurance
Deferred Compensation/Retirement Plans
Vacation Time and Authorized Leave
Social Security and Unemployment Taxes
Group Medical Plan and Life Insurance Premiums

Overhead costs for items such as the following, if they are not included in Direct Costs:

Indirect Labor (Supervisory, Administrative, etc.)
Travel, Food and Lodging
Maintenance and Depreciation of Equipment/Computers
Business Insurance Premiums Not Billed to Clients
Rent, Heat, Power, Light and Janitorial Services
Office Supplies
Communications
Reproduction Costs
Recruiting Expense
Rentals of Equipment/Computers

UN-ALLOWABLE COSTS - Costs for the following items and certain other costs defined in 48 CFR Part 31 and related regulations are not allowable. Such costs shall not be included as Indirect Costs or in the calculation of the Indirect Cost Rate.

Alcoholic Beverages
Advertising
Interest and Other Financial Costs
Contributions and Donations
Federal Income Taxes
Goodwill
Organization Costs
Lobbying Costs
Bad Debts
Fines and Penalties
Entertainment
Keyman Insurance

NOTE: IF YOUR ACCOUNTING SYSTEM WHOLLY OR PARTIALLY ALLOCATES INDIRECT COSTS ON OTHER THAN A DIRECT LABOR BASIS, ATTACH A DESCRIPTION OF THE COST POOLS OR SERVICE CENTERS YOU USE AND IDENTIFY THE INDIRECT COSTS RATE(S) AND BASE(S).

INDEMNIFICATION AND INSURANCE
Appendix D in Professional Services Agreements

PSA No: 25172001

Date Prepared:

CONTRACTOR shall include the provisions of this form in all subcontracts which exceed $25,000 and shall ensure Subcontractor's compliance with such provisions.

ARTICLE D1
INDEMNIFICATION

D1.1 The CONTRACTOR shall indemnify, hold harmless, and defend the CONTRACTING AGENCY from and against any claim of, or liability for negligent acts, errors or omissions of the CONTRACTOR under this Agreement. The CONTRACTOR shall not be required to indemnify the CONTRACTING AGENCY for a claim of, or liability for, the independent negligence of the CONTRACTING AGENCY. If there is a claim of, or liability for, the joint negligent error or omission of the CONTRACTOR and the independent negligence of the CONTRACTING AGENCY, the indemnification and hold harmless obligation shall be apportioned on a comparative fault basis. "CONTRACTOR" and "CONTRACTING AGENCY", as used within this article, include the employees, agents and other contractors who are directly responsible, respectively, to each. The term "Independent Negligence" is negligence other than in the CONTRACTING AGENCY's selection, administration, monitoring, or controlling of the CONTRACTOR and in approving or accepting the CONTRACTOR's Work.

D1.2 The CONTRACTOR shall exercise that degree of skill, care and judgment commensurate with the professional standards for the services of a similar nature. When such standards are in dispute, they shall be established by a panel of three qualified, impartial professionals objectively selected and appointed by the Appeals Officer.

D1.3 The CONTRACTOR shall correct, through re-performance at its expense, any services which are deficient or defective because of the CONTRACTOR's failure to perform said services in accordance with professional standards, provided the CONTRACTING AGENCY has notified the CONTRACTOR in writing within a reasonable time, not to exceed 60 days, of the discovery of any such deficiency during the performance of the services and within 12 months of the date of final payment under this Agreement.

ARTICLE D2
INSURANCE

D2.1 Without limiting the CONTRACTOR's indemnification, it is agreed that CONTRACTOR shall purchase at its own expense and maintain in force at all times for the duration of this Agreement, plus one year following the date of final payment, the following policies of insurance. Where specific limits are shown, it is understood that they shall be the minimum acceptable limits. If the CONTRACTOR's policy contains higher limits, the CONTRACTING AGENCY shall be entitled to coverage to the extent of such higher limits. Certificates of insurance must be furnished to the CONTRACTING AGENCY and incorporated into this Agreement with copies attached to this document. Certificates must provide for the CONTRACTING AGENCY to receive notice of any policy cancellation or reduction per AS 21.36 Sections 210-310. Failure to furnish certificates of insurance or lapse of the policy is a material breach and grounds for termination of the CONTRACTOR's services and may preclude other Agreements between the CONTRACTOR and the CONTRACTING AGENCY.

D2.1.1 Worker's Compensation Insurance: The CONTRACTOR shall provide and maintain, for all employees engaged in work under this Agreement, coverage as required by AS 23.30.045, and; where applicable, any other statutory obligations including but not limited to Federal USL&H and Jones Act requirements. The policy(s) must waive subrogation against the State of Alaska.

D2.1.2 Commercial General Liability Insurance: Such policy shall have ***minimum*** coverage limits of $2,000,000 combined single limit per occurrence, covering all business premises and operations used by the Contractor in the performance of services under this agreement. The policy shall be written on an "occurrence" form and shall not be written as a "claims-made" form unless specifically reviewed and agreed to by the CONTRACTING AGENCY.

D2.1.3 Comprehensive Automobile Liability Insurance: Such policy shall have ***minimum*** coverage of $1,000,000 combined single limit per occurrence covering all vehicles used by the Contractor in the performance of services under this agreement.

D2.1.4 Professional Liability (E&O) Insurance: Covering all negligent errors or omissions, and negligent acts, which the CONTRACTOR, Subcontractor or anyone directly or indirectly employed by them, make in the performance of this Agreement which result in financial loss to the State of Alaska. Limits required are per the following schedule:

MINIMUM LIMITS OF E&O INSURANCE

Contract Amount	Combined Single Limit, Per Occurrence & Annual Aggregate
Under $25,000	As Available
$25,000 to $100,000	$300,000
$100,000 to $499,999	$500,000
$500,000 to $999,000	$1,000,000
$1,000,000 and over	Negotiable

D2.1.5 Professional Liability Insurance required for this Agreement is $ 2,000,000

D2.1.6 Pollution Liability Insurance: Provide Pollution Coverage for the Hazardous Materials removed as part of the Work. Limits: $2,000,000 per incident.

ARTICLE D3
MODIFICATION OF INSURANCE REQUIREMENTS

(Article D3 is completed only when some of the standard insurance coverages are not applicable.)

CONTRACTOR RELATED MODIFICATIONS

D3.1 ☐ **Workers Compensation Insurance** is not required because the CONTRACTOR is an Independent Contractor, Sole Proprietor or Self-Employed Person having no employees in any sense of AS 23.30.045.

D3.2 ☐ **Comprehensive or Commercial General Liability Insurance** is not required because the general public and clients do not have any business access to a place of business or home office maintained by the CONTRACTOR.

D3.3 ☐ **Comprehensive Automobile Liability Insurance** is not required because only public transportation, or a rented passenger vehicle with business use insurance, will be used to accomplish requirements of this Agreement.

PROJECT RELATED MODIFICATIONS FOR E&O COVERAGE

When services may apply to fire, life safety or structural aspects and/or wherever the services should safeguard life, limb, health or property, Professional Liability Insurance shall be required.

(E&O Coverage may be waived only if it was specifically not required within the solicitation for proposals.)

D3.4 ☐ **Professional Liability (E&O) Insurance** is not required because: 1) the CONTRACTING AGENCY's use of the services or Work products obtained from the CONTRACTOR will not result in significant exposure to any third party claims for loss or damage; and 2), the CONTRACTOR services will not apply to any construction, alteration, demolition, repair or direct use of any highway, airport, harbor, building or other structure.

D3.5 ☐ **Professional Liability (E&O) Insurance** is not required because this Agreement is for one of the following applicable (*checked*) services for which E&O coverage is not needed:

- ☐ Right-of-Way Fee Appraisals
- ☐ Photogrammetric Mapping Services
- ☐ Architectural/Engineering review of Construction Bid Documents wherein design responsibility clearly remains with the designer of record.

OTHER BASIS FOR MODIFICATIONS

(Requires written concurrence from Division of Risk Management)

D3.6 ☐ Attached Exhibit D-1 identifies and provides justification for insurance modifications.

Above *checked* modifications of the insurance requirements specified in Article D2 are hereby approved:

CONTRACTING OFFICER Signature: _____ Date: _____

Name:

Title:

STATEMENT OF SERVICES
APPENDIX B

AKSAS Project No:
Federal Project No:
Date Prepared:

Aniak PCB-Contaminated Soil Removal

ARTICLE B1
ADMINISTRATIVE REQUIREMENTS

B1.1 General. The CONTRACTOR shall provide services as identified and authorized by sequentially numbered Notices-to-Proceed. The CONTRACTOR shall not perform services or incur billable expense except as authorized by a NTP.

B1.2 Project Staff. All services must be performed by or under the direct supervision of the following individuals (replacement of, or addition to, the Project Staff named below shall be accomplished only by prior written approval from the Contracting Agency:

Name	Project Responsibilities
ENTER NAMES OF CONTRACTOR'S & SUBCONTRACTOR'S KEY STAFF	

B1.3 Qualified Environmental Professional. Site cleanup shall be conducted or supervised by a qualified environmental professional as set forth in the Alaska site Cleanup Rules (18 AAC 75.325-.390)

B1.4 Billing Reports. The CONTRACTOR shall provide a two-page (typical) report with each monthly billing for months in which services are performed. The report shall specifically describe the services and other items ***for which the billing is submitted***, and shall estimate the percent the services are complete. Any delayed costs from previous billing periods that are included in the current billing must be clearly explained in the report.

B1.5 Correspondence. All correspondence prepared by the CONTRACTOR shall bear the Contracting Agency's assigned Project name and numbers (State & Federal).

B1.6 Documents and Reports shall be printed with solid black letters that are double spaced on white, 8.5 inch x 11 inch bond or "Xerox Copy" paper. Other size paper may be used for illustrations if they are folded to 8.5 inch x 11-inch size. Original documents and reports shall be printed on one side of the paper only and shall be ready for copying. Documents and reports shall have no black and white photographs, color photographs, or multicolored graphics except as specifically approved by the Contracting Agency. Original, camera ready, copies of final documents and reports shall be submitted to the Contracting Agency for a check before printing.

B.1.6.1 Copies. When the Contract calls for multiple copies of documents or reports, the copies shall be printed on both sides of the paper. However, the cover and pages with approved illustrations, multicolored graphics, or photographs shall be printed on one side of the page only. All copies - except for originals - shall be bound.

B1.6.2 Page Numbers. All documents shall be page numbered to allow every major Section, Chapter, Appendix, etc., to begin on a "right hand," odd numbered page.

B1.6.3 Covers. The cover of all documents and reports shall include the following information:

a. Name of document or report.
b. Date.
c. Indicate whether draft or final.
d. Project Name.
e. State and Federal Project Number(s).
f. Prepared for: Alaska Department of Transportation and Public Facilities.
g. Prepared by:
h Map and/or picture of project area.

B1.7 CONTRACTOR Name on Plan Sheets and Documents. No CONTRACTOR logos shall be allowed on any electronic or hard copy document produced for the Contracting Agency. The CONTRACTOR company name shall be included in the box above or below the engineer's seal on each plan sheet. Documents produced for the Contracting Agency shall include the CONTRACTOR's company name at the bottom right of the first page, cover sheet or title sheet only. CONTRACTOR letterhead shall be allowed only as exhibits in document appendices. The CONTRACTOR name shall be in the same font as other lettering on the plan sheet or document, shall be 1/16" or less in height on 11"X17" plan sheets, and shall be in the following format:

PLANS DEVELOPED BY:
COMPANY NAME

B1.8 Errors and Omissions. Except as described in this Statement of Services, work products shall be essentially complete when submitted to the Contracting Agency. Work products having significant errors or omissions will not be accepted until such problems are corrected.

B1.9 Review Meetings. Following each review the Contracting Agency will provide written comments and may hold a meeting to discuss the issues. The CONTRACTOR's personnel who are in-responsible-charge for the work products under review shall attend the meeting and they may be asked to interpret and provide explanations of the content.

B1.10 Comment Resolution. The CONTRACTOR shall provide a written response with subsequent submittals that address all written and oral comments from the Contracting Agency. All changes from previous submittals shall be clearly explained.

B1.11 Reproduction and Distribution. When the contract requires only the original or only one copy of a work product to be delivered, the Contracting Agency will reproduce and distribute any other copies required. Items delivered for reproduction shall be organized and camera ready for copying and not stapled or otherwise bound.

B1.12 Progress Reports. The CONTRACTOR shall prepare and submit to the ADEC and to the Contracting Agency monthly written progress reports, except that while field activities are underway, the reporting frequency shall be weekly. Coordinate with the ADEC and the Contracting Agency to develop a report format that meets their needs.

B1.13 Maintenance of Project Records. The CONTRACTOR shall make available for inspection and copying by the Contracting Agency all documents, records, photographs, data and other writings in its possession that are reasonably related to the PCB cleanup performed under this contract. Copying costs shall be reimbursed by the Contracting Agency.

B1.14 Coordination with Others. The CONTRACTOR shall coordinate its schedules and activities with others that may be seek to gain access to, or be in the vicinity of the Project Site.

ARTICLE B2
BASIC SERVICES

B2.1 Introduction. Polychlorinated biphenyl (PCB) and in some areas co-located tetrachloroethylene (TCE) contamination has been documented in soil at the former White Alice Communication Site (WACS) in Aniak, Alaska, which was converted to the Aniak Middle School. The former WACS Aniak Middle School (Project Site) is a Potentially Responsible Party (PRP) site involving the United States, the State of Alaska, and several private entities that are either successors to, were former contractors/operators of, or were owners of the former WACS facilities. The United States, the State of Alaska Department of Transportation and Public Facilities (ADOT&PF), Alaska Department of Education and Early Development (ADEED), Kuspuk School District (KSD), Alascom, Inc., Exelis Inc., and Lockheed Martin Corporation collectively represent the PRP (hereinafter "the PRP Group"). Jacobs Engineering Group, Inc. prepared a PCB removal work plan for the PRP Group under U.S. Army Corps of Engineers (USACE), Alaska District Hazardous, Toxic, and Radioactive Waste Contract No. W911KB-11-D-0006, Task Order No. 0018. This work plan titled, "PCB-Contaminated Soil Removal Work Plan, Former WACS Aniak Middle School, Aniak, Alaska", prepared for PRP Group, January 2015, is hereafter referred to as the Removal Work Plan. The Removal Work Plan presents more information regarding the site, its history, previous investigations and cleanup activities.

B2.2 Project Scope. The CONTRACTOR shall remove and dispose of polychlorinated biphenyl (PCB)-contaminated soil in accordance with the Removal Work Plan, which shall be incorporated by reference as the Basic Services of this contract.

B2.3 Project Goal. The overall goal of this project is to complete PCB removal work to reduce potential human health exposure risk to PCB-contaminated soil at the Project Site. The PCB removal action shall include excavation, containerization, transportation and disposal of PCB and any co-located TCE contaminated soil. The Removal Work Plan defines specific project objectives.

B2.4 Remediation Tasks. Major remediation tasks, defined more explicitly in the Remediation Work Plan, include:

B2.4.1 Planning Document Updating. The CONTRACTOR shall update and finalize planning document supplements to the Remediation Work Plan for review and acceptance by the Contracting Agency. The documents include: Project Schedule, SAP, Contractor Quality Control Plan, Site Layout Plan, Site Safety and Health Plan, and Waste Management Plan. The CONTRACTOR shall also develop and prepare any other plan or document it deems necessary to perform its work.

B2.4.2 Permitting and Coordination. Obtain permits as may be necessary to conduct the cleanup operation. Minimum permit requirements are defined in the Removal Work Plan.

B2.4.3 Mobilization. As set forth in more detail in the Removal Work Plan, mobilize to the Project Site all equipment, supplies, materials, temporary facilities, and personnel to perform the PCB removal action. Provide for accommodations and travel, site security and controls, and community relations program implementation.

B2.4.4 Site Preparation. Prepare the site for removal operations in accordance with the Removal Work Plan. At minimum, establish a truck route, decommission or protect environmental monitoring system components, construct temporary storage areas, temporarily remove fuel lines, utilities and structures, install runoff and erosion controls, clear interfering vegetation, and establish a mobile field laboratory.

B2.4.5 Excavation. Excavate PCB-contaminated soil in accordance with the Removal Work Plan. Conduct pre-excavation sampling, excavate and sample, manage excavated materials, perform wastewater management.

B2.4.6 Waste Material Containment, Transport and Disposal. Characterize, contain, transport and dispose of all generated waste materials in accordance with the

Removal Work Plan, State of Alaska, local, and federal requirements.

B2.4.7 Site Restoration and Demobilization. In accordance with the Removal Work Plan, backfill excavations, grade to match pre-existing conditions, conduct backfill material source confirmation sampling, remove all erosion controls and materials and equipment, restore temporary storage and construction support areas. Demobilize from the project site following the completion of all field activities. Perform surveying as specified.

B2.4.8 Remedial Action Report. Prepare and submit pre-draft, draft and final PRP/Hazardous, Toxic, and Radioactive Waste (HTRW) Remedial Action Reports in accordance with the Removal Work Plan. Submit the pre-draft report to the Contracting Agency for review and comment within 90 calendar days following receipt of all analytical sample results. Address comments and submit a draft report for review, followed by a final report after the disposal verification is received.

B2.5 Project Schedule. The CONTRACTOR shall conduct all field activities during the spring, summer and fall of 2017. Submit the final remedial action report by September 1, 2018. The CONTRACTOR shall prepare detailed project schedules as part of its planning document updating task. The CONTRACTOR shall develop and submit to the Contracting Agency monthly schedule updates.

GENERAL CONDITIONS
APPENDIX A

PSA No:	**25172001**
AKSAS Project No:	**N/A**
Federal Project No:	**N/A**
Date Prepared:	

INDEX

Article Number and Title

A1 Definitions
A2 Information and Services from Others
A3 Hold Harmless
A4 Insurance
A5 Occupational Safety and Health
A6 Equal Employment Opportunity
A7 Payments to the CONTRACTOR
A8 Changes
A9 Audits and Records
A10 CONTRACTING AGENCY Inspections
A11 Termination or Suspension
A12 Officials Not to Benefit
A13 Independent CONTRACTOR
A14 Proselytizing
A15 Covenant against Contingent Fees
A16 Precedence of Documents
A17 Endorsement on Documents
A18 Ownership of Work Products
A19 Subcontractors Successors and Assigns
A20 Claims and Disputes
A21 Extent of Agreement
A22 Taxes
A23 Governing Law
A24 Federal Aid Certification (Highways)
A25 Trade Restrictions
A26 Suspension and Debarment
A27 Additional Provisions

ARTICLE A1
DEFINITIONS

A1.1 Additional or Extra Services - Services, work products or actions required of the CONTRACTOR above and beyond provisions of the Agreement.

A1.2 Agreement – This Professional Services Agreement and its appendices that outline the terms and conditions regarding Contractor's services during the authorized period of performance.

A1.3 Amendment - A written change to this Agreement.

A1.4 Change - A revision in services, complexity, character, or duration of the services or provisions of this Agreement.

A1.5 Commissioner – Commissioner of DOT&PF.

A1.6 CONTRACTING AGENCY – The Department of Transportation & Public Facilities (DOT&PF).

A1.7 Contracting Officer - The individual or a duly appointed successor designated as the official representative to administer contracts for the CONTRACTING AGENCY.

A1.8 CONTRACTOR - The firm (person or any business combination) providing services.

A1.9 Contractor's Manager - The CONTRACTOR's representative in responsible charge of the project(s) and directly answerable for the required services.

A1.10 Contract Manager – CONTRACTING AGENCY's representative and the CONTRACTOR's primary point of contract with the CONTRACTING AGENCY.

A1.10 Contracts Officer - CONTRACTING AGENCY's representative and the CONTRACTOR's primary point of contact with the CONTRACTING AGENCY.

A1.11 Funding Agency - An agency of a Federal, State, Political subdivision, or Local Government which furnishes funds for the CONTRACTOR's compensation under this Agreement and which may have established regulations and requirements binding upon the CONTRACTING AGENCY and the CONTRACTOR.

A1.12 Notice to Proceed (NTP) - Written authorization from the CONTRACTING AGENCY to the CONTRACTOR to provide all or specified services in accordance with an existing Agreement.

A1.13 Statement of Services - Services and work products required of the CONTRACTOR by this Agreement.

A1.14 Subcontractor - CONTRACTOR engaged to provide a portion of the services by subcontract with the firm which is a party to this Agreement.

ARTICLE A2
INFORMATION AND SERVICES FROM OTHERS

A2.1 The CONTRACTING AGENCY may, at its election or in response to a request from the CONTRACTOR, furnish information or services from other contractors. If, in the CONTRACTOR's opinion, such information or services is inadequate, the CONTRACTOR must notify the CONTRACTING AGENCY of the specific service or material deemed inadequate and the extent of the inadequacy prior to use in the performance of this Agreement. The

CONTRACTING AGENCY will then evaluate and resolve the matter in writing. Unless so notified by the CONTRACTOR, the CONTRACTING AGENCY may assume the information or services provided are adequate.

ARTICLE A3
HOLD HARMLESS

A3.1 See Appendix D, "Indemnification and Insurance".

ARTICLE A4
INSURANCE

A4.1 See Appendix D, "Indemnification and Insurance".

ARTICLE A5
OCCUPATIONAL SAFETY AND HEALTH

A5.1 The CONTRACTOR and its Subcontractors shall observe and comply with the Federal Occupational Safety and Health act of 1970 and with all safety and health standards promulgated by the Secretary of Labor under authority thereof and with all State of Alaska Occupational Safety and Health Laws and regulations.

ARTICLE A6
EQUAL EMPLOYMENT OPPORTUNITY

A6.1 The CONTRACTOR shall comply with the following applicable laws and directives and regulations of the CONTRACTING AGENCY which effectuate them; all of which are incorporated herein by reference:

Title VI of Federal Civil Rights Act of 1964;

Federal Executive Order 11625 (Equal Employment Opportunity);

Title 41, Code of Federal Regulations, Part 60 (Equal Employment Opportunity);

Title 49 Code of Federal Regulations, Part 21 (Discrimination);

Title 49, Code of Federal Regulations, Part 26 (Minority Business Enterprises);

Office of Management and Budget (OMB) circular 102, Attachment O (Procurement Standards);

Alaska Statute (AS) 18.80.200-300 (Discrimination).

A6.2 The CONTRACTOR may not discriminate against any employee or applicant for employment because of race, religion, color, national origin, age, physical disability, sex, or marital status, change in marital status, pregnancy or parenthood when the reasonable demands of the position do not require distinction on such basis. The CONTRACTOR shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, national origin, age, physical disability, sex, or marital status. This action must include, but need not be limited to, the following: employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The CONTRACTOR shall post in conspicuous places, available employees and applicants for employment, notices setting out the provisions of this paragraph.

A6.3 The CONTRACTOR shall state, in all solicitations or advertisements for employees to work in performance of this Agreement, that it is an equal opportunity employer and that all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, age, physical disability, sex, or marital status.

A6.4 The CONTRACTOR shall send to each labor union or representative or workers with which the CONTRACTOR has a collective bargaining Agreement or other contract or understanding a notice advising the labor union or workers' representative of the CONTRACTOR's commitments under this article and post copies of the notice in conspicuous places available to all employees and applicants for employment.

A6.5 In the event the CONTRACTOR subcontracts any part of the services to be performed under this Agreement, the CONTRACTOR agrees to make good faith efforts to utilize Disadvantaged Business Enterprises, to affirmatively solicit their interest, capability and prices and to furnish documentation of the results of all such direct contacts on forms provided by or acceptable to the CONTRACTING AGENCY.

A6.6 The CONTRACTOR shall make, keep and preserve such records necessary to determine compliance with equal employment opportunity obligations and shall furnish required information and reports. All records must be retained and made available in accordance with Article A9, Audits and Records.

A6.7 The CONTRACTOR shall include the provisions of this article in every contract, and shall require the inclusion of these provisions in every contract entered into by any of its Subcontractors, so that these provisions will be binding upon each Subcontractor.

ARTICLE A7
PAYMENTS TO THE CONTRACTOR

A7.1 Payments shall be based on approved CONTRACTOR's invoices submitted in accordance with this article and the provisions of Appendix C. The sum of payments shall not exceed allowable compensation stated in Notice(s) to Proceed and no payments shall be made in excess of the maximum allowable total for this Agreement.

A7.2 The CONTRACTING AGENCY will exert every effort to obtain required Funding Agency approvals and

to issue authorizations in a timely manner. CONTRACTOR shall not perform any services without a Notice to Proceed therefore. Accordingly, the CONTRACTING AGENCY will not pay the CONTRACTOR for services or associated reimbursable costs performed outside those which are authorized by a Notice to Proceed.

A7.3 CONTRACTOR's invoices shall be submitted when services are completed or monthly, for months during which services are performed, as applicable, in a format provided by or acceptable to the CONTRACTING AGENCY.

A7.4 In the event items on an invoice are disputed, payment on those items will be held until the dispute is resolved. Undisputed items will not be held with the disputed items.

A7.5 The CONTRACTOR shall submit a final invoice and required documentation within 90 days after final acceptance of services by the CONTRACTING AGENCY. The CONTRACTING AGENCY will not be held liable for payment of invoices submitted after this time unless prior written approval has been given. Total payment of all Subcontractors and satisfactory compliance with Article A22, Taxes, are conditions precedent to final payment.

ARTICLE A8
CHANGES

A8.1 Changes (including "Supplemental Agreements") in the period of performance, general conditions, statement of services, or other provisions established by this Agreement may be made by written Amendment only. If such changes cause an increase or a decrease in the CONTRACTOR's cost, an equitable adjustment shall be made and specified in the Amendment. The CONTRACTOR shall not perform any additional or extra services prior to receiving a fully executed copy of an Amendment and a Notice to Proceed, except as the CONTRACTOR may be directed under the provisions of Article A20, Claims and Disputes.

A8.2 If at any time the CONTRACTING AGENCY through its authorized representatives, either verbally or in writing, requests or issues instructions for Additional or Extra Services or otherwise directs actions which conflict with any provision of this Agreement, the CONTRACTOR shall, within 30 days of receipt and prior to pursuing such instructions, so notify the CONTRACTING AGENCY in writing, and to the extent possible, describe the services and estimated cost of any Additional or Extra Services. The CONTRACTING AGENCY will then evaluate and, if appropriate, negotiate an Amendment. Unless so notified by the CONTRACTOR, the CONTRACTING AGENCY will conclude such instructions have not changed any provisions of this Agreement nor require additional compensation. No additional payments shall be made to the CONTRACTOR without such notice.

ARTICLE A9
AUDITS AND RECORDS

A9.1 The CONTRACTOR shall maintain records of performances, communications, documents, correspondence and costs pertinent to this Agreement and the Funding or CONTRACTING AGENCY's authorized representatives shall have the right to examine such records and accounting procedures and practices.

A9.2 The Funding or CONTRACTING AGENCY's authorized representatives shall have the right to examine all books, records, documents and other data of the CONTRACTOR related to the negotiation, pricing and performance of this Agreement and any modification or change for the purpose of evaluating the accuracy, completeness and currency of the data submitted. The right of examination shall extend to all documents necessary to permit adequate evaluation of the data, computations and projections used.

A9.3 The materials described in this article shall be made available at a business office of the CONTRACTOR at all reasonable times for inspection, audit or reproduction, for a minimum of 3 years from the date of any resulting final settlement.

A9.3.1 If this Agreement is completely or partially terminated, records relating to the services terminated shall be made available for a minimum of 3 years from the date of any termination or resulting final settlement, whichever is later.

A9.3.2 Records which relate to appeals under Article A20, Claims and Disputes, or litigation or the settlement of Claims arising out of the performance of this Agreement shall be made available until such appeals, litigation or Claims have been concluded.*

ARTICLE A10
CONTRACTING AGENCY INSPECTIONS

A10.1 The CONTRACTING AGENCY has the right to inspect, in the manner and at reasonable times it considers appropriate during the period of this Agreement, all facilities and activities of the CONTRACTOR as may be engaged in the performance of this Agreement.

ARTICLE A11
TERMINATION OR SUSPENSION

A11.1 This Agreement may be terminated by either party upon 10 days written notice if the other party fails substantially to perform in accordance with its terms through no fault of the party initiating the termination (default termination). If the CONTRACTING AGENCY terminates this Agreement, the CONTRACTING AGENCY will pay the CONTRACTOR a sum equal to the percentage of work completed that can be substantiated in whole or in part either by the CONTRACTOR to the satisfaction of the

CONTRACTING AGENCY or by the CONTRACTING AGENCY. If the CONTRACTING AGENCY becomes aware of any non-conformance with this Agreement by the CONTRACTOR, the CONTRACTING AGENCY will give prompt written notice thereof to the CONTRACTOR. Should the CONTRACTOR's services remain in non-conformance, the percentage of total compensation attributable to the nonconforming work may be withheld.

A11.2 The CONTRACTING AGENCY may at any time terminate (convenience termination) or suspend this Agreement for its needs or convenience. In the event of a convenience termination, or suspension for more than 3 months, the CONTRACTOR will be compensated for authorized services and authorized expenditures performed to the date of receipt of written notice of termination or suspension plus reasonable expenses. No fee or other compensation for the uncompleted portion of the services will be paid except for already incurred indirect costs which the CONTRACTOR can establish and which would have been compensated for over the life of this Agreement, but because of the termination or suspension would have to be absorbed by the CONTRACTOR without further compensation.

A11.3 If federal funds support this Agreement, settlement for default or convenience termination must be approved by the Funding Agency.

A11.4 In the event of termination or suspension, the CONTRACTOR shall deliver all work products, reports, estimates, schedules and other documents and data prepared pursuant to this Agreement to the CONTRACTING AGENCY.

ARTICLE A12
OFFICIALS NOT TO BENEFIT

A12.1 No member of or delegate to Congress, United States Commissioner or other officials of the Federal, State, Political subdivision or Local Government shall be admitted to any share or part of this Agreement or any benefit to arise therefrom.

ARTICLE A13
INDEPENDENT CONTRACTOR

A13.1 The CONTRACTOR and its agents and employees shall act in an independent capacity and not as officers or agents of the CONTRACTING AGENCY in the performance of this Agreement except that the CONTRACTOR may function as the CONTRACTING AGENCY's agent as may be specifically set forth in this Agreement.

A13.2 Any and all employees of the CONTRACTOR, while engaged in the performance of any work or services required by the CONTRACTOR under this Agreement, shall be considered employees of the CONTRACTOR only and not of the CONTRACTING AGENCY and any and all Claims that may or might arise under the Worker's Compensation Act on behalf of said employees, while so engaged and any and all Claims made by a third party as a consequence of any negligent act or omission on the part of the CONTRACTOR's employees, while so engaged on any of the services to be rendered herein, shall be the sole obligation and responsibility of the CONTRACTOR.

A13.3 This Agreement will be declared null and void should the CONTRACTING AGENCY determine that by Internal Revenue Service definitions the CONTRACTOR is an employee of the CONTRACTING AGENCY.

ARTICLE A14
PROSELYTIZING

A14.1 The CONTRACTOR agrees that it will not engage on a full or part time basis, during the period of this Agreement, any person or persons who are or have been employed by the CONTRACTING AGENCY during the period of this Agreement or during the 90 days immediately preceding the date of this Agreement except those who have been regularly retired or approved in writing by the CONTRACTING AGENCY.

ARTICLE A15
COVENANT AGAINST CONTINGENT FEES

A15.1 The CONTRACTOR shall comply with the Copeland "Anti-Kickback" Act (18 USC 874) as supplemented in Federal Department of Labor regulations (29 CFR, part 3), which are incorporated by reference and made a part of this Agreement.

A15.2 The CONTRACTOR warrants that it has not employed or retained any organization or person, other than a bona fide employee, to solicit or secure this Agreement and that it has not paid or agreed to pay any organization or person, other than a bona fide employee, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, the CONTRACTING AGENCY has the right to annul this Agreement without liability or, in its discretion, to deduct from the allowable compensation the full amount of such commission, percentage, brokerage or contingent fee.

A15.3 The CONTRACTING AGENCY warrants that the CONTRACTOR or the CONTRACTOR's representative has not been required, directly or indirectly as an express or implied condition in obtaining or carrying out this Agreement, to employ or retain, or agree to employ or retain, any organization or person or to make a contribution, donation or consideration of any kind.

ARTICLE A16
PRECEDENCE OF DOCUMENTS

A16.1 Components of this Agreement shall stand and prevail in the following order: Agreement over General Conditions; General Conditions over Statement of Services: Statement of Services over Basis of

Compensation; Basis of Compensation over any appendices beyond Appendix C.

A16.2 If a "Request for Proposal" (RFP) and/or a proposal are appended to this Agreement, the components described in paragraph A16.1 shall stand and prevail over the proposal and the proposal over the RFP.

ARTICLE A17
ENDORSEMENT ON DOCUMENTS

A17.1 Endorsements and professional seals, if applicable, must be included on all final drawings, specifications, cost estimates and reports prepared by the CONTRACTOR. Preliminary copies of such documents submitted for review must have seals affixed without endorsement (signature).

ARTICLE A18
OWNERSHIP OF WORK PRODUCTS

A18.1 Work products produced under this Agreement, except items which have pre-existing copyrights, are the property of the CONTRACTING AGENCY. Payments to the CONTRACTOR for services hereunder include full compensation for all work products produced by the CONTRACTOR and its Subcontractors and the CONTRACTING AGENCY shall have royalty free non-exclusive and irrevocable right to reproduce, publish, or otherwise use, and to authorize others to use, such work products.

A18.2 Should the CONTRACTING AGENCY elect to reuse work products provided under this Agreement for other than the original project and/or purpose, the CONTRACTING AGENCY will indemnify the CONTRACTOR and its Subcontractors against any responsibilities or liabilities arising from such reuse. Additionally, any reuse of design drawings or specifications provided under this Agreement must be limited to conceptual or preliminary use for adaptation and the original CONTRACTOR's or Subcontractor's signature, professional seals and dates removed. Such reuse of drawings and specifications, which require professional seals and dates removed, will be signed, sealed and dated by the professional who is in direct supervisory control and responsible for all adaptation.

ARTICLE A19
SUBCONTRACTORS, SUCCESSORS AND ASSIGNS

A19.1 The CONTRACTING AGENCY must concur in the selection of any person or firm that may be engaged in performance of this Agreement to provide negotiable professional or technical services, products, etc., (vs. commodity items available to the general public in stores at market prices).

A19.2 If this Agreement includes named firms or individuals, then such firms or individuals shall be employed for the designated services, unless the Agreement is changed by Amendments.

A19.3 The CONTRACTOR shall not assign, sublet or transfer any interest in this Agreement without the prior written consent of the CONTRACTING AGENCY.

A19.4 The CONTRACTOR binds itself, its partners, its Subcontractors, assignees and legal representatives to this Agreement and to the successors, assignees and legal representatives of the CONTRACTING AGENCY with respect to all covenants of this Agreement.

A19.5 The CONTRACTOR shall include provisions appropriate to effectuate the purposes of this Appendix A in all subcontracts executed to perform services under this Agreement which may exceed a cost of $25,000.

ARTICLE A20
CLAIMS AND DISPUTES

A20.1 If the CONTRACTOR becomes aware of any act or occurrence which may form the basis of a Claim by the CONTRACTOR for additional compensation or an extension of time for performance, or if any dispute arises regarding a question of fact or interpretation of this Agreement, the CONTRACTOR shall immediately inform the Contracts Officer. If the matter cannot be resolved within 7 days, the CONTRACTOR shall, within the next 14 days, submit an "Intent to Claim" in writing to the Contracts Officer.

A20.1.1 If the CONTRACTOR believes additional compensation is warranted, the CONTRACTOR shall immediately begin to keep and maintain complete, accurate and specific daily records concerning every detail of the potential Claim including actual costs incurred. The CONTRACTOR shall give the CONTRACTING AGENCY access to any such record and, when so requested, shall forthwith furnish the CONTRACTING AGENCY copies thereof.

A20.1.2 The Claim, if not resolved, shall be presented to the Contracting Officer, in writing, within 60 days following receipt of the "Intent to Claim". Receipt of the Claim will be acknowledged in writing by the Contracting Officer.

A20.1.3 The CONTRACTOR agrees that unless these written notices are provided, the CONTRACTOR will have no entitlement to additional time or compensation for such act, event or condition. The CONTRACTOR shall in any case continue diligent performance under this Agreement.

A20.2 The Claim shall specifically include the following:

A20.2.1 The act, event or condition giving rise to the Claim.

A20.2.2 The provisions of the Agreement which apply to the Claim and under which relief is provided.

A20.2.3 The item or items of project work affected and how they are affected.

A20.2.4 The specific relief requested, including Contract Time if applicable, and the basis upon which it was calculated.

A20.3 The Claim, in order to be valid, must not only show that the CONTRACTOR suffered damages or delay but that those conditions were actually a result of the act, event or condition complained of and that the Agreement provides entitlement to relief to the CONTRACTOR for such act, event, or condition.

A20.3.1 The Contracting Officer reserves the right to make written requests to the CONTRACTOR at any time for additional information which the CONTRACTOR may possess relative to the Claim. The CONTRACTOR agrees to provide the Contracting Officer such additional information within 30 days of receipt of such a request. Failure to furnish such additional information may be regarded as a waiver of the Claim.

A20.3.2 If the Claim is not resolved by Agreement within 90 days of its receipt, the Contracting Officer will issue a written decision to the CONTRACTOR.

A20.3.3 The CONTRACTOR shall certify that the Claim is made in good faith, that the supporting cost and pricing data are accurate and complete to the best of the CONTRACTOR's knowledge and belief, and that the amount requested accurately reflects the adjustment to the Agreement for which the CONTRACTOR believes the CONTRACTING AGENCY is liable.

A20.4 The CONTRACTOR will be furnished a written signed copy of the Contracting Officer's decision within 90 days, unless additional information is requested by the Contracting Officer. The Contracting Officer's decision is final unless, within 14 days of receipt of the decision, the CONTRACTOR delivers a written Notice of Appeal to the Commissioner designated on Page 2 of this Agreement.

A20.5 Procedures for appeals and hearings are covered under AS 36.30.625 and AS 36.30.630.

ARTICLE A21
EXTENT OF AGREEMENT

A21.1 This Agreement including appendices represents the entire and integrated Agreement between the CONTRACTING AGENCY and the CONTRACTOR and supersedes all prior negotiations, representations or Agreements, written or oral.

A21.2 Nothing contained herein may be deemed to create any contractual relationship between the CONTRACTING AGENCY and any Subcontractors or material suppliers; nor may anything contained herein be deemed to give any third party Claim or right of action against the CONTRACTING AGENCY or the CONTRACTOR which does not otherwise exist without this Agreement.

A21.3 This Agreement may be changed only by written Amendment executed by both the CONTRACTING AGENCY and the CONTRACTOR.

A21.4 All communications that affect this Agreement must be made or confirmed in writing and must be sent to the addresses designated in this Agreement.

A21.5 The CONTRACTOR on receiving final payment will execute a release, if required, in full of all Claims against the CONTRACTING AGENCY arising out of or by reason of the services and work products furnished and under this Agreement.

ARTICLE A22
TAXES

A22.1 As a condition of performance of this Agreement, the CONTRACTOR shall pay all Federal, State and Local taxes incurred by the CONTRACTOR and shall require their payment by any Subcontractor or any other persons in the performance of this Agreement.

ARTICLE A23
GOVERNING LAW

A23.1 This Agreement is governed by the laws of the State of Alaska and Federal and Local Laws and Ordinances applicable to the work performed. The CONTRACTOR shall be cognizant and shall at all times observe and comply with such laws which in any manner affect those engaged or employed in the performance, or which in any way affects the manner of performance, of this Agreement.

ARTICLE A24
FEDERAL AID CERTIFICATION (HIGHWAYS)
(For Agreements exceeding $100,000)

A24.1 The CONTRACTOR certifies, by executing this Agreement, to the best of his or her knowledge and belief, that:

A24.1.1 No federal appropriated funds have been paid or will be paid, by or on behalf of the CONTRACTOR, to any person for influencing or attempting to influence an officer or employees of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative Agreement, and at the extension, continuation, renewal, Amendment, or modification of any Federal contract, grant, loan, or cooperative Agreement.

A24.1.2 If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress in connection with this Federal contract, grant, loan, or cooperative Agreement, the undersigned shall complete and submit Standard Form LLL, Disclosure of

Lobbying Activities, in accordance with its instructions. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

A24.2 This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code.

A24.3 The CONTRACTOR also agrees by executing this Agreement that the CONTRACTOR shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

ARTICLE A25
TRADE RESTRICTIONS

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

a. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
b. Has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list;
c. Has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a contractor or subcontractor who is unable to certify to the above. If the contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on said list for use on the project, the Federal Aviation Administration may direct through the Sponsor cancellation of the contract at no cost to the Government.

Further, the contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The contractor may rely on the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The contractor shall provide immediate written notice to the sponsor if the contractor learns that its certification or that of a subcontractor was erroneous when submitted by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the Sponsor cancellation of the contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally posed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

ARTICLE A26
SUSPENSION AND DEBARMENT

The bidder/offeror certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offeror/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/ proposal.

ARTICLE A27
ADDITIONAL PROVISIONS

(Any deletion or modification of Articles A1 through A26 shall be approved "as to form" by the CONTRACTING AGENCY's legal section, acknowledged in writing, and attached as an Exhibit to this Appendix.)

A27.1

PCB-CONTAMINATED SOIL REMOVAL WORK PLAN

FORMER WACS ANIAK MIDDLE SCHOOL ANIAK, ALASKA

Prepared for:
PRP Group

DRAFT-FINAL
January 2015

PCB-CONTAMINATED SOIL REMOVAL WORK PLAN

FORMER WACS ANIAK MIDDLE SCHOOL ANIAK, ALASKA

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TABLE OF CONTENTS

SECTION **PAGE**

ACRONYMS AND ABBREVIATIONS iii

1.0 INTRODUCTION 1-1

1.1 PROJECT GOALS AND OBJECTIVES 1-1

1.2 PROJECT SITE DESCRIPTION 1-2

1.3 PREVIOUS INVESTIGATIONS AND CLEANUP 1-3

1.4 CLEANUP LEVELS 1-6

2.0 PROJECT SITE BACKGROUND 2-1

2.1 SITE HISTORY 2-1

2.2 ENVIRONMENTAL SETTING 2-1

2.3 CURRENT SITE CONDITIONS 2-3

3.0 WORK PLAN RATIONALE 3-1

3.1 DATA QUALITY OBJECTIVES 3-1

3.2 PROJECT EXECUTION APPROACH 3-2

3.2.1 Licensing and Certificates 3-3

4.0 REMEDIATION CONTRACTOR TASKS 4-1

4.1 PLANNING DOCUMENTS 4-1

4.2 PERMITTING AND COORDINATION 4-2

4.3 MOBILIZATION 4-3

4.3.1 Accommodations and Travel 4-3

4.3.2 Site Security and Controls 4-3

4.3.3 Community Relations 4-5

4.4 SITE PREPARATION 4-5

4.4.1 Route of Ingress and Egress for Construction 4-5

4.4.2 Decommission and Protection of Environmental Monitoring System Components 4-5

4.4.3 Temporary Storage Areas 4-6

4.4.4 Temporary Removal of Utilities and Structures 4-8

4.4.5 Runoff and Erosion Controls 4-9

4.4.6 Clearing 4-10

4.4.7 Mobile Field Laboratory 4-10

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

4.5 EXCAVATION 4-10
4.5.1 Pre-Excavation Sampling....4-12
4.5.2 Excavation and Sampling Procedures....4-14
4.5.3 Management of Excavated Materials....4-21
4.5.4 Wastewater Management....4-22
4.6 WASTE MATERIAL TRANSPORT AND DISPOSAL 4-23
4.7 SITE RESTORATION AND DEMOBILIZATION 4-23
4.7.1 Surveying 4-25
4.8 REMEDIAL ACTION REPORT....4-26
5.0 REFERENCES....5-1

TABLES

Table 4-1 Estimated Quantities 4-11
Table 4-2 List of Surveys 4-25

APPENDICES

Appendix A Figures
Appendix B Previous Site Investigation Information
Appendix C Project Schedule
Appendix D Sampling and Analysis Plan
Appendix E Contractor Quality Control Plan
Appendix F Site Safety and Health Plan
Appendix G Waste Management Plan
Appendix H Fuel System Plans
Appendix I National Geodetic Survey Data Sheets

ACRONYMS AND ABBREVIATIONS

µg	micrograms
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation and Public Facilities
AST	aboveground storage tank
bags	LiftPacs, Super Sacks®, or the equivalent
bgs	below ground surface
CFR	Code of Federal Regulations
COC	contaminant of concern
CQCP	Contractor Quality Control Plan
cm^2	square centimeters
cy	cubic yard
EPA	U.S. Environmental Protection Agency
GPS	global positioning system
gpm	gallons per minute
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous, Toxic, and Radioactive Waste
KSD	Kuspuk School District
mg/kg	milligram per kilogram
mg/L	milligrams per liter
MW	monitoring well
NAVD88	North American Vertical Datum of 1988
ELAP	Environmental Laboratory Accreditation Program
OASIS	OASIS Environmental, Inc.
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PPE	personal protective equipment
PRP	Potentially Responsible Party
Project Site	Former WACS Aniak Middle School
RCRA	Resource Conservation and Recovery Act
RTK	real-time kinetic
SAP	Sampling and Analysis Plan
SSHP	Site Safety and Health Plan
TCE	trichloroethene
TCLP	toxic characteristic leaching procedure

ACRONYMS AND ABBREVIATIONS (Continued)

TSCA	Toxic Substance Control Act of 1976
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WACS	White Alice Communication Site
WGS 1984	World Geodetic System 1984
WMP	Waste Management Plan

1.0 INTRODUCTION

This Removal Work Plan describes and defines the actions to perform polychlorinated biphenyl (PCB)-contaminated soil removal at the former White Alice Communication Site (WACS), which was converted to the Aniak Middle School in Aniak, Alaska. Figure A-1 in Appendix A presents the location and vicinity of Aniak. The former WACS Aniak Middle School (Project Site) is a Potentially Responsible Party (PRP) site involving the United States, the State of Alaska, and several private entities that are either successors to, were former contractors/operators of, or were owners of the former WACS facilities. The United States, Alaska Department of Transportation and Public Facilities (ADOT&PF), Alaska Department of Education and Early Development (ADEED), Kuspuk School District (KSD), Alascom, Inc., Exelis Inc., and Lockheed Martin Corporation collectively represent the PRP (hereinafter "the PRP Group"). Jacobs Engineering Group Inc. prepared this Work Plan for the PRP Group under U.S. Army Corps of Engineers (USACE), Alaska District Hazardous, Toxic, and Radioactive Waste Contract No. W911KB-11-D-0006, Task Order No. 0018.

The removal activities discussed in this Work Plan are focused on addressing PCB-contaminated soils that pose a potential exposure risk based on results from the *Final Site Characterization Report* (Shannon & Wilson 2010) and *PCB Cleanup* report (Shannon & Wilson 2009), as well as other previous characterizations performed at the Project Site. A third-party contractor (herein referred to as the Remediation Contractor) selected by the ADOT&PF, with input from other members of the PRP Group, will perform this PCB removal action pursuant to a contract with ADOT&PF.

1.1 PROJECT GOALS AND OBJECTIVES

The overall goal of this project is to complete PCB removal work to reduce current human health exposure risk to PCB-contaminated soil at the Project Site. The PCB removal action will include excavation, containerization, transportation and disposal. The project objectives for the PCB removal action include the following:

- In areas located beyond 10 feet from the perimeter of the school building, remove soil contaminated with PCBs at concentrations greater than 1 milligram per kilogram

(mg/kg) for unrestricted land use, as established in Code of Federal Regulations (CFR) Title 40, Part 761.61 and Alaska Administrative Code (AAC), Title 18, Section 75.341 (18 AAC 75.341), Table B1 (Alaska Department of Environmental Conservation [ADEC] 2014).

- Leave PCB-contaminated soil beneath the school building footprint in place to maintain the integrity of the structure.
- Remove only surface soil (top 2 feet) with PCBs at concentrations greater than 1 mg/kg within 10 feet of the perimeter of the school's foundation. PCB concentrations greater than 1 mg/kg may remain in place in subsurface soil within this 10-foot perimeter (greater than 2 feet below ground surface [bgs]) below a clean soil cap, as established in 18 AAC 75.341, Table B1, Note 9 (ADEC 2014) upon ADEC approval, to maintain the stability of the soils adjacent to the building and maintain the integrity of the structure.
- Remove and properly dispose of trichloroethene (TCE)-contaminated soils collocated with soil containing PCBs greater than 1 mg/kg in the Former Septic System Area.
- Limit excavation depth to a maximum of 15 feet bgs or 2 feet below the groundwater table, whichever occurs first, to protect potential future worker exposure to PCBs greater than 1 mg/kg.
- Utilize the onsite mobile laboratory for PCB analysis.
- Document the concentrations of contaminants of concern (COC) remaining and the excavation extent for both areas.
- Restore the Project Site by replacing removed material with clean fill to match the pre-existing grade.

1.2 PROJECT SITE DESCRIPTION

Aniak is located approximately 300 miles west of Anchorage within the Kuskokwim River floodplain. The city of Aniak, with a population of 501, according to a 2010 census, is bordered on the north by the Kuskokwim River and on the south by Aniak Slough (Appendix A, Figure A-2). The Aniak WACS originally covered approximately 180 acres, located along the northwest end of the Aniak airstrip, approximately 550 feet southwest of the airstrip centerline. The Project Site is located in Section 12, Township 17 North, Range 57 West, Seward Meridian. The removal action will be performed at the Aniak Middle School property. The local topography is generally flat, although the surrounding area slopes west toward Aniak Slough/Kuskokwim River. The Project Site is situated on a gravel pad overlaying the native alluvial deposits, such that the school is at an elevation approximately 10 feet higher

than the area directly to the west/northwest. Thick vegetation consisting of trees and shrubs borders the project area.

The Project Site is owned by the State of Alaska, under the jurisdiction of the ADOT&PF, the State leases the property to KSD and Alascom, Inc. Site features include three buildings; the school, a storage building, and a maintenance building; including an aboveground storage tank (AST) array, and aboveground fuel pipelines. Several former WACS structure foundations, including the former antenna foundations, remain onsite. Specific site features are shown on Figure A-3 in Appendix A.

1.3 PREVIOUS INVESTIGATIONS AND CLEANUP

Extensive site inspections, investigations, and cleanup efforts have been performed at the Project Site between 1997 and 2009. Previous investigations identified soil contaminated with PCBs, TCE, metals, and other volatile organic compounds (VOC) at the Project Site. A brief summary of the investigation and cleanup efforts performed at the Project Site is presented below and was obtained from the following sources:

- April 2009 "*PCB Cleanup, Former White Alice Communication System Aniak Middle School Site, Aniak*, Alaska" prepared by Shannon & Wilson, Inc.
- June 2010 "*Final Site Characterization Report, Former White Alice Communication System Anika Middle School Site, Aniak, Alaska*" prepared by Shannon & Wilson, Inc.

In 1997, during a site inspection, PCB-contaminated soil was identified outside the former generator room (Wood Shop Area) and in a drum storage/disposal area. Samples collected outside the school building contained PCB concentrations that exceed 50 mg/kg, the Toxic Substance Control Act (TSCA)-regulated waste level, in surface and subsurface soil to depths of up to 3 feet bgs. PCB contamination was also measured in sludge and sediment samples from the Former Septic System Area. Subsequent sampling also showed PCBs were present on the floors within the building. The USACE conducted a Time-Critical Removal Action in the winter of 1997-98, during which the interior of the school building was cleaned and a temporary cap was placed over PCB-contaminated soil outside, and adjacent to, the Wood

Shop Area. The cap reportedly consisted of a geotextile liner and approximately 6 inches of clean sand and gravel placed on top of the liner (Shannon & Wilson 2010).

In 1998, soil sampling and analysis was performed outside and around the school. Sixteen hand borings (B1 though B16) were advanced to depths between 2.5 and 8 feet bgs near the southeast corner of the Project Site to assess the extent of PCB-contaminated soil in this area. Twenty-five soil samples from these borings, and an additional 35 surface soil samples, were collected for PCB analysis. Based on the analytical results of this assessment, soil with PCB concentrations greater than 10 mg/kg appeared to be contained within the areas designated Areas F and G on Figure A-5 in Appendix A. Isolated locations that contained PCB concentrations between 1 and 46 mg/kg were also identified outside Areas F and G (Shannon & Wilson 2010).

Additional limited surface soil sampling was performed in 1999 along the northeastern portion of the school building, north of the Wood Shop Area. The surface sample locations were located based on areas of high foot traffic. Of the eight surface soil samples collected, two samples contained concentrations of PCBs exceeding the cleanup level of 1 mg/kg. A maximum of 1.69 mg/kg was reported in the surface soil samples. These samples were located east of the school and north of the Wood Shop Area (Shannon & Wilson 2010).

In 2001, approximately 872 tons of PCB-contaminated soil was removed from a portion of the 1997-98 capped area, six previously identified outlying areas, and the 2001 Staging Area. Soil remaining beneath the 2001 excavations contains less than 1 mg/kg PCBs, except at the 2001 Staging Area. The remaining PCB-contaminated soil at the 2001 Staging Area (Figure A-5, Appendix A) was covered with a temporary cap constructed of a 6-inch sand and gravel layer and geotextile liner.

In 2006, soil and groundwater sampling and analysis were performed in and around the WACS Former Septic System Area. Elevated concentrations of PCBs, TCE, and concentrations of arsenic, cadmium, chromium, lead, mercury, selenium, and silver were detected in samples collected within the Former Septic System Area.

In 2008, a TCE investigation was conducted west of the school near the Maintenance Building and around the Former Septic System Area to further characterize the TCE-impacted media encountered during the 2006 efforts. An investigation of the Runway Apron/Disposal Pit Area, located about 500 feet northwest of the Middle School, was also performed to further characterize the TCE-impacted soil and/or groundwater previously encountered (Shannon & Wilson 2010).

During the TCE Characterization efforts conducted in 2008, 14 soil borings (three completed as MWs) were advanced to assess the lateral and vertical extent of TCE contamination and to identify the potential source(s) of the TCE contamination. TCE concentrations greater than the applicable ADEC cleanup criteria were documented in samples from six of the borings and 10 of the 25 water samples collected. The highest TCE concentrations in both soil and water samples were encountered in a boring and temporary well located near monitoring well MW5 positioned just west of the Aniak Middle School Building adjacent to the septic line for the Former Septic System (Shannon & Wilson 2010).

Based on results of inspections and investigations conducted at the Project Site before 2008, a PCB cleanup effort was performed in 2008, removing approximately 2,300 cubic yards (cy) of PCB-contaminated soil, construction debris, and tank content wastes from the Project Site. The highest concentration of PCBs measured during the 2008 cleanup effort, 2,610 mg/kg, was detected in a sample of soil excavated from beneath the concrete pad on the south side of the Wood Shop Area. PCB-impacted soil likely extends beneath the building foundation in this area (Shannon & Wilson 2010). The majority of the soil removed from the Project Site in 2008 was from the Former Septic System Area (Figure A-4, Appendix A). The former septic tank and septic lines were removed as part of the 2008 cleanup activities. Only PCB-contaminated soil beneath the former concrete pad near the Wood Shop garage doors was removed from the Wood Shop Area.

At the end of the 2008 field season, it was concluded that removal of all PCB-contaminated soil in the Former Septic System Area and Wood Shop Area was not possible with the limited funds available. As a result, marker liners made of plastic were placed in the Former Septic

System Area excavations, and orange barrier fence was placed in the Wood Shop Area excavation as a marker prior to backfill. The excavations were backfilled with uncontaminated soil and the excavated PCB-contaminated soil was transported offsite for disposal. A chain-link fence was constructed adjacent to the reinstalled fuel pipelines to limit access to the PCB-contaminated soil remaining in the Former Septic System Area.

Following the PCB cleanup, soil borings were advanced at the Former Septic System Area and Wood Shop Area in 2009 to supplement previous data and refine the vertical and horizontal extent of PCB-contaminated soil, as documented in the *Final Site Characterization Report* (Shannon & Wilson 2010). The results from this work indicate that PCB-contaminated soils remain above the cleanup level of 1 mg/kg. The approximate extent and depths of the 2008 excavations with PCB-contaminated soil remaining at the Former Septic System Area and Wood Shop Area are shown on Figure A-4 and Figure A-5, respectively, in Appendix A.

Information pertaining to the previous 1998 sampling, 2001 cleanup, 2008 TCE sampling, 2008 cleanup, and 2009 soil borings are included in Appendix B.

1.4 CLEANUP LEVELS

The applicable cleanup level for PCBs of 1 mg/kg for unrestricted land use is established in 40 CFR 761.61 and 18 AAC 75.341, Table B1 (Note 9). For restricted land use, the cleanup level for PCBs is 10 mg/kg, but the PCBs in soil must be covered with a cap and approved by ADEC, as presented in 40 CFR 761.61 and 18 AAC 75.341, Table B1 (Note 9). The U.S. Environmental Protection Agency (EPA) cleanup criterion for an indoor hard surface is 10 micrograms (µg) of PCBs per 100 square centimeters (cm^2) (10 µg/100 cm^2). This action level is based on the EPA PCB cleanup criterion for high-occupancy, nonporous surfaces [40 CFR 761.61(a)(4)(ii)]. The cleanup level associated with the decontamination water is 0.0005 milligram per liter (mg/L) PCBs, as presented in 18 AAC 75.345.

As stated above, this Work Plan is designed to address the primary chlorinated solvent detected at the Project Site, TCE, within the extent that TCE may be found to be collocated

with PCB-contaminated soil. ADEC's cleanup levels for TCE are 0.02 mg/kg (migration to groundwater) for soil as presented in 18 AAC 75.341, Table B1, and 0.005 mg/L for groundwater as presented in 18 AAC 75.345, Table C; however, final site TCE cleanup levels have not been established. The applicable cleanup levels for the other VOCs and metals are the most stringent Method Two levels listed in 18 AAC 75.341, Table B1 for soil, and 18 AAC 75.345, Table C for groundwater.

The Resource Conservation and Recovery Act (RCRA) waste disposal criterion for TCE in liquids, listed in 40 CFR 261.24, Table 1, is 0.5 mg/L. For solids, the RCRA waste disposal criterion for TCE is 0.5 mg/L using the toxic characteristic leaching procedure (TCLP). RCRA waste disposal criteria for other VOCs and RCRA metals are also listed in 40 CFR 261.24, Table 1. The TSCA waste disposal criterion for PCB in bulk PCB remediation waste (i.e., solids), listed in 40 CFR 761.61, is 50 mg/kg.

The 1988 U.S. Geological Survey (USGS) Professional Paper 1458, titled *Element Concentrations in Soils and Other Surficial Materials of Alaska*, provides data for background concentrations of metals in surficial soil in Alaska. The USGS paper calculated an arithmetic mean for arsenic in Alaskan soil of 9.6 mg/kg. Based on the general geographical location of Aniak, the regional soil concentration for arsenic is less than 40 mg/kg (USGS 1988).

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2.0 PROJECT SITE BACKGROUND

This section describes the site history and environmental setting for the Former WACS Aniak Middle School Site.

2.1 SITE HISTORY

The Aniak WACS facility was constructed circa 1958 and was operated by the United States Air Force until approximately 1978. The portion of the facility targeted by this cleanup effort is leased by the KSD. The KSD renovated the WACS equipment/power building for use as a school (Joe Parent Vocational Education Center, or JPVEC). Between September 1979 and November 1980, the KSD contracted two construction companies to remove the electrical and engine generator equipment from the WACS building. Multiple spills of PCB-contaminated transformer oil mixed with antifreeze allegedly occurred during this work. The transformer oil was reportedly swept out the door of the Wood Shop and off the concrete slab.

2.2 ENVIRONMENTAL SETTING

Aniak is situated on the floodplain of the Kuskokwim River. The Aniak River flows northward into the Kuskokwim River just east of the village of Aniak. The Aniak Slough flows southward from the general area where the Aniak River meets the Kuskokwim River. The central Kuskokwim River floods annually or biennially, usually as a result of ice breakup, which typically occurs in May (OASIS Environmental, Inc. [OASIS] 2012). The Project Site is located approximately 1/2 mile south of the Kuskokwim River and 3/4 mile west of the Aniak Slough (Figure A-2, Appendix A).

The surficial geology near Aniak consists of Kuskokwim floodplain deposits of unconsolidated silt, sand, and gravel. The river deposits include sediment deposits of bed-load sand, gravel, and silt from river-channel activity; fine-grain (silt and fine sand) sediments deposited on riverbanks during flood periods; and sediments deposited during heavy floods. Silt thicknesses in Aniak have been reported to range from 1 to 6 meters (Krause 1984 in OASIS 2012).

Based on past investigations, the former WACS installation was constructed on a gravel pad overlying alluvial sediments. The pad material consists of soils classified as sandy gravel, and thickness near the school varies significantly from 12 to 27 feet bgs. The native soil underneath the pad is predominately silt approximately 10 to 25 feet thick. The silt overlies native material classified as gravelly sand. The silt appears to have been partially removed beneath the school, presumably prior to building construction (OASIS 2012).

From September 2009 through May 2010, and May 2011 through October 2011, the groundwater elevations at the Former WACS Aniak Middle School Site have been recorded using pressure transducers at several site monitoring wells (MW). The recorded groundwater elevation data were presented in the *Focused Feasibility Study-Groundwater* (OASIS 2012), and the following conclusions were made:

- Groundwater elevation is closely tied to the Kuskokwim River.
- There are significant seasonal fluctuations in the groundwater table elevation and groundwater flow direction.
- Three groundwater flow regimes were identified:
  - Very High: Maximum groundwater elevation 72 feet above mean sea level (16.2 feet bgs at MW12 and 19.6 feet bgs at MW11) during two weeks in May 2011—flow direction south-southwest.
  - High: Groundwater elevation ranged between 61 and 64 feet above mean sea level (approximately 27 feet bgs) following the very high regime in late-May through September—primary flow direction north-northeast, and secondary flow direction south-southwest.
  - Low: Groundwater elevation ranged between 58 and 61 feet above mean sea level between October and April—primary flow direction west, and secondary flow direction north-northwest.

Copies of the groundwater flow maps prepared by OASIS of the May 2011, June 2011 and August 2011 water level measures are provided in Appendix B. Groundwater flow maps of the very high and low groundwater flow regimes are not provided in this Work Plan because PCB removal action is anticipated to occur between late-May and September when groundwater elevation is expected to be between 61 and 64 feet above mean sea level.

As discussed in the *Focused Feasibility Study-Groundwater* (OASIS 2012), pumping tests of the middle school and high school drinking water wells were performed by Shannon & Wilson in 2010. The middle school drinking water well is approximately 60 feet deep, whereas the high school drinking water well is approximately 45 feet deep (OASIS 2012). During the pumping test, groundwater level was measured at approximately 32 feet in MW11 and 29 feet in MW12. Three pumping tests were performed:

- Pumping test results indicated 20 gallons per minute (gpm) for 3.5 hours at the middle school.
- High school pumping test net flow rate of 11 gpm for 6 hours.
- Combined pumping test at total net flow rate of 31 gpm for 4 hours.

All three pumping tests showed very little change in water level during or after pumping. Additional information on the site groundwater and pumping test results can be found in the *Focused Feasibility Study-Groundwater* (OASIS 2012).

2.3 CURRENT SITE CONDITIONS

The Project Site is currently used by KSD as a secondary school, temporary lodging, and administration and staff offices; it is also used as a communications hub for Alascom, Inc.. However, as of March 2013, the middle school was temporarily closed until indoor air concentrations of TCE were verified to be below levels of concern. The school was reoccupied in August 2014. Located approximately 150 feet west of the middle school is Aniak High School. The high school is occupied every weekday during school months and periodically during the summer months.

A sub-slab depressurization system is located beneath the middle school, and several soil gas probes and vapor extraction system wells are located exterior of the building footprint. The soil gas probes and vapor extraction wells are identified on Figure A-3 in Appendix A.

Three ASTs are located north of the Former Septic System Area. The fuel is used for heating both the middle school and high school. Fuel pipelines servicing the middle school are located below ground surface, outside of the proposed excavation areas. Aboveground fuel pipelines

and electrical conduit extending from the new storage tanks to the high school are located within the proposed excavation area, as shown on Figure A-4 in Appendix A. The fuel pipelines and electrical conduits running between the tanks and high school were temporarily removed to facilitate the 2008 cleanup activities at the Project Site. It is expected that similar removal and replacement activities performed during the 2008 cleanup activities is required to perform the PCB removal action.

A long-term storage cell constructed during the 2008 PCB cleanup activities southeast of the Wood Shop Area was modified at the completion of the 2009 activities for storage of the unused lift liner bags and drums. Approximately 30 lift liner bags, thirty-three 55-gallon drums, and six 85-gallon drums were placed in the long-term storage cell for future use (Shannon & Wilson 2010). The location of the 2009 long-term storage cell is shown on Figure A-3 in Appendix A.

During the 2008 PCB cleanup, an underground storage tank (UST), formerly used as a septic tank by the middle school, was encountered, as shown on Figure A-3. The excavation of PCB-contaminated soil was performed around the septic UST without removing soil supporting the tank. The septic UST was not removed during the cleanup effort and PCB-contaminated soils above the cleanup level remain beneath the tank (Shannon & Wilson 2009). It is unclear whether the septic UST is currently the active septic for the middle school; thus, further evaluation is required.

3.0 WORK PLAN RATIONALE

This section describes the data quality objectives and approach to ensure that work procedures and data collected during the project will satisfy contract requirements. It discusses conditions for performing the work and identifies fieldwork control requirements.

3.1 DATA QUALITY OBJECTIVES

Data quality objectives guide decisions and procedures for collecting, analyzing, and evaluating data so that overall project objectives are met. The primary COC for the removal action is PCBs. In addition, TCE and RCRA metals are COCs for the Former Septic System Area. Previous cleanup efforts did not complete removal of PCB-contaminated soils, and a few areas identified as having PCB concentrations greater than or equal to 50 mg/kg, the TSCA regulated waste level, remain at site. The intent of the sampling effort for this PCB removal action is:

- Verify the extent of soil with PCB contamination at the Wood Shop Area and Former Septic System Area.
- Verify the presence of TSCA soil (PCB concentration greater than or equal to 50 mg/kg) in the Wood Shop Area.
- Confirm removal of PCB-contaminated soil greater than 1 mg/kg at the Former Septic System Area and Wood Shop Area.
- Characterize waste (soil and water) generated to determine the appropriate disposal facilities.
- Characterize the temporary overburden stockpile and Bag Staging Area footprints prior to use and following use at end of project.
- Characterize the backfill material (overburden and imported).

Pre-excavation samples will be collected at the Wood Shop Area and the Former Septic System Area to verify the extent of soil with PCB contamination for areas that do not have analytical results from previous investigations. In addition, pre-excavation samples will be collected in the vicinity of boring B8 and 2001 Staging Areas G14 and G16 of the Wood Shop Area (Appendix A, Figure A-5) to verify the presence of PCB concentrations greater than or

equal to 50 mg/kg in the upper 2 feet of soil that would require special handling, storage, and disposal.

Confirmation soil sampling will be performed at both the Wood Shop Area and Former Septic System Area. During excavation, confirmation samples will be collected from the floor and sidewalls of the excavation in accordance with 40 CFR 761.61(a)(6), Subpart O, and ADEC *Draft Field Sampling Guidance* (ADEC 2010). Soil excavation will continue until the excavation sample results indicate that the cleanup level of 1 mg/kg has been met.

Soil containing greater than or equal to 50 mg/kg PCB (TSCA soil) and between 1 and 49 mg/kg PCB (non-TSCA soil) based on laboratory analysis will be segregated and containerized separately into LiftPacs, Super Sacks®, or the equivalent, (hereon referred to as bags). Waste characterization samples will be collected from the bags and submitted to a mobile field laboratory for PCB analysis to verify waste has been adequately characterized for the appropriate disposal facility. In addition, if wastewater is generated, waste characterization samples will be collected prior to and following treatment to demonstrate that applicable discharge standards have been met.

Prior to and following use of the overburden stockpile and bag staging areas, soil samples within the footprint of each area will be collected to document site conditions. Additionally, overburden materials to be reused as backfill, and imported soil from a local borrow source will be sampled to verify COCs are below cleanup levels and suitable as excavation backfill material.

The Sampling and Analysis Plan (SAP) in Appendix D contains additional details regarding sample collection methodology.

3.2 PROJECT EXECUTION APPROACH

Before mobilizing to the field, the Remediation Contractor will hold a meeting to discuss mobilization preparedness and activities with key project personnel. Key project personnel associated with this project will be identified by both the Remediation Contractor and

ADOT&PF as part of contract procurement. All necessary documents that will be used at the Project Site, including this Work Plan, contracts, certificates, licenses, permits, equipment lists, and reference materials will be reviewed. At a minimum, the Remediation Contractor project team, ADOT&PF project manager, and major subcontractors will attend this meeting. Technical representatives from the PRP Group may also attend this meeting, as appropriate. This meeting will help ensure all parties involved in the project understand and agree on the project goals and objectives, schedule, submittal requirements, contract requirements, documentation requirements, construction means and methods, reporting and communication requirements, health and safety requirements, and other protocols. In general, the Remediation Contractor will consult, cooperate, and coordinate project activities with ADOT&PF to ensure project success.

All available field equipment will be checked prior to mobilization according to individual equipment inspection procedures. All equipment must be inspected and prepared for use to prevent damage that could result in possible injuries, project delays and costly repairs or replacement. This will be accomplished by reviewing the history of the equipment, identifying procedures specified by the manufacturer, and following the equipment-specific checklists.

As needed, representatives from all members of the PRP Group will participate in technical meetings to mutually resolve issues that may arise prior to and during remediation activities. The Remediation Contractor may be requested to participate in the technical meetings.

3.2.1 Licensing and Certificates

The Remediation Contractor and subcontractor personnel must carry proof of current licenses for all motorized vehicles and equipment that requires a license for operation. Additional licenses required for this PCB removal action include the waste transporter license, and permitted waste disposal facility license.

The Remediation Contractor and subcontractor personnel must hold current certifications required for their job respective responsibility or classification, including:

- 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training
- Current 8-hour HAZWOPER refresher
- Proof of enrollment in a medical monitoring program
- Proof of insurance with at least $2 million in Commercial General Liability, Pollution Liability, Errors and Omissions, and Automobile Liability insurance, as well as Workers' Compensation insurance in the amounts required by law.

4.0 REMEDIATION CONTRACTOR TASKS

This section describes the tasks to be performed during the PCB removal action by the Remediation Contractor. All tasks are to be completed during the 2015 construction season. Figures for the PCB removal action are presented in Appendix A.

4.1 PLANNING DOCUMENTS

The following section describes planning documents prepared to supplement this Work Plan and to be utilized by the Remediation Contractor. The selected Remediation Contractor will have the opportunity to update and finalize these planning documents for review and acceptance by ADOT&PF. These planning documents include:

- Project Schedule: Site remediation fieldwork is tentatively scheduled to begin June 2015, and must be completed during the 2015 construction season. A proposed schedule is provided in Appendix C. However, the selected Remediation Contractor will provide ADOT&PF a detailed schedule, including dates for starting and completing critical features of the work for their review and acceptance.
- SAP: Details the requirements and procedures for conducting field activities at the Project Site, including soil sampling and sample management procedures to ensure that data quality standards are met during the PCB removal action. This plan is provided in Appendix D.
- Contractor Quality Control Plan (CQCP): Provides a general description of the quality control organization and procedures for tracking and reporting deliverables to cover all operations, both onsite and offsite, during the PCB removal action. This plan is provided in Appendix E.
- Site Safety and Health Plan (SSHP): Provides safety and health guidance and procedures for field activities at the Project Site. The SSHP is provided in Appendix F. The Remediation Contractor's employees and subcontractors performing work on this project will be required to have appropriate training, as specified in the Occupational Safety and Health Administration (OSHA) standards, including HAZWOPER Standard 29 CFR 1910.120.
- Waste Management Plan (WMP): Provides requirements for managing wastes, both onsite and offsite, during the PCB removal action. The selected Remediation Contractor must modify the WMP (Appendix G) to include specific details on waste handling, selected transportation methods, and disposal facilities for review and acceptance by the contacting entity.

4.2 PERMITTING AND COORDINATION

The following permits and coordination efforts are, at a minimum, required to implement the PCB removal action:

- Right-of-entry permit will be provided to the Remediation Contractor for the Project Site. The Remediation Contractor will request additional rights-of-entry permit(s) from ADOT&PF to access the Bag Staging Area and barge landing to conduct project activities (Figure A-2, Appendix A).
- Notify the Federal Aviation Administration that an area near the barge landing area will be used to stage bags prior to shipment for disposal.
- Notify EPA in writing at least 30 days prior to beginning work at the site, and if any changes are made to this Work Plan after it has been approved by EPA.
- A wastewater discharge permit will be obtained from ADEC to discharge treated water generated during the project to a stable, vegetated area to minimize soil erosion. Pre- and post-treatment samples will be collected to demonstrate that applicable discharge standards are met. A copy of the permit will be provided to ADOT&PF.
- Coordination with KSD will be required for site access, temporary removal of the fuel pipelines, barricading school exit doors, relocation of the storage shed, and use determination of the septic UST. In addition, confirm with KSD the start date of 2015-2016 school year to ensure work is completed before school resumes in August 2015.
- Coordination with Village of Aniak will be required for establishing the final truck route from the Project Site to the barge landing area and gravel borrow source, access and use of gravel borrow source, and use of local equipment and personnel to complete removal activities, as necessary.
- A waste characterization/profile and manifests for each waste stream generated during the PCB removal action will be required for offsite transport and disposal.

A Storm Water Construction General Permit is not required for this work since the planned construction activity disturbs less than one acre of land. The Remediation Contractor is to evaluate and identify the need for any additional permits early in the planning process. The Remediation Contractor will notify ADOT&PF of any additional permits for the PCB removal action, and will secure the permits, as needed, during construction activities. The Remediation Contractor will provide copies of all permits, leases, rights of access, and manifests acquired for this project to ADOT&PF, when available. Prior to any coordination effort with KSD and the Village of Aniak, the Remediation Contractor will consult with ADOT&PF.

4.3 MOBILIZATION

All equipment, supplies, materials, temporary facilities, and personnel to perform the PCB removal action will be mobilized to the Project Site. The Remediation Contractor must ensure land-use requirements (leases, right-of-access requirements, and permits) are approved and in place prior to setup and work at the Project Site. In addition, the Remediation Contractor will ensure all required environmental permits are obtained in advance of removal activities.

4.3.1 Accommodations and Travel

The Remediation Contractor will provide meals, lodging, transportation, and a field office for field team personnel and one contracting agency representative for the duration of the project. Lodging, food, and sanitation facilities are locally available for Remediation Contractor use. The field office will have adequate power, internet connection, heat, and ventilation. It will be equipped with a laser printer/scanner/copier, printer cartridges, and printer paper for the exclusive use of the contracting agency's representative, as well as a means of transferring photos from a digital camera to suitable electronic media, such as a recordable compact disc (CD-R).

Additionally, the Remediation Contractor will provide meals, lodging and transportation for two employees of ADOT&PF, and one ADEC employee to visit the Project Site for two days near the beginning and again at or near the end of the cleanup activities—a total of four days. The ADOT&PF and ADEC employees will require transportation from Anchorage, Alaska. The Remediation Contractor will ensure a suitable vehicle and a knowledgeable site representative are available during the Project Site tour.

4.3.2 Site Security and Controls

Prior to implementing removal activities at the Project Site, the Remediation Contractor will coordinate site activities with a KSD point of contact (to be determined) to access the Project Site and school building. In addition, the Remediation Contractor will coordinate efforts with KSD to barricade the building exit doors that open to the planned work areas and to clear the

work area of obstructions prior to the field team's arrival. The following additional site security and control measures will be established and implemented during the project:

- A utility locate request will be submitted to the local utility company at least five days prior to the start of excavation work. Each utility locate company will be requested to meet at the Project Site to locate the underground and above ground utility services within the project area. As-built plans of the buildings will also be reviewed, and site personnel will be interviewed to identify potential utility conflicts and subsurface structures within the planned excavation boundaries. If conditions of the Project Site change, an additional utility locate request will be requested for utility clearance.
- An exclusion zone will be demarcated with appropriate signage and secured with barricades and/or a temporary construction fence at the Project Site access points to prevent unauthorized site entry, and to protect the public from potential hazards and exposures.
- An onsite health and safety station will be established that contains a first aid kit, eye wash station, hand wash station, and fire extinguisher.
- All personnel vehicles will be parked in a designated parking area.
- Work practices will be used to mitigate the migration of PCBs outside the project area and minimize the potential for cross-contamination as site conditions change (e.g., wind), and as necessary (e.g., excavation access, equipment availability). Wet and dry decontamination will be utilized to prevent migration of PCB-contaminated soil on vehicles and other equipment. No contaminated dirt or mud will be tracked off the job site.
- Construction fence or yellow caution tape will be used to barricade inactive excavations. In addition, at the end of each workday all excavations (active and inactive) and other physical hazards will be identified with barricades or other safety measures, as appropriate.
- A traffic control plan will be implemented, and appropriate engineering controls including fencing, barricades, traffic cones and signs will be used to control access to, and at, the Project Site.
- "Authorized personnel only" signs will be posted at site entrances.

Prior to commencing excavation activities, the Remediation Contractor will conduct a site walkover with the field team personnel to become familiar with the PCB-contaminated areas, barge landing area, and general features at the Project Site.

4.3.3 Community Relations

A community relations program will be implemented to communicate pertinent facts regarding the PCB removal action to the residents of Aniak. The community relations plans will be implemented by ADEC and ADOT&PF. The Remediation Contractor may be required to participate in meetings or prepare public notices, as requested by ADOT&PF.

4.4 SITE PREPARATION

Site preparation will be conducted at the Project Site, as shown on Figure A-6 in Appendix A. Site preparation will include establishment of a truck route, decommission or protection of environmental monitoring system components, construction of temporary storage areas, temporary removal of utilities and structures, installation of runoff and erosion controls, clearance of vegetation, and establishment and operation of a mobile field laboratory.

4.4.1 Route of Ingress and Egress for Construction

During removal activities, trucks will enter and exit the Project Site from Housing Main Road along Teachers Road. Waste designated for landfill disposal will be transported to the Bag Staging Area at the barge landing along the Kuskokwim River, as shown on Figure A-2 in Appendix A. In addition, the Remediation Contractor will establish a truck route at the Project Site for trucks to follow during the project to ensure the safety of onsite personnel.

4.4.2 Decommission and Protection of Environmental Monitoring System Components

Located near the septic tank and east pipeline for the Former Septic System, one monitoring well (MW5), two soil gas probes (SGP13 and SGP14), and two pilot air injection points—AIMP and AIW—will be decommissioned during site preparation activities. These monitoring system components are located within or near the proposed excavation areas. Decommission of these components will be conducted in accordance with the State of Alaska regulations and guidance. Copies of the construction logs are provided in Appendix B.

Environmental monitoring system components to remain in place will be protected from construction operation activities. The following components will be protected: monitoring wells MW1, MW4, MW6, MW8, MW10, and MW11; two vapor extraction system wells (VES1/MW7 and VES2); and soil gas probes (SG-1, SGP1, SGP2, SGP3, SGP4, SGP5, SGP6, SGP7, SGP8, SGP9, SGP10, SGP15, SGP17, SGP18, SGP19, SGP20, SGP21, and SGP22). Barricades or construction fence will be placed around components as necessary for protection and will remain throughout the duration of the project. Additionally, these components will be flagged to make them easily visible to personnel and operators.

It is assumed that soil removal can be performed around vapor extraction system well VES2 and soil gas probe SGP10, located near the school building within the Wood Shop Area, while maintaining the integrity of the well/probe and achieving the proposed excavation depth of 2 and 1.5 feet, respectively. Hand digging near these components may be necessary to prevent damage.

If any components are damaged as a result of construction, and it is determined that the component's integrity is compromised, the component will be decommissioned and replaced in accordance with the State of Alaska requirements and guidance.

4.4.3 Temporary Storage Areas

Temporary storage areas will be constructed at the Project Site to store potentially clean soil, drums of wastewater, and PCB-contaminated waste. The following three storage areas will be constructed for the waste generated at the Project Site:

- Overburden Stockpile Area: Constructed at the Project Site to store potentially clean overburden soil from the excavation areas. The location of this area, north of the middle school, is shown on Figure A-6 (Appendix A). Surface soil samples will be collected prior to and following use within the planned footprint of the area in accordance with the SAP (Appendix D). In addition, stockpiles of overburden material will be sampled prior to reuse as backfill in accordance with the SAP (Appendix D).
- Drum Storage Area: Constructed at the Project Site to store 55-gallon drums of wastewater prior to discharge. The location of this area is near the northwest corner of the middle school, as shown on Figure A-6. Surface soil samples will be collected prior to and following use within the planned footprint of the area in accordance with the SAP

(Appendix D). Pre- and post-treatment samples will be collected prior to discharge in accordance with the discharge permit requirements and the SAP (Appendix D).

- Bag Staging Area: This area is approximately 100 feet from the barge landing area on the Kuskokwim River and will be used to store bags of PCB-contaminated waste and other waste prior to shipping for offsite disposal. The location of this area is shown on Figure A-2. Surface soil samples will be collected prior to, and following use within, the planned footprint of the area in accordance with the SAP (Appendix D).

Both the Overburden Stockpile Area and Drum Storage Area will consist of 18-inch high gravel berms and lined with nonwoven geotextile and 20-mil polyethylene liner system atop of the existing ground surface. Within the Drum Storage Area, drums will be placed on wooden pallets. The overburden stockpile will be covered with 12-mil reinforced polyethylene liner, anchored, inspected, and maintained in accordance with the WMP. A schematic of a temporary storage area is included as Attachment G-1 in the WMP (Appendix G).

At the Bag Staging Area, two staging areas will be constructed. One staging area will be used to store TSCA waste, and the other staging area will be used to store non-TSCA waste. At both staging areas, constructed minimum 6-mil reinforced liner will be placed on the ground surface and anchored with sand bags prior to staging the bags.

If potentially non-impacted debris (e.g., concrete, Septic UST tank material) is encountered and waste characterization samples are needed to confirm that debris does not contain PCBs, a Non-Impacted Debris Area will be constructed at the Project Site to temporarily store this material while awaiting sample results. Surface soil samples will be collected prior to and following use within the planned footprint of the area in accordance with the SAP (Appendix D). The area will be lined with nonwoven geotextile and 20-mil polyethylene liner system atop the existing ground surface in accordance with the WMP. However, if a small amount of non-impacted debris is encountered and space is available, the Drum Storage Area may be used to store the debris prior to transport to the Bag Staging Area. If stockpiles of debris are placed at the Drum Storage Area, they will be covered and anchored.

The bags and liner will be inspected for damage or deterioration on a daily basis throughout the duration of the project. If damage occurs, corrective action will be implemented as soon as possible after discovery.

All temporary storage areas will be decommissioned and restored to their pre-existing conditions at project completion. Decommissioning will include removal and disposal of liner to the appropriate disposal facility in accordance with the WMP (Appendix G), and removal and reuse of berm material as backfill upon confirmation of samples meeting the backfill cleanup requirements as discussed in Section 4.5.3.

4.4.4 Temporary Removal of Utilities and Structures

Prior to conducting the excavation activities at the Former Septic System Area, the fuel pipelines, fuel dispenser, and associated components between the high school and the fuel storage tanks will be removed. The Remediation Contractor will coordinate disconnection of fuel system with a KSD prior to removal. Residual fuel remaining in the fuel lines will be drained and contained in a 55-gallon drum or pumped into a fuel storage tank to be reused on site. Electrical conduits adjacent and parallel to these fuel pipelines will also be removed. The fuel pipelines and associated components will be placed on a plastic liner within an area designated for temporary storage and will be replaced at project completion. A copy of the upgraded fuel system as-built plans, dated 2006, is provided in Appendix H.

In addition, the storage shed along the east end of the Wood Shop Area will either be relocated to a location approved by the KSD or demolished. The Remediation Contractor will evaluate the condition of the storage shed to determine whether the shed can be relocated safely and effectively to maintain its structural integrity. Based on this evaluation and further discussions with KSD, the Remediation Contractor will develop a plan and seek approval to either relocate or demolish the shed. The Remediation Contractor will coordinate efforts with KSD to remove items and materials stored in the shed during site preparation activities.

Prior to excavation activities, the long-term storage cell will be removed and relocated outside the extents of the proposed Wood Shop Area excavation (Appendix A, Figure A-6). The bags, 55-gallon drums, and 85-gallon drums stored in the long-term storage cell will be used for this project.

4.4.5 Runoff and Erosion Controls

Prior to the commencement of site work, the following runoff and erosion control activities will be performed:

- Silt fence or sediment logs/straw wattles will be placed downgradient of each excavation area and of any other potential sediment or storm water release areas.
- Excavation will be conducted in phases to limit exposed soil.
- Preservation of the natural vegetation to the extent practical to reduce the potential for soil erosion.
- Management of dust generation and migration in accordance with the SSHP Respiratory Protection Program (Appendix F).
- Any dirt or mud that is tracked onto paved or surfaced roadways will be cleaned away within the day it is deposited.
- As necessary, additional measures such as installation of berms or drainage channels will be taken to divert run-on of surface water, particularly to prevent surface water contact with the excavation areas throughout the duration of the project.

During the proposed work, installation methods and maintenance procedures for erosion control silt fences and other runoff and erosion controls will follow best management practices. Throughout the project duration, erosion control measures will be maintained until the site is backfilled or permanent erosion control measures are in place.

The Remediation Contractor will be responsible for implementing their erosion control plan, including conducting site inspections to:

- Document the conditions and/or repair silt fences and/or other runoff and erosion controls at the site.
- Document sediment accumulation amounts adjacent to fences and/or other runoff and erosion controls at the site.
- Evaluate eroded or potentially unstable soils.

Inspections will be made on a weekly basis and within 24 hours after significant rainfall events (0.5 inches or greater). Maintenance activities may include removal of sediment from fences, and repair, as needed. A weekly inspection log will be maintained at the Project Site.

4.4.6 Clearing

Trees and vegetation from within the extent of the excavation will be cleared (Appendix A, Figure A-6). Tree roots in contact with PCB-contaminated soil will be disposed of offsite as non-TSCA waste. Tree logs will be de-limbed, and the limbs and brush will either be chipped for reuse as mulch at project completion or stockpiled at the Tree Stockpile Area, as identified on Figure A-6. Trees and vegetation not anticipated to interfere with the project activities are to remain and be protected to the extent practicable.

4.4.7 Mobile Field Laboratory

An Environmental Laboratory Accreditation Program (ELAP)-certified, ADEC Contaminated Sites-approved mobile field analytical laboratory will be provided and operated by the Remediation Contractor to analyze pre-excavation and excavation samples to aid in waste stream characterization and guide the excavation activities. The field laboratory will be certified to analyze soil samples for PCBs (as Aroclors) by EPA Method SW-846 8082. The Remediation Contractor will coordinate with KSD and ADOT&PF to determine a location to set up the laboratory and will provide power as needed to support the field laboratory operations. Laboratory-approved standard operating procedures will be provided to ADOT&PF by the Remediation Contractor prior to mobilization.

4.5 EXCAVATION

Results from a combination of previous characterization and cleanup efforts were used to estimate the extent of PCB-contaminated soil remaining at the Former Septic System Area and the Wood Shop Area. The proposed excavation extent and depths of the Former Septic System Area and the Wood Shop Area are shown in Appendix A on Figure A-7 and Figure A-8, respectively. Based on the project objectives, several areas where PCBs greater than

1 mg/kg remain in subsurface soil (greater than 2 feet bgs) will not be addressed during the PCB removal action to ensure the integrity of the school building where PCBs remain within 10 feet of the building, and because soils with PCB concentrations between 1 and 10 mg/kg are present at depths greater than 15 feet bgs.

Estimated quantities of materials to be removed during the PCB removal action are presented in Table 4-1.

Table 4-1
Estimated Quantities

Material	Excavation Area	In-Place Volume[1] (cy)	Bulk Volume[2] (cy)	Quantity[3] (tons)
TSCA soil (PCB concentrations greater than or equal to 50 mg/kg)	Former Septic System	120	140	180
	Wood Shop	30	40	45
TSCA Soil Subtotal		150	180	225
Non-TSCA soil (PCB concentrations between 1 and 50 mg/kg)	Former Septic System	620	750	930
	Wood Shop	1,470	1,770	2,205
Non-TSCA Soil Subtotal		2,090	2,520	3,135
Overburden	Former Septic System	780[4]	940	1,170
	Wood Shop	280[5]	340	420
Overburden Subtotal		1,060	1,280	1,590
Total		3,300	3,980	4,950

Notes:
[1]Estimate based on the proposed excavation extent and depths shown on figures. Estimate does not include volume of soil to be removed for sloping and benching of excavation. Assumes excavations have vertical sidewalls.
[2]Assume excavated soils will increase by approximately 20% due to bulking.
[3]Assume in-place soil is 1.5 tons/cy.
[4]Calculation excludes the bottom 1 foot of overburden above the plastic liner to account for potential commingling with PCB-contaminated soil beneath the liner.
[5]Calculation based on 6 inches of overburden removed from the capped area.

These estimated quantities are to be used for scoping/planning purposes. The actual quantities of contaminated soil may be lower or higher. The Remediation Contractor will communicate with ADOT&PF and ADEC project managers to minimize the volume of waste generated while attempting to achieve the cleanup goals.

The PCB removal action will consist of the following elements, as described in this section:

- Pre-Excavation Sampling
- Excavation and Sampling Procedure
- Management of Excavated Materials
- Wastewater Management

4.5.1 Pre-Excavation Sampling

During the 2008 PCB cleanup effort, field screening was performed using a PCB field test kit to delineate the extent of the excavation. Verification samples were also collected to evaluate the accuracy and correlation of field screening results. Field screening results and verification sample analytical results collected did not correlate well where the field screening results of $1.1 < x < 4.9$ mg/kg. Therefore, during the 2009 Characterization effort, six borings were advanced to verify the results of the field screening that was performed during the 2008 PCB cleanup effort. Because the PCB data results for the 2009 verification borings SBYY5, SBZZ3, SBA0, SBX4, and SBZ6 were below cleanup level, the field screening results performed around the perimeter of proposed excavation during the 2008 PCB cleanup are assumed to be false positive results. Consequently, during the PCB removal action, pre-excavation samples will be collected from the planned excavation areas that do not have analytical results from previous investigation to delineate the extent of the PCB-contaminated surface soil.

At every 15 feet around the perimeter of the proposed Wood Shop Area excavation, hand tools or an excavator bucket will be used to collect pre-excavation samples at approximately 0.5 feet and 2 feet bgs, beneath the existing cap (6-inch sand and gravel layer and geotextile liner). Figure D-2 in Appendix D presents the proposed locations of these pre-excavation samples. In addition, pre-excavation samples will be collected along the southern extent of the Former Septic System Area from exploratory test pits. Test pits will be excavated to 5 feet bgs, and a pre-excavation sample will be collected at the base of the test pit. Figure D-3 in Appendix D presents the proposed locations of these pre-excavation samples. Pre-excavation sample results from along the perimeter of the proposed excavation areas will be evaluated to

delineate the extent of PCB contamination in these areas. If sample results are above 1 mg/kg for PCBs, step-out pre-excavation samples will be collected 5 feet outward (in a perpendicular direction) from the initial sample location. Step-out samples will be collected until results are below the cleanup level of 1 mg/kg for PCBs.

During the 1998 PCB cleanup effort, field screening results from confirmation samples FSCS68 and FSCS69, located west of the northwest corner of the Former Truck Fill Containment Pad, indicated that PCB-contaminated soil remains in this area. However, additional excavation was not performed and the confirmation samples for FSCS68 and FSCS69 were not submitted to the laboratory for PCB analysis. Therefore, pre-excavation samples will also be collected in Areas FSCS68 and FSCS69 at the base of the former excavation, after overburden material is removed (Appendix D, Figure D-3). The base of the former excavation at Areas FSCS68 and FSCS69 varies between 2 and 10 feet bgs. These pre-excavation samples will be nine-point composites to verify subsurface soil PCB concentrations remain above 1 mg/kg.

In addition, pre-excavation samples will be collected in the vicinity of boring B8 and 2001 Staging Areas G14 and G16 of the Wood Shop Area to verify the presence of PCB concentrations greater than or equal to 50 mg/kg (TSCA) in the upper 2 feet of soil (Appendix D, Figure D-2). Discrete samples will be collected at approximately 0.5 feet and 2.0 feet below the surface.

All pre-excavation samples will be analyzed for PCBs (as Aroclors) by EPA Method SW-846 8082 using the onsite mobile laboratory. The pre-excavation sampling procedures and figures showing the proposed sampling grid and sample locations are provided in the SAP (Appendix D).

Using the pre-excavation sample results, the extent of the proposed excavation areas will be revised by the Remediation Contractor, as necessary, in accordance with the project objectives. The Remediation Contractor will communicate with ADOT&PF and other key personnel for approval of the revised excavation plan.

4.5.2 Excavation and Sampling Procedures

PCB removal activities will commence at the Former Septic System Area, starting where the 2008 cleanup effort ended, and will proceed to the Wood Shop Area. The PCB removal action at both the Former Septic System Area and Wood Shop Area will be sequenced in the following stages, described generally below:

- Stage I: Remove overburden layer (PCBs less than 1 mg/kg) and underlying liner.
- Stage II: Remove PCB-contaminated soil to the proposed depths within the defined cells, as shown on Figures A-7 and A-8 (Appendix A), and collect confirmation samples to verify PCB concentrations are less than 1 mg/kg or to guide additional excavation activities if PCB concentrations remain above 1 mg/kg.
- Stage III: Upon verification that PCB concentrations are less than 1 mg/kg or the excavation has reached 15 feet bgs or 2 feet below groundwater table, whichever occurs first, collect floor and sidewall samples for characterization of TCE and RCRA metals contamination in the TCE Area as depicted on Figure A-7 in Appendix A.
- Stage IV: Backfill excavation upon confirmation of floor and sidewall samples below PCB cleanup level.

Overall, the excavation process will occur in a staged progression designed to effectively meet the project objectives but minimize duration of open excavations and allow for adequate access to the excavation areas. Phasing and sequencing of work will be further developed by the Remediation Contractor.

Former Septic System Area

Stage I: Following temporary relocation of fuel pipelines, excavation will begin at the Former Septic System Area. The overburden layer and underlying plastic liner will be removed within each excavation cell (approximately 15 feet by 15 feet). Overburden thickness ranges between 2 and 12 feet (Appendix A, Figure A-4). The overburden material is considered clean and will be segregated from the liner and placed into approximately 50 cy piles at the Overburden Stockpile Area. Overburden materials that come in contact with underlying PCB-contaminated soils will be minimized and managed as non-TSCA material. The liner will be placed in bags for disposal as non-TSCA waste, in accordance with WMP

(Appendix G). The estimated extents of the overburden layer (i.e., bottom depth of the 2008 excavation) are shown on Figure A-4 in Appendix A. A total of approximately 780 cy of overburden material will be removed from the Former Septic System Area and will be reused as backfill once it has been confirmed clean.

Stage II: Following removal of the liner, the excavation of PCB-contaminated soil will proceed within each excavation cell (approximately 15 feet by 15 feet) to remove additional soil from beneath the 2008 confirmation floor sample (i.e., beneath the plastic liner). The initial layer of PCB-contaminated soil beneath the plastic liner will be removed and placed in bags for offsite disposal. The initial layer thickness per excavation cell is presented on Figure A-7 in Appendix A.

Following removal of the initial layer of soil, confirmation samples will be collected from the floor and sidewalls of the excavation cell to confirm the PCB concentration is below 1 mg/kg. If sample results have PCB concentrations greater than 1 mg/kg but less than 10 mg/kg, an additional one foot of soil within the excavation cell will be removed. If sample results have PCB concentrations exceeding 10 mg/kg, an additional 2 feet of soil within the excavation cell will be removed. As the excavation proceeds at each cell, confirmation samples will be collected after each layer of soil is removed either until the sample results indicate that the cleanup level of 1 mg/kg has been met or until the excavation reaches 15 feet bgs or 2 feet below groundwater table, whichever occurs first.

Confirmation samples will be collected in accordance with 40 CFR 761.61(a)(6) and Subpart O from each excavation cell as a composite sample of up to nine subsamples. No sidewall samples will be collected if the excavation is 1 foot deep or less and the adjacent cell has been confirmed clean. Excavation sampling procedures and figures showing the proposed sampling grid and sampling locations are provided in the SAP (Appendix D).

If during the course of removal activities, PCBs are detected above 1 mg/kg beyond the proposed excavation limits, the excavation may be expanded depending on proximity to

existing structures and other surface and subsurface constraints that would interfere with the excavation.

Sloping or benching of banks along the perimeter of the excavation areas will be required to stabilize excavation sidewalls, as necessary, to complete the excavation. Slope cutbacks are to be in accordance with applicable industry standards and OSHA requirements. Soil removed to slope banks will be stockpiled at the Overburden Stockpile Area and sampled prior to reuse as backfill unless there is an indication that the soil is potentially contaminated; then, it will be placed in bags for characterization and disposal.

During excavation, a septic UST will be encountered (Appendix A, Figure A-7). The Remediation Contractor will coordinate with KSD to determine whether this UST is an active septic tank used by the middle school, or to determine the location of the middle school's active septic system. The Remediation Contractor will consult with KSD to determine acceptable times and duration for any disruption to the active septic system. The Remediation Contractor will continue coordination efforts with KSD throughout project duration to ensure that the school's active septic system is operational upon project completion.

If the UST within the excavation area is an active septic tank, the tank and associated piping will be emptied, the septic waste will be properly handled and disposed, the tank will be temporarily removed to excavate the PCB-contaminated soil beneath the tank, and the tank will be replaced upon completion of excavation. If the UST is an inactive septic tank, the tank and associated piping will be emptied, the septic waste will be properly handled and disposed, the tank and the PCB-contaminated soil beneath the tank removed and properly handled and disposed. Wastes generated, including tank contents and tank material, will be sampled according to the SAP (Appendix D) and will be managed according to the WMP (Appendix G).

Solid contents from the septic UST will be placed in bags and liquid contents will be placed in 55-gallon drums. A description of the tank was not provided in the report titled *PCB Cleanup* (Shannon & Wilson 2009); however, it is anticipated to be concrete similar to the former

septic tank removed during the 2008 PCB cleanup. Whether or not the tank is active, if the tank is constructed of concrete, samples will be collected (e.g., concrete chip samples) from the external surfaces of the tank in contact with PCB-contaminated soil and the internal surfaces of the tank in contact with septic waste to determine whether or not they are PCB-contaminated. If PCB contamination in the concrete is above 1 mg/kg, then the contaminated portions of the concrete tank will be handled and disposed as waste. If the tank is inactive and the concrete does not contain PCBs, then it will be reused as backfill at the site. The concrete tank will be broken into pieces, having maximum dimensions of less than 8 feet long by 4 feet wide, and placed in bags for offsite disposal or reused as backfill. If the tank is constructed of steel, the tank will be cut and pressure-washed prior to collecting a wipe sample to confirm that the tank has been sufficiently cleaned prior to disposal at the local landfill.

Stage III: Upon confirmation of PCB results below the cleanup level or the excavation reaches 15 feet bgs or 2 feet below groundwater table, whichever occurs first; characterization samples will be collected as discrete samples from areas where TCE remains (inferred TCE Area as depicted on Figure A-7 in Appendix A). The discrete samples will be collected from the same excavation cells as PCB samples, which meets the frequency specified in ADEC *Draft Field Sampling Guidance* (ADEC 2010). These samples will be submitted to a fixed laboratory for RCRA metals and VOCs analyses, in accordance with the SAP (Appendix D).

Stage IV: Following confirmation and characterization sampling (when applicable), backfilling activities will commence. A nonwoven geotextile liner will be placed at the bottom and along the sidewalls of the excavation prior to backfilling in the TCE Area. This TCE-impacted area is delineated on Figure A-7 in Appendix A.

Wood Shop Area

Stage I: The top 6-inch sand and gravel layer (overburden) and underlying geotextile liner will be removed from the Wood Shop Area. The overburden material is considered clean and will be segregated from the liner and placed into 50 cy piles onsite at the Overburden Stockpile Area. The sand and gravel layer is estimated to consist of approximately 280 cy of

material. The liner will be placed in bags for disposal as non-TSCA waste in accordance with the WMP (Appendix G). The estimated extent of the cap is shown on Figure A-8 in Appendix A.

The caps were reportedly placed in 1997 and 2001. It is possible that since that time, excavations have been advanced into the PCB-contaminated soil beneath the geotextile liner. If the geotextile liner is observed to be compromised (penetrated by trenching equipment, for example) the excavated materials from the area will be segregated from other gravel layer materials and managed as non-TSCA waste in accordance with the WMP (Appendix G).

To minimize exposure and potential migration of PCB-contaminated soils, the overburden material and liner will either be removed as the excavation progresses at each excavation cell (15 feet by 15 feet), or the entire layer of overburden material will be removed and the liner will be kept in place as an engineering control within the proposed excavation area until the excavation proceeds to each excavation cell.

Stage II: Following removal of the liner, the excavation of PCB-contaminated soil will proceed within each excavation cell (approximately 15 feet by 15 feet) to the proposed depths as shown on Figure A-8 in Appendix A.

The Wood Shop Area excavation will begin adjacent to the middle school where the 2008 PCB cleanup effort ended. Because PCB-contaminated soil is present directly adjacent to the foundation of the middle school building, the Remediation Contractor will develop a Structural Protection Plan for protection of the building to address soils adjacent to the middle school. Underpinning the building is not anticipated to meet the project objectives and complete the PCB removal action. At a minimum, soils within 10 feet of the building footprint with PCB concentrations greater than 1 mg/kg are to be removed to 2 feet bgs. Soils within 10 feet of the building footprint with PCB concentrations greater than 1 mg/kg may remain in place at or below 2 feet bgs to maintain the stability of the soils beneath the building. However, additional PCB-contaminated soil above the cleanup level may be removed deeper than 2 feet within this area provided that the building is protected at all times

from damage caused by settlement, lateral movement, undermining, washout, or other hazards that could develop during excavation.

Sloping or benching of banks along the perimeter of the excavation areas will be required to stabilize excavation sidewalls, as necessary, to complete the excavation. Slope cutbacks are to be in accordance with applicable industry standards and OSHA requirements. As-built plans of the building are available for Remediation Contractor use to assist with development of the Structural Protection Plan. Soil removed to slope banks will be stockpiled at the Overburden Stockpile Area and sampled prior to reuse as backfill unless there is an indication that the soil is potentially contaminated; then, it will be placed in bags for characterization and disposal.

Results from the 2008 PCB cleanup and 2009 characterization efforts indicate that PCB concentrations between 1 and 10 mg/kg remain at and below the former bottom of the Wood Shop concrete pad excavation (4 to 10 feet bgs). However, the remaining PCB-contaminated soil within 10 feet of the building located beneath the former concrete pad excavation will not be removed as part of this PCB removal action. PCB-contaminated soil greater than 1 mg/kg will be removed outside the building 10-foot offset, as depicted by the proposed depths shown on Figure A-8 in Appendix A.

During excavation activities near or within the former concrete pad excavation, overburden material (former excavation backfill) and orange barrier fence used at the bottom of the excavation as a marker will be encountered. The overburden material is present at ground surface to approximately 4 to 6 feet bgs. Overburden material is considered clean and will be placed at the Overburden Stockpile Area, as necessary, to facilitate the excavation. If during removal, the overburden material commingles with the surrounding soils, the backfill material will be managed as non-TSCA waste in accordance with the WMP (Appendix G).

The excavation will proceed south from the school building. At each excavation cell, the initial layer (top of liner to proposed depth) of PCB-contaminated soil will be removed and placed in bags for offsite disposal. Following removal of the initial layer of soil, confirmation samples will be collected from the floor and sidewalls of the excavation cell to confirm that

the PCB concentration is below 1 mg/kg. If sample results have PCB concentrations greater than 1 mg/kg but less than 10 mg/kg, an additional one foot of soil within the excavation cell will be removed. If sample results have PCB concentrations exceeding 10 mg/kg, an additional 2 feet of soil within the excavation cell will be removed. As the excavation proceeds at each cell, confirmation samples will be collected after each layer of soil is removed either until the sample results indicate that the cleanup level of 1 mg/kg has been met or until the excavation reaches 15 feet bgs or 2 feet below the groundwater table, whichever occurs first.

Confirmation samples will be collected in accordance with 40 CFR 761.61(a)(6) and Subpart O from each excavation cell as a composite sample of up to nine subsamples. No sidewall samples will be collected if the excavation is 1 foot deep or less and the adjacent cell has been confirmed clean. Excavation sampling procedures and figures showing the proposed sampling grid and sampling locations are provided in the SAP (Appendix D).

If, during the course of removal activities, PCBs are detected above 1 mg/kg beyond the proposed excavation limits, the excavation may be expanded depending on proximity to existing structures and other surface and subsurface constraints that would interfere with the excavation.

Stage III: Because PCB is the only COC at the Wood Shop Area, characterization samples will not be submitted to a fixed laboratory for additional analyses.

Stage IV: Upon confirmation of PCB results below the cleanup level, or the excavation reaches 15 feet bgs or 2 feet below the groundwater table, whichever occurs first, backfilling activities will commence. Prior to backfilling within 10 feet of the building footprint, a nonwoven geotextile liner will be placed at the bottom and along the sidewalls of the excavation where soil PCB concentrations remain above 1 mg/kg.

4.5.3 Management of Excavated Materials

During excavation activities, materials will be segregated into five categories:

- Non-TSCA material (soil and debris)
- TSCA soil
- Non-impacted debris
- Overburden material
- Septic UST waste

Materials from the excavation will be segregated and managed in accordance with the WMP (Appendix G). Soil containing PCBs greater than or equal to 50 mg/kg (TSCA soil), and soil and debris with PCBs between 1 and 50 mg/kg (non-TSCA material), based on the field laboratory analysis, will be segregated and placed in separate bags. Non-TSCA material and TSCA soil will be weighed using a contractor-provided calibrated scale and transported to the Bag Staging Area for storage until shipment for offsite disposal, in accordance with the WMP (Appendix G). Waste characterization samples will be collected in accordance with the SAP (Appendix D) to verify the waste has been adequately characterized for the appropriate disposal facility.

Non-impacted debris and concrete (containing PCBs less than 1 mg/kg) removed from the excavation areas will be temporarily stockpiled at the Project Site in a designated area. Upon confirmation, the non-impacted debris will be disposed of as nonhazardous waste, in accordance with the WMP (Appendix G).

Potentially clean overburden soil will be segregated and stockpiled at the Overburden Stockpile Area. Approximately 1,060 cy of overburden material is estimated to be removed from the Project Site and reused as backfill material. Confirmation samples for PCB analysis will be collected at a rate of 1 per 50 cy and analyzed by the field mobile laboratory. Headspace screening samples will be collected at a rate of 1 per 10 cy of stockpiled soils, confirmation samples for fixed laboratory analysis will be collected at a rate of 3 samples plus

1 sample per each additional 200 cy of stockpiled soils, in accordance with the ADEC *Draft Field Sampling Guidance* (ADEC 2010) and as discussed in the SAP (Appendix D).

Confirmation samples must be below the most stringent ADEC Method Two cleanup levels (ADEC 2014) for the material to be used as backfill. Upon confirmation, the stockpiled soils will be reused as the excavation backfill material. Overburden material that exceeds the PCB cleanup level or ADEC Method Two cleanup levels will not be used for backfill but will be segregated and disposed of as non-TSCA material at the designated disposal facility.

As indicated above, a septic UST, located within the proposed excavation area encountered during the 2008 PCB cleanup effort remains at the Project Site (Appendix A, Figure A-7). Waste associated with the removal of this septic UST (i.e., tank, sludge, and liquid) will be sampled in accordance with the SAP (Appendix D) and segregated and managed in accordance with the WMP (Appendix G).

Additional details describing the handling, packaging, labeling, transportation, and disposal of materials removed from the Project Site is provided in the WMP (Appendix G).

4.5.4 Wastewater Management

Wastewater will consist of water generated from the decontamination of non-disposable PPE and excavation equipment and any rainwater that may accumulate in the temporary storage areas. Generated wastewater will be collected in 55-gallon, open-top drums and stored at the Drum Storage Area (Appendix A, Figure A-6). The wastewater will be treated on site with a water treatment system to meet the State of Alaska regulatory discharge requirements.

The onsite water treatment system will consist of a portable sediment filtration unit, granulated activated carbon filter unit, sample ports, and a pump. Pre- and post-treatment wastewater samples will be collected in accordance with the SAP (Appendix D). Treated water will be stored in clean drums. Based on pre- and post-treatment analytical sample results, the water will be discharged to the ground surface with a vegetative mat following all

applicable ADEC regulations and upon ADEC review of data and approval for discharge. Treated water will not be discharged to surface water or in such a way as to cause erosion. Wastewater management will follow the State of Alaska regulations as discussed further in the WMP (Appendix G).

4.6 WASTE MATERIAL TRANSPORT AND DISPOSAL

All waste materials generated will be transported and disposed of in accordance with State of Alaska, local, and federal requirements. Documentation of waste characterization and approved acceptance by an appropriate disposal facility will be maintained as part of waste tracking records. Waste profiles will be created to identify each waste stream. Profiles will be signed by the generator and updated, as needed, to reflect new waste streams or changes in waste characterization or handling.

Waste transportation and the receiving disposal facility will be licensed and approved by the appropriate governing agency. Documentation of these activities will be included in waste tracking records. As waste is transported offsite, it will be packed and labeled in accordance with federal, state, and local transportation requirements. Copies of waste profiles, waste manifests/bills of lading, and certificates of disposal will be obtained from the disposal facilities for all waste shipments in order to document proper transportation and disposal of all waste streams. The WMP (Appendix G) provides additional details on waste handling, storage, transportation, and disposal.

4.7 SITE RESTORATION AND DEMOBILIZATION

Excavations will be backfilled and graded to match pre-existing conditions before the beginning of the school year. Backfill material will consist of the soil stockpiled at the Overburden Stockpile Area, and imported material from the local borrow source. The local borrow source is located west of the Barge Landing Area, at the approximate location shown on Figure A-2. The material at this location was sampled during the 2008 field activities and did not contain concentrations of target analytes greater than ADEC Method Two cleanup levels (ADEC 2014). The same borrow source material was used during the 2009

characterization effort. To confirm the 2008 and 2009 analytical results, one soil sample will be collected of the borrow material and analyzed at a fixed laboratory for RCRA metals, VOCs, and PCBs, in accordance with the SAP (Appendix D). The analytical results of this sample must be below the most stringent ADEC Method Two cleanup levels (ADEC 2014) for the material to be used as backfill. Backfill material will be free of debris and vegetation.

All backfill material will be placed in no more than 1-foot lifts and compacted by a minimum of two passes by heavy equipment or with the excavator bucket. Backfill will be placed and graded to match existing conditions that will ensure positive drainage to prevent ponding and soil erosion. The Remediation Contractor will evaluate final site conditions to determine whether the backfilled areas must be seeded and/or mulched to minimize potential soil erosion, and will discuss the determination with ADOT&PF prior to conducting the work.

In the event the PCB removal is not completed during the construction season, the Remediation Contractor will place nonwoven geotextile liner at the bottom and along the sidewalls of the excavations prior to placing backfill. The nonwoven geotextile liner will demarcate the boundary between the backfill and potentially contaminated soil.

At project completion, all erosion controls and temporary storage areas used during construction activities will be removed, and other construction-related support areas will be restored to their pre-existing conditions. In addition, the fuel pipelines, AST fill ports, fuel dispenser, and chain-link fencing will be replaced. A determination to whether the storage shed is to be replaced at project completion will be discussed with KSD prior to demobilization.

Demobilization from the Project Site will occur following the completion of all field activities. All machinery, equipment, and non-disposable tools will be decontaminated prior to leaving the Project Site, in accordance with the SSHP (Appendix F). All decontamination waste will be managed in accordance with the WMP (Appendix G).

4.7.1 Surveying

Using a real-time kinetic (RTK) global positioning system (GPS), the proposed excavation at the Wood Shop Area and Former Septic System Area, sampling grid, and proposed pre-excavation sample locations will be staked out. Throughout the PCB removal action efforts, the following items will be surveyed using the RTK GPS:

- Location of pre-excavation, confirmation, and excavation characterization samples.
- Initial stake out of the extent and depth of each proposed excavation cell.
- Final limit and depth of each excavation cell, if accessible. If the base of the excavation is inaccessible, manual measurements will be collected using a tape measure and plumb-bobs, and trilateration from control points as appropriate.
- Location of temporary storage areas.

In accordance with ADOT&PF requirements, a survey will be conducted by the Remediation Contractor or their subcontractor. Table 4-2 provides a list of items that, at a minimum, will be surveyed at the Project Site:

Table 4-2
List of Surveys

Survey	Frequency
Pre- and Post-Topographic survey of Project Area (0.5-foot contours)	50-foot square grid and at grade change
Location of the final extent of the Wood Shop Area excavation	15-foot intervals
Location of the final extent of the Former Septic System Area excavation	15-foot intervals
Location of replaced chain-link fence	As necessary
Location of reinstalled fuel pipelines and associated components	As necessary
Location of the storage shed	At building corners
Location of any storage areas that remains at project completion	As necessary
Location and elevation of the replacement environmental monitoring features, if any	Top of casing, top of cover and ground surface

The surveyed locations and relative elevations will be presented on a base map. Survey controls will be established using either conventional or GPS equipment. Data will be

reported in feet using World Geodetic System 1984 (WGS 1984) latitude/longitude and North American Vertical Datum of 1988 (NAVD88) coordinate systems in feet (orthometric height). Surveys will be collected to a minimum horizontal quality of +/- 1.5 feet and minimum vertical quality of 0.5 foot. Check shots will be taken daily at a known location 'pre' and 'post' use to verify that the equipment is accurate to ± 0.1 feet. Local control monuments are shown on Figure A-2, and associated National Geodetic Survey data sheets are provided in Appendix I.

4.8 REMEDIAL ACTION REPORT

The Remedial Contractor will prepare and submit a draft and final PRP/Hazardous, Toxic, and Radioactive Waste (HTRW) Remedial Action Report. The report will include, but not be limited to, the following information:

- A cover letter signed and sealed by a Professional Engineer (registered in the State of Alaska) stating that all services have been performed in accordance with the terms and conditions of the contract
- Executive summary of fieldwork and results
- A narrative report describing activities undertaken to complete the project, including variances from the planning documents. At a minimum, the following activities will be described: removal and replacement of all utilities and environmental monitoring points, contaminated soil excavation, analytical sample results, waste transport and disposal, and placement of uncontaminated backfill. In addition, a description of the location of any remaining contamination and placement of cap, and a cap maintenance plan will be provided in the report.
- Tables, drawings, figures, and calculations to support the narrative report, summarize site data, show locations of field activities, and illustrate processes and decision matrices. Figures will include, but not be limited to, a map of the Project Site displaying excavation boundaries, volumes, and confirmation soil sample locations and results, as well as pertinent site features.
- Appendices containing copies of all chemical data generated, permits, waste manifests, waste profile sheets, certificates of disposal, field notebooks, logs, forms, daily contract quality reports, and other reports, progress photographs, survey data, and additional pertinent documentation.
- ADEC Laboratory Data Review Checklists completed and submitted with laboratory data.
- ADEC Contaminated Site Laboratory Approval Letter.

- An evaluation of risks, if any, presented by any PCB-contaminated soil beneath the Middle School and identification of Appropriate Institutional Controls to address any identified risks.
- Recommendations for additional activities including, but not limited to, soil sampling adjacent to the Middle School foundation, estimating the associated volume of additional PCB-contaminated soil that could feasibly be removed without disturbing the building foundation, and proposing soil removal methods that would provide suitable foundation support during and after removal.
- References.

Within 90 calendar days following receipt of all analytical sample results, the pre-draft PRP/HTRW Remedial Action Report will be submitted to the PRP Group for review and comment. The PRP Group will review and provide the Remediation Contractor comments on the pre-draft Report for response within 45 days after submittal. Following one round of comment and response period, it is anticipated that the draft Remedial Action Report will be submitted to ADEC for review and comment. The final Remedial Action Report will be submitted to the PRP Group, ADEC, and EPA Region 10 within 120 days after the disposal verification is received.

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5.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2014 (October). *Oil and Other Hazardous Substances Pollution Control*. 18 AAC 75.

ADEC. 2010 (May). *ADEC Draft Field Sampling Guidance*. Draft.

OASIS Environmental, Inc. 2012 (June). *Focused Feasibility Study-Groundwater, Aniak Middle School, Aniak, Alaska*.

Shannon & Wilson, Inc., 2010 (June), *Final Site Characterization Report, Former White Alice Communication System, Aniak Middle School Site, Aniak, Alaska.*

Shannon & Wilson, Inc., 2009 (April), *PCB Cleanup, Former White Alice Communication System, Aniak Middle School Site, Aniak, Alaska.*

USGS (U.S. Geological Society). 1988. *Element Concentration in Soils and Other Surficial Material of Alaska*. USGS 1458.

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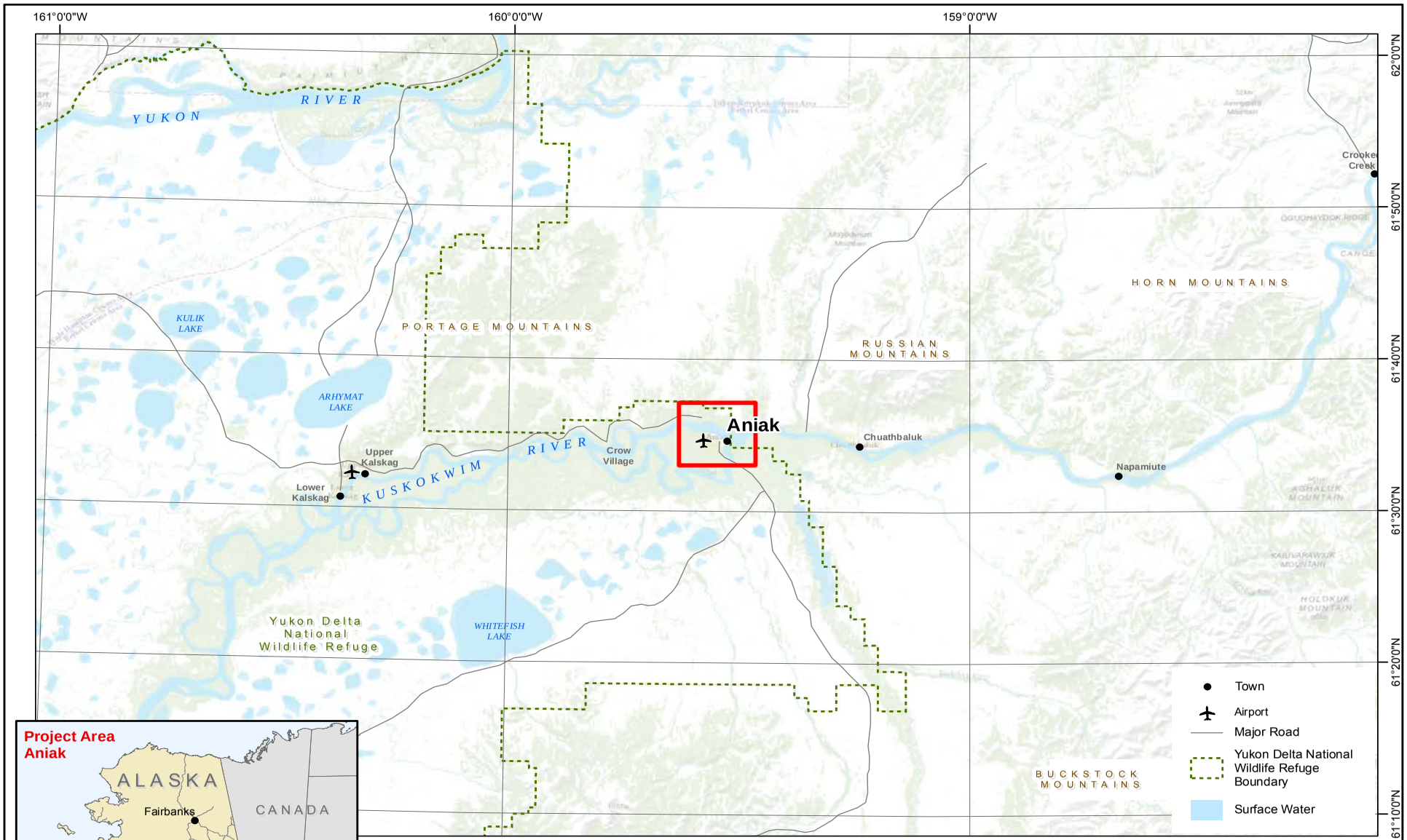
APPENDIX A

Figures

Figure A-1	Site Location
Figure A-2	Site Vicinity Map
Figure A-3	Site Plan-Existing Conditions
Figure A-4	Former Septic System Area Historical Site Plan
Figure A-5	Wood Shop Area Historical Plan
Figure A-6	Site Preparation Plan
Figure A-7	Former Septic System Area Excavation Plan
Figure A-8	Wood Shop Area Excavation Plan



1 inch=10 miles

0 5 10 15 20

Miles

WGS84 UTM 6N

N

SITE LOCATION

PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	30 OCT 2014	G. RUTKOWSKI	A-1

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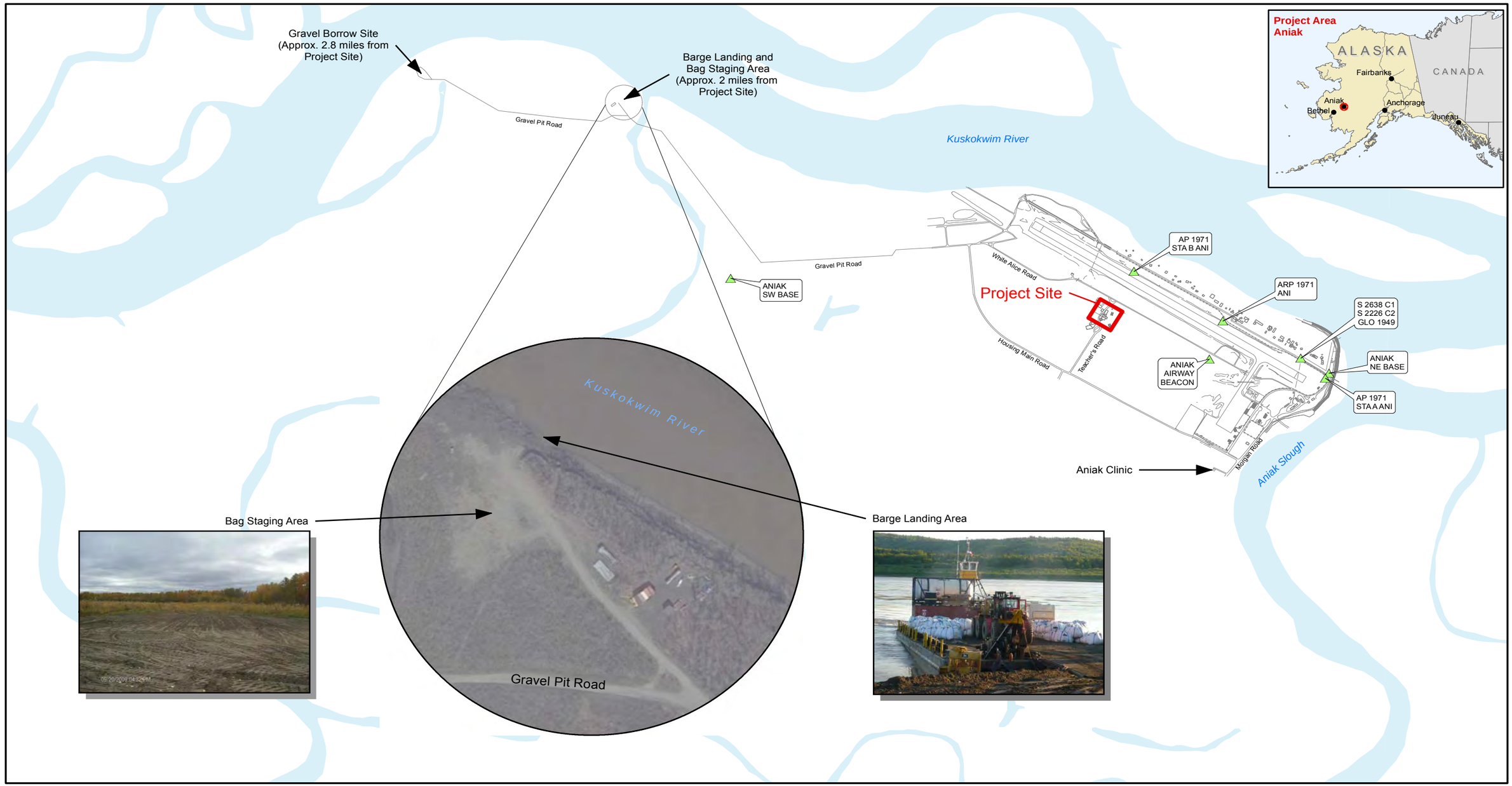

Sources:
1. Photos obtained from the Shannon & Wilson report titled PCB Cleanup (April 2009).
2. This drawing was developed from a drawing prepared by Shannon & Wilson for the Final Site Characterization Report (June 2010).
3. Basemap hydrology from Department of Natural Resources 2011 Geodatabase at 1:63360 scale.
4. Imagery provided by Bing Maps Aerial Service Layer May 2010.
5. Survey monuments were downloaded from the National Geodetic Survey website: www.ngs.noaa.gov

N

1 inch = 2,000 feet

0 1,000 2,000 3,000 4,000
Feet

WGS84 UTM 6N, meters

National Geodetic Survey Monuments [2012]

SITE VICINITY
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 22 DEC 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: A-2

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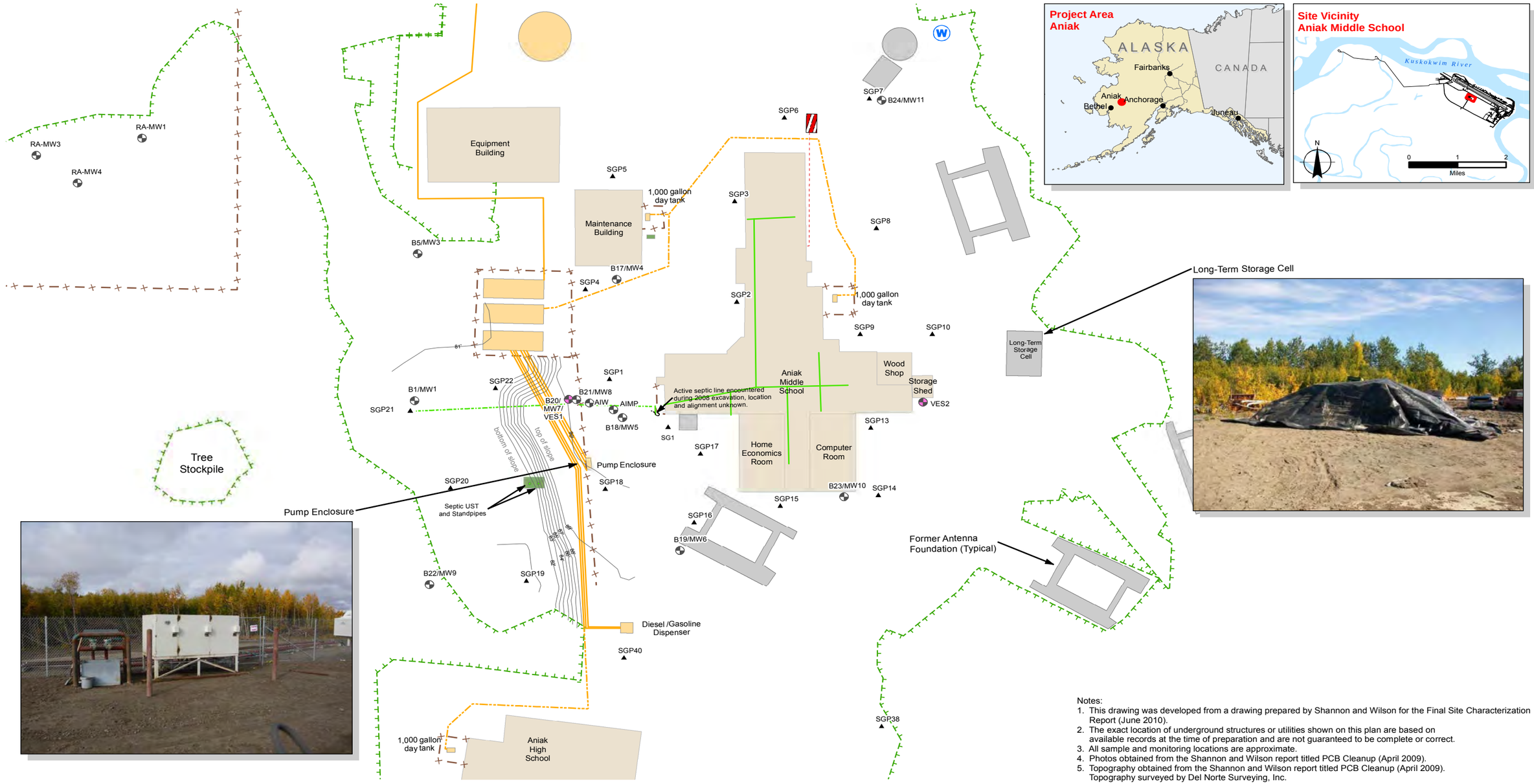


Notes:
1. This drawing was developed from a drawing prepared by Shannon and Wilson for the Final Site Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. Photos obtained from the Shannon and Wilson report titled PCB Cleanup (April 2009).
5. Topography obtained from the Shannon and Wilson report titled PCB Cleanup (April 2009). Topography surveyed by Del Norte Surveying, Inc.

1 inch = 60 feet

0 30 60 90 120
Feet

WGS84 UTM 6N, meters

- Drinking Water Well
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Ground Surface Contour [1 Foot Interval]
- Aboveground Fuel Line
- Underground Fuel Line
- Former Septic Line (Removed in 2008)
- Sanitary Sewer Line
- Underground Electrical Line
- Vegetation Line
- Fence
- Transformer
- AST
- UST
- Structure
- Building

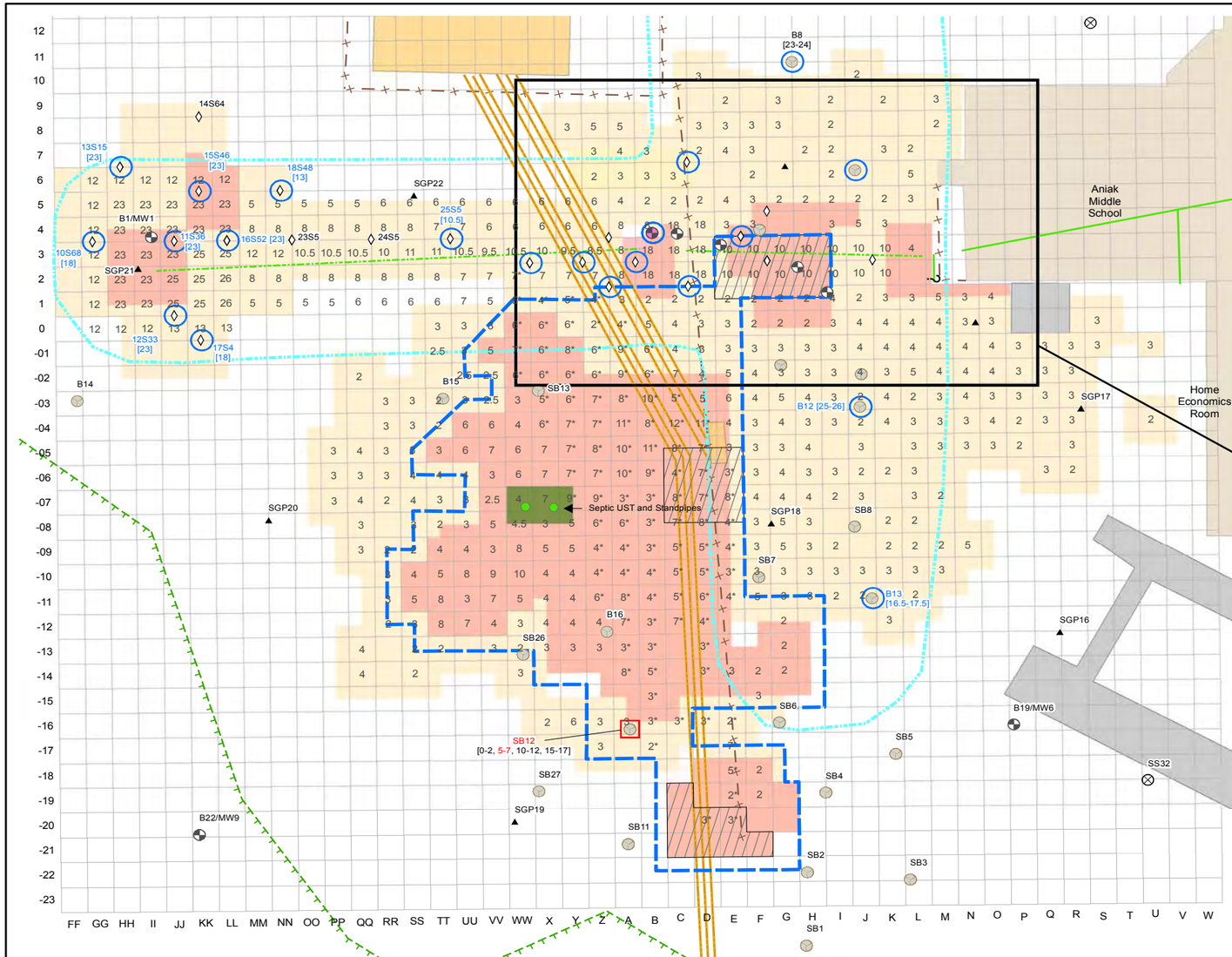
N

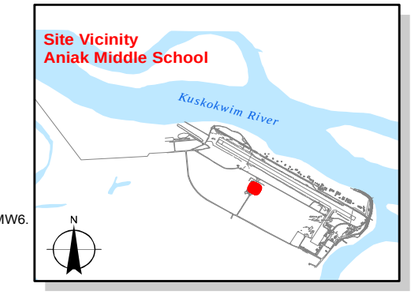
SITE PLAN - EXISTING CONDITIONS
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

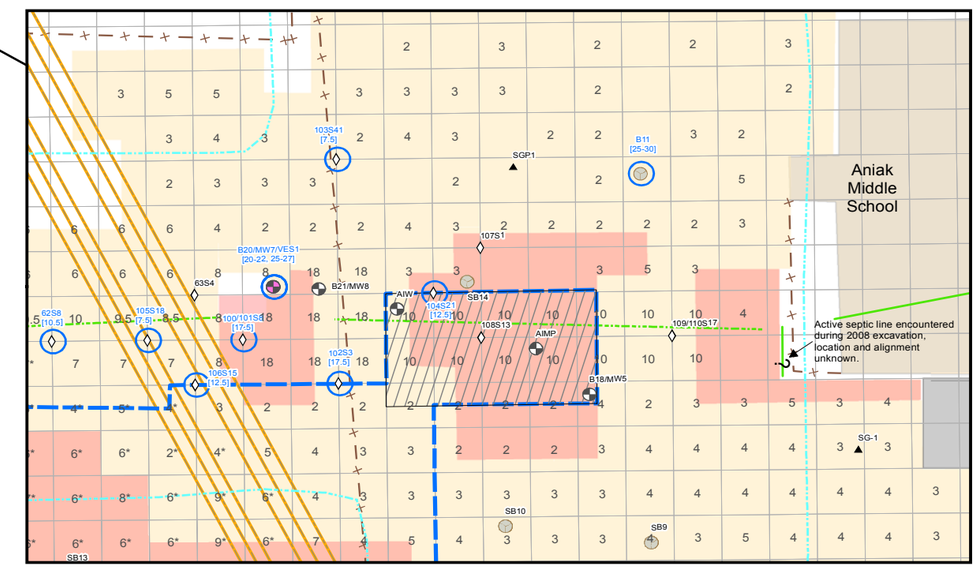
JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	30 OCT 2014	G. RUTKOWSKI	A-3

P:\Aniak\MXD\A3_Aniak_ExistingSitePlan.mxd wattsa

Notes:
1. This drawing was developed from drawings prepared by Shannon & Wilson for the Final Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. All discrete samples have prefix "FSCS" and were collected during the 2008 PCB cleanup effort.
5. Proposed excavation based on historical analytical field screening results and project objectives.
6. Soil borings SB1 through SB14, SB26 and SB27 were advanced during the 2009 charaterization effort (June 2010).
7. Soil borings B1 through B5 were advanced in October 2006. Soil borings B6 through B19 were advanced in May 2008. Soil Borings B17 through B19 were converted into new monitoring wells, MW4 through MW6. Soil borings B20 through B25 were advanced in August 2009 to install new monitoring wells, MW7 to MW12 (June 2010).







Soil with TCE > 0.02 mg/kg [sample depths in feet bgs and blue where exceeding]

Soil with PCB > 1mg/kg [sample depths in feet bgs and red where exceeding]

2008 Excavation Confirmation Sample with PCB > 1 mg/kg

2008 Excavation Confirmation Sample with PCB < 1 mg/kg

Proposed Excavation

Inferred Extent of Remaining TCE Contamination in Soil (TCE Area)

TSCA Soil

Surface Soil Sample (1998)

Discrete Sample

Soil Boring

Soil Gas Probe

Vapor Extraction Well

Groundwater Monitoring Well

Aboveground Fuel Line

Former Wet Septic Line

Sanitary Sewer Line

Vegetation Line

Fence

UST

AST

Building

Structure

1 inch = 25 feet

0 25 50 75 100

Feet

WGS 1984 UTM Zone 4N Transverse Mercator

4 Grid labeled with depth of 2008 excavation from pre-excavation ground surface (feet bgs).

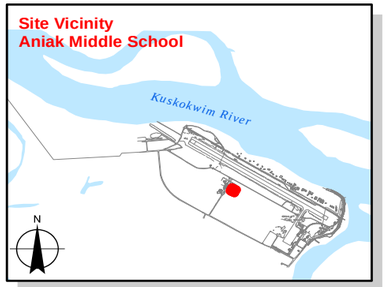
4* * Denotes current ground surface is approximatley 1 to 5 feet higher than pre-excavation ground surface. See Geological Cross Sections in Appendix B.

FORMER SEPTIC SYSTEM AREA HISTORICAL PLAN

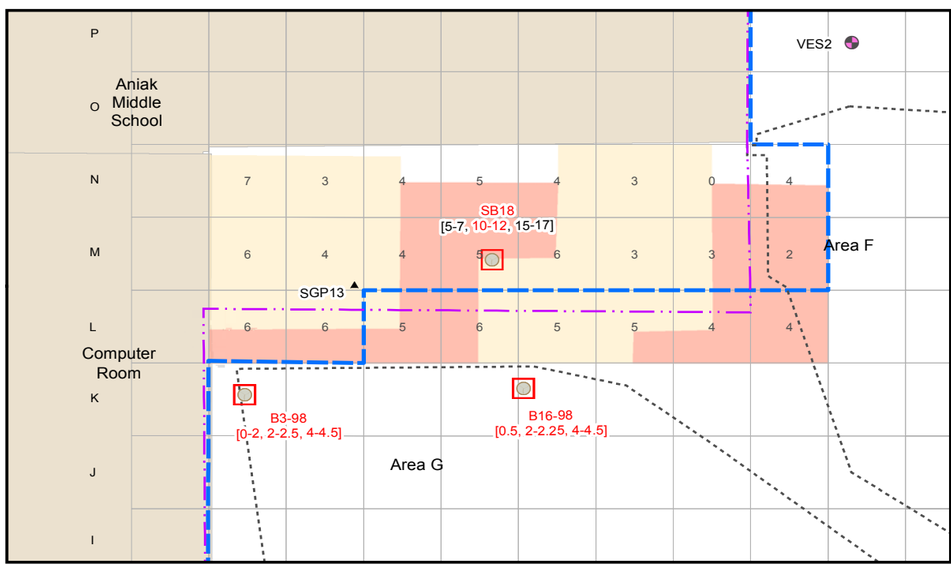
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

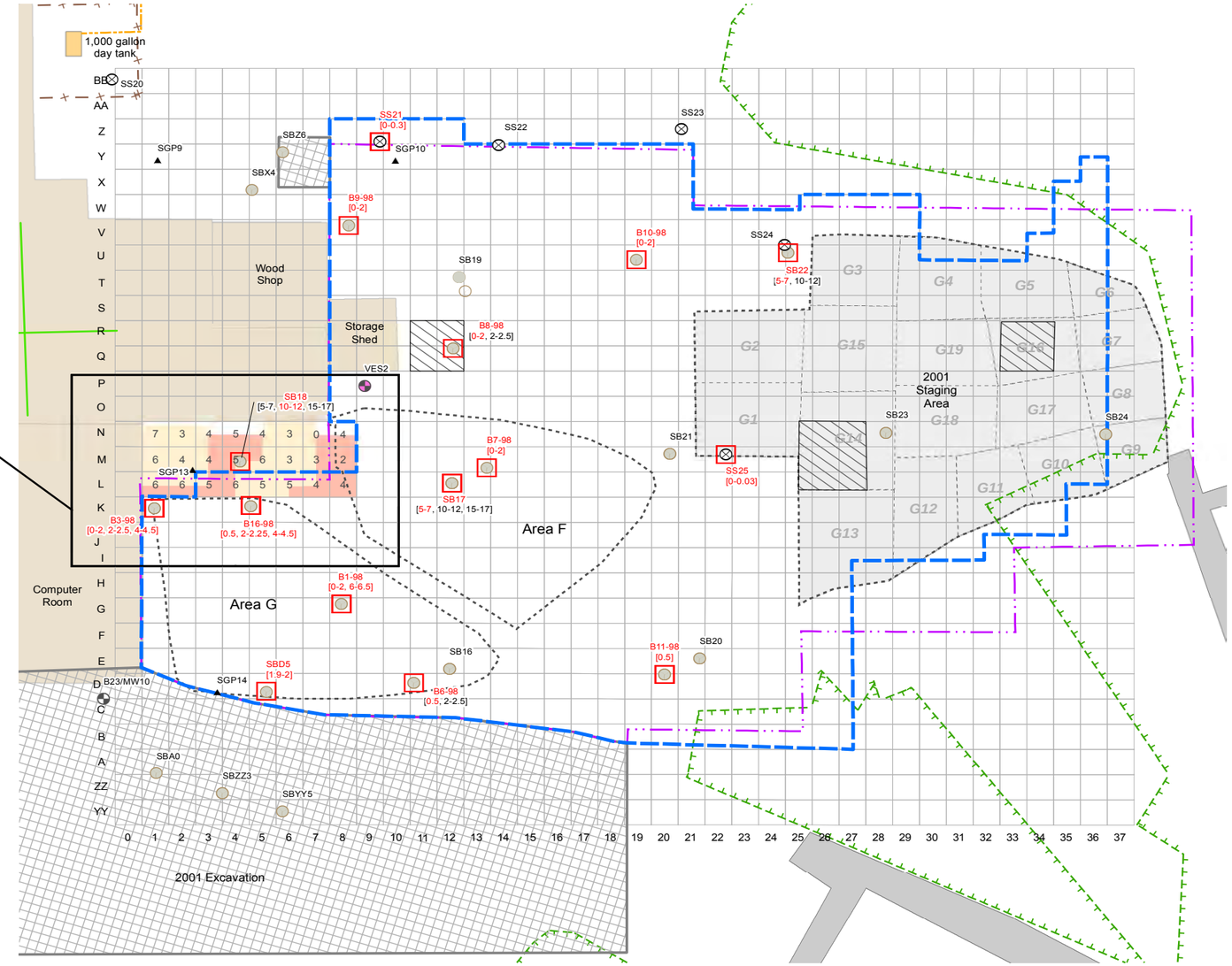
JACOBS	DATE: 30 OCT 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: A-4

P:\Aniak\MXD\A4_Aniak_HistoricPlan_FormerSeptic.mxd watta



Notes:
1. This drawing was developed from drawings from the Shannon & Wilson reports titled PCB Cleanup (April 2009) and the Final Site Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. Proposed excavation based on historical analytical and field screening results.
5. Hand borings B1-98 through B16-98 were advanced in June 1998, and labeled as B1 through B16 in the Shannon & Wilson report PCB Cleanup (April 2009).
6. G1 through G19 are confirmation samples collected in August 2001 from their respective area within the 2001 Staging Area.
7. Soil borings SB15 through SB24, SBYY5, SBZZ3, SBA0, SBD5, SBX4, and SBZ6 were advanced during the 2009 characterization effort (June 2010).





- Soil with PCB > 1mg/kg [sample depths in feet bgs and red where exceeding]
- Surface Soil Sample (1998)
- Soil Boring
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Proposed Excavation
- Defined Areas
- Extent of remaining geotextile liner and gravel cap (1997 and 2001)
- 2001 Excavation
- Potential TSCA Soil
- Underground Fuel Line (Electric Associated)
- Sanitary Sewer Line
- Vegetation Line
- Fence
- AST
- 2008 Excavation Confirmation Sample with PCB > 1 mg/kg
- Staging Area Confirmation Sample (see notes)
- 2008 Excavation Confirmation Sample with PCB < 1 mg/kg
- Building
- Structure
- 4 — Grid labeled with depth of 2008 excavation from pre-excavation ground surface (feet bgs).

1 inch = 25 feet

0 25 50 75 100
Feet

WGS 1984 UTM Zone 4N Transverse Mercator

N

WOOD SHOP AREA HISTORICAL PLAN
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
24 DEC 2014	G. RUTKOWSKI	A-5

P:\Aniak\MXD\A5_Aniak_HistoricPlan_Woodshop.mxd wattta

CONSTRUCTION NOTES:

1. LOCATE ALL ONSITE UTILITIES PRIOR TO THE START OF ANY EARTHWORK ACTIVITIES. IF AT ANY TIME DURING THE PROJECT THE CONDITIONS OF THE PROJECT SITE CHANGE, AN ADDITIONAL UTILITY LOCATE REQUEST TO BE REQUESTED FOR UTILITY CLEARANCE.

2. PROTECT EXISTING FACILITIES AND STRUCTURES NOT SLATED FOR REMOVAL FROM DAMAGE. REMEDIATION CONTRACTOR IS RESPONSIBLE FOR REPLACEMENT AND/OR REPAIRS OF ANY STRUCTURES DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT.

3. INSTALL TEMPORARY CONSTRUCTION FENCING (OR OTHER EFFECTIVE MEANS) AROUND PERIMETER OF ELECTRICAL TRANSFORMER TO PROTECT IT THROUGHOUT THE DURATION OF THE PROJECT.

4. ESTABLISH AN EXCLUSION ZONE, DESIGNATED PARKING AREA(S), FIELD OFFICE LOCATION, AND TRAFFIC CONTROL PLAN TO BE IMPLEMENTED DURING CONSTRUCTION ACTIVITIES.

5. CONSTRUCT AND MAINTAIN TEMPORARY STORAGE AREAS INCLUDING THE OVERBURDEN STOCKPILE AREA, DRUM STORAGE AREA, BAG STAGING AREA, AND A NON-IMPACTED DEBRIS AREA (IF NECESSARY) IN ACCORDANCE WITH WASTE MANAGEMENT PLAN. ALL STORAGE AREAS TO BE DECOMMISSIONED AT PROJECT COMPLETION.

6. REMOVE EXISTING CHAIN LINK FENCE DURING CONSTRUCTION AND REPLACE AT PROJECT COMPLETION.

7. COORDINATE WITH KUSPUK SCHOOL DISTRICT (KSD) AND REMOVE ABOVEGROUND FUEL PIPELINES, PUMP ENCLOSURE, AND ASSOCIATED ELECTRICAL CONDUIT AND COMPONENTS NECESSARY TO FACILITATE EXCAVATION ACTIVITIES. DRAIN FUEL LINES PRIOR TO REMOVAL. CONTAIN THE DRAINED FUEL IN DRUMS AND REUSE ON SITE. FUEL PIPELINES AND ASSOCIATED COMPONENTS ARE TO BE PLACED ON A PLASTIC LINER WITHIN AN AREA DESIGNED FOR TEMPORARY STORAGE AND BE REPLACED, TESTED AND FULLY FUNCTIONAL AT PROJECT COMPLETION.

8. STORAGE SHED TO BE EITHER RELOCATED TO AN APPROVED LOCATION OR DEMOLISHED. REMEDIATION CONTRACTOR TO EVALUATE THE CONDITION OF SHED TO DETERMINE WHETHER RELOCATION IS FEASIBLE AND DEVELOP A PLAN FOR APPROVAL.

9. REMOVE AND RELOCATE THE LONG-TERM STORAGE CELL OUTSIDE THE EXTENTS OF THE PROPOSED WOOD SHOP AREA EXCAVATION. MATERIALS STORED IN THIS CELL TO BE USED FOR THE PROJECT.

10. ENVIRONMENTAL MONITORING POINTS SHOWN IN SCHEDULE BELOW TO BE DECOMMISSIONED IN ACCORDANCE WITH STATE OF ALASKA REQUIREMENTS AND GUIDANCE.

11. PLACE BARRICADES OR OTHER MEANS TO PROTECT ENVIRONMENTAL MONITORING POINTS DURING CONSTRUCTION ACTIVITIES. REMEDIATION CONTRACTOR WILL BE RESPONSIBLE FOR REPLACEMENT OF ENVIRONMENTAL MONITORING POINTS DAMAGED AS A RESULT OF CONSTRUCTION ASSOCIATED WITH THIS PROJECT.

12. AS NECESSARY, INSTALL AND MAINTAIN SILT FENCE OR SEDIMENT LOGS/STRAW WATTLE ALONG THE DOWNSLOPE EXTENT OF EACH EXCAVATION AREA. INSTALL AND MAINTAIN ANY ADDITIONAL RUNOFF AND EROSION CONTROL MEASURES AS APPROPRIATE TO PROTECT THE ENVIRONMENT. PRESERVE NATURAL VEGETATION TO THE EXTENT PRACTICABLE DURING PROJECT DURATION. PERFORM INSPECTIONS AND MAINTAIN INSPECTION RECORDS OF RUNOFF AND EROSION CONTROLS. REPAIR ANY DAMAGED SITE CONTROLS AND MAINTAIN CONTROLS THROUGHOUT DURATION OF PROJECT.

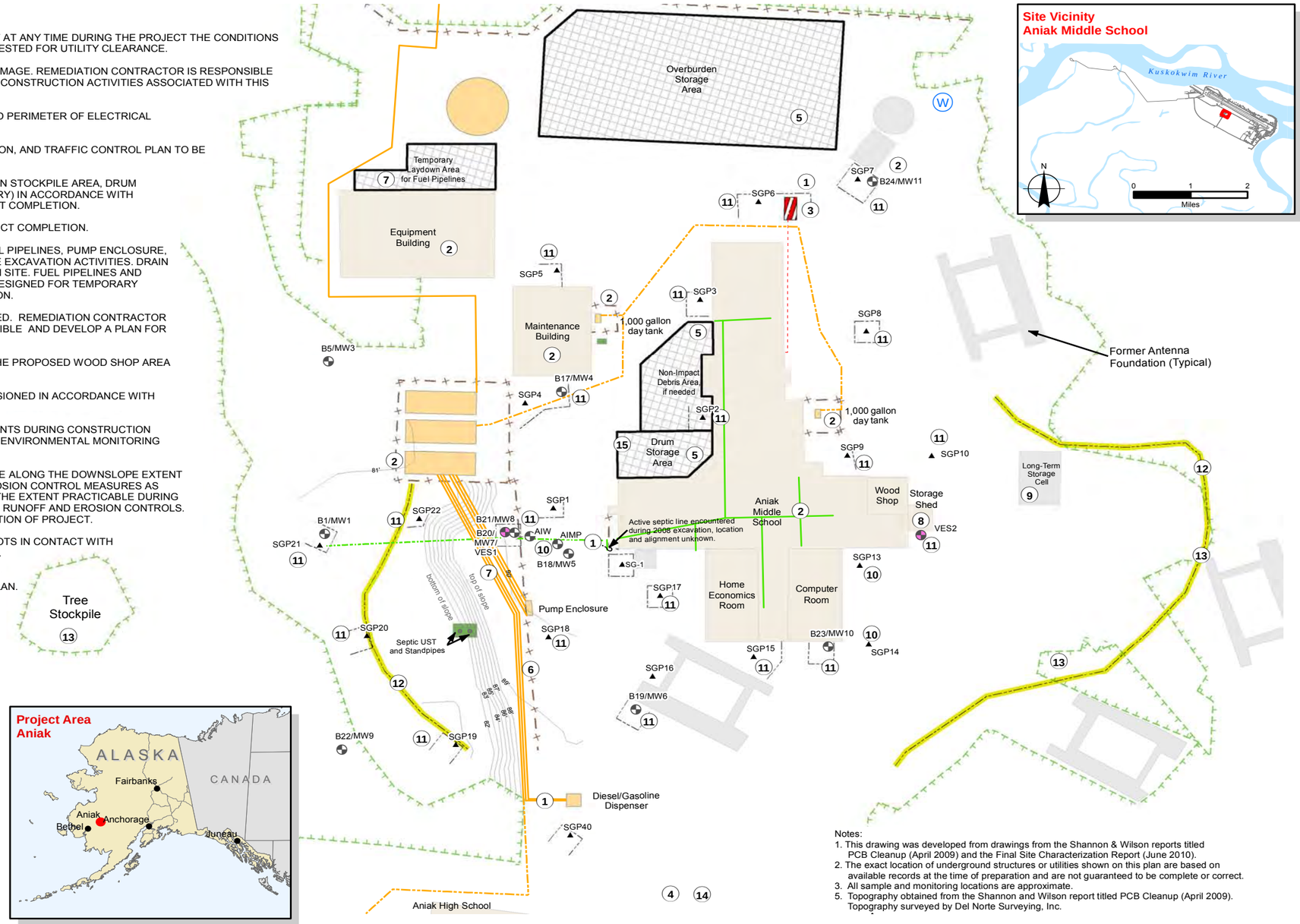
13. CLEAR TREES AND VEGETATION AS NECESSARY TO FACILITATE EXCAVATION. TREE ROOTS IN CONTACT WITH PCB-CONTAMINATED SOIL TO BE DISPOSED OFFSITE AS PCB-CONTAMINATED MATERIAL.
TREE LOGS TO BE DE-LIMBED,
AND THE LIMBS AND BRUSH TO BE EITHER CHIPPED FOR REUSE AS MULCH AT PROJECT COMPLETION OR STOCKPILED AT THE TREE STOCKPILE AREA, AS IDENTIFIED ON THE PLAN.

14. PROVIDE AND OPERATE AN ELAP-CERTIFIED AND ADEC APPROVED MOBILE FIELD ANALYTICAL LABORATORY AT AN APPROVED LOCATION AT THE PROJECT SITE. DECOMMISSION LABORATORY AT PROJECT COMPLETION.

15. PROVIDE A WASTEWATER TREATMENT SYSTEM AND DEWATERING EQUIPMENT TO MANAGE, TREAT AND DISCHARGE WASTEWATER GENERATED DURING PROJECT IN ACCORDANCE WITH THE STATE OF ALASKA DISCHARGE REQUIREMENTS.DISCHARGE PERMIT TO BE OBTAINED BY THE REMEDIATION CONTRACTOR. OPERATEAND MAINTAIN TREATMENT SYSTEM AND DEWATERING EQUIPMENT THROUGHOUT DURATION OF PROJECT. DECOMMISSION THE SYSTEM AND EQUIPMENT AT PROJECT COMPLETION.

(10)

Environmental Monitoring Point Decommission Schedule			
Point ID	Casing Type	Diameter (inches)	Depth (feet bgs)
MW5	Schedule 40 PVC	2	32
SGP13	Schedule 40 PVC	2	25
SGP14	Schedule 40 PVC	2	15
AIMP	Steel	2	35
AIW	Steel	2	45



Notes:
1. This drawing was developed from drawings from the Shannon & Wilson reports titled PCB Cleanup (April 2009) and the Final Site Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
5. Topography obtained from the Shannon and Wilson report titled PCB Cleanup (April 2009). Topography surveyed by Del Norte Surveying, Inc.

1 inch = 60 feet

0 30 60 90 120
Feet

WGS84 UTM 6N, meters

N

- Drinking Water Well
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Aboveground Fuel Line
- Underground Fuel Line
- Former Septic Line
- Sanitary Sewer Line
- Underground Electrical Line
- Vegetation Line
- Barricade
- Chain Link Fence
- Proposed Silt Fence or Straw Wattle
- Ground Surface Contour [1 Foot Interval]
- Temporary Storage Area
- Transformer
- AST
- UST
- Structure
- Building

SITE PREPARATION PLAN
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
23 DEC 2014	G. RUTKOWSKI	A-6

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CONSTRUCTION NOTES:

1. PERFORM PRE-EXCAVATION SAMPLING IN ACCORDANCE WITH THE SAMPLING AND ANALYSIS PLAN (WORK PLAN, APPENDIX D).

2. FOLLOWING CONFIRMATION OF PROPOSED EXCAVATION EXTENT, PROCEED WITH THE PROPOSED SEQUENCE FOR EXCAVATION:

   a. *STAGE I*: REMOVE OVERBURDEN MATERIALS FROM THE PROPOSED EXCAVATION. OVERBURDEN THICKNESS RANGES BETWEEN 2 AND 12 FEET. OVERBURDEN MATERIAL TO BE STOCKPILED APPROXIMATELY EVERY 50 CY AT THE OVERBURDEN STOCKPILE AREA. REMOVE UNDERLYING PLASTIC LINER. OVERBURDEN MATERIALS THAT COME IN CONTACT WITH UNDERLYING PCB-CONTAMINATED SOILS TO BE MANAGED AS NON-TSCA WASTE.

   b. *STAGE II*: REMOVE ADDITIONAL PCB-CONTAMINATED SOIL FROM BENEATH THE PLASTIC LINER. THE PROPOSED DEPTH OF EXCAVATION BELOW THE LINER FOR EACH EXCAVATION CELL ARE AS SHOWN. COLLECT CONFIRMATION SAMPLES IN ACCORDANCE WITH THE SAMPLING AND ANALYSIS PLAN (SAP). IF SAMPLE RESULTS HAVE PCB CONCENTRATIONS GREATER THAN 1 MG/KG BUT LESS THAN 10 MG/KG, REMOVE AN ADDITIONAL ONE FOOT OF SOIL WITHIN THE EXCAVATION CELL. IF SAMPLE RESULTS HAVE PCB CONCENTRATIONS EXCEEDING 10 MG/KG, REMOVE AN ADDITIONAL TWO FEET OF SOIL WITHIN THE EXCAVATION CELL AS THE EXCAVATION PROCEEDS AT EACH CELL, COLLECT CONFIRMATION SAMPLES AFTER EACH LAYER OF SOIL IS REMOVED UNTIL EITHER THE SAMPLE RESULTS INDICATE THAT THE CLEANUP LEVEL OF 1 MG/KG HAS BEEN MET OR EXCAVATION IS AT MAXIMUM DEPTH OF 15 FEET BGS OR 2 FEET BELOW GROUNDWATER TABLE, WHICHEVER OCCURS FIRST.

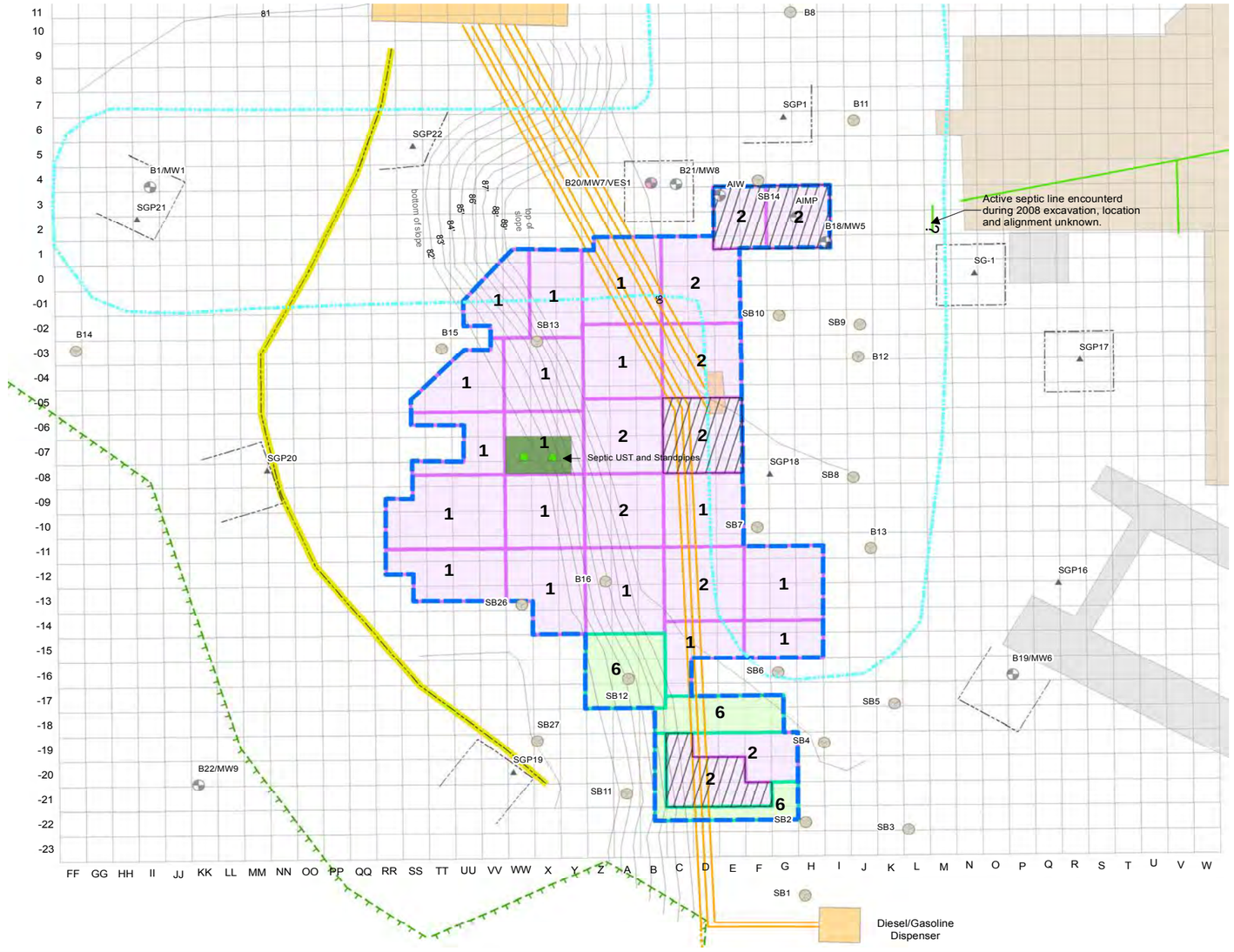
   c. *STAGE III*: UPON CONFIRMATION OF PCB RESULTS BELOW THE CLEANUP LEVEL OR THE EXCAVATION REACHES 15 FEET BGS OR 2 FEET BELOW GROUNDWATER TABLE, WHICHEVER OCCURS FIRST, COLLECT CHARACTERIZATION SAMPLES FROM AREAS WHERE TRICHLOROETHENE (TCE) REMAINS (TCE AREA) AND SUBMIT TO FIXED-LABORATORY IN ACCORDANCE WITH THE SAP.

   d. *STAGE IV*: BACKFILLING ACTIVITIES MAY COMMENCE FOLLOWING CONFIRMATION AND CHARACTERIZATION SAMPLING (WHEN APPLICABLE) IS COMPLETE. A NON-WOVEN GEOTEXTILE LINER IS TO BE PLACED AT THE BOTTOM AND ALONG THE SIDEWALLS OF THE EXCAVATION PRIOR TO PLACEMENT OF BACKFILL MATERIAL IN THE TCE AREA. BACKFILL MATERIAL TO BE PLACED NO MORE THAN 1-FOOT LIFTS AND COMPACTED BY A MINIMUM OF TWO PASSES BY HEAVY EQUIPMENT OR WITH THE EXCAVATOR BUCKET.

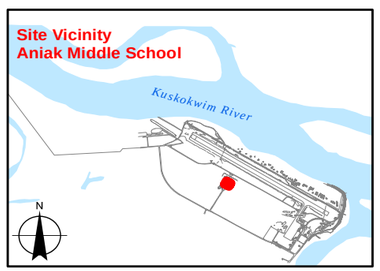
3. COORDINATE WITH KUSPUK SCHOOL DISTRICT (KSD) TO DETERMINE WHETHER THE SEPTIC UST IS ACTIVELY USED BY THE MIDDLE SCHOOL OR DETERMINE THE LOCATION OF THE MIDDLE SCHOOL SEPTIC SYSTEM. CONSULT WITH KSD TO DETERMINE ACCEPTABLE TIMES AND DURATION FOR ANY DISRUPTION TO THE ACTIVE SEPTIC SYSTEM. IF THE UST IS ACTIVE, EMPTY THE TANK AND ASSOCIATED PIPING, TEMPORARILY REMOVE THE TANK TO EXCAVATE THE PCB-CONTAMINATED SOIL BENEATH THE TANK, AND REPLACE THE TANK AT COMPLETION OF EXCAVATION. IF THE UST IS INACTIVE, EMPTY THE TANK AND ASSOCIATED PIPING, HANDLE AND DISPOSE OF THE SEPTIC WASTE PROPERLY, REMOVE AND PROPERLY HANDLE AND DISPOSE OF THE TANK AND PCB-CONTAMINATED SOIL BENEATH THE TANK. COLLECT SAMPLES OF GENERATED WASTE, INCLUDING TANK CONTENTS AND TANK MATERIAL IN ACCORDANCE WITH THE SAP (WORK PLAN, APPENDIX D), AND MANAGE WASTE IN ACCORDANCE WITH THE WASTE MANAGEMENT PLAN (WORK PLAN, APPENDIX G).

4. MATERIALS FROM THE EXCAVATION TO BE SEGREGATED AND MANAGED IN ACCORDANCE WITH THE WASTE MANAGEMENT PLAN. ALL WASTE DESIGNED FOR OFFSITE DISPOSAL TO BE PACKED AND LABELED IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL TRANSPORTATION REQUIREMENTS AND STAGED AT THE BAG STAGING AREA PRIOR TO SHIPMENT (SEE FIGURE A-2).

5. REMOVE ANY RAIN WATER THAT MAY ACCUMULATE IN TEMPORARY STORAGE AREAS. TREAT GENERATED WASTEWATER USING THE ONSITE WATER TREATMENT SYSTEM. DISCHARGE WATER IN ACCORDANCE WITH THE STATE OF ALASKA REGULATIONS.



Notes:
1. This drawing was developed from drawings from the Shannon & Wilson reports titled PCB Cleanup (April 2009) and Final Site Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. Proposed excavation based on historical analytical and field screening results.



- Excavation Cell [Proposed Depth in Feet Below Ground Surface]
- Excavation Cell [Proposed Depth in Feet Below Plastic Liner]
- Proposed Excavation
- Inferred Extent of Remaining TCE Contamination in Soil (TCE Area)
- TSCA Soil
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Soil Boring
- Aboveground Fuel Line
- Underground Fuel Line
- Sanitary Sewer Line
- Vegetation Line
- Barricade
- Proposed Silt Fence or Straw Wattle
- Ground Surface Contour [1 Foot Interval]
- AST
- UST
- Building
- Structure

1 inch = 25 feet

0 25 50 75 100
Feet

WGS 1984 UTM Zone 4N Transverse Mercator

FORMER SEPTIC SYSTEM AREA EXCAVATION PLAN
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 24 DEC 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: A-7

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CONSTRUCTION NOTES:

1. PERFORM PRE-EXCAVATION SAMPLING IN ACCORDANCE WITH THE SAMPLING AND ANALYSIS PLAN (SAP) (WORKPLAN, APPENDIX D).

2. FOLLOWING CONFIRMATION OF PROPOSED EXCAVATION EXTENT, PROCEED WITH THE PROPOSED SEQUENCE FOR EXCAVATION:

   a. *STAGE I*: REMOVE 6-INCH SAND AND GRAVEL LAYER (OVERBURDEN) FROM THE PROPOSED EXCAVATION. OVERBURDEN MATERIAL TO BE STOCKPILED APPROXIMATELY EVERY 50 CY AT THE OVERBURDEN STOCKPILE AREA. REMOVE UNDERLYING GEOTEXTILE LINER. OVERBURDEN MATERIALS THAT COME IN CONTACT WITH UNDERLYING PCB-CONTAMINATED SOILS TO BE MANAGED AS NON-TSCA WASTE.

   b. *STAGE II*: START EXCAVATION ADJACENT TO THE SCHOOL BUILDING IN ACCORDANCE WITH REMEDIATION CONTRACTOR STRUCTURAL PROTECTION PLAN. REMOVE PCB-CONTAMINATED SOIL TO PROPOSED DEPTHS. EXCAVATION TO PROCEED SOUTH FROM THE SCHOOL BUILDING. COLLECT CONFIRMATION SAMPLES IN ACCORDANCE WITH THE SAP. IF SAMPLE RESULTS HAVE PCB CONCENTRATIONS GREATER THAN 1 MG/KG BUT LESS THAN 10 MG/KG, REMOVE AN ADDITIONAL ONE FOOT OF SOIL WITHIN THE EXCAVATION CELL. IF SAMPLE RESULTS HAVE PCB CONCENTRATIONS EXCEEDING 10 MG/KG, REMOVE AN ADDITIONAL TWO FEET OF SOIL WITHIN THE EXCAVATION CELL. AS THE EXCAVATION PROCEEDS AT EACH CELL, COLLECT CONFIRMATION SAMPLES AFTER EACH LAYER OF SOIL IS REMOVED UNTIL EITHER THE SAMPLE RESULTS INDICATE THAT THE CLEANUP LEVEL OF 1 MG/KG HAS BEEN MET OR EXCAVATION IS AT MAXIMUM DEPTH OF 15 FEET BGS OR 2 FEET BELOW GROUNDWATER TABLE, WHICHEVER OCCURS FIRST.

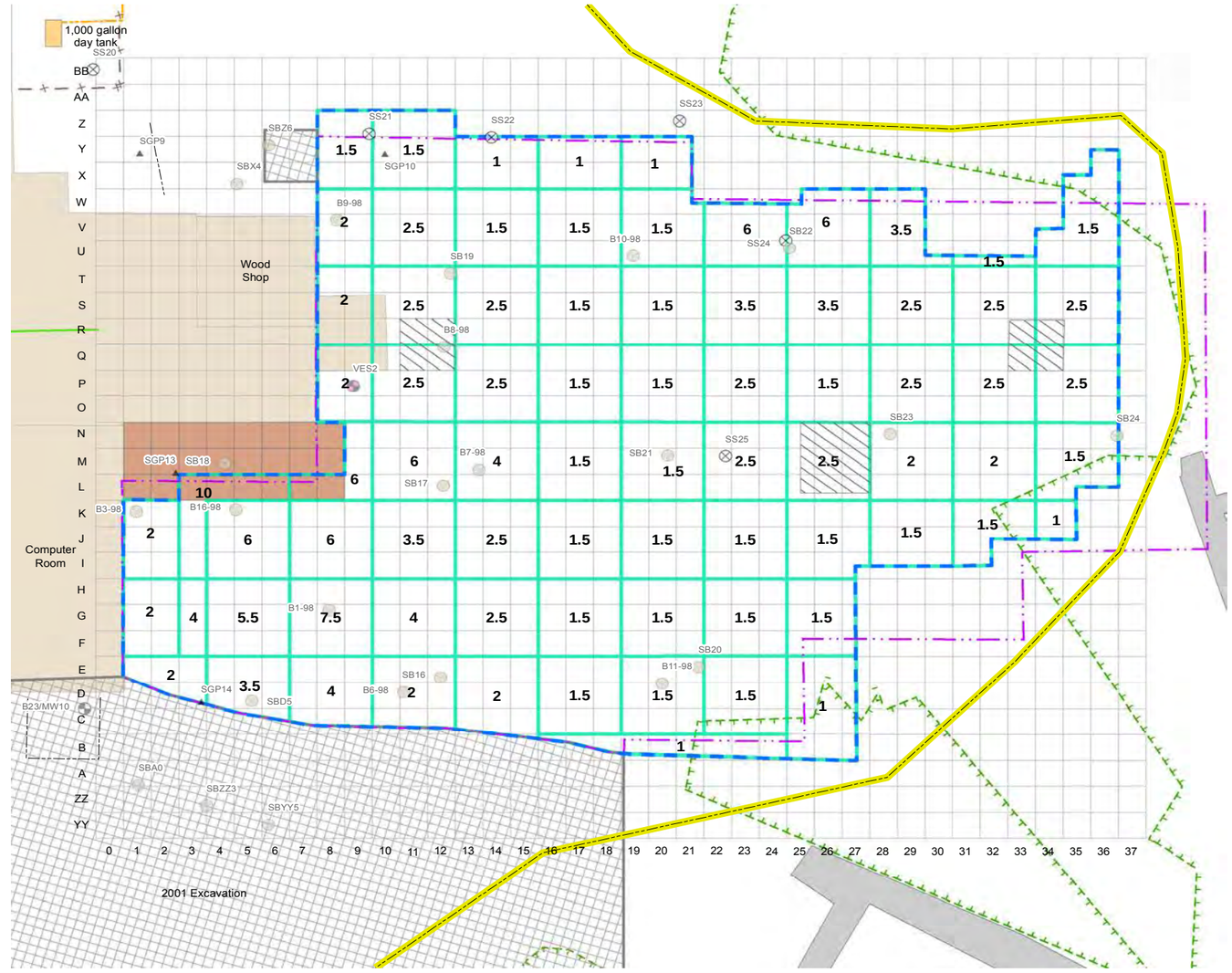
   c. *STAGE III*: CHARACTERIZATION SAMPLES WILL NOT BE COLLECTED FOR FIXED LABORATORY ANALYSIS.

   d. *STAGE IV*: UPON CONFIRMATION OF PCB RESULTS BELOW THE CLEANUP LEVEL OR THE EXCAVATION REACHES 15 FEET BGS OR 2 FEET BELOW GROUNDWATER TABLE, WHICHEVER OCCURS FIRST, BACKFILLING ACTIVITIES MAY COMMENCE. A NON-WOVEN GEOTEXTILE LINER IS TO BE PLACED AT THE BOTTOM AND ALONG THE SIDEWALLS OF THE EXCAVATIONS LOCATED WITHIN 10 FEET OF THE BUILDING FOOTPRINT WHERE SOIL PCB CONCENTRATIONS REMAIN ABOVE 1 MG/KG. BACKFILL MATERIAL TO BE PLACED NO MORE THAN 1-FOOT LIFTS AND COMPACTED BY A MINIMUM OF TWO PASSES BY HEAVY EQUIPMENT OR WITH THE EXCAVATOR BUCKET.

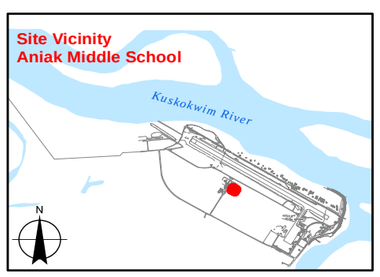
3. DURING EXCAVATION ACTIVITIES NEAR OR WITHIN THE FORMER CONCRETE PAD EXCAVATION, OVERBURDEN MATERIAL (EXCAVATION BACKFILL) AND ORANGE BARRIER FENCE USED AT BOTTOM OF THE EXCAVATION AS A MARKER WILL BE ENCOUNTERED. THE OVERBURDEN MATERIAL IS PRESENT AT GROUND SURFACE TO APPROXIMATELY 4 TO 6 FEET BGS. OVERBURDEN MATERIAL TO BE PLACED AT THE OVERBURDEN STOCKPILE AREA AS NECESSARY TO FACILITATE THE EXCAVATION. ORANGE BARRIER FENCE MATERIAL TO BE REMOVED AND DISPOSED ALONG WITH PCB-CONTAMINATED SOIL.

4. MATERIALS FROM THE EXCAVATION TO BE SEGREGATED AND MANAGED IN ACCORDANCE WITH THE WASTE MANAGEMENT PLAN (WORKPLAN, APPENDIX G). ALL WASTE DESIGNATED FOR OFFSITE DISPOSAL TO BE PACKED AND LABELED IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL TRANSPORTATION REQUIREMENTS AND STAGED AT THE BAG STAGING AREA PRIOR TO SHIPMENT (SEE FIGURE A-2).

5. REMOVE ANY RAIN WATER THAT MAY ACCUMULATE IN TEMPORARY STORAGE AREAS. TREAT GENERATED WASTEWATER USING THE ONSITE WATER TREATMENT SYSTEM. DISCHARGE WATER IN ACCORDANCE WITH THE STATE OF ALASKA REGULATIONS.



Notes:
1. This drawing was developed from drawings from the Shannon & Wilson reports titled PCB Cleanup (April 2009) and Final Site Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. Proposed excavation based on historical analytical and field screening results.



- Excavation Cell [Proposed Depth in Feet Below Ground Surface]
- Barricade
- Proposed Silt Fence or Straw Wattle
- Proposed Excavation
- Extent of remaining geotextile liner and gravel cap (1997 and 2001)
- 2001 Excavation
- Potential TSCA Soil
- Soil Boring
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Surface Soil Sample (1998)
- Underground Fuel Line (Electric Associated)
- Sanitary Sewer Line
- Vegetation Line
- Fence
- Former Concrete Pad Excavation
- AST
- Building
- Structure

N

1 inch = 25 feet

0 25 50 75 100
Feet

WGS 1984 UTM Zone 4N Transverse Mercator

WOOD SHOP AREA EXCAVATION PLAN
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 29 DEC 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: A-8

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APPENDIX B

Previous Site Investigation Information

2009 Characterization

2008 PCB Site Cleanup

2008 TCE Characterization

2001 PCB Cleanup

1998 Site Characterization

2011 Potentiometric Surface Maps

Select Environmental Monitoring Point Construction Logs

2009 Characterization

TABLE 5.4-1 - PCB 1254 CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)				
			Soil Boring SB1				
Parameter Tested	**Method***	**Cleanup Level****	SB1-2 0 to 2	SB1-5 5 to 7	SB1-10 10 to 12	SB1-15 15 to 17	SB1-20 19 to 21
Percent Solids	SM20 2540G	-	95.2	82.2	86.6	84.5	90.2
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	**0.436**	< 0.0603	**0.134**	< 0.0589	< 0.0549
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0519	< 0.0603	< 0.0569	< 0.0589	< 0.0549
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)				
			Soil Boring SB2				
Parameter Tested	**Method***	**Cleanup Level****	SB2-5 5 to 7	SB2-10 10 to 12	SB2-15 15 to 17	SB2-20 20 to 22	SB2-25~ 20 to 22
Percent Solids	SM20 2540G	-	88.7	85.3	87.4	83.6	84.3
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	**0.220**	< 0.0557	< 0.0568	< 0.0592	< 0.0591
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0557	< 0.0557	< 0.0568	< 0.0592	< 0.0591
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0519	Analyte not detected at the laboratory reporting limit of 0.0519 mg/kg
~	Duplicate of previous sample
0.436	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-1 - PCB 1254 CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)					
			Soil Boring SB3					
Parameter Tested	**Method***	**Cleanup Level****	SB3-2 0 to 2	SB3-25~ 0 to 2	SB3-5 5 to 7	SB3-10 10 to 12	SB3-15 15 to 17	SB3-20 20 to 22
Percent Solids	SM20 2540G	-	97.3	96.7	96.2	96.5	87.3	85.1
Polychlorinated Biphenyls (PCBs)								
Aroclor 1260 - mg/kg	EPA 8082	1	**0.121**	**0.172**	< 0.0515	< 0.0515	< 0.0561	< 0.0579
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0504	< 0.0509	< 0.0515	< 0.0515	< 0.0561	< 0.0579
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)				
			Soil Boring SB4				
Parameter Tested	**Method***	**Cleanup Level****	SB4-5 5 to 7	SB4-10 10 to 12	SB4-25~ 10 to 12	SB4-15 15 to 17	SB4-20 20 to 22
Percent Solids	SM20 2540G	-	97.4	96.5	96.1	89.6	82.0
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0508	< 0.0515	< 0.0510	< 0.0553	< 0.0609
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0508	< 0.0515	< 0.0510	< 0.0553	< 0.0609
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0504	Analyte not detected at the laboratory reporting limit of 0.0504 mg/kg
~	Duplicate of previous sample
0.121	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-1 - PCB 1254 CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)				
			Soil Boring SB5				
Parameter Tested	**Method***	**Cleanup Level****	SB5-2 0 to 2	SB5-5 5 to 7	SB5-10 10 to 12	SB5-15 15 to 17	SB5-20 20 to 22
Percent Solids	SM20 2540G	-	98.1	97.0	96.3	88.7	81.9
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0499	**0.0790**	< 0.0517	< 0.0557	< 0.0607
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0499	< 0.0508	< 0.0517	< 0.0557	< 0.0607
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)			
			Soil Boring SB6			
Parameter Tested	**Method***	**Cleanup Level****	SB6-5 5 to 7	SB6-10 10 to 12	SB6-15 15 to 17	SB6-20 20 to 22
Percent Solids	SM20 2540G	-	96.7	96.4	91.5	87.6
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	**0.895**	< 0.0517	< 0.0541	< 0.0564
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0516	< 0.0517	< 0.0541	< 0.0564
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
< 0.0499	Analyte not detected at the laboratory reporting limit of 0.0449 mg/kg
0.0790	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-1 - PCB 1254 CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)			
			Soil Boring SB11			
Parameter Tested	**Method***	**Cleanup Level****	SB11-0 0 to 2	SB11-5 5 to 7	SB11-10 10 to 12	SB11-15 15 to 17
Percent Solids	SM20 2540G	-	83.9	82.6	78.0	81.4
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0591	< 0.0594	< 0.0632	< 0.0614
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0591	< 0.0594	< 0.0632	< 0.0614
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)				
			Soil Boring SB12				
Parameter Tested	**Method***	**Cleanup Level****	SB12-0 0 to 2	SB12-5 5 to 7	SB12-10 10 to 12	SB12-20~ 10 to 12	SB12-15 15 to 17
Percent Solids	SM20 2540G	-	95.2	83.6	77.3	82.9	82.5
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0521	**3.27**	< 0.0639	< 0.0599	**0.0638**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0521	< 0.0592	< 0.0639	< 0.0599	< 0.0598
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
3.27	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0591	Analyte not detected at the laboratory reporting limit of 0.0591 mg/kg
~	Duplicate of previous sample
0.0638	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-1 - PCB 1254 CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)				
			Soil Boring SB26			Soil Boring SB27	
Parameter Tested	**Method***	**Cleanup Level****	SB26-5 ‡ 5 to 7	SB26-6~ ‡ 5 to 7	SB26-10 ‡ 10 to 12	SB27-5 ‡ 5 to 7	SB27-10 ‡ 10 to 12
Percent Solids	SM20 2540G	-	84.3	86.3	83.5	80.7	82.2
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	**0.212**	< 0.0572	< 0.0593	< 0.0614	< 0.0596
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0581	< 0.0572	< 0.0593	< 0.0614	< 0.0596
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0581	Analyte not detected at the laboratory reporting limit of 0.0581 mg/kg
~	Duplicate of previous sample
0.212	Analyte detected at concentrations less than the ADEC Cleanup level
‡	Sample was submitted to the lab as B26, but is corrected in this table to reflect the SB designation.

TABLE 5.4-2 - FORMER TRUCK FILL PAD CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)					
			Soil Boring SB7				Soil Boring SB8	
Parameter Tested	**Method***	**Cleanup Level****	SB7-5 5 to 7	SB7-10 10 to 12	SB7-15 15 to 17	SB7-20 20 to 22	SB8-5 5 to 7	SB8-10 10 to 12
Percent Solids	SM20 2540G	-	95.9	97.3	78.3	80.7	94.5	95.4
Polychlorinated Biphenyls (PCBs)								
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0521	< 0.0512	< 0.0625	< 0.0619	**0.150**	< 0.0517
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0521	< 0.0512	< 0.0625	< 0.0619	< 0.0526	< 0.0517
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)					
			Soil Boring SB8		Soil Boring SB9			
Parameter Tested	**Method***	**Cleanup Level****	SB8-15 15 to 17	SB8-20 20 to 22	SB9-5 5 to 7	SB9-10 10 to 12	SB9-15 15 to 17	SB9-20 20 to 22
Percent Solids	SM20 2540G	-	79.1	81.6	97.8	96.7	96.2	85.2
Polychlorinated Biphenyls (PCBs)								
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0622	< 0.0604	< 0.0501	**0.0586**	< 0.0519	< 0.0577
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0622	< 0.0604	< 0.0501	< 0.0507	< 0.0519	< 0.0577
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0521	Analyte not detected at the laboratory reporting limit of 0.0521 mg/kg
~	Duplicate of previous sample
0.150	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-2 - FORMER TRUCK FILL PAD CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)			
			Soil Boring SB9	Soil Boring SB10		
Parameter Tested	**Method***	**Cleanup Level****	SB9-25~ 20 to 22	SB10-5 5 to 7	SB10-10 10 to 12	SB10-15 15 to 17
Percent Solids	SM20 2540G	-	87.7	96.9	96.5	96.7
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0568	**0.0639**	**0.723**	**0.287**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0568	< 0.0514	< 0.0516	< 0.0513
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)			
			Soil Boring SB10		Soil Boring SB13	
Parameter Tested	**Method***	**Cleanup Level****	SB10-20 20 to 22	SB10-25~ 20 to 22	SB13-11 10 to 12	SB13-15 15 to 17
Percent Solids	SM20 2540G	-	84.0	84.2	80.9	83.6
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0586	< 0.0589	< 0.0608	< 0.0595
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0586	< 0.0589	< 0.0608	< 0.0595
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0501	Analyte not detected at the laboratory reporting limit of 0.0501 mg/kg
~	Duplicate of previous sample
0.0639	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-3 - EAST SEPTIC LINE CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.1-1, Section 5 Figures, and Appendix D)		
			Soil Boring SB14		
Parameter Tested	**Method***	**Cleanup Level****	SB14-20 20 to 22	SB14-15~ 20 to 22	SB14-25 24 to 26
Percent Solids	SM20 2540G	-	80.5	85.2	84.1
Polychlorinated Biphenyls (PCBs)					
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0613	< 0.0577	< 0.0589
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0613	< 0.0577	< 0.0589
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0613	Analyte not detected at the laboratory reporting limit of 0.0613 mg/kg
~	Duplicate of previous sample

TABLE 5.4-4 - WOOD SHOP CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.2-1, Section 5 Figures, and Appendix D)						
			Soil Boring SB16			Soil Boring SB17			
Parameter Tested	**Method***	**Cleanup Level****	SB16-5 5 to 7	SB16-10 10 to 12	SB16-15 15 to 17	SB17-5 5 to 7	SB17-20~ 5 to 7	SB17-10 10 to 12	SB17-15 15 to 17
Percent Solids	SM20 2540G	-	94.7	95.5	81.7	94.1	95.4	96.0	95.7
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	**0.456**	**0.167**	< 0.0609	**13.2**	**4.86**	**0.642**	< 0.0517
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0521	< 0.0516	< 0.0609	< 0.0523	< 0.0518	< 0.0510	< 0.0517
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.2-1, Section 5 Figures, and Appendix D)						
			Soil Boring SB18			Soil Boring SB19		Soil Boring SB20	
Parameter Tested	**Method***	**Cleanup Level****	SB18-5 5 to 7	SB18-10 10 to 12	SB18-15 15 to 17	SB19-5 5 to 7	SB19-10 10 to 12	SB20-5 5 to 7	SB20-10 10 to 12
Percent Solids	SM20 2540G	-	94.9	95.4	94.2	97.3	96.1	95.5	95.1
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	**0.189**	**1.94**	**0.830**	< 0.0509	**0.110**	< 0.0518	0.0463J
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0524	< 0.0522	< 0.0526	< 0.0509	< 0.0514	< 0.0518	< 0.0521
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
13.2	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0521	Analyte not detected at the laboratory reporting limit of 0.0521 mg/kg
~	Duplicate of previous sample
J	Concentration is an estimation
0.456	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-4 - WOOD SHOP CHARACTERIZATION AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.2-1, Section 5 Figures, and Appendix D)				
			Soil Boring SB21			Soil Boring SB22	
Parameter Tested	**Method***	**Cleanup Level****	SB21-5 5 to 7	SB21-10 10 to 12	SB21-15 15 to 17	SB22-5 5 to 7	SB22-10 10 to 12
Percent Solids	SM20 2540G	-	96.0	96.5	95.7	91.9	96.8
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	**0.167**	**0.0681**	< 0.0512	**1.10**	< 0.0512
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0515	< 0.0511	< 0.0512	< 0.0537	< 0.0512
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

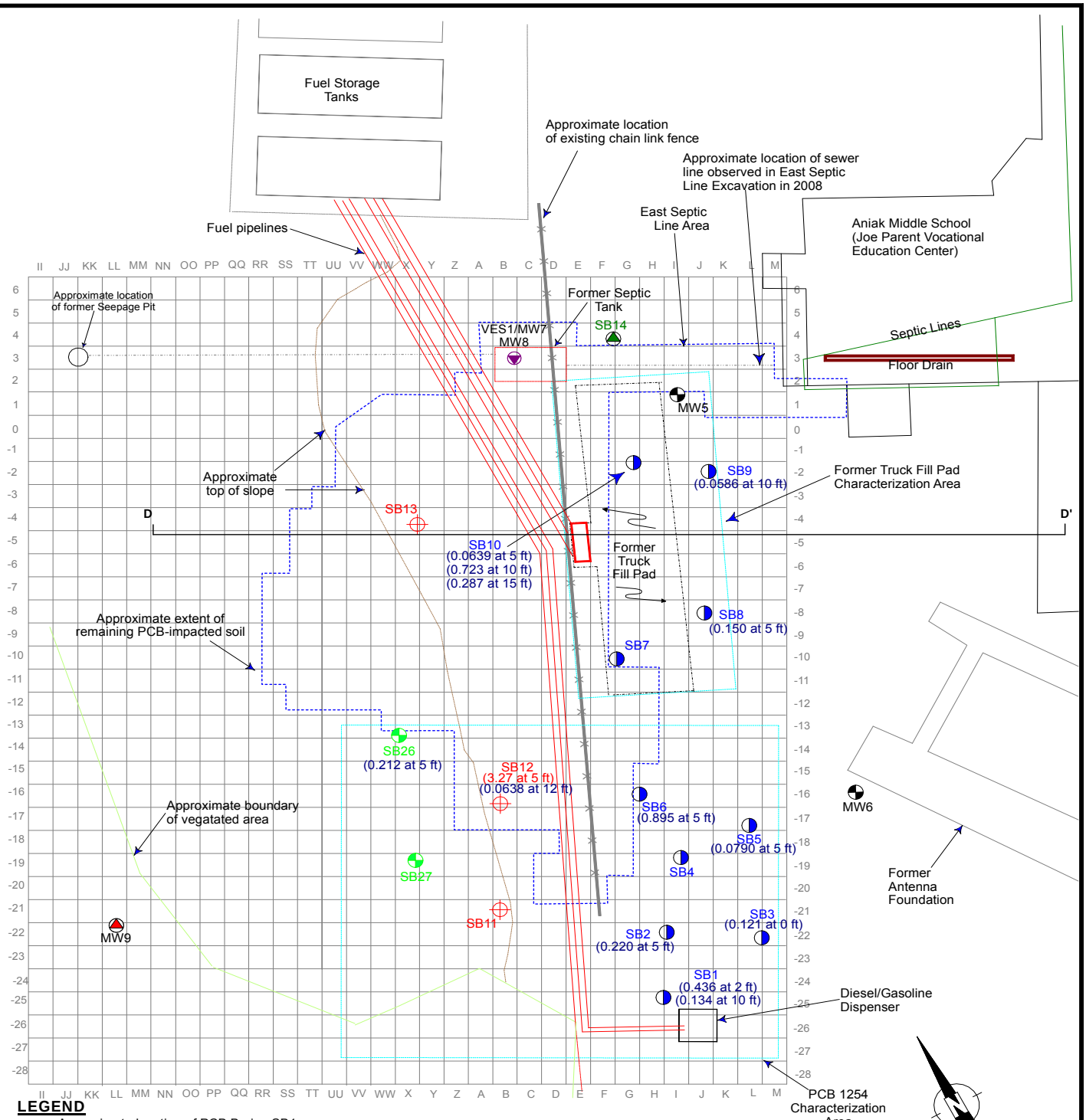
			Sample Number^ and Collection Depth in Feet (See Table 5.2-1, Section 5 Figures, and Appendix D)			
			Soil Boring SB23		Soil Boring SB24	
Parameter Tested	**Method***	**Cleanup Level****	SB23-5 5 to 7	SB23-10 10 to 12	SB24-5 5 to 7	SB24-10 10 to 12
Percent Solids	SM20 2540G	-	95.9	96.1	96.1	95.9
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	**0.544**	**0.259**	< 0.0513	< 0.0516
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0517	< 0.0516	< 0.0513	< 0.0516
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
1.10	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0515	Analyte not detected at the laboratory reporting limit of 0.0515 mg/kg
0.167	Analyte detected at concentrations less than the ADEC Cleanup level

TABLE 5.4-5 - WOOD SHOP VERIFICATION ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.2-1, Section 5 Figures, and Appendix D)						
			PCB Verification Borings						
Parameter Tested	**Method***	**Cleanup Level****	SBA0-2 1.9-2	SBD5-2 1.9-2	SBZZ3-2 1.9-2	SBZZ3-4~ 1.9-2	SBYY5-2 1.9-2	SBX4-2 1.9-2	SBZ6-2 1.9-2
2008 PCB Field Screening Result (ppm)	HACH	-	1.1<X<4.9	4.9<X<11	1.1<X<4.9	1.1<X<4.9	1.1<X<4.9	1.1<X<4.9	1.1<X<4.9
Percent Solids	SM20 2540G	-	96.9	94.8	95.3	95.0	95.6	95.7	95.7
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0513	**4.65**	**0.215**	**0.254**	**0.189**	< 0.0518	< 0.0518
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0513	< 0.0517	< 0.0520	< 0.0520	< 0.0519	< 0.0518	< 0.0518
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix D for compounds tested, methods, and laboratory reporting limits
**	Soil cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008).
^	Sample ID No. preceded by "17308-002" on the chain of custody form
4.65	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.0513	Analyte not detected at the laboratory reporting limit of 0.0513 mg/kg
~	Duplicate of preceeding sample
0.215	Analyte detected at concentrations less than the ADEC Cleanup level
ppm	parts per million



LEGEND

SB1 — Approximate location of PCB Boring SB1. Boring advanced to approximately 22 feet bgs by Shannon & Wilson, Inc. in August 2009.

B26 — Approximate location of PCB Boring SB26. Boring advanced to approximately 12 feet bgs by Shannon & Wilson, Inc. in August 2009.

SB14 — Approximate location of PCB Boring SB14. Boring advanced to approximately 33 feet bgs by Shannon & Wilson, Inc. in August 2009.

SB11 — Approximate location of PCB Boring SB11. Boring advanced to approximately 17 feet bgs by Shannon & Wilson, Inc. in August 2009.

MW5 — Approximate location of Monitoring Well MW5 installed by Shannon & Wilson, Inc. in May 2008.

D — D' — See Figure 5.4-1 for Cross Section D - D'.

MW9 — Approximate location of Groundwater Monitoring Well MW9, installed by Shannon & Wilson, Inc. August 2009. Well was screened from about 7 feet above to 8 feet below groundwater contact.

VES1/MW7 MW8 — Approximate location of vapor extraction system wells, installed by Shannon & Wilson, Inc. in August 2009. Note that MW7 and MW8 are a nested pair of groundwater monitoring wells. Well MW7 was installed at VES1. Well MW8 was installed approximately 5 feet west of VES1/MW7.

(3.27 at 5 ft) (0.0790 at 5 ft) — PCB Concentrations in mg/kg from a sample collected at 5 ft bgs. Red color indicates PCB concentrations exceeding ADEC cleanup levels in soil. Blue color indicates PCB detections less than ADEC cleanup levels. Non-detectable PCB concentrations are not listed.

0 30 60
APPROXIMATE SCALE IN FEET

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Aniak, Alaska

FORMER SEPTIC SYSTEM CHARACTERIZATION AREA

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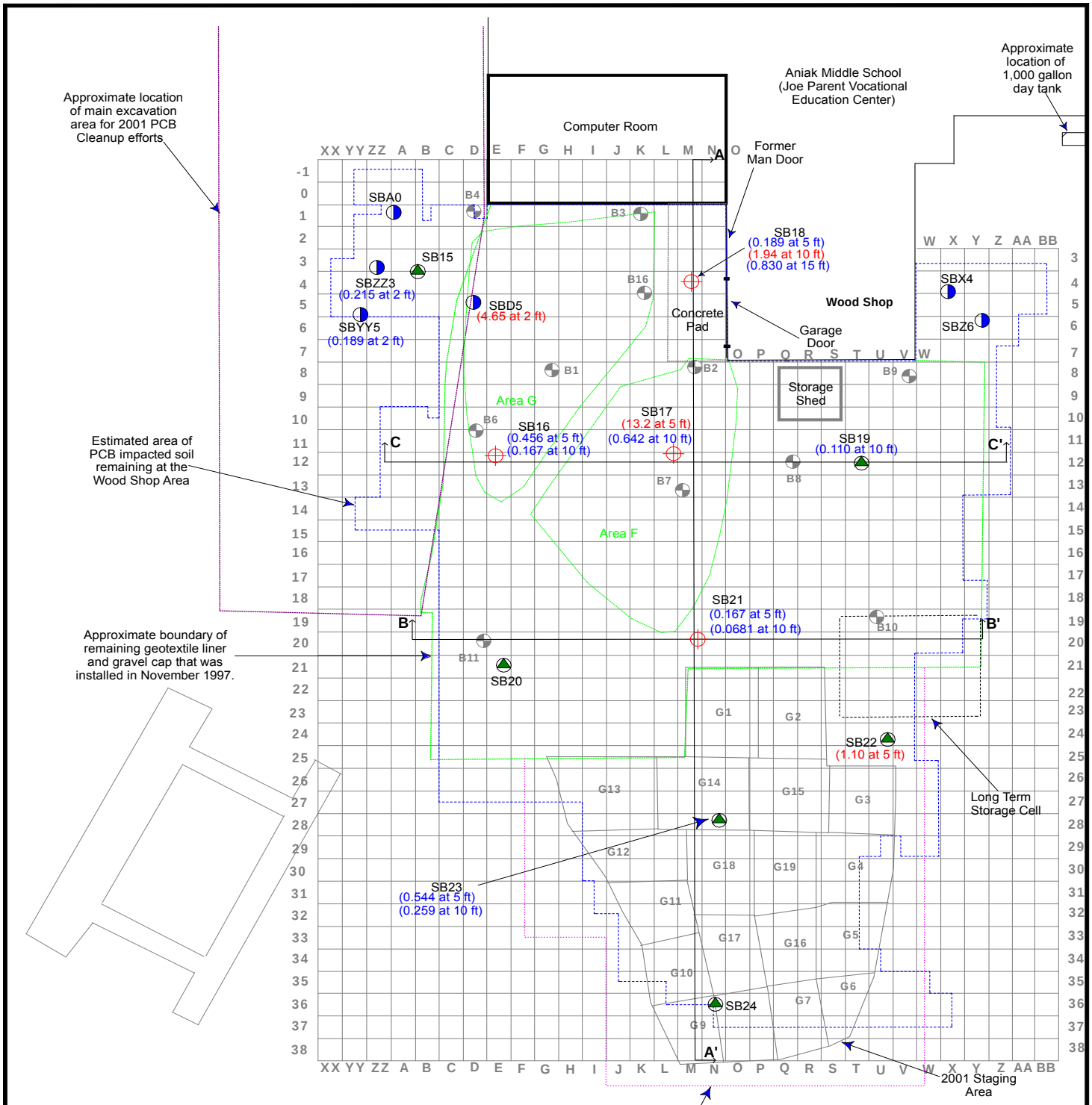
Fig. 5.0-1



LEGEND

SBZZ3	Approximate location of 2 foot verification boring advanced in Grid Square ZZ3 by Shannon & Wilson, Inc. in August 2009.
SB15	Approximate location of PCB Boring SB15, advanced to approximately 12 feet bgs by Shannon & Wilson, Inc. in August 2009.
SB16	Approximate location of PCB Boring SB16, advanced to approximately 17 feet bgs in vicinity of Areas F and G by Shannon & Wilson, Inc. in August 2009
(0.189 at 5 ft) (13.2 at 5 ft)	PCB Concentrations in mg/kg from a sample collected at 5 ft bgs. Red color indicates PCB concentrations exceeding ADEC Target Levels in soil. Blue color indicates PCB detections less than ADEC Target levels. Non-detectable PCB concentrations are not listed.
G14	Sample taken from area G14 of the Staging Area, collected by Shannon & Wilson, Inc. in August 2001.
B1	Approximate location of hand boring B1, advanced by Shannon & Wilson, Inc. in June 1998.

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WOOD SHOP CHARACTERIZATION AREA

June 2010 32-1-17308-003

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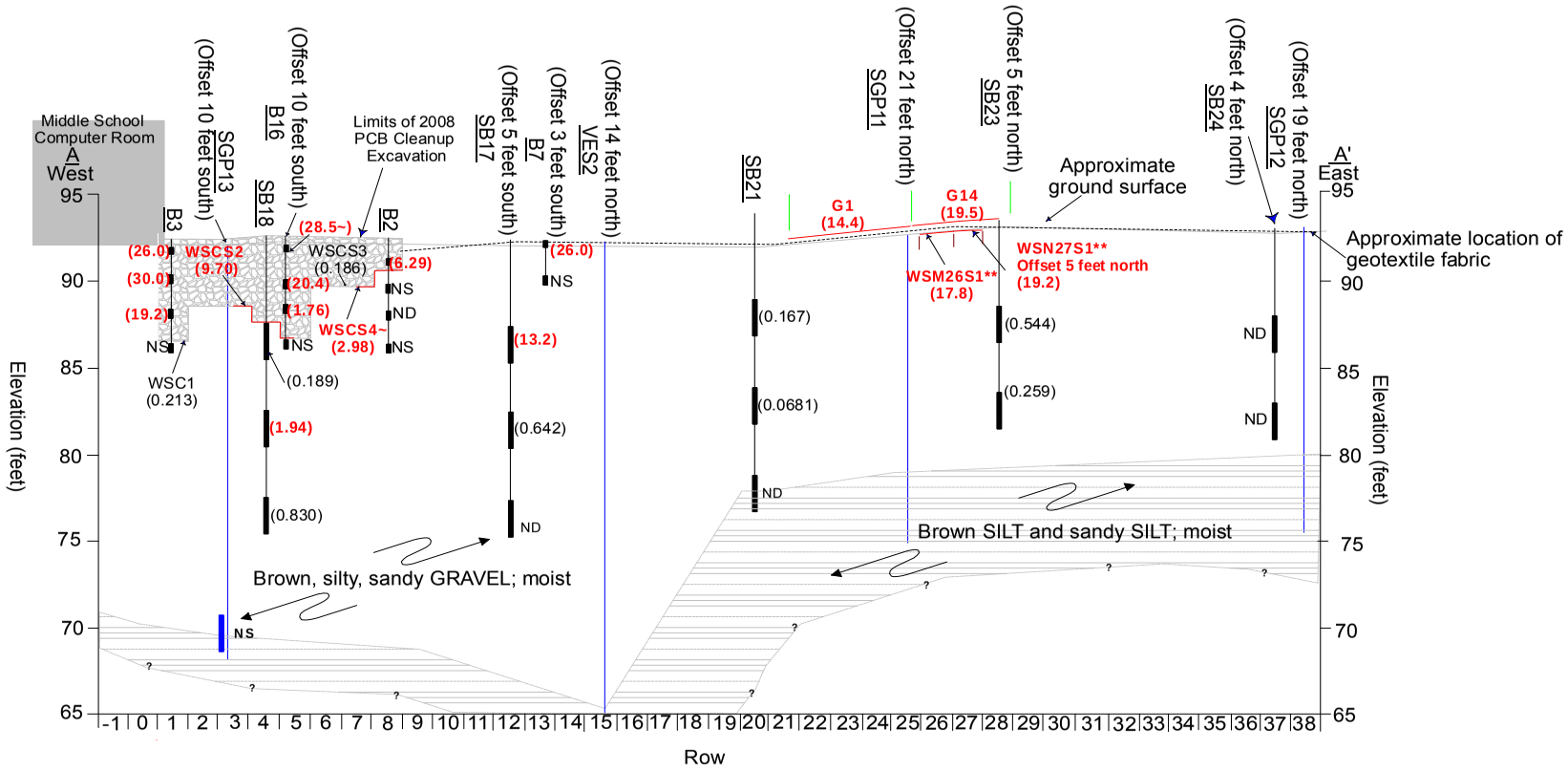
Fig. 5.0-2



CROSS SECTION A-A'

LEGEND

(26.0)	Boring sample location and PCB concentration in mg/kg. Red color indicates concentration exceeds applicable cleanup level of 1 mg/kg.
	Boring not sampled for PCBs; shown for lithology purposes only.
~	Duplicate sample collected. Highest PCB result shown.
NS	No PCB analytical sample collected
**	2008 Verification sample location and analytical result
G1 (14.4)	2001 Staging area sample location and analytical result
ND	PCBs not detected in analytical sample

See Figure 5.0-2 for Cross Section A-A' locations.
See Figure 4.0-1 for SGP and VES locations

0 30 60
APPROXIMATE HORIZONTAL SCALE IN FEET; VERTICAL SCALE SHOWN

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WOOD SHOP CROSS SECTION A-A'

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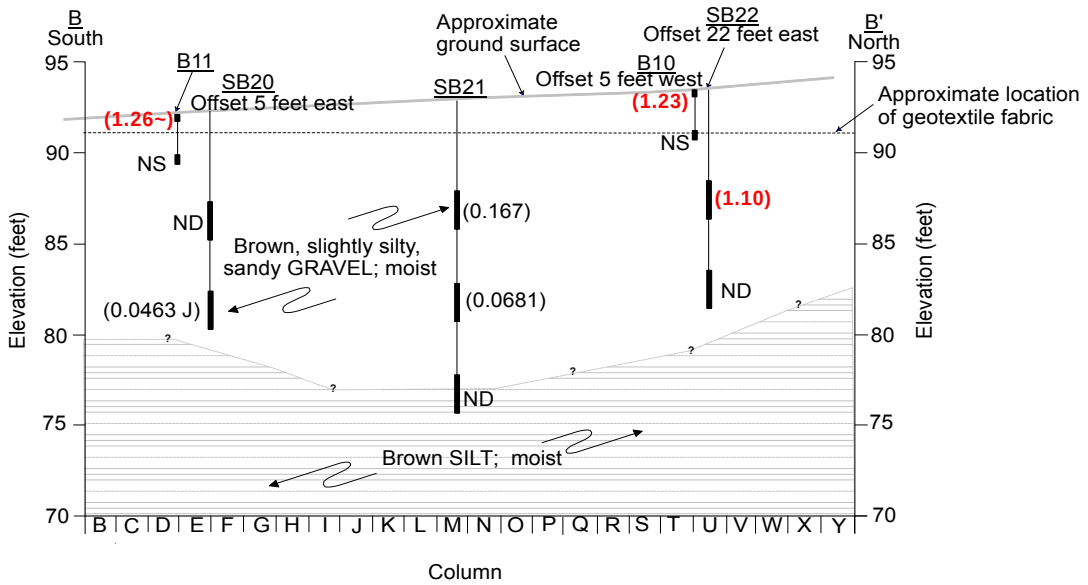
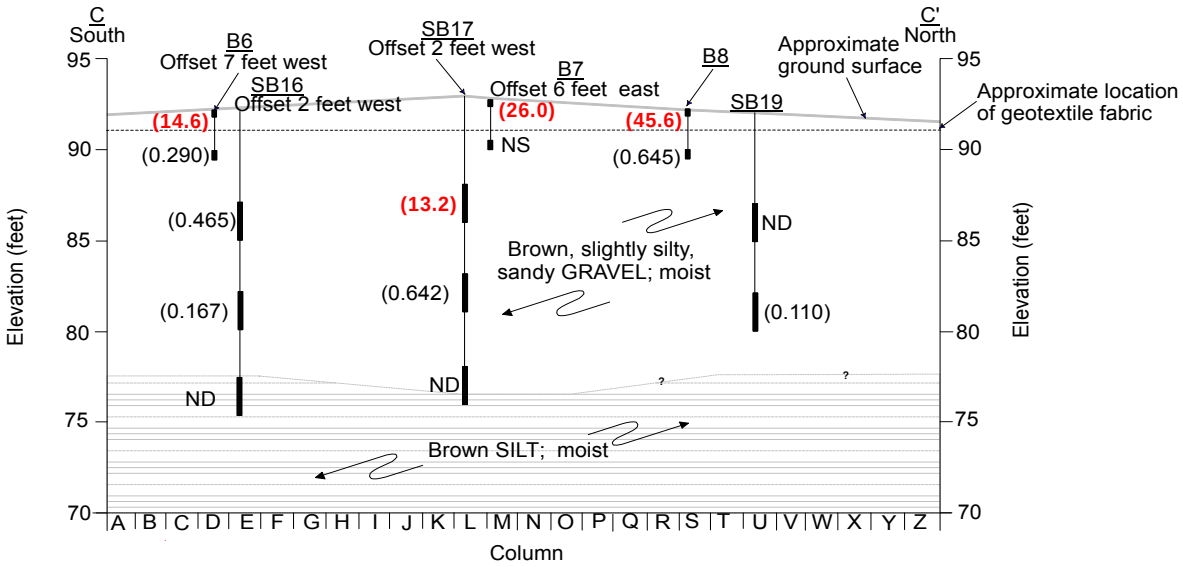
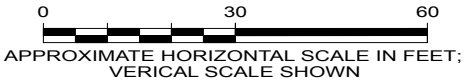
Fig. 5.3-1



CROSS SECTION B-B'



CROSS SECTION C-C'



LEGEND

(1.26)	Boring sample location and PCB concentration in mg/kg. Red color indicates concentration exceeds applicable cleanup level of 1 mg/kg.
~	Duplicate sample collected. Highest PCB result shown.
ND	PCBs not detected in analytical sample
NS	No PCB analytical sample collected
J	Quantitation is an estimate

See Figure 5.0-2 for Cross Sections B-B' and C-C' locations.

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WOOD SHOP CROSS SECTIONS B-B' AND C-C'

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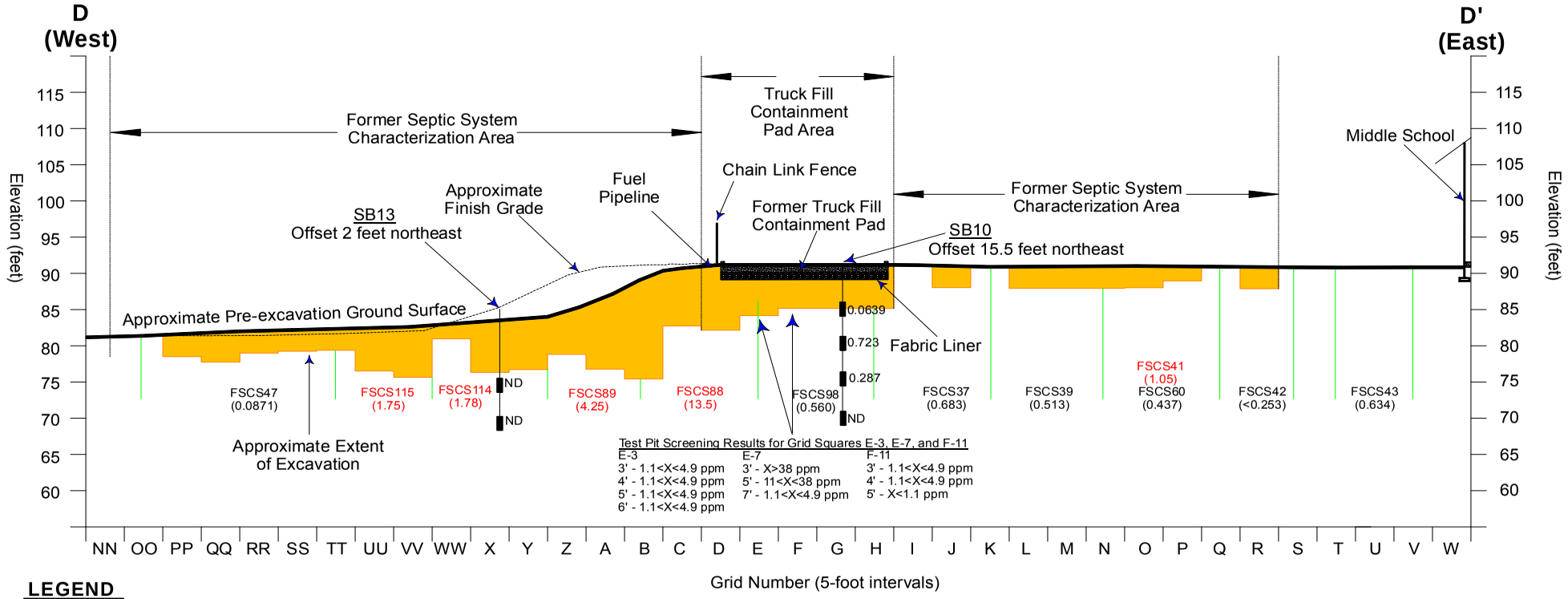
Fig. 5.3-2



LEGEND

FSCS41 (1.05) — 2008 PCB Cleanup Composite Sample FSCS41, with sample boundaries, and analytical result of 1.05 mg/kg PCBs. Red color indicates concentration exceeds the applicable cleanup level.

FSCS60 (0.437) — 2008 PCB Cleanup Composite Sample FSCS60, with sample boundaries and analytical result of 0.437 mg/kg PCBs. Black color indicates concentration is less than the applicable cleanup level.

ND — 2009 Soil Boring sample location, and PCB concentration in mg/kg. ND indicates PCBs not detected in analytical sample.

ppm — parts per million

0 20 40
APPROXIMATE SCALE IN FEET

Notes:
1) See Figure 5.0-1 for Cross Section Locations.
2) Above ground structure heights are not to scale.
3) Approximate Pre-excavation Ground Surface estimated using pre-existing survey information.
4) Surface and excavation boundaries are approximate.

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FORMER SEPTIC SYSTEM CROSS SECTION D-D'

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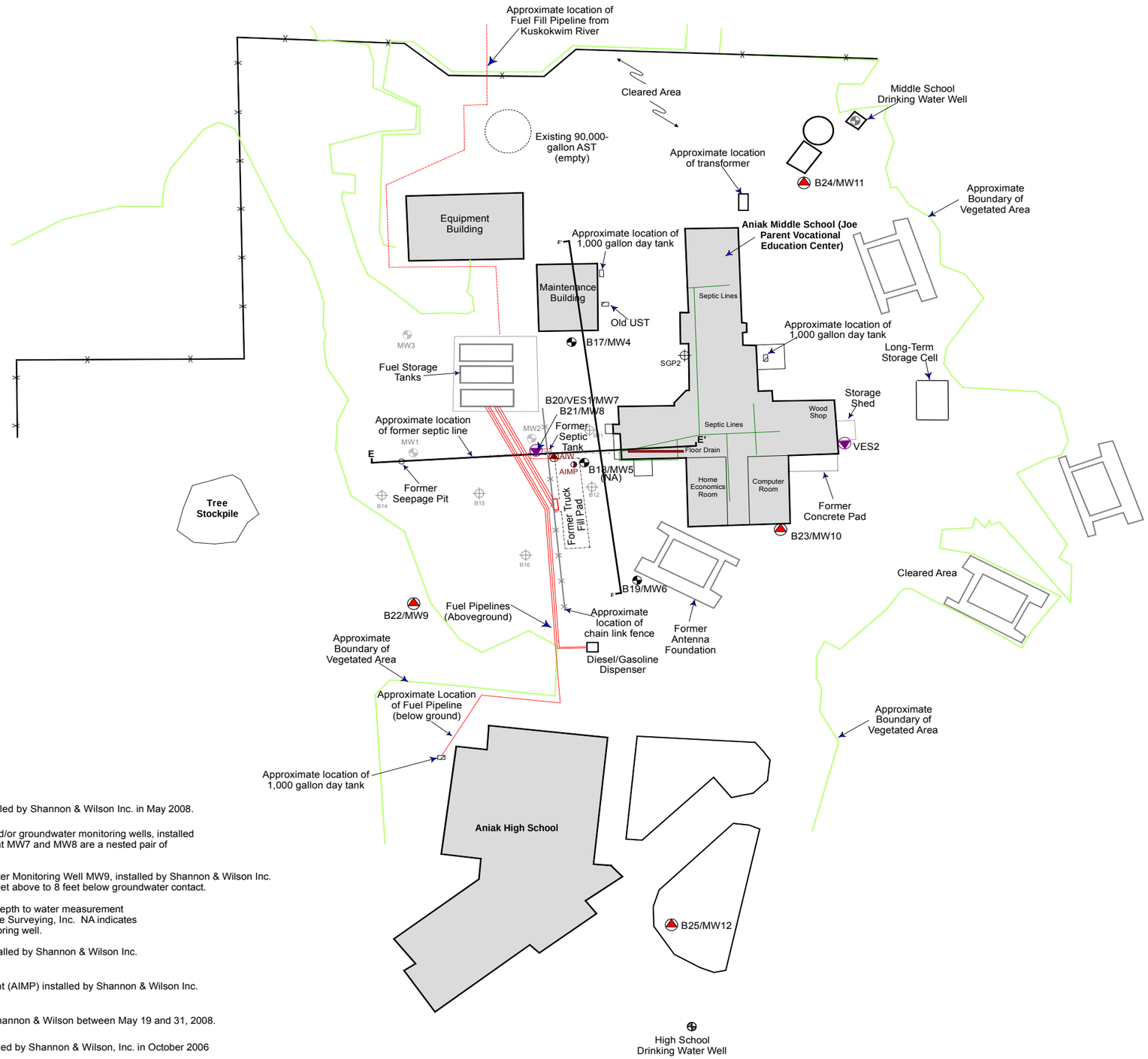
Fig. 5.4-1



LEGEND

B19/MW6	Approximate location of Monitoring Well MW6 installed by Shannon & Wilson Inc. in May 2008.
B20/VES1/MW7 B21/MW8	Approximate location of vapor extraction system and/or groundwater monitoring wells, installed by Shannon & Wilson, Inc. in August 2009. Note that MW7 and MW8 are a nested pair of groundwater monitoring wells.
B22/MW9	Approximate location of Soil Boring B22/Groundwater Monitoring Well MW9, installed by Shannon & Wilson Inc. in August 2009. Well was screened from about 7 feet above to 8 feet below groundwater contact.
(59.73)	Groundwater elevation based on August 22, 2009 depth to water measurement and September 2009 survey conducted by Del Norte Surveying, Inc. NA indicates that groundwater was not encountered in the monitoring well.
AIW	Approximate location of air injection well (AIW) installed by Shannon & Wilson Inc. in August 2009 for air injection pilot testing.
AIMP	Approximate location of air injection monitoring point (AIMP) installed by Shannon & Wilson Inc. in August 2009 for air injection pilot testing.
B14	Approximate location of Boring B14 advanced by Shannon & Wilson between May 19 and 31, 2008.
MW1	Approximate location of Monitoring Well MW1 installed by Shannon & Wilson, Inc. in October 2006 and subsequently destroyed or decommissioned.
E E'	See Figure 6.2-1 for Cross Section E-E', and Figure 6.2-2 for Cross Section F-F'

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MONITORING WELL LOCATIONS

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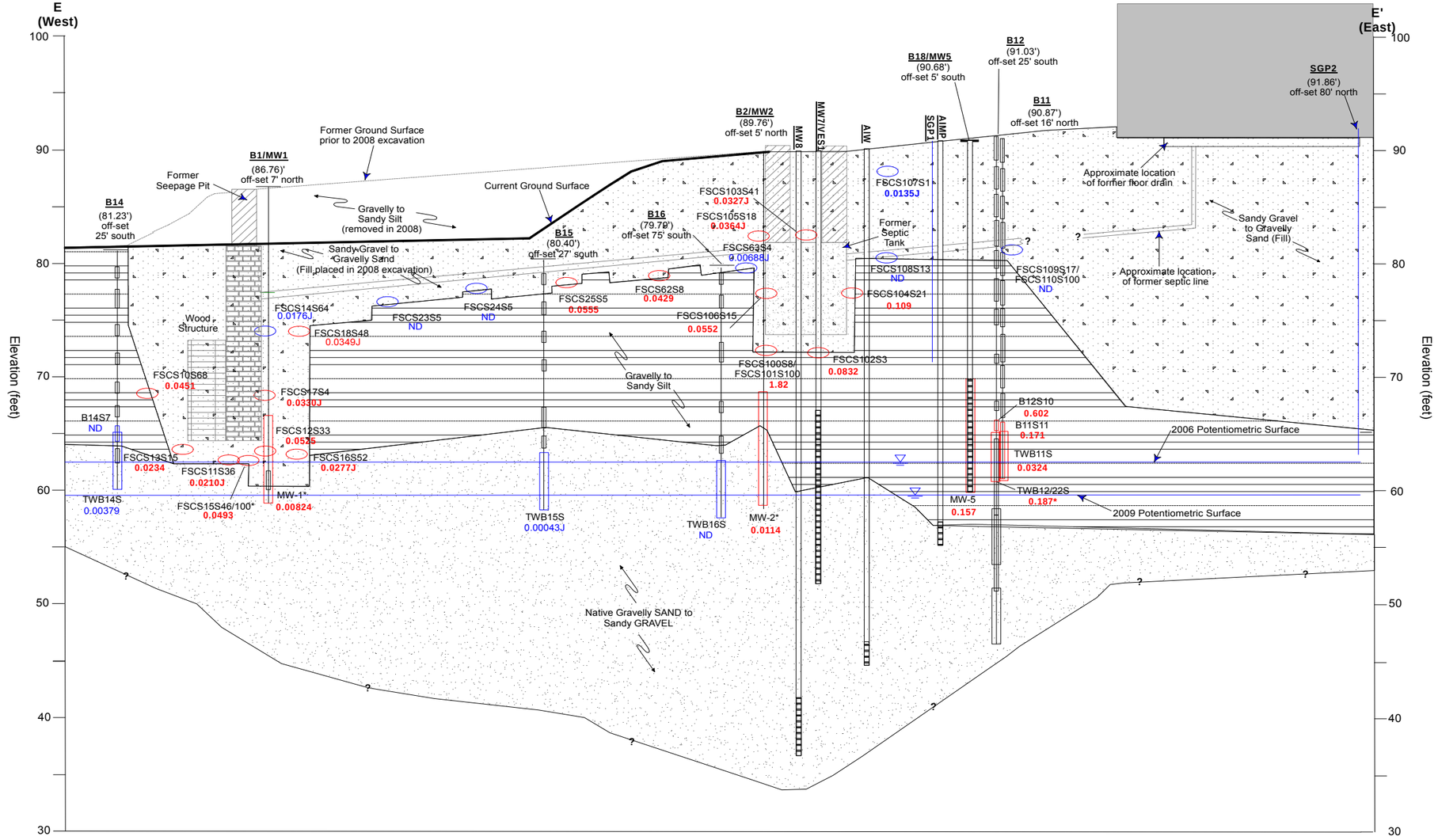
Fig. 6.0-1



LEGEND

TWB14S 0.00379	Concentration of TCE detected (mg/L for water or mg/kg for soil). Blue color indicates concentrations less than the applicable cleanup level. Bold red color indicates concentrations exceeding the applicable cleanup level.
⬭	Confirmation soil sample collected from the 2008 excavation. Blue color indicates concentrations less than the applicable cleanup level. Bold red color indicates concentrations exceeding the applicable cleanup level.
▯	Soil boring sample
▯	Water sample from temporary or permanent monitoring well
B14 (81.23')	Top of casing or ground surface elevation based on 2006 or 2008 survey data.
▽	Approximate potentiometric surface elevation based on 2006 and 2009 water level measurements in on-site monitoring wells.
ND	Non-detect
J	Concentration is an estimation detected below the laboratory detection limit but above the method detection limit.
*	Duplicate or replicate samples collected from this location. The highest TCE concentration is shown.

Note that the contact between soil types is gradual and the contact of silt/gravel depicts estimated conditions along the cross-section line.

See Figure 6.0-1 for Cross Section E-E' location. See Figure 4.0-1 for Soil Gas Point locations. See March 2009 TCE Characterization Report for confirmation sample descriptions and analytical results.

0 20 40
APPROXIMATE HORIZONTAL SCALE IN FEET

Former WACS Aniak Middle School Site
Aniak, Alaska

FORMER SEPTIC SYSTEM
CROSS SECTION E-E'

June 2010 32-1-17308-003

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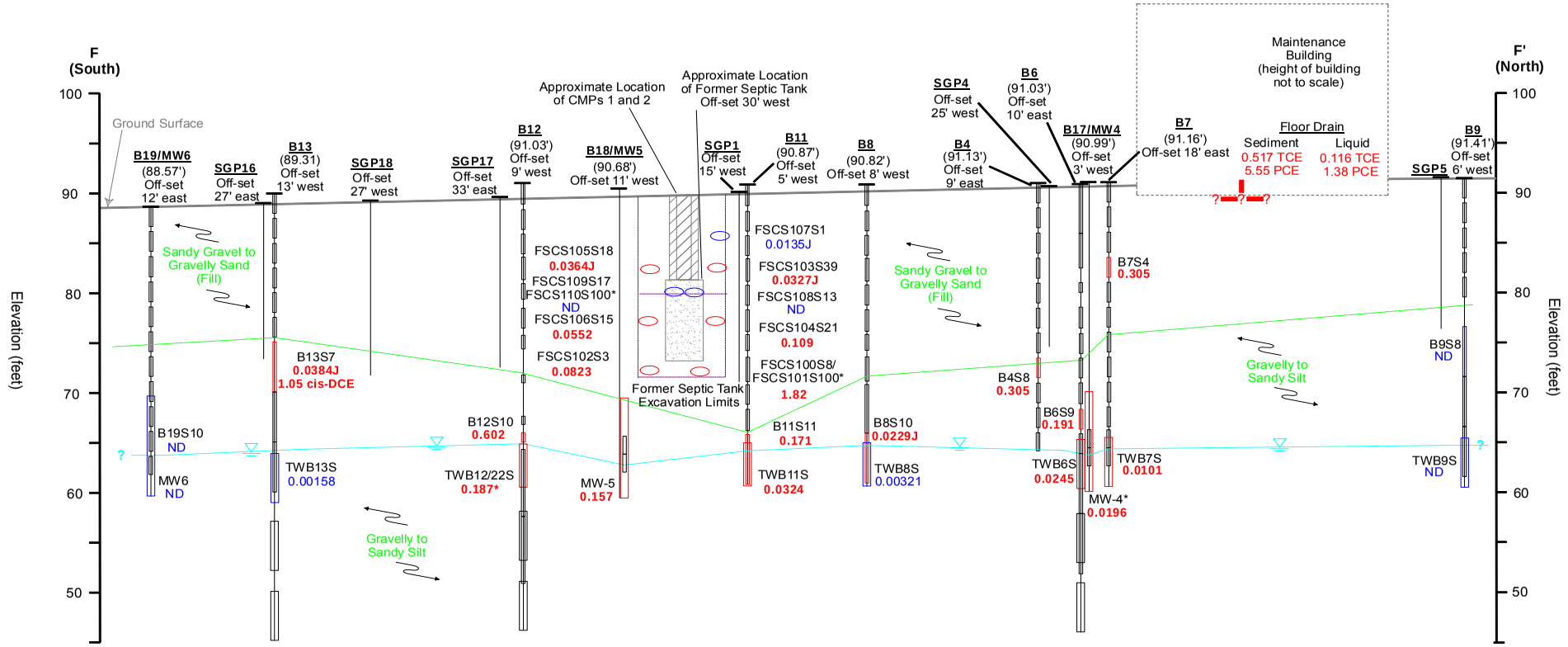
Fig. 6.2-1



LEGEND

TWB13S 0.00158	Concentration of TCE detected (mg/L for water or mg/kg for soil). Blue color indicates concentrations less than the applicable cleanup level. Bold red color indicates concentrations exceeding the applicable cleanup level.
⬭	Excavation confirmation soil sample
▯	Soil boring sample
▯	Water sample from temporary or permanent monitoring well
B6 (91.03')	Top of casing or ground surface elevation based on 2006 or 2008 survey data.
▽	Inferred groundwater elevation based on depth to water measurements from individual borings.

ND Non-detect

J Concentration is an estimation detected below the laboratory detection limit but above the method detection limit.

* Duplicate or replicate samples collected from this location. The highest TCE concentration is shown.

Note that the contact between soil types is gradual and the contact of soil/gravel depicts estimated conditions along the cross-section line.

0 15 30
APPROXIMATE VERTICAL SCALE IN FEET

0 30 60
APPROXIMATE HORIZONTAL SCALE IN FEET

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CROSS SECTION F - F'

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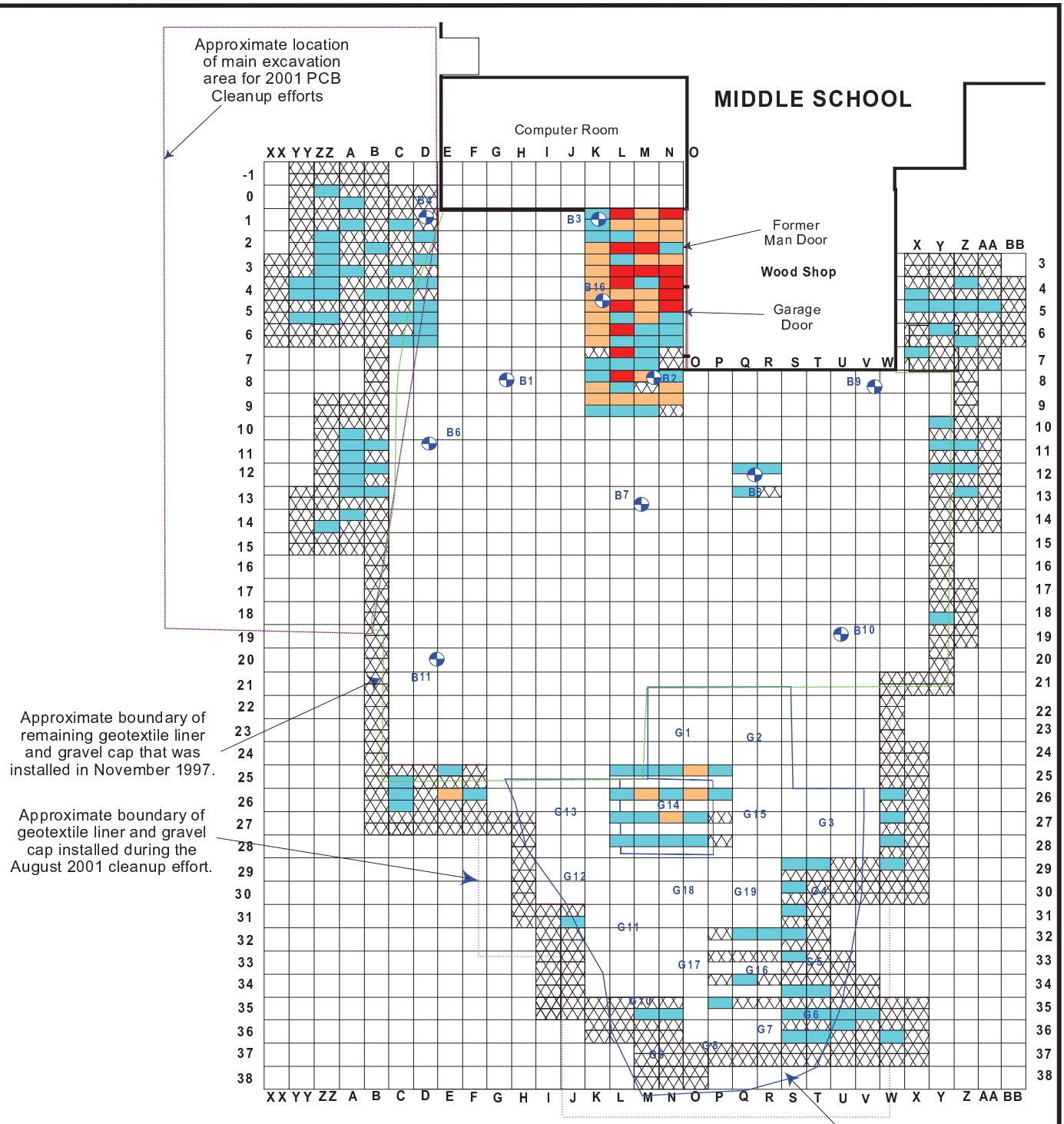
Fig. 6.2-2

2008 PCB Cleanup



LEGEND

- Grid square with screening results at 0.5-foot and 2-foot depths. (See below for concentration ranges).
- PCB screening result <1 mg/kg
- PCB screening result 1< x <11 mg/kg
- PCB screening result 11< x <38 mg/kg
- PCB screening result > 38 mg/kg
- Proposed excavation area prior to obtaining 2008 pre-excavation screening results.
- B1 — Approximated location of hand boring B1, advanced by Shannon & Wilson, Inc. in June 1998.
- G14 — Sample taken from area G14 of the Staging Area, collected by Shannon & Wilson, Inc. in August 2001.

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WOOD SHOP AREA PRE-EXCAVATION SCREENING

April 2009 | 32-1-17201-106

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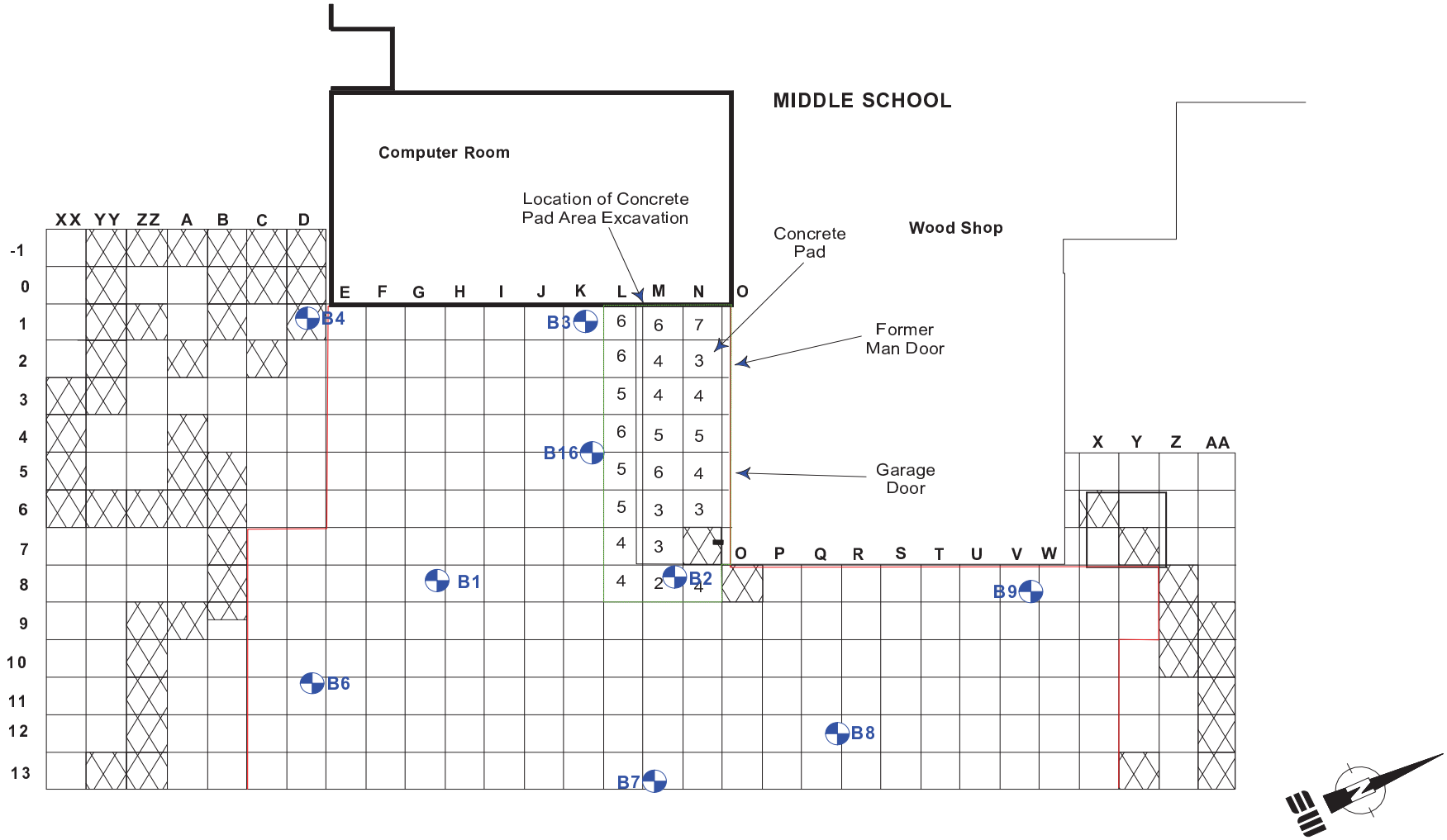
Fig. 4.2-1



LEGEND

PCB screening result <1 mg/kg

3 — Grid Square depth following final excavation.

Proposed excavation area prior to obtaining 2008 pre-excavation screening results.

B1 — Approximated location of hand boring B1, advanced by Shannon & Wilson, Inc. in June 1998.

0 20 40
APPROXIMATE SCALE IN FEET

Former WACS Middle School Site
Aniak, Alaska

WOOD SHOP AREA EXCAVATION DEPTHS

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
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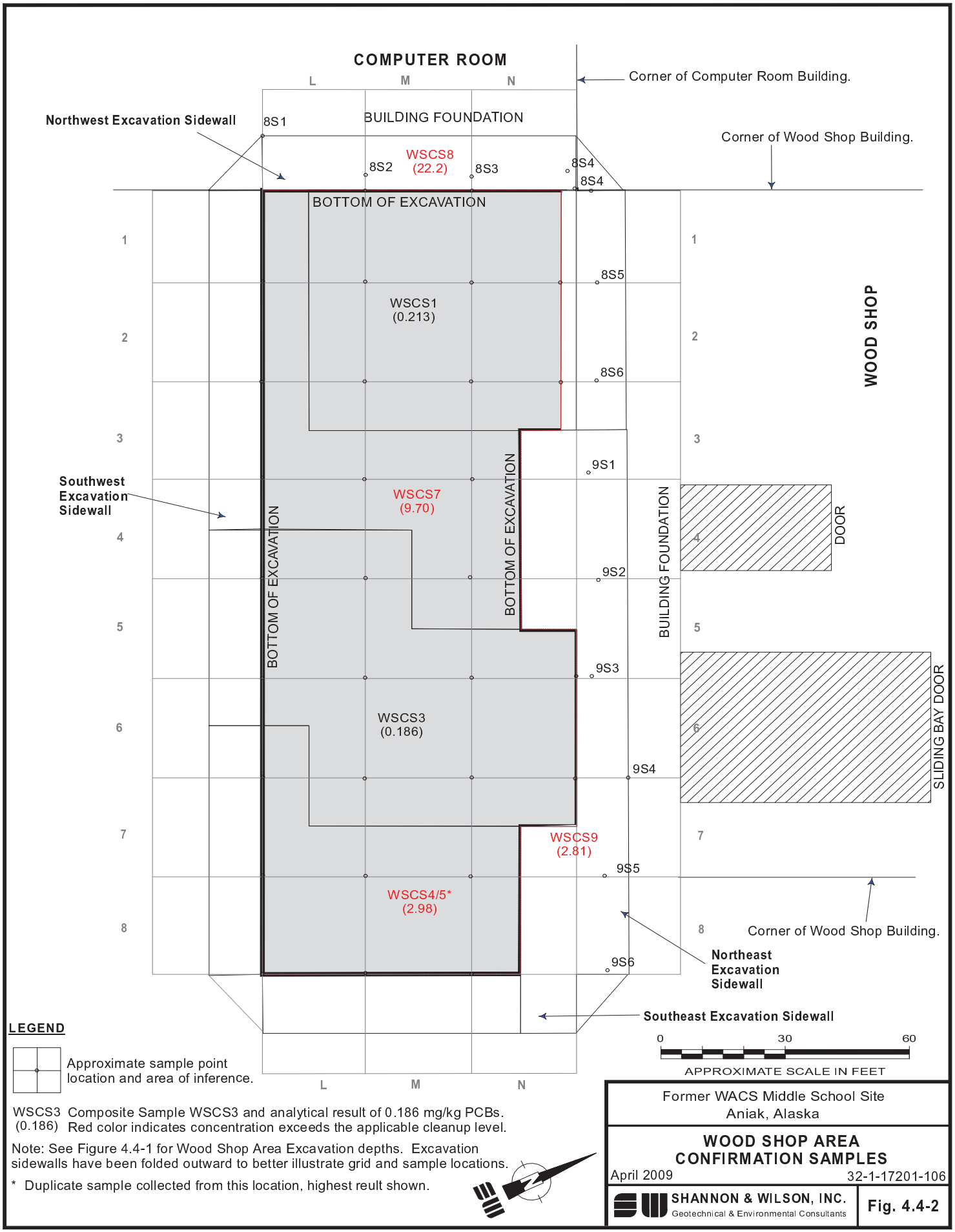
Fig. 4.4-1



LEGEND

Approximate sample point location and area of inference.

WSCS3 (0.186) Composite Sample WSCS3 and analytical result of 0.186 mg/kg PCBs. Red color indicates concentration exceeds the applicable cleanup level.

Note: See Figure 4.4-1 for Wood Shop Area Excavation depths. Excavation sidewalls have been folded outward to better illustrate grid and sample locations.

* Duplicate sample collected from this location, highest reult shown.

Former WACS Middle School Site
Aniak, Alaska

WOOD SHOP AREA CONFIRMATION SAMPLES

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
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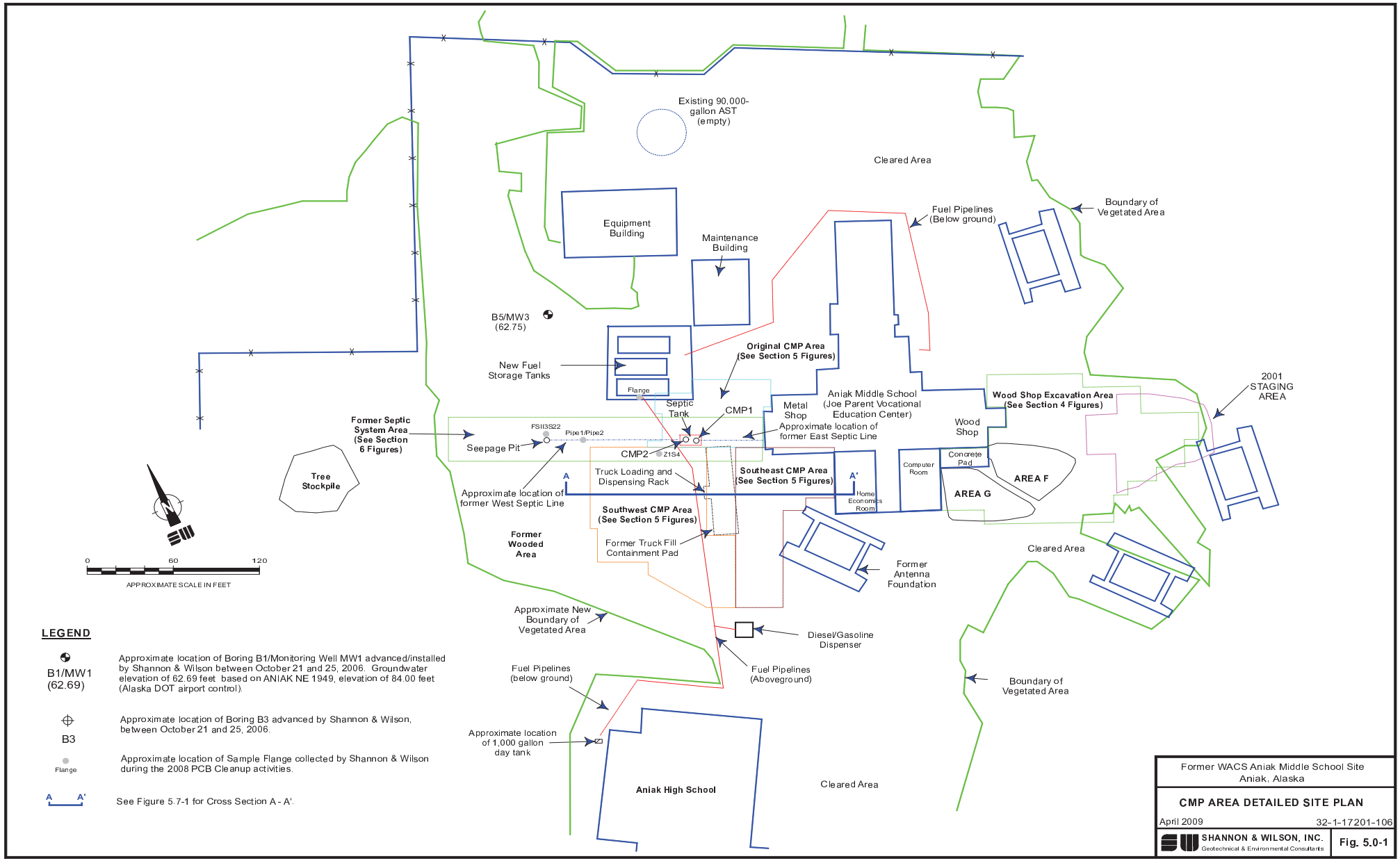
Fig. 4.4-2



Former WACS Aniak Middle School Site
Aniak, Alaska

CMP AREA DETAILED SITE PLAN

April 2009 | 32-1-17201-106

SHANNON & WILSON, INC.
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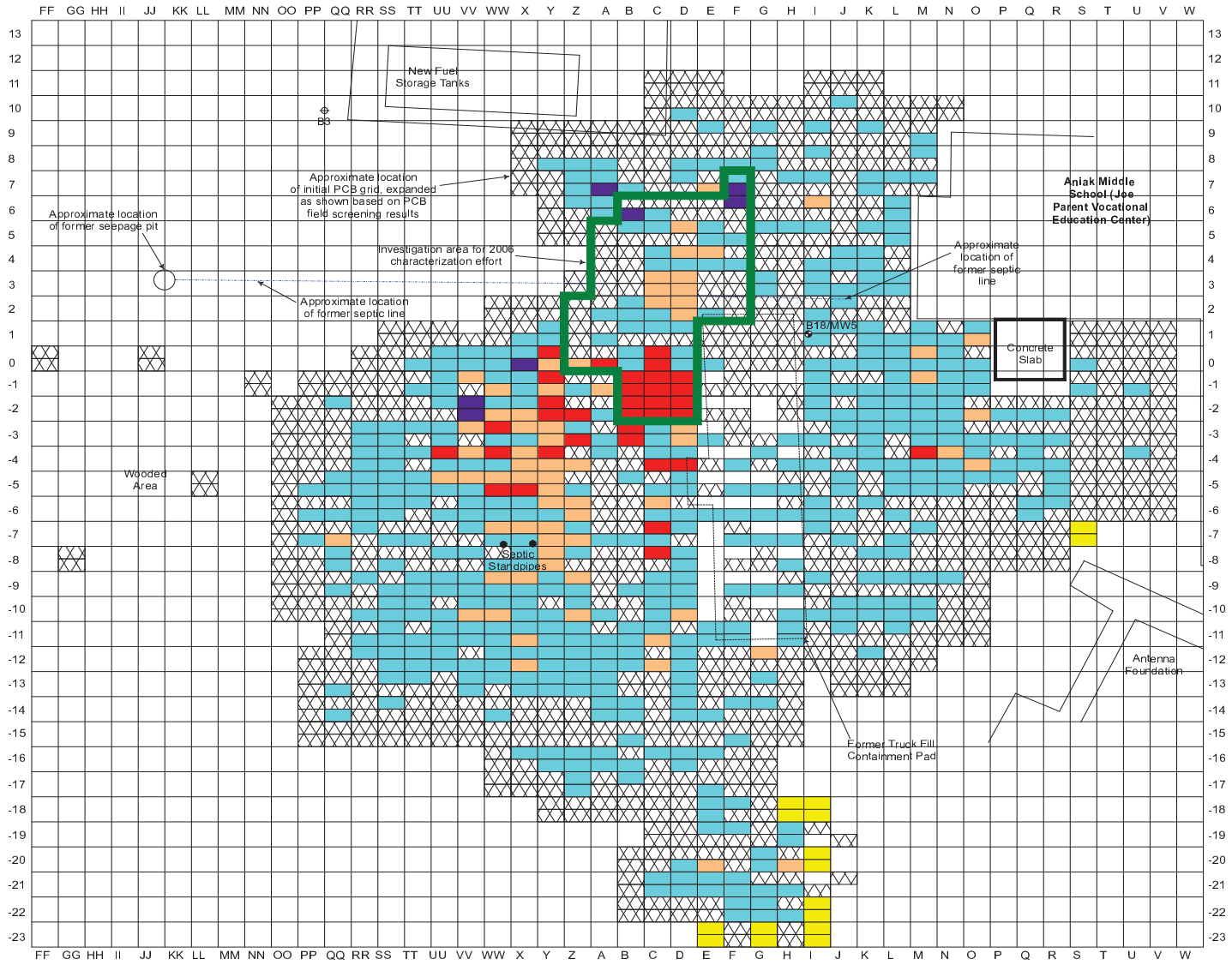
Fig. 5.0-1



LEGEND

- Grid square with screening results at 0.5-foot and 2-foot depths. (See below for concentration ranges).
- PCB screening result <1 mg/kg
- PCB screening result >1 but <11 mg/kg
- PCB screening result >11 but <38 mg/kg
- PCB screening result >38 mg/kg
- Field screening sample inadvertently not collected from this location.
- Location of additonal pre-excavation screening sample required to further delineate extent of potential contamination.
- Approximate location of former PCB Grid area established during October 2006 site characterization activities
- B18/MW5 — Approximate location of Boring B18/Monitoring Well MW5, advanced/installed by Shannon & Wilson October 2006 or May 2008.
- B3 — Approximate location of Boring B3 advanced by Shannon & Wilson, between October 21 and 25, 2006.

0 20 40
APPROXIMATE SCALE IN FEET

Former WACS Aniak Middle School Site
Aniak, Alaska

CMP AREA PRE-EXCAVATION SCREENING RESULTS

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
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Fig. 5.3-1

TABLE 5.3-2 - SUMMARY OF ORIGINAL CMP AREA ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level**	Sample Number^ and Collection Depth in Feet (See Table 5.3-2, Section 5 Figures, and Verification Samples					
			FSX7S1 0.5	FSZ5S1 0.5	FSG5S1 0.5	FSI9S1 0.5	FSJ3S2 2	FSJ3S6~ 2
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	X < 1.1	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	94.3	95.9	96.1	97.1	96.8	96.8
Polychlorinated Biphenyls (PCBs)								
Aroclor 1260 - mg/kg	EPA 8082	1	0.465	0.582	**1.89**	**4.41**	**1.76**	**1.38**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0521	< 0.0517	< 0.519	< 0.0509	< 0.511	< 0.514
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND

Parameter Tested	Method*	Cleanup Level**	Sample Number^ and Collection Depth in Feet (See Table 5.3-2, Section 5 Figures, and Appendix C)						
			Verification Samples		Confirmation Samples				
			FSK8S1 0.5	FSD3S4 4	FSCS1 3 - 4	FSCS2 2 - 4	FSCS3 2 - 4	FSCS4 3 - 4	FSCS5 2 - 4
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	4.9 < X < 11	-	-	-	-	-
Percent Solids	SM20 2540G	-	94.9	93.9	95.2	94.9	94.9	95.6	95.4
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	0.722	**12.3**	0.599	0.287	0.866	0.901	0.588
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0525	< 0.318‡	< 0.0515	< 0.0519	< 0.0522	< 0.0517	< 0.0516
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

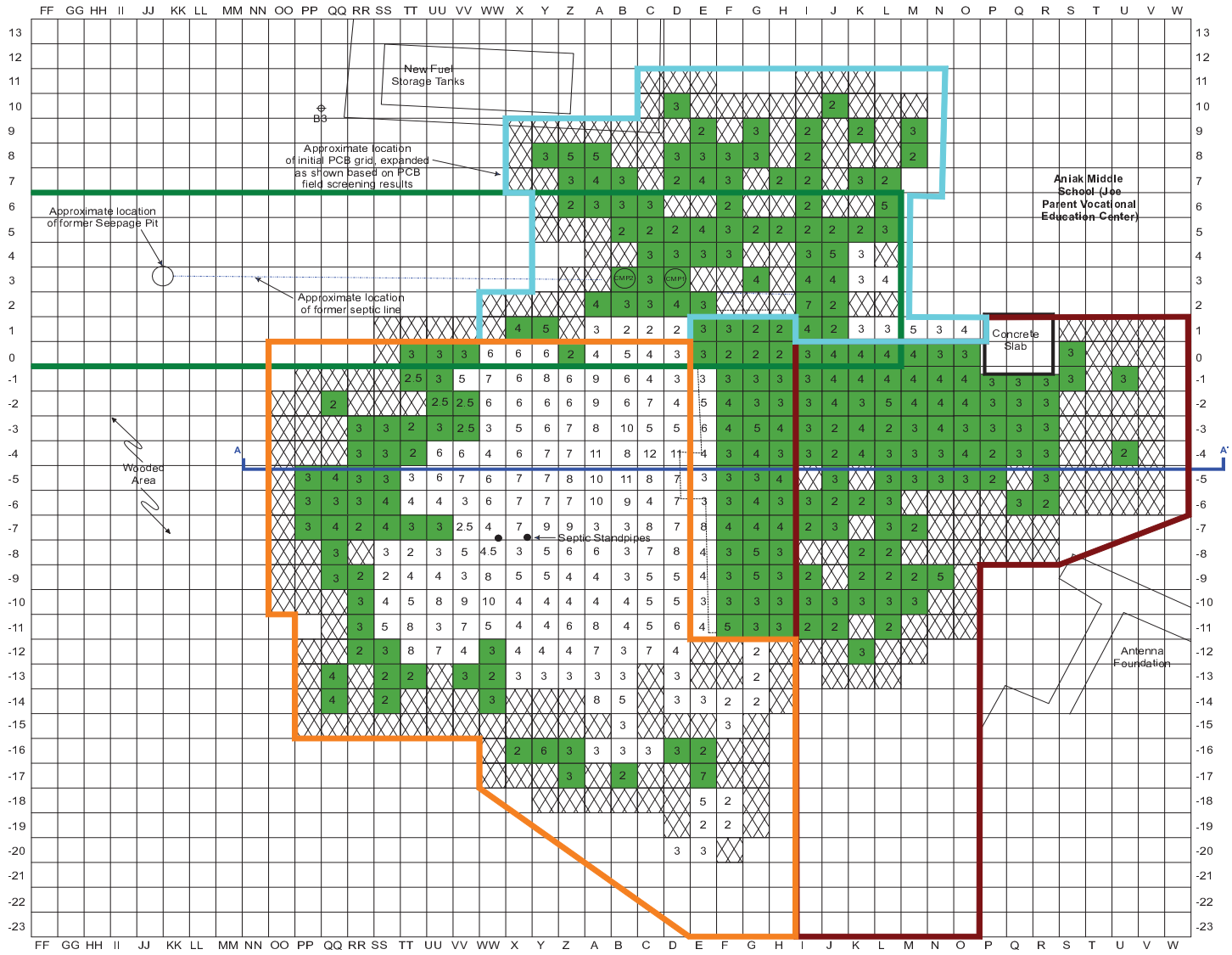
KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.47	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
~	Duplicate of previous sample
< 0.0525	Analyte not detected above the laboratory reporting limit of 0.0525 mg/kg
< 0.318‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level

TABLE 5.3-2 - SUMMARY OF ORIGINAL CMP AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.3-2, Section 5 Figures, and Appendix C)						
			Confirmation Samples						
Parameter Tested	**Method***	**Cleanup Level****	FSCS6 2 - 4	FSCS7 2 - 3	FSCS8 2 - 3	FSCS9~ 2 - 3	FSCS26 2 - 3	FSCS27 2 - 3	FSCS28 2 - 5
PCB Field Screening - ppm	HACH Test Kit	-	-	-	-	-	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	96.1	95.9	95.5	95.4	95.8	85.1	96.3
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	0.317	0.703	0.141	0.146	0.461	0.441	0.142 J
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0515	< 0.0520	< 0.0522	< 0.0515	< 0.256	< 0.291	< 0.257
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.3-2, Section 5 Figures, and Appendix C)						
			Confirmation Samples						
Parameter Tested	**Method***	**Cleanup Level****	FSCS29 2 - 5	FSCS30 3 - 5	FSCS31~ 3 - 5	FSCS32 2 - 7	FSCS57 2 - 5	FSCS58 3 - 5	FSCS111 6 - 8
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	X < 1.1	1.1 < X < 4.9	X < 1.1
Percent Solids	SM20 2540G	-	97.5	95.8	96.3	96.0	97.5	87.7	97.6
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	**1.33**	**2.47**	**1.99**	0.722	0.978	**1.35**	0.106
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.254	< 0.258	< 0.256	< 0.259	< 0.253	< 0.564	< 0.0509
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.33	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
mg/kg	Milligram per Kilogram
ppm	Parts per Million
~	Duplicate of previous sample
< 0.0516	Analyte not detected above the laboratory reporting limit of 0.0516 mg/kg
J	Quantitation is an estimate



LEGEND

- PCB pre-excavation screening result <1 mg/kg
- 3 — Grid Square depth following final excavation.
- 3 — Grid square depth with <1 mg/kg confirmation sample.
- A — A' See Figure 5.7-1 for Cross Section A - A'.
- Approximate location of Former Septic System Area (See Figure 5.6-1).
- Approximate location Southeast CMP Area (See Figure 5.3-1).
- Approximate location Southwest CMP Area (See Figure 5.3-1).
- Approximate location Original CMP Area (See Figure 5.3-1).

Note: Although confirmation samples collected from the vicinity of the former Truck Fill Pad met the ADEC cleanup criterion, additional excavation is required to remove PCB-impacted soil remaining at depth.

0 20 40
APPROXIMATE SCALE IN FEET

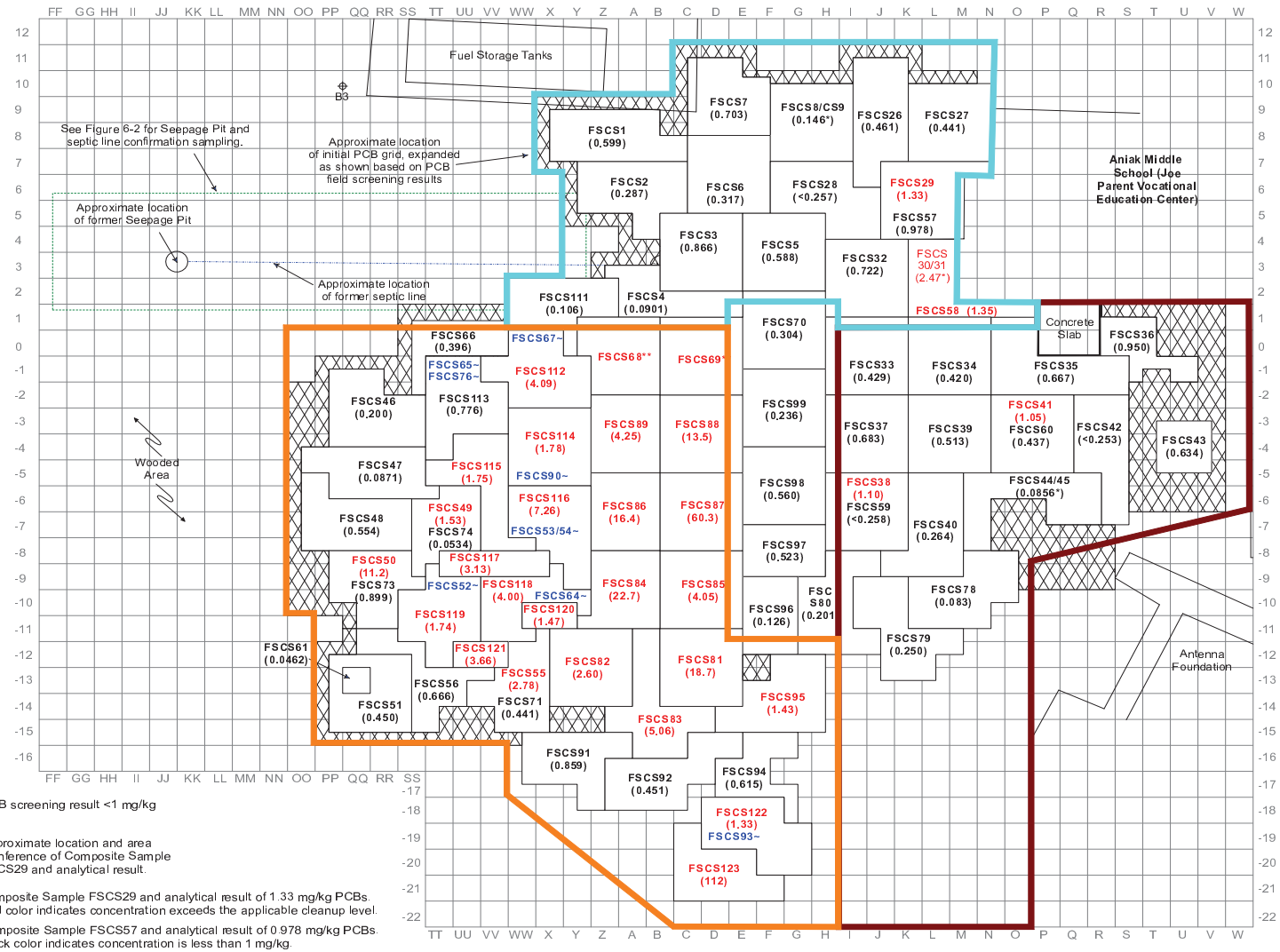
Former WACS Aniak Middle School Site
Aniak, Alaska

CMP AREA EXCAVATION DEPTHS

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 5.3-2



LEGEND

- Approximate location of Former Septic System Area
- Approximate location Southeast CMP Area
- Approximate location Southwest CMP Area
- Approximate location Original CMP Area

Note: Although confirmation samples collected from the vicinity of the former Truck Fill Pad met the ADEC cleanup criterion, additional excavation is required to remove PCB-impacted soil remaining at depth.

0 20 40
APPROXIMATE SCALE IN FEET

LEGEND

- PCB screening result <1 mg/kg
- FSCS29 (1.33) FSCS57 (0.978) — Approximate location and area of inference of Composite Sample FSCS29 and analytical result.
- **FSCS29 (1.33)** — Composite Sample FSCS29 and analytical result of 1.33 mg/kg PCBs. Red color indicates concentration exceeds the applicable cleanup level.
- FSCS57 (0.978) — Composite Sample FSCS57 and analytical result of 0.978 mg/kg PCBs. Black color indicates concentration is less than 1 mg/kg.
- **FSCS8/CS9 (0.146*)** — Duplicate sample set collected, highest result shown
- **FSCS68**** — Indicates that Composite Sample FSCS68 did not meet X<1.1 mg/kg PCB field screening criteria; analytical sample not submitted.
- **FSCS52~** — Indicates that Composite Sample FSCS52 had an analytical result exceeding the applicable cleanup criterion of 1.0 mg/kg PCBs. This area (including the area of inference) was excavated, sampled, and is represented by the confirmation samples shown in the vicinity of this sample.

Former WACS Aniak Middle School Site
Aniak, Alaska

FINAL CMP AREA CONFIRMATION RESULTS

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 5.3-3

TABLE 5.4-2 - SUMMARY OF SOUTHWEST CMP AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)							
			Verification Samples							
Parameter Tested	**Method***	**Cleanup Level****	FSWW-4S2 2	FSX-1S2 2	FSY-8S1 0.5	FSY-16S2 2	FSZ-2S2 2	FSA-2S2 2	FSA-14S1 0.5	FSC-7S1 0.5
PCB Field Screening - ppm	HACH Test Kit	-	11 < X < 38	4.9 < X < 11	11 < X < 38	1.1 < X < 4.9	X > 38	4.9 < X < 11	4.9 < X < 11	X > 38
Percent Solids	SM20 2540G	-	80.8	94.1	82.3	85.2	96.3	96.5	94.8	96.5
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	**1.49**	**16.5**	**22.0**	0.988	**69.4**	**34.6**	**7.18**	**227**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.608	< 0.317‡	< 0.896‡	< 0.0712	**< 3.10‡**	**< 1.54‡**	< 0.311‡	< 0.0513
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)							
			Verification Samples							
Parameter Tested	**Method***	**Cleanup Level****	FSC-8S1 0.5	FSC-9S1 0.5	FSD-3S2 2	FSD-4S2 2	FSD-4S3~ 2	FSE-16S1 0.5	FSE-19S1 0.5	FSG-13S1 0.5
PCB Field Screening - ppm	HACH Test Kit	-	X > 38	4.9 < X < 11	11 < X < 38	X > 38	X > 38	1.1 < X < 4.9	4.9 < X < 11	4.9 < X < 11
Percent Solids	SM20 2540G	-	96.1	94.7	96.2	96.8	96.2	97.3	96.7	98.0
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	**97.8**	**17.9**	**27.7**	**109**	**117**	0.622	**7.96**	0.567
Aroclor 1254 - mg/kg	EPA 8082	1	**< 3.06‡**	< 0.623‡	**< 1.53‡**	**< 3.05‡**	**< 3.08‡**	< 0.0311	< 0.624	< 0.0304
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
27.7	Reported concentration exceeds the ADEC cleanup level
109	Reported concentration exceeds TSCA hazardous waste criterion (50 mg/kg)
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
~	Duplicate of previous sample
< 0.0513	Analyte not detected above the laboratory reporting limit of 0.0513 mg/kg
< 0.317‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level
< 3.05‡	MDL exceeds cleanup level

TABLE 5.4-2 - SUMMARY OF SOUTHWEST CMP AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)							
			Verification Samples							
Parameter Tested	**Method***	**Cleanup Level****	FSQQ-13S3 3	FSQQ-14S3 3	FSUU-12S4 4	FSWW-9S5 5	FSZ-7S8 8	FSA-5S9 9	FSA-6S3 3	FSB-1S4 4
PCB Field Screening - ppm	HACH Test Kit	-	4.9 < X < 11	1.1 < X < 4.9	4.9 < X < 11	1.1 < X < 4.9	11 < X < 38	1.1 < X < 4.9	4.9 < X < 11	X > 38
Percent Solids	SM20 2540G	-	76.7	80.7	90.2	86.3	89.5	96.1	96.4	95.9
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	**64.3**	**1.37**	0.720 J	**8.58**	**28.9**	0.409	**5.68**	**422**
Aroclor 1254 - mg/kg	EPA 8082	1	**< 1.93‡**	< 0.305	< 0.329‡	< 0.572	< 0.825‡	< 0.0318	< 0.306‡	**< 15.5‡**
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)							
			Verification Samples				Confirmation Samples			
Parameter Tested	**Method***	**Cleanup Level****	FSB-1S5~ 4	FSB-11S3 3	FSC-7S6 6	FSCS52S9 4	FSCS46 2 - 3	FSCS47 3 - 4	FSCS48 3 - 4	FSCS49 2 - 5
PCB Field Screening - ppm	HACH Test Kit	-	X > 38	1.1 < X < 4.9	X > 38	1.1 < X < 4.9	X < 1.1	X < 1.1	1.1 < X < 4.9	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	96.5	94.9	96.2	84.4	89.7	89.1	87.1	89.1
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	**413**	**15.0**	**114**	**1.33**	0.200 J	0.0871 J	0.554	**1.53**
Aroclor 1254 - mg/kg	EPA 8082	1	**< 15.5‡**	< 0.784‡	**< 1.54‡**	< 0.175	< 0.275	< 0.277	< 0.284	< 0.279
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
28.9	Reported concentration exceeds the ADEC cleanup level
64.3	Reported concentration exceeds TSCA hazardous waste criterion (50 mg/kg)
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
~	Duplicate of previous sample
mg/kg	Milligram per Kilogram
ppm	Parts per Million
< 0.305	Analyte not detected above the laboratory reporting limit of 0.305 mg/kg
< 0.825‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level
< 1.93‡	MDL exceeds cleanup level
J	Quantitation is an estimate

TABLE 5.4-2 - SUMMARY OF SOUTHWEST CMP AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)							
			Confirmation Samples							
Parameter Tested	**Method***	**Cleanup Level****	FSCS50 2 - 5	FSCS51 2 - 4	FSCS52 3 - 8	FSCS53 2 - 9	FSCS54~ 2 - 9	FSCS55 2 - 5	FSCS56 2 - 8	FSCS61 7
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	X < 1.1	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	X < 1.1	X < 1.1	X < 1.1
Percent Solids	SM20 2540G	-	83.8	81.3	81.5	83.3	87.4	81.5	83.2	82.7
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	**11.2**	0.450	**5.90**	**2.90**	0.963	**2.78**	0.666	0.0462
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.294	< 0.302	< 0.303	< 0.295	< 0.281	< 0.305	< 0.298	< 0.037
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)							
			Confirmation Samples							
Parameter Tested	**Method***	**Cleanup Level****	FSCS64 3 - 10	FSCS66 4 - 7	FSCS67 2 - 9	FSCS71 2 - 7	FSCS73 2 - 4	FSCS74 2 - 4	FSCS81 3 - 5	FSCS1008~ 3 - 5
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	X < 1.1	X < 1.1	X < 1.1	1.1 < X < 4.9	X < 1.1	4.9 < X < 11	4.9 < X < 11
Percent Solids	SM20 2540G	-	84.0	87.7	95.1	84.5	90.1	88.5	94.5	95.3
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	**2.64**	0.396	**2.76**	0.441	0.899	0.0534	**18.7**	**17.8**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.371	< 0.0351	< 0.325	< 0.071	< 0.336	<0.0343	<0.315‡	< 0.313‡
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	waste under the Toxic Substance Control Act (TSCA).
1.53	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
< 0.279	Analyte not detected above the laboratory reporting limit of 0.279 mg/kg
<0.315‡	Method detection limit (MDL) is reported because the laboratory reporting limit exceeds cleanup level
~	Duplicate of previous sample

TABLE 5.4-2 - SUMMARY OF SOUTHWEST CMP AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)						
			Confirmation Samples						
Parameter Tested	**Method***	**Cleanup Level****	FSCS82 3 - 7	FSCS1009~ 3 - 7	FSCS83 3 - 8	FSCS84 3 - 7	FSCS1010~ 3 - 7	FSCS85 3 - 8	FSCS86 3 - 11
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	1.1 < X < 4.9	4.9 < X < 11	4.9 < X < 11	4.9 < X < 11	4.9 < X < 11	4.9 < X < 11
Percent Solids	SM20 2540G	-	86.1	85.7	94.4	86.5	89.2	95.3	88.5
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	**2.60**	**2.71**	**5.06**	**22.7**	**24.4**	**4.05**	**16.4**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.568	< 0.581	< 0.526	< 0.345‡	< 0.831‡	< 0.522	< 0.338‡
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)						
			Confirmation Samples						
Parameter Tested	**Method***	**Cleanup Level****	FSCS87 3 - 11	FSCS88 4 - 12	FSCS89 4 - 11	FSCS90 2 - 7	FSCS91 2 - 4	FSCS92 2 - 3	FSCS93 2 - 5
PCB Field Screening - ppm	HACH Test Kit	-	11 < X < 38	4.9 < X < 11	1.1 < X < 4.9	4.9 < X < 11	1.1 < X < 4.9	X < 1.1	11 < X < 38
Percent Solids	SM20 2540G	-	100	96.1	94.9	93.9	86.7	95.0	94.9
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	**60.3**	**13.5**	**4.25**	**13.8**	0.859	0.451	**< 3.15‡**
Aroclor 1254 - mg/kg	EPA 8082	1	**< 1.49‡**	< 0.513	< 0.315‡	< 0.318‡	< 0.586	< 0.0521	**82.2**
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
18.7	Reported concentration exceeds the ADEC cleanup level
60.3	Reported concentration exceeds TSCA hazardous waste criterion (50 mg/kg)
ND	Analyte not detected
mg/kg	Milligram per Kilogram
ppm	Parts per Million
~	Duplicate of previous sample
<0.0343	Analyte not detected above the laboratory reporting limit of 0.0343 mg/kg
<0.315‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level
< 1.49‡	MDL exceeds cleanup level

TABLE 5.4-2 - SUMMARY OF SOUTHWEST CMP AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)							
			Confirmation Samples							
Parameter Tested	**Method***	**Cleanup Level****	FSCS94 2 - 5	FSCS95 2 - 3	FSCS112 6 - 8	FSCS113 3 - 7	FSCS114 3 - 8	FSCS115 3 - 8	FSCS116 3 - 10	FSCS117 3 - 8
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	1.1 < X < 4.9	1.1 < X < 4.9	X < 1.1	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	95.5	96.5	96.2	95.3	90.4	86.0	86.6	83.1
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0520	**1.43**	**4.09**	0.776	**1.78**	**1.75**	**7.26**	**3.13**
Aroclor 1254 - mg/kg	EPA 8082	1	0.615	< 0.516	< 0.512	< 0.522	< 0.550	< 0.580	< 0.344‡	< 0.601
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.4-2, Section 5 Figures, and Appendix C)						
			Confirmation Samples						
Parameter Tested	**Method***	**Cleanup Level****	FSCS118 4 - 10	FSCS119 4- 9	FSCS120 4	FSCS121 5 - 8	FSCS122 2 - 5	FSCS123 2 - 4	FSCS1011~ 2 - 4
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	1.1 < X < 4.9	X < 1.1	1.1 < X < 4.9	1.1 < X < 4.9	11 < X < 38	11 < X < 38
Percent Solids	SM20 2540G	-	84.5	87.2	87.4	84.7	93.4	90.0	90.5
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	**4.00**	**1.74**	**1.47**	**3.66**	< 0.267	**< 3.32‡**	**< 1.65‡**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.587	< 0.569	< 0.286	< 0.589	**1.33**	**112**	**120**
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
4.09	Reported concentration exceeds the ADEC cleanup level
112	Reported concentration exceeds TSCA hazardous waste criterion (50 mg/kg)
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
~	Duplicate of previous sample
< 0.512	Analyte not detected above the laboratory reporting limit of 0.512 mg/kg
< 0.344‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level
< 3.15‡	MDL exceeds cleanup level

TABLE 5.5-2 - SUMMARY OF SOUTHEAST CMP AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.5-1, Section 5 Figures, and Appendix C)							
			Verification Samples							
Parameter Tested	**Method***	**Cleanup Level****	FSK-9S1 0.5	FSL-8S1 0.5	FSL-8S10~ 0.5	FSM0S1 0.5	FSN-10S1 0.5	FST-4S1 0.5	FSV1S2 2	FSK-1S3 3
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	11 < X < 38	X < 1.1	X < 1.1	X < 1.1	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	95.5	88.6	90.6	91.8	97.4	94.7	93.4	96.2
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - mg/kg	EPA 8082	1	**1.57**	0.943	0.875	**23.8**	0.0493 J	0.0961	0.0282 J	**1.81**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.258	< 0.562	< 0.543	< 0.644‡	< 0.0512	< 0.0525	< 0.0532	< 0.254
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.5-1, Section 5 Figures, and Appendix						
			Confirmation Samples						
Parameter Tested	**Method***	**Cleanup Level****	FSCS33 2 - 4	FSCS34 3 - 5	FSCS35 3 - 4	FSCS36 3	FSCS37 2 - 4	FSCS38 2 - 3	FSCS39 2 - 4
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	96.2	96.1	88.4	95.9	96.6	96.2	96.5
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/kg	EPA 8082	1	0.429	0.420	0.667	0.950	0.683	**1.10**	0.513
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.257	< 0.257	< 0.279	< 0.259	< 0.254	< 0.257	< 0.258
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.81	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
~	Duplicate of previous sample
< 0.0532	Analyte not detected above the laboratory reporting limit of 0.0532 mg/kg
< 0.644‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level
J	Quantitation is an estimate

TABLE 5.5-2 - SUMMARY OF SOUTHEAST CMP AREA ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level**	Sample Number^ and Collection Depth in Feet (See Table 5.5-1, Section 5 Figures, and Appendix C)					
			Confirmation Samples					
			FSCS40 2 - 3	FSCS41 2 - 4	FSCS42 2 - 3	FSCS43 2 - 4	FSCS44 2 - 3	FSCS45 ~ 2 - 3
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	96.2	97.1	97.5	95.9	96.6	96.5
Polychlorinated Biphenyls (PCBs)								
Aroclor 1260 - mg/kg	EPA 8082	1	0.264	**1.05**	< 0.253	0.634	< 0.258	0.0856 J
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.259	< 0.255	< 0.253	< 0.258	< 0.258	< 0.255
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND

Parameter Tested	Method*	Cleanup Level**	Sample Number^ and Collection Depth in Feet (See Table 5.5-1, Section 5 Figures, and Appendix C)				
			Confirmation Samples				
			FSCS59 3 - 5	FSCS60 2 - 4	FSCS78 2 - 6	FSCS79 2 - 3	FSCS80 2 - 3
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	X < 1.1	X < 1.1	X < 1.1	X < 1.1
Percent Solids	SM20 2540G	-	96.7	97.0	95.1	96.4	97.5
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.258	0.437	0.0836	0.250	0.201
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.258	< 0.255	< 0.0524	< 0.0511	< 0.0512
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.10	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
~	Duplicate of previous sample
< 0.254	Analyte not detected above the laboratory reporting limit of 0.254 mg/kg
J	Quantitation is an estimate

TABLE 5.6-2 - SUMMARY OF FORMER TRUCK FILL PAD AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.6-1, Section 5 Figures, and Appendix C)				
			Verification Samples		Former Truck Pad Concrete		
Parameter Tested	Method*	Cleanup Level**	FSE-7S7 7	FSF-2S3 3	CD4 0.4 - 0.8	CD5 0.5 - 0.8	CD6 0.5
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	4.9 < X < 11	-	-	-
Percent Solids	SM20 2540G	-	96.4	95.6	-	-	-
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	**2.01**	**4.32**	0.231	0.261	0.0600
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.152	< 0.310‡	< 0.0495	< 0.0494	< 0.0498
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.6-1, Section 5 Figures, and Appendix C)				
			Former Truck Pad Concrete				
Parameter Tested	Method*	Cleanup Level**	CD7 0.5	CD8 0.0 - 0.3	CD9 0.0 - 0.3	CD10 0.0 - 0.3	CD11~ 0.0 - 0.3
PCB Field Screening - ppm	HACH Test Kit	-	-	-	-	-	-
Percent Solids	SM20 2540G	-	-	96.8	97.4	97.6	97.9
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0498	< 0.258	< 0.257	< 0.256	< 0.255
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0498	< 0.258	< 0.257	< 0.256	< 0.255
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

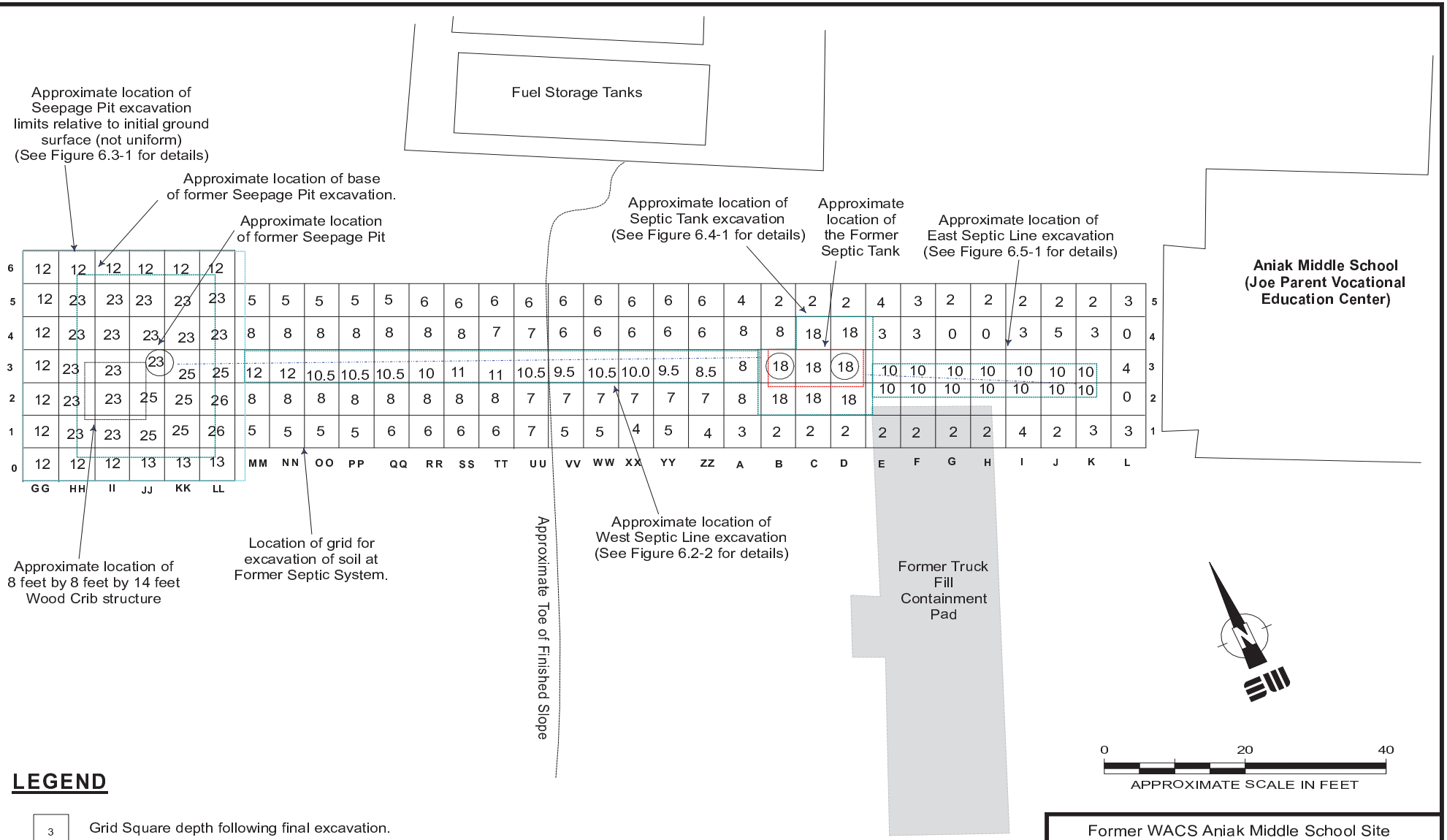
KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
2.01	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per Million
< 0.0304	Analyte not detected at the laboratory reporting limit of 0.0304 mg/kg
< 0.310‡	Method detection limit (MDL) is reported because the laboratory reporting limit exceeds cleanup level
~	Duplicate of previous sample

TABLE 5.6-2 - SUMMARY OF FORMER TRUCK FILL PAD AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 5.6-1, Section 5 Figures, and Appendix C)			
			Soil Beneath Former Truck Pad			
Parameter Tested	Method*	Cleanup Level**	CD4S 2	CD5S 2	CD6S 2	CD7S 2
PCB Field Screening - ppm	HACH Test Kit	-	1.1 < X < 4.9	X < 1.1	X < 1.1	1.1 < X < 4.9
Percent Solids	SM20 2540G	-	97.6	98.4	98.2	97.5
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	**1.52**	0.317	**2.08**	0.246
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.504	< 0.0506	< 0.0507	< 0.0505
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 5.6-1, Section 5 Figures, and Appendix C)				
			Confirmation Samples				
Parameter Tested	Method*	Cleanup Level**	FSCS70 2 - 3	FSCS96 3 - 5	FSCS97 2 - 8	FSCS98 4 - 8	FSCS99 2 - 6
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	X < 1.1	1.1 < X < 4.9	X < 1.1	X < 1.1
Percent Solids	SM20 2540G	-	96.0	97.1	96.1	96.3	95.2
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - mg/kg	EPA 8082	1	0.304	0.126	0.523	0.560	0.236
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0222	< 0.0512	< 0.0512	< 0.0518	< 0.0517
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.52	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
< 0.504	Analyte not detected above the laboratory reporting limit of 0.504 mg/kg
ppm	Parts per Million



LEGEND

3 Grid Square depth following final excavation.

Note: Grid squares west of the approximate toe of finished slope were backfilled to the elevation of the surrounding surface. The pre-existing peninsular-shaped mound of fill material above the West Septic Line and Seepage Pit was not replaced such that approximately 15 feet of fill material was backfilled at the former Seepage Pit Area and about 2.5 to 4 feet of material was backilled over the West Septic Line Area.

Former WACS Aniak Middle School Site
Aniak, Alaska

FORMER SEPTIC SYSTEM EXCAVATION DEPTHS

April 2009 32-1-17201-106

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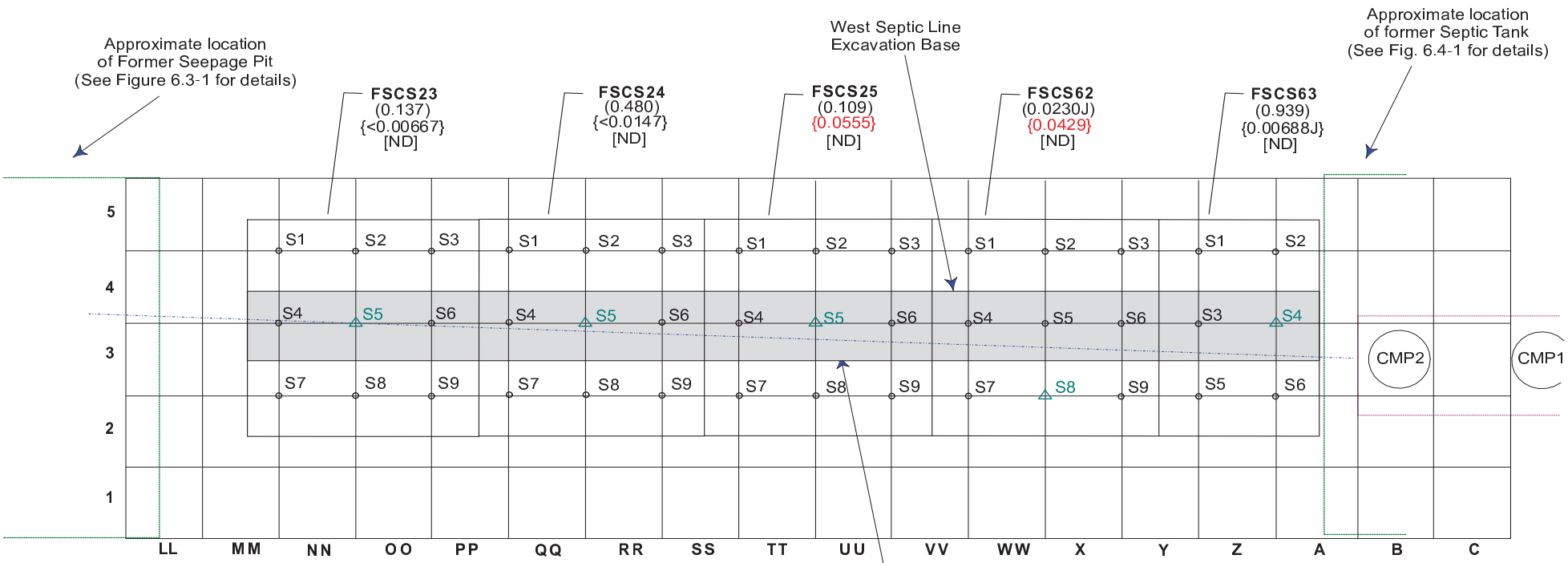
Fig. 6.2-1

TABLE 6.2-2 - SUMMARY OF WEST SEPTIC LINE AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 6.2-1, Figures 6.2-1 and 6.2-2, and Appendix C)														
			Verification Samples			West Septic Line Confirmation Samples										QC	
Parameter Tested	Method*	Cleanup Level**	FSNN3S12 12	FSA3S8.5 8.5	FSA3S9~ 8.5	FSCS23 10.5 - 12	FSCS23S5 10.5	FSCS24 10 - 11	FSCS24S5 10	FSCS25 10.5 - 11	FSCS25S5 10.5	FSCS62 10.5	FSCS62S8 10.5	FSCS63 10.5	FSCS63S4 10.5	STB 8/8/2008	Trip Blank 8/20/2008
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	1.1 < X < 4.9	1.1 < X < 4.9	X < 1.1	-	X < 1.1	-	X < 1.1	-	X < 1.1	-	X < 1.1	-	-	-
PID Headspace Reading - ppm	580B PID	-	-	-	-	-	1.9	-	1.9	-	1.9	-	0	-	0	-	-
Percent Solids	SM20 2540G	-	77.6	94.7	94.8	85.7	94.9	87.3	92.1	92.2	84.9	88.8	88.2	92.0	94.5		
Polychlorinated Biphenyls (PCBs)																	
Aroclor 1260 - mg/kg	EPA 8082	1	<0.317	**1.53**	**1.47**	0.137	-	0.480	-	0.109	-	0.0230 J	-	0.939	-	-	-
Aroclor 1254 - mg/kg	EPA 8082	1	<0.317	< 0.522	< 0.521	< 0.0581	-	< 0.0566	-	< 0.0535	-	< 0.0335	-	< 0.0314	-	-	-
Other PCB Aroclors -mg/kg	EPA 8082	1	ND	ND	ND	ND	-	ND	-	ND	-	ND	-	ND	-	-	-
Total RCRA Metals																	
Arsenic - mg/kg	EPA 6020	3.9	-	-	-	**10.2**	-	**8.69**	-	**6.88**	-	-	**11.4**	-	**5.26**	-	-
Barium - mg/kg	EPA 6020	1,100	-	-	-	132	-	123	-	86.0	-	-	136	-	99.2	-	-
Cadmium - mg/kg	EPA 6020	5	-	-	-	0.486	-	0.414	-	0.253	-	-	< 1.03	-	< 0.998	-	-
Chromium - mg/kg	EPA 6020	25	-	-	-	18.9	-	18.7	-	19.2	-	-	22.8	-	17.3	-	-
Lead - mg/kg	EPA 6020	400	-	-	-	5.42	-	4.60	-	3.51	-	-	6.65	-	6.15	-	-
Selenium - mg/kg	EPA 6020	3.4	-	-	-	< 0.562	-	< 0.568	-	< 0.517	-	-	**6.04**	-	**3.65**	-	-
Silver - mg/kg	EPA 6020	11.2	-	-	-	0.119	-	0.270	-	0.133	-	-	< 1.03	-	2.07	-	-
Mercury - mg/kg	EPA 245.1	1.4	-	-	-	< 0.0458	-	0.00130 J	-	< 0.0433	-	-	0.0322	-	0.107	-	-
Volatile Organic Compounds (VOCs)																	
Trichloroethene - mg/kg	EPA 8260B	0.020	-	-	-	-	< 0.00667‡	-	< 0.0147	-	**0.0555**	-	**0.0429**	-	0.00688J	< 0.00812‡	< 0.00135‡
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	-	-	-	< 0.0214	-	< 0.0147	-	0.0149 J	-	< 0.0188	-	< 0.0138	< 0.0260	< 0.0250
1,4-Dichlorobenzene - mg/kg	EPA 8260B	0.64	-	-	-	-	0.00983 J	-	< 0.0147	-	< 0.0267	-	0.0322	-	0.00963J	< 0.0260	< 0.0250
1,2,4-Trichlorobenzene - mg/kg	EPA 8260B	0.85	-	-	-	-	0.0271 J	-	< 0.0294	-	< 0.0533	-	0.0162J	-	0.00990J	< 0.0520	< 0.0250
Toluene - mg/kg	EPA 8260B	6.5	-	-	-	-	< 0.0427	-	< 0.0294	-	< 0.0533	-	0.00471J	-	0.00344J	< 0.0520	< 0.0250
Ethylbenzene - mg/kg	EPA 8260B	6.9	-	-	-	-	< 0.0214	-	< 0.0147	-	< 0.0267	-	0.00339J	-	< 0.0138	< 0.0260	< 0.0250
Xylenes (total) - mg/kg	EPA 8260B	63	-	-	-	-	< 0.0855	-	< 0.0588	-	< 0.107	-	0.00146J	-	< 0.0275	< 0.104	0.00350 J
Methylene Chloride - mg/kg	EPA 8260B	0.016	-	-	-	-	< 0.0855	-	< 0.0588	-	< 0.107	-	< 0.00184‡	-	< 0.00135‡	< 0.104	**0.0285**
Other VOC analytes - mg/kg	EPA 8260B	Varies	-	-	-	-	ND	-	ND	-	ND	-	ND	-	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
10.2	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
QC	Quality Control
< 0.562	Analyte not detected above laboratory reporting limit of 0.562 mg/kg
J	Quantitation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
< 0.781‡	Method detection limit (MDL) is reported because the laboratory reporting limit exceeds cleanup level



LEGEND

FSCS25 (0.109) — Composite Sample FSCS25 and analtycal result of 0.109 mg/kg PCBs. Black color indicates concentration is less than the applicable cleanup level.

{0.0555} — TCE analtyical result of 0.0555 mg/kg. Red color indicates contaminant concentrationis greater than the applicable cleanup level. Black indicates TCE was detected but concentration is below the cleanup level. J indicates reported concentration is an estimation.

[ND] — Concentrations of PCE were not detected in this sample.

FSCS23 — Approximate location and area of inference of Composite Sample FSCS23.

S1 — Approximate location of Sample Point S1. Up to 9 sample points were composited together to create each confirmation sample.

S5 — Indicates a discreet sample was collected from this location and submitted to the project laboratory for VOC analysis. Sample was selected based on headspace screening results and spatial representation. See Tables 6.2-1 and 6.2-2 for details.

Former WACS Aniak Middle School Site
Aniak, Alaska

WEST SEPTIC LINE AREA EXCAVATION DETAIL

April 2009 — 32-1-17201-106

SHANNON & WILSON, INC.
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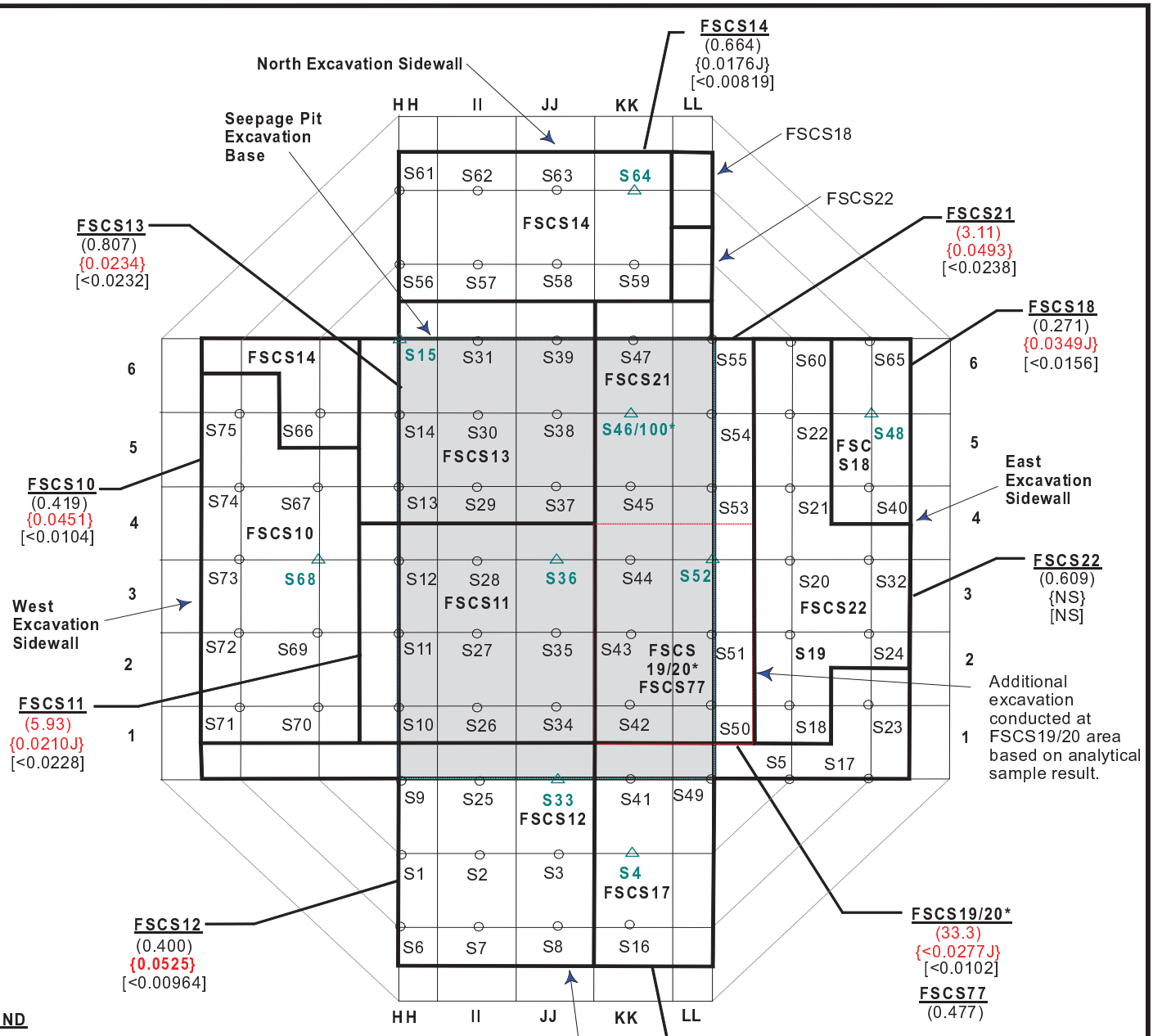
Fig. 6.2-2



LEGEND

FSCS10 (0.419)	Composite Sample FSCS10 and analtycal result of 0.419 mg/kg PCBs. Black color indicates concentration is less than the applicable cleanup level.
{0.0451}	TCE analtyical result of 0.0451 mg/kg. Red color indicates contaminant concentrationis greater than the applicable cleanup level. Black indicates TCE was detected but concentration is below the cleanup level. J indicates reported concentration is an estimation.
[<0.0104]	Concentrations of PCE were not detected above 0.0104 mg/kg.
FSCS10	Approximate location and area of inference of Composite Sample FSCS10.
S1	Approximate location of Sample Point S1. Up to 9 sample points were composited together to create each confirmation sample.
S5	Indicates a discreet sample was collected from this location and submitted to the project laboratory for VOC analysis. Sample was selected based on headspace screening results and spatial representation. See Tables 6.3-1 and 6.3-2 for details.

* Duplicate sample set collected, highest result shown.

Note: See Figure 6.2-1 for Seepage Pit Excavation Location. Excavation sidewalls have been folded outward to better illustrate grid and sample locations.

0 10 20
APPROXIMATE SCALE IN FEET

Former WACS Aniak Middle School Site
Aniak, Alaska

SEEPAGE PIT AREA EXCAVATION DETAIL

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 6.3-1

TABLE 6.3-2 - SUMMARY OF SEEPAGE PIT AREA ANALYTICAL RESULTS

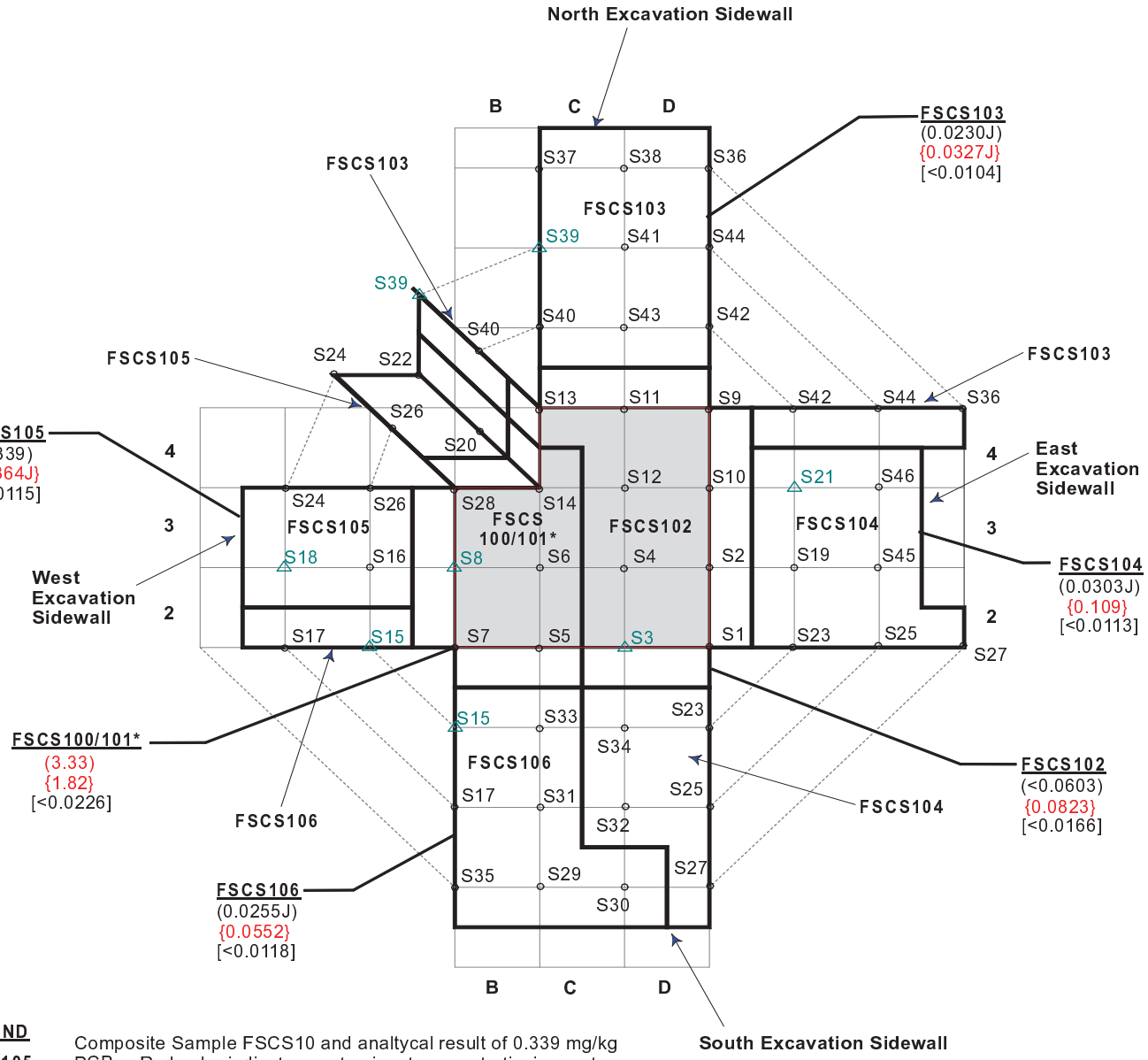
			Sample Number^ and Collection Depth in Feet (See Table 6.3-1, Figures 6.2-1 and 6.3-1, and Appendix C)												
			Verification Samples	Confirmation Samples											
Parameter Tested	Method*	Cleanup Level**	FSI14S10 10	FSCS10 13 - 18	FSCS10S68^^ 18	FSCS11 23	FSCS11S36^^ 23	FSCS12 13 - 23	FSCS12S33^^ 23	FSCS13 23	FSCS13S15^^ 23	FSCS14 13 - 23	FSCS14S64^^ 13	FSCS17 13 - 23	FSCS17S4^^ 18
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	X < 1.1	-	1.1 < X < 4.9	-	X < 1.1	-	1.1 < X < 4.9	-	X < 1.1	-	X < 1.1	-
PID Headspace Reading - ppm	580B PID	-	-	-	2.0	-	2.9	-	2.9	-	3.0	-	1.8	-	1.8
Percent Solids	SM20 2540G	-	95.6	88.1	86.3	89.6	93.3	85.6	87.4	90.3	91.1	94.2	90.2	85.6	87.7
Polychlorinated Biphenyls (PCBs)															
Aroclor 1260 - mg/kg	EPA 8082	1	0.107 J	0.419	-	**5.93**	-	0.400	-	0.807	-	0.664	-	0.338	-
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.260	< 0.0556	-	< 0.275	-	< 0.0578	-	< 0.273	-	< 0.0524	-	< 0.058	-
Other PCB Aroclors -mg/kg	EPA 8082	1	ND	ND	-	ND	-	ND	-	ND	-	ND	-	ND	-
Total RCRA Metals															
Arsenic - mg/kg	EPA 6020	3.9	-	**6.97**	-	**6.94**	-	**11.0**	-	**7.58**	-	**7.78**	-	**15.0**	-
Barium - mg/kg	EPA 6020	1,100	-	111	-	101	-	136	-	105	-	105	-	144	-
Cadmium - mg/kg	EPA 6020	5	-	0.528	-	0.666	-	0.485	-	0.565	-	0.409	-	0.571	-
Chromium - mg/kg	EPA 6020	25	-	20.7	-	17.5	-	23.7	-	19.5	-	19.1	-	24.8	-
Lead - mg/kg	EPA 6020	400	-	5.47	-	8.42	-	6.20	-	5.90	-	5.34	-	6.57	-
Selenium - mg/kg	EPA 6020	3.4	-	< 0.547	-	< 0.536	-	0.229 J	-	< 0.546	-	< 0.515	-	< 0.574	-
Silver - mg/kg	EPA 6020	11.2	-	0.27	-	1.22	-	0.0855 J	-	0.694	-	0.211	-	0.200	-
Mercury - mg/kg	EPA 245.1	1.4	-	0.0319	-	0.0834	-	0.0172 J	-	0.0217 J	-	0.0221 J	-	0.0347 J	-
Volatile Organic Compounds (VOCs)															
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	-	<0.0104‡	-	<0.0228	-	<0.00964‡	-	<0.0232	-	<0.00819‡	-	<0.0107‡
Trichloroethene - mg/kg	EPA 8260B	0.02	-	-	**0.0451**	-	**0.0210 J**	-	**0.0525**	-	**0.0234**	-	0.0176 J	-	**0.0330 J**
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	-	< 0.0332	-	< 0.0228	-	0.0408	-	< 0.0232	-	< 0.0262	-	<0.0344
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	-	<0.0332	-	<0.0228	-	<0.0309	-	<0.0232	-	<0.0262	-	<0.0344
1,4-dichlorobenzene - mg/kg	EPA 8260B	0.64	-	-	0.0740	-	0.0411	-	0.128	-	0.0424	-	0.0446	-	0.0519
1,2,3-trichlorobenzene - mg/kg	EPA 8260B	-	-	-	0.0242 J	-	< 0.0457	-	< 0.0618	-	< 0.0463	-	< 0.0525	-	< 0.0688
1,2,4-trichlorobenzene - mg/kg	EPA 8260B	0.85	-	-	0.0866	-	0.0448 J	-	< 0.0618	-	0.0410 J	-	0.0260 J	-	0.0268 J
Other VOC analytes - mg/kg	EPA 8260B	Varies	-	-	ND	-	ND	-	ND	-	ND	-	ND	-	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
^^	Discrete samples FSCS10S68-FSCS18S48 are listed as CS10S68-CS18S48 on the chain of custody and on Shannon and Wilson's sample tracking log included as Table C-1 in Appendix C.
6.97	Reported concentration exceeds the ADEC cleanup level
< 0.0556	Analyte not detected above laboratory reporting limit of 0.0556 mg/kg
J	Quantitation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
<0.0104‡	Method detection limit (MDL) is reported because the laboratory reporting limit exceeds cleanup level
ND	Analyte not detected
mg/kg	Milligrams per Kilogram
ppm	Parts per million
-	Not applicable or sample not tested for this analyte
~	Duplicate of previous sample

TABLE 6.3-2 - SUMMARY OF SEEPAGE PIT AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 6.3-1, Figures 6.2-1 and 6.3-1, and Appendix C)										
			Confirmation Samples										QC
Parameter Tested	Method*	Cleanup Level**	FSCS18 13	FSCS18S48^^ 13	FSCS19 23	FSCS20~ 23	FSCS77 24	FSCS16S52^^ 23	FSCS21 23	FSCS15S46^^ 23	FSCS15S100~ 23	FSCS22 13 - 18	STB3 7/22/08
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	-	11 < X < 38	11 < X < 38	-	-	1.1 < X < 4.9	-	-	X < 1.1	-
PID Headspace Reading - ppm	580B PID	-	-	1.8	-	-	-	2.8	-	3.0	3.0	-	-
Percent Solids	SM20 2540G	-	83.6	75.4	87.8	89.7	86.7	83.5	88.9	92.9	91.8	90.0	99.8
Polychlorinated Biphenyls (PCBs)													
Aroclor 1260 - mg/kg	EPA 8082	1	0.271	-	**33.3**	**28.9**	0.477	-	**3.11**	-	-	0.609	-
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0588	-	< 0.847‡	< 0.821‡	<0.0357	-	< 0.281	-	-	< 0.055	-
Other PCB Aroclors -mg/kg	EPA 8082	1	ND	-	ND	ND	ND	-	ND	-	-	ND	-
Total RCRA Metals													
Arsenic - mg/kg	EPA 6020	3.9	**9.93**	-	**8.61**	**6.89**	-	-	**6.74**	-	-	**7.12**	-
Barium - mg/kg	EPA 6020	1,100	127	-	125	95.1	-	-	118	-	-	101	-
Cadmium - mg/kg	EPA 6020	5	0.554	-	1.53	1.28	-	-	0.577	-	-	0.492	-
Chromium - mg/kg	EPA 6020	25	22.2	-	22.7	16.9	-	-	20.5	-	-	18.5	-
Lead - mg/kg	EPA 6020	400	7.02	-	16.5	14.9	-	-	7.18	-	-	5.58	-
Selenium - mg/kg	EPA 6020	3.4	0.189 J	-	< 0.556	< 0.539	-	-	0.192 J	-	-	< 0.551	-
Silver - mg/kg	EPA 6020	11.2	0.179	-	2.43	1.96	-	-	0.556	-	-	0.259	-
Mercury - mg/kg	EPA 245.1	1.4	0.0250 J	-	0.0334 J	0.568	-	-	0.0396 J	-	-	0.0241 J	-
Volatile Organic Compounds (VOCs)													
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	<0.0156‡	-	-	-	<0.0102‡	-	<0.0238	<0.00839	-	<0.00812‡
Trichloroethene - mg/kg	EPA 8260B	0.020	-	**0.0349 J**	-	-	-	**0.0277 J**	-	**0.0493**	0.0191J	-	<0.00812‡
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	<0.0499	-	-	-	<0.0325	-	< 0.0238	< 0.0269	-	<0.0260
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	<0.0499	-	-	-	<0.0325	-	<0.0238	<0.0269	-	<0.0260
1,4-dichlorobenzene - mg/kg	EPA 8260B	0.64	-	0.0904	-	-	-	< 0.0325	-	0.0754	0.0492	-	< 0.026
1,2,3-trichlorobenzene - mg/kg	EPA 8260B	-	-	0.0404 J	-	-	-	0.464	-	< 0.0476	< 0.0538	-	< 0.0521
1,2,4-trichlorobenzene - mg/kg	EPA 8260B	0.85	-	0.0944 J	-	-	-	< 0.0651	-	0.0535	0.0564	-	< 0.0521
4- Isopropyltoluene - mg/kg	EPA 8260B	-	-	<0.0499	-	-	-	<0.0325	-	0.0157J	0.0105J	-	<0.0260
Naphthalene - mg/kg	EPA 8260B	20	-	< 0.0999	-	-	-	0.0521 J	-	<0.0476	<0.0538	-	< 0.0521
Other VOC analytes - mg/kg	EPA 8260B	Varies	-	ND	-	-	-	ND	-	ND	ND	-	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
^^	Discrete samples FSCS10S68-FSCS18S48 are listed as CS10S68-CS18S48 on the chain of custody and on Shannon and Wilson's sample tracking log included as Table C-1 in Appendix C.
15.0	Reported concentration exceeds the ADEC cleanup level
<0.0325	Analyte not detected above laboratory reporting limit of 0.0325 mg/kg
J	Quantitation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
<0.0102‡	Method detection limit (MDL) is reported because the laboratory reporting limit exceeds cleanup level
ND	Analyte not detected
mg/kg	Milligram per Kilogram
ppm	Parts per million
-	Not applicable or sample not tested for this analyte
~	Duplicate of previous sample



LEGEND

FSCS105 (0.339) — Composite Sample FSCS10 and analtycal result of 0.339 mg/kg PCBs. Red color indicates contaminant concentrationis greater than the applicable cleanup level. Black color indicates concentration is less than the applicable cleanup level.

{0.0364J} — TCE analtyical result of 0.0364 mg/kg. Red color indicates contaminant concentrationis greater than the applicable cleanup level. Black indicates TCE was detected but concentration is below the cleanup level. J indicates reported concentration is an estimation.

[<0.0116] — Concentrations of PCE were not detected above 0.0116 mg/kg.

FSCS105 — Approximate location and area of inference of Composite Sample FSCS105.

S1 — Approximate location of Sample Point S1. Up to 9 sample points were composited together to create each confirmation sample.

S5 — Indicates a discreet sample was collected from this location and submitted to the project laboratory for VOC analysis. Sample was selected based on headspace screening results and spatial representation. See Tables 6.4-1 and 6.4-2 for details.

* Duplicate sample set collected, highest result shown.

Note: See Figure 6.2-1 for Septic Tank Excavation Location. Excavation sidewalls have been folded outward to better illustrate grid and sample locations.

0 10 20

APPROXIMATE SCALE IN FEET

Former WACS Aniak Middle School Site
Aniak, Alaska

SEPTIC TANK AREA EXCAVATION DETAIL

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 6.4-1

TABLE 6.4-2 - SUMMARY OF SEPTIC TANK AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 6.4-1, Figures 6.2-1 and 6.4-1, and Appendix C)									
			Septic Tank Confirmation Samples									
Parameter Tested	**Method***	**Cleanup Level****	FSCS100 17.5	FSCS101~ 17.5	FSCS100S8 17.5	FSCS101S100~ 17.5	FSCS102 17.5	FSCS102S3 17.5	FSCS103 2.5 - 12.5	FSCS103S41 7.5	FSCS104 2.5 - 12.5	FSCS104S21 12.5
PCB Field Screening - ppm	HACH Test Kit	-	4.9 < X < 11	4.9 < X < 11	-	-	X < 1.1	-	X < 1.1	-	X < 1.1	-
PID Headspace Reading - ppm	580B PID	-	-	-	7.8	-	-	1.2	-	0	-	0.4
Percent Solids	SM20 2540G	-	86.8	86.5	79.8	80.3	82.4	81.9	97.3	97.3	95.2	95.5
Polychlorinated Biphenyls (PCBs)												
Aroclor 1260 - mg/kg	EPA 8082	1	**1.95**	**3.33**	-	-	< 0.0603	-	0.023 J	-	0.0303 J	-
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.572	<0.576	-	-	< 0.0603	-	< 0.0513	-	< 0.0525	-
Other PCB Aroclors -mg/kg	EPA 8082	1	ND	ND	-	-	ND	-	ND	-	ND	-
Total RCRA Metals												
Arsenic - mg/kg	EPA 6020	3.9	**12.8**	**14.0**	-	-	**14.0**	-	**8.77**	-	**6.49**	-
Barium - mg/kg	EPA 6020	1,100	139	140	-	-	144	-	101	-	77.4	-
Cadmium - mg/kg	EPA 6020	5	0.460	0.490	-	-	0.472	-	0.226	-	0.237	-
Chromium - mg/kg	EPA 6020	25	21.4	22.3	-	-	21.7	-	15.2	-	16.8	-
Lead - mg/kg	EPA 6020	400	6.96	7.08	-	-	7.50	-	13.9	-	12.2	-
Selenium - mg/kg	EPA 6020	3.4	< 0.563	< 0.569	-	-	< 0.597	-	< 0.502	-	< 0.513	-
Silver - mg/kg	EPA 6020	11.2	0.157	0.169	-	-	0.149	-	0.0466 J	-	0.060 J	-
Mercury - mg/kg	EPA 245.1	1.4	0.0287J	0.0319J	-	-	0.0333 J	-	< 0.0410	-	< 0.0417	-
Volatile Organic Compounds (VOCs)	AK101/8021B											
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	-	<0.0226‡	<0.0171‡	-	<0.0166‡	-	<0.0104‡	-	<0.0113‡
Trichloroethene - mg/kg	EPA 8260B	0.020	-	-	**1.82**	**1.49**	-	**0.0823**	-	**0.0327 J**	-	**0.109**
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	-	<0.0723	<0.0550	-	<0.0531	-	<0.0334	-	<0.0362
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	-	<0.0723	<0.0550	-	<0.0531	-	<0.0334	-	<0.0362
1,4-Dichlorobenzene - mg/kg	EPA 8260B	0.64	-	-	0.0340J	0.110	-	< 0.0531	-	< 0.0334	-	< 0.0362
1,2,3-trichlorobenzene - mg/kg	EPA 8260B	-	-	-	<0.145	0.166	-	< 0.106	-	< 0.0667	-	< 0.0725
1,2,4-trichlorobenzene - mg/kg	EPA 8260B	0.85	-	-	0.140J	0.561	-	< 0.106	-	0.0521 J	-	0.0217 J
Other VOC analytes - mg/kg	EPA 8260B	Varies	-	-	ND	ND	-	ND	-	ND	-	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.95	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
~	Duplicate of previous sample
< 0.572	Analyte not detected above laboratory reporting limit of 0.572 mg/kg
J	Quantiation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
<0.0226‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
ppm	Parts per million

TABLE 6.4-2 - SUMMARY OF SEPTIC TANK AREA ANALYTICAL RESULTS

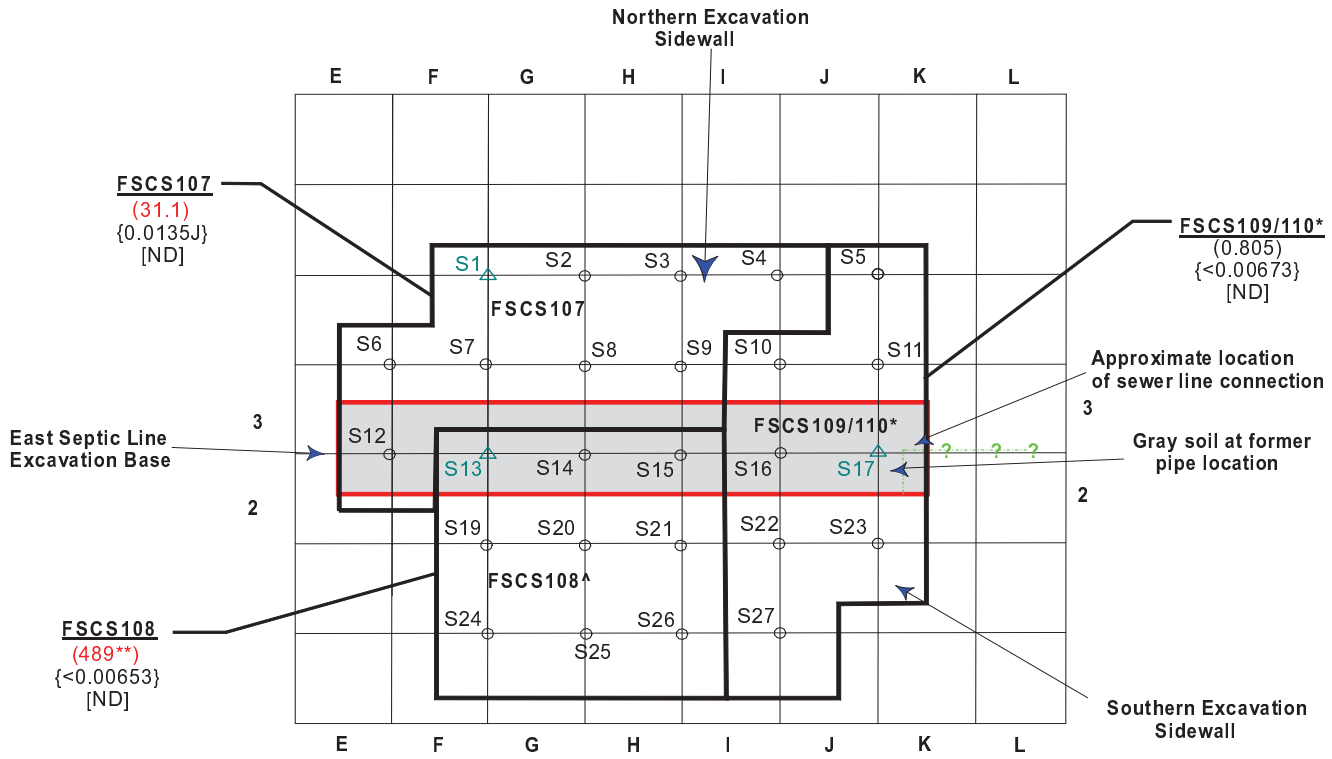
			Sample Number^ and Collection Depth in Feet (See Table 6.4-1, Figures 6.2-1, 6.2-2, and 6.4-1, and Appendix C)							
			Septic Tank Confirmation Samples				Septic Tank		Quality Control	
Parameter Tested	**Method***	**Cleanup Level****	FSCS105 2.5 - 12.5	FSCS105S18 7.5	FSCS106 2.5 - 12.5	FSCS106S15 12.5	CD12 0.0 - 0.3	CD13 0.0 - 0.3	STB 8/17/2008	STB 9/2/2008
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	-	X < 1.1	-	-	-	-	-
PID Headspace Reading - ppm	580B PID	-	-	0.4	-	0	-	-	-	-
Percent Solids	SM20 2540G	-	95.6	96.8	95.4	95.9	97.9	94.4	-	-
Polychlorinated Biphenyls (PCBs)									82.4	
Aroclor 1260 - mg/kg	EPA 8082	1	0.399	-	0.0255 J	-	0.595	0.267	-	-
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0521	-	< 0.0516	-	< 0.0311	< 0.0319	-	-
Other PCB Aroclors -mg/kg	EPA 8082	1	ND	-	ND	-	ND	ND	-	-
Total RCRA Metals										
Arsenic - mg/kg	EPA 6020	3.9	**7.95**	-	**7.01**	-	-	-	-	-
Barium - mg/kg	EPA 6020	1,100	103	-	99.6	-	-	-	-	-
Cadmium - mg/kg	EPA 6020	5	0.288	-	0.304	-	-	-	-	-
Chromium - mg/kg	EPA 6020	25	15.8	-	14.3	-	-	-	-	-
Lead - mg/kg	EPA 6020	400	58.9	-	3.24	-	-	-	-	-
Selenium - mg/kg	EPA 6020	3.4	< 0.502	-	< 0.519	-	-	-	-	-
Silver - mg/kg	EPA 6020	11.2	0.0803 J	-	0.0507 J	-	-	-	-	-
Mercury - mg/kg	EPA 245.1	1.4	< 0.0411	-	0.0477	-	-	-	-	-
Volatile Organic Compounds (VOCs)	AK101/8021B									
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	<0.0115‡	-	<0.0118‡	<0.0173	<0.0169	<0.00262‡	<0.00809‡
Trichloroethene - mg/kg	EPA 8260B	0.020	-	**0.0364 J**	-	**0.0552**	<0.0173	**0.0622**	<0.00262‡	<0.00809‡
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	<0.0368	-	<0.0378	<0.0173	0.00575J	<0.0380	<0.0259
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	<0.0368	-	<0.0378	<0.0173	<0.0169	<0.0380	<0.0259
1,4-Dichlorobenzene - mg/kg	EPA 8260B	0.64	-	< 0.0368	-	< 0.0378	<0.0173	0.0267	<0.0380	<0.0259
1,2,3-trichlorobenzene - mg/kg	EPA 8260B	-	-	< 0.0736	-	< 0.0756	<0.0173	<0.0169	<0.0380	< 0.0519
1,2,4-trichlorobenzene - mg/kg	EPA 8260B	0.85	-	< 0.0736	-	< 0.0756	<0.0173	0.0220	<0.0380	< 0.0519
Other VOC analytes - mg/kg	EPA 8260B	Varies	-	ND	-	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.95	Reported concentration exceeds the ADEC cleanup level
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
~	Duplicate of previous sample
< 0.572	Analyte not detected above laboratory reporting limit of 0.572 mg/kg
J	Quantiation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
<0.0226‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
ppm	Parts per million

TABLE 6.4-3 - SUMMARY OF SEPTIC TANK SLUDGE ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 6.4-1 , Figures 6.2-1 and 6.4-1, and Appendix C)	
		RCRA Cleanup Level	Septic Tank Liquid	Quality Control
			Tank1	WTB1
Parameter Tested	**Method***	**	2 feet below tank liquid	7/26/2008
Polychlorinated Biphenyls (PCBs)				
Aroclor 1260 - mg/L	EPA 8082	-	0.0227	-
Other PCB Aroclors - mg/L	EPA 8082	-	ND	-
Volatile Organic Compounds (VOCs)				
Benzene - mg/L	EPA 8260B	0.5	< 0.00400	< 0.000400
Chlorobenzene - mg/L	EPA 8260B	100.0	< 0.00500	< 0.000500
1,2-Dichloroethane - mg/L	EPA 8260B	0.5	< 0.00500	< 0.000500
cis-1,2-Dichloroethene - mg/L	EPA 8260B	-	0.151	< 0.00100
trans-1,2-Dichloroethene - mg/L	EPA 8260B	-	< 0.0100	< 0.00100
Trichloroethene - mg/L	EPA 8260B	0.5	**1.12**	< 0.00100
Tetrachloroethene - mg/L	EPA 8260B	0.7	< 0.00310‡	< 0.00100
1,4-Dichlorobenzene - mg/L	EPA 8260B	7.5	0.0735	< 0.000500
Toluene - mg/L	EPA 8260B	-	0.0247	< 0.00100
4-Isopropyltoluene - mg/L	EPA 8260B	-	0.00650 J	< 0.00100
1,2,4-Trichlorobenzene - mg/L	EPA 8260B	-	0.00470 J	< 0.00100
Vinyl Chloride - mg/L	EPA 8260B	0.2	0.00630 J	< 0.00100
2-Butanone (MEK) - mg/L	EPA 8260B	200.0	0.151	< 0.0100
Methylene Chloride - mg/L	EPA 8260B	-	0.0238 J	< 0.00500
1,1-Dichloroethane - mg/L	EPA 8260B	-	0.0170	< 0.00100
1,2-Dichloropropane - mg/L	EPA 8260B	-	0.0613	< 0.00100
Other VOCs - mg/L	EPA 8260B	-	ND	ND
Total RCRA Metals				
Arsenic - mg/L	EPA 6020	5.0	0.0213	-
Barium - mg/L	EPA 6020	100	0.267	-
Cadmium - mg/L	EPA 6020	1.0	0.0106	-
Chromium - mg/L	EPA 6020	5.0	0.0359	-
Lead - mg/L	EPA 6020	5.0	0.135	-
Selenium - mg/L	EPA 6020	1.0	0.00297	-
Silver - mg/L	EPA 6020	5.0	0.0560	-
Mercury - mg/L	EPA 245.1	0.2	0.0248	-

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Resource Conservation and Recovery Act (RCRA) Cleanup level is listed in Table 1, 40 CFR 261.24
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1.12	Reported concentration exceeds RCRA hazardouse waste criteria
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per million
J	Quantitation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
< 0.0005	Analyte not detected above laboratory reporting limit of 0.0800 mg/kg
<0.0310‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level



LEGEND

FSCS108 (31.1)	Composite Sample FSCS10 and analtycal result of 0.339 mg/kg PCBs. Red color indicates contaminant concentrationis greater than the applicable cleanup level. Black color indicates concentration is less than the applicable cleanup level.
{0.0135J}	TCE analtyical result of 0.0135 mg/kg. Red color indicates contaminant concentrationis greater than the applicable cleanup level. Black indicates TCE was detected but concentration is below the cleanup level. J indicates reported concentration is an estimation.
[ND]	Concentrations of PCE were not detected in this sample.
FSCS108	Approximate location and area of inference of Composite Sample FSCS108.
○ S1	Approximate location of Sample Point S1. Up to 9 sample points were composited together to create each confirmation sample.
△ S5	Indicates a discreet sample was collected from this location and submitted to the project laboratory for VOC analysis. Sample was selected based on headspace screening results and spatial representation. See Tables 6.4-1 and 6.4-2 for details.

* Duplicate sample set collected, highest result shown.

** Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA)

^ Sample FSCS108s13 had 18.4 mg/kg 1,2,3-trichlorobenzene. ADEC does not have a published cleanup level for this analyte.

Note 1: See Figure 6.2-1 for East Septic Line Excavation Location. Excavation sidewalls have been folded outward to better illustrate grid and sample locations.

Note 2: Locations of utilities are approximate and should be used for planning purposes only. Utility locations depicted on this figure should not be used to determine the exact location of buried underground utilities. Utility locates must be requested from the appropriate utility companies with supplemental private locates likely necessary.

0 10 20
APPROXIMATE SCALE IN FEET

Former WACS Aniak Middle School Site
Aniak, Alaska

EAST SEPTIC LINE AREA EXCAVATION DETAIL

April 2009 32-1-17201-106

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 6.5-1

TABLE 6.5-2 - SUMMARY OF EAST SEPTIC LINE AREA ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 6.5-1, Figures 6.2-1 and 6.5-1, and Appendix C)								
			East Septic Line Confirmation Samples								QC
Parameter Tested	Method*	Cleanup Level**	FSCS107 2 - 8	FSCS107S1 2	FSCS108 2 - 8	FSCS108S13 8	FSCS109 2 - 8	FSCS110~ 2 - 8	FSCS109S17 8	FSCS110S100~ 8	STB 9/3/2008
PCB Field Screening - ppm	HACH Test Kit	-	11 < X < 38	-	11 < X < 38	-	X < 1.1	X < 1.1	-	-	-
TCE Field Screening- ppb^^	AQR Test Kit	-	-	-	-	0 to 5	-	-	0 to 5	0 to 5	-
PID Headspace Reading - ppm	580B PID	-	-	0.7	-	1.3	-	-	2.7	2.7	-
Percent Solids	SM20 2540G	-	95.6	95.7	96.7	94.1	97.2	99.8	95.6	95.3	-
Polychlorinated Biphenyls (PCBs)											
Aroclor 1260 - mg/kg	EPA 8082	1	**31.1**	-	**489**	-	0.805	0.725	-	-	-
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.781‡	-	< 0.510	-	< 0.0512	< 0.0493	-	-	-
Other PCB Aroclors -mg/kg	EPA 8082	1	ND	-	ND	-	ND	ND	-	-	-
Total RCRA Metals											
Arsenic - mg/kg	EPA 6020	3.9	**5.86**	-	**7.71**	-	**6.89**	**7.53**	-	-	-
Barium - mg/kg	EPA 6020	1,100	95.9	-	125	-	97.5	86.2	-	-	-
Cadmium - mg/kg	EPA 6020	5	0.114 J	-	0.256	-	< 0.203	< 0.198	-	-	-
Chromium - mg/kg	EPA 6020	25	14.0	-	15.8	-	15.8	14.2	-	-	-
Lead - mg/kg	EPA 6020	400	3.15	-	3.37	-	3.39	3.11	-	-	-
Selenium - mg/kg	EPA 6020	3.4	< 0.503	-	< 0.501	-	< 0.507	< 0.496	-	-	-
Silver - mg/kg	EPA 6020	11.2	0.0492 J	-	0.149	-	< 0.101	< 0.0992	-	-	-
Mercury - mg/kg	EPA 245.1	1.4	< 0.0412	-	< 0.0401	-	< 0.0404	< 0.0392	-	-	-
Volatile Organic Compounds (VOCs)											
Trichloroethene - mg/kg	EPA 8260B	0.020	-	0.0135 J	-	< 0.00653‡	-	-	< 0.00673‡	< 0.00741‡	< 0.00795‡
1,2,3-Trichlorobenzene - mg/kg	EPA 8260B	-	-	< 0.0588	-	18.4	-	-	< 0.0432	< 0.0475	< 0.0510
1,2,4-Trichlorobenzene - mg/kg	EPA 8260B	0.85	-	< 0.0588	-	0.0669	-	-	0.0166 J	< 0.0475	< 0.0510
Methylene Chloride - mg/kg	EPA 8260B	0.016	-	**< 0.0365‡**	-	**< 0.0259‡**	-	-	**< 0.0268‡**	**< 0.0295‡**	**< 0.0316‡**
Other VOC Analytes - mg/kg	EPA 8260B	various	-	ND	-	ND	-	-	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
^^	Field screening result of total chlorinated solvents
31.1	Reported concentration exceeds the ADEC cleanup level
489	Reported concentration exceeds TSCA hazardous waste criteria
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligrams per Kilogram
ppm	Parts per million
ppb	Parts per billion
< 0.503	Analyte not detected above laboratory reporting limit of 0.503 mg/kg
J	Quantitation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
< 0.781‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
< 0.0365‡	MDL exceeds cleanup level
~	Duplicate of preceeding sample
QC	Quality Control

TABLE 6.6-2 - SUMMARY OF OVERBURDEN STOCKPILE ANALYTICAL RESULTS

			Sample Number^, and Collection Depth in Feet (See Table 6.6-1, Figure 6.6-1, and Appendix C)								
			Stockpiles SP1-SP9		Stockpile SP10			Stockpiles SP11-SP17, SP19		Stockpile SP18	
		Cleanup	FST1	FST2	FST3	FST4	FST4A	FST5	FST6	FST7	FST8
Parameter Tested	**Method***	**Level****	2	2	1.5	1.5	1.5	1.5	1.5	1.5	1.5
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	-	-	X < 1.1	1.1 < X < 4.9	X < 1.1	-	-	X < 1.1
PID Headspace Reading - ppm	580B PID	-	-	2.8	2.3	-	-	-	1.1	1.1	-
Total Solids - percent	SM20 2540G	-	85.0	85.0	84.6	86.9	88.6	88.8	84.3	81.7	91.3
Polychlorinated Biphenyls (PCBs)											
Aroclor 1260 - mg/kg	EPA 8082	1	0.0762 J	-	-	**9.65**	**4.69**	0.122 J	-	-	0.372
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.116	-	-	< 0.0564	< 0.337	< 0.308	-	-	< 0.0540
Other PCB analytes - mg/kg	EPA 8083	1	ND	-	-	ND	ND	ND	-	-	ND
Volatile Organic Compounds (VOCs)											
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	< 0.0114‡	< 0.00942‡	-	-	-	< 0.00892‡	<0.0150‡	-
Trichloroethene - mg/kg	EPA 8260B	0.020	-	< 0.0114‡	**0.0290 J**	-	-	-	< 0.00892‡	<0.0150‡	-
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	< 0.0365	< 0.0302	-	-	-	< 0.0286	< 0.0480	-
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	< 0.0365	< 0.0302	-	-	-	< 0.0286	< 0.0480	-
1,4-Dichlorobenzene - mg/kg	EPA 8260B	0.64	-	< 0.0365	0.0278 J	-	-	-	< 0.0286	< 0.0480	-
1,2,3-Trichlorobenzene - mg/kg	EPA 8260B	-	-	< 0.0730	0.0233 J	-	-	-	< 0.0572	< 0.0960	-
1,2,4-Trichlorobenzene - mg/kg	EPA 8260B	0.85	-	< 0.0730	0.0909	-	-	-	< 0.0572	< 0.0960	-
Other VOC Analytes - mg/kg	EPA 8260B	Varies	-	ND	ND	-	-	-	ND	ND	-
Total RCRA Metals											
Arsenic - mg/kg	EPA 6020	3.9	**13.3**	-	-	**7.53**	-	**10.7**	-	-	**9.95**
Barium - mg/kg	EPA 6020	1,100	140	-	-	110	-	113	-	-	133
Cadmium - mg/kg	EPA 6020	5	0.298	-	-	0.76	-	0.357	-	-	0.312
Chromium - mg/kg	EPA 6020	25	22.9	-	-	19.6	-	19.9	-	-	20.9
Lead - mg/kg	EPA 6020	400	6.05	-	-	8.78	-	5.45	-	-	5.4
Selenium - mg/kg	EPA 6020	3.4	0.330	-	-	< 0.571	-	< 0.539	-	-	< 0.540
Silver - mg/kg	EPA 6020	11.2	0.147	-	-	1.06	-	0.0960 J	-	-	0.196
Mercury - mg/kg	EPA 245.1	1.4	0.0301 J	-	-	0.0726	-	0.0172 J	-	-	0.0703

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
9.65	Reported concentration exceeds the ADEC cleanup level
J	Quantitation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
< 0.116	Analyte not detected above laboratory reporting limit of 0.116 mg/kg
< 0.0114‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level
-	Not applicable or sample not tested for this analyte
ND	Analyte not detected
mg/kg	Milligram per Kilogram
ppm	Parts per Million

TABLE 6.6-2 - SUMMARY OF OVERBURDEN STOCKPILE ANALYTICAL RESULTS

			Sample Number^, and Collection Depth in Feet (See Table 6.6-1, Figure 6.6-1, and Appendix C)										
			Stockpile SP20(S1-S5)		Stockpiles SP20(S6-S10), SP21-SP24		Stockpile SP25	Quality Control					
Parameter Tested	**Method***	**Cleanup Level****	SP20S10 1.5	SP20CS1 1.5	SP21S6 1.5	SP21CS2 1.5	SP25S1 1.5	STB1 6/26/2008	STB4 7/27/2007	STB 8/8/2008	STB 8/29/2008	STB 8/30/2008	STB 9/3/2008
PCB Field Screening - ppm	HACH Test Kit	-	-	11 < X < 38	-	X < 1.1	-		-	-	-	-	-
PID Headspace Reading - ppm	580B PID	-	11.6	-	1.2	-	1.9	-	-	-	-	-	-
Total Solids - percent	SM20 2540G	-	96.7	97.9	95.1	95.5	95.5	100.0	-	-	-	-	-
Polychlorinated Biphenyls (PCBs)													
Aroclor 1260 - mg/kg	EPA 8082	1	-	**13.2**	-	0.067	-		-	-	-	-	-
Aroclor 1254 - mg/kg	EPA 8082	1	-	< 0.760‡	-	< 0.0520	-		-	-	-	-	-
Other PCB Aroclors - mg/kg	EPA 8082	1	-	ND	-	ND	-		-	-	-	-	-
Volatile Organic Compounds (VOCs)													
Tetrachloroethene - mg/kg	EPA 8260B	0.024	< 0.00944‡	-	< 0.00915‡	-	< 0.0206	< 0.00820‡	< 0.00862‡	< 0.00812‡	< 0.00792‡	< 0.00791‡	< 0.00795‡
Trichloroethene - mg/kg	EPA 8260B	0.020	0.0148 J	-	< 0.00915‡	-	**0.0303**	< 0.00820‡	< 0.00862‡	< 0.00812‡	< 0.00792‡	< 0.00791‡	< 0.00795‡
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	< 0.0303	-	< 0.0293	-	< 0.0206	< 0.0263	< 0.0276	< 0.0260	< 0.0254	< 0.0253	< 0.0255
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	< 0.0303	-	< 0.0293	-	< 0.0206	< 0.0263	< 0.0276	< 0.0260	< 0.0254	< 0.0253	< 0.0255
1,2,3-Trichlorobenzene - mg/kg	EPA 8260B	-	< 0.0605	-	< 0.0587	-	0.0126 J	< 0.0525	< 0.0552	< 0.052	< 0.0507	< 0.0507	< 0.051
Other VOC Analytes - mg/kg	EPA 8260B	Varies	ND	-	ND	-	ND	ND	ND	ND	ND	ND	ND
Total RCRA Metals													
Arsenic - mg/kg	EPA 6020	3.9	-	**6.73**	-	**6.77**	-	-	-	-	-	-	-
Barium - mg/kg	EPA 6020	1,100	-	83.1	-	72.4	-	-	-	-	-	-	-
Cadmium - mg/kg	EPA 6020	5	-	0.146 J	-	0.150 J	-	-	-	-	-	-	-
Chromium - mg/kg	EPA 6020	25	-	15.1	-	13.6	-	-	-	-	-	-	-
Lead - mg/kg	EPA 6020	400	-	9.28	-	3.36	-	-	-	-	-	-	-
Selenium - mg/kg	EPA 6020	3.4	-	< 0.493	-	0.202 J	-	-	-	-	-	-	-
Silver - mg/kg	EPA 6020	11.2	-	0.0462 J	-	0.0475 J	-	-	-	-	-	-	-
Mercury - mg/kg	EPA 245.1	1.4	-	0.0712	-	< 0.0415	-	-	-	-	-	-	-

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
13.2	Reported concentration exceeds the ADEC cleanup level
J	Quantitation is an estimate, concentration detected below the laboratory reporting limit but above the method detection limit
< 0.0303	Analyte not detected above laboratory reporting limit of 0.0303 mg/kg
< 0.00944‡	Method detection limit (MDL) is reported because PQL exceeds cleanup level
-	Not applicable or sample not tested for this analyte
ND	Analyte not detected
mg/kg	Milligram per Kilogram
ppm	Parts per Million

TABLE 6.6-3 - SUMMARY OF OVERBURDEN STOCKPILE FINAL DISPOSITION

Stockpile No. (See Figure 6.6-1)	Approx. Volume (cy)	Characterization Sample No.	PCBs Result (mg/kg)	TCE Result* (mg/kg)	Final Disposition
SP1 thru SP5	250	FST1 and FST2	<0.116	<0.0114	backfill material
SP6 thru SP9	200	FST1 and FST2	<0.116	<0.0114	backfill material
SP10	60	FST3, FST4 and FST4a	**9.65**	**0.0290J**	Lift-Liner Bags S481 to S496
SP11 thru SP17 & SP19	400	FST5 and FST6	<0.308	<0.00892	backfill material
SP18	300	FST7 and FST8	0.372	<0.0150	backfill material
SP20 (Piles S1-S5)	35 to 40	SP20CS1 and SP20S10	**13.2**	0.0148J	Lift-Liner Bags S545 to S550 and S559 to S561
SP20 (Piles S6-S10), SP21, SP22, SP23, and SP24	255 to 270	SP21CS2 and SP21S6	0.067	<0.00915	backfill material
SP25	30	Samples SP25S1	-	**0.0303**	Lift-Liner Bags S551 to S558

KEY	DESCRIPTION
*	See Table 6.6-2 for results of other analytes tested by the project laboratory
-	Not applicable or sample not screened for this analyte
cy	Cubic Yards
PCBs	Polychlorinated Biphenyls
TCE	Trichloroethene
mg/kg	Milligrams per kilogram
<0.116	Analyte not detected above laboratory reporting limit of 0.116 mg/kg
13.2	Reported concentration exceeds ADEC cleanup level for PCBs of 1 mg/kg
0.0303	Reported concentration exceeds ADEC cleanup level for TCE of 0.02 mg/kg

TABLE 7.1-2 - SUMMARY OF WIPE SAMPLE ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level **	Sample Number^ (See Table 7.1-1, Figure 7.1-1, and Appendix C)				
			WS1	WS2	S1005~	WS3	WS4
Polychlorinated Biphenyls (PCBs)							
Aroclor 1260 - µg	EPA 8082	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aroclor 1254 - µg	EPA 8082	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Other PCB Aroclors - µg	EPA 8082	10	ND	ND	ND	ND	ND

Parameter Tested	Method*	Cleanup Level**	Sample Number^ (See Table 7.1-1, Figure 7.1-1, and Appendix C)			
			WS5	WS6	WS7	WS8
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - µg	EPA 8082	10	**< 20.0**	**< 20.0**	**< 20.0**	**1,260**
Aroclor 1254 - µg	EPA 8082	10	**< 20.0**	**< 20.0**	**< 20.0**	**< 100**
Other PCB Aroclors - µg	EPA 8082	10	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Wipe sample cleanup level is the criteria listed in 40 CFR 310, based on a wipe sample area of 100 cm^2.
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
1,260	Reported concentration exceeds the ADEC or EPA cleanup level
-	Not applicable or sample not tested for this analyte
µg	Micrograms
~	Duplicate of previous sample
< 1.0	Analyte not detected above laboratory reporting limit of 1.0 µg
< 20.0	Laboratory reporting limit exceeds the regulated cleanup level

TABLE 7.2-2 - SUMMARY OF CONTAINMENT CELL SAMPLE ANALYTICAL RESULTS

			Sample Number^ and Collection Depth in Feet (See Table 7.2-1, Figure 7.2-1, and Appendix C)			
			Containment Cell, Before Storage			
Parameter Tested	**Method***	**Cleanup Level****	CCB1 0.0 - 0.3	CCB2 0.0 - 0.3	CCB3 0.0 - 0.3	CCB4 0.0 - 0.2
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	1.1 < X < 4.9	X < 1.1	X < 1.1
Percent Solids	SM20 2540G	-	89.9	79.3	89.5	77.7
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	<0.0551	< 0.0623	<0.0549	< 0.0630
Aroclor 1254 - mg/kg	EPA 8082	1	<0.0551	< 0.0623	<0.0549	< 0.0630
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

			Sample Number^ and Collection Depth in Feet (See Table 7.2-1, Figure 7.2-1, and Appendix C)			
			Containment Cell, After Storage			
Parameter Tested	**Method***	**Cleanup Level****	CCA1S2 0.0 - 0.3	CCA2S1 0.0 - 0.3	CCA3S1 0.0 - 0.3	CCA4S1 0.0 - 0.3
PCB Field Screening - ppm	HACH Test Kit	-	X < 1.1	X < 1.1	X < 1.1	X < 1.1
Percent Solids	SM20 2540G	-	92.2	89.7	88.1	80.9
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0542	< 0.0554	< 0.0566	< 0.0616
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0542	< 0.0554	< 0.0566	< 0.0616
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ppm	Parts per million
<0.0551	Analyte not detected above laboratory reporting limit of 0.0551 mg/kg

TABLE 7.3-2 - SUMMARY OF BACKFILL MATERIAL SAMPLE ANALYTICAL RESULTS

			Sample Number^ (See Table 7.3-1, Figure 7.2-1, and Appendix C)			
			Backfill Material			QC
Parameter Tested	Method*	Cleanup Level**	BS1 1.5-2	BS2 1.5-2	BS3 1.5-2	STB4 7/27/2008
Total Solids - percent	SM20 2540G	-	96.1	97.3	94.1	-
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	1.01 J	0.489 J	0.466 J	< 2.76
Diesel Range Organics (DRO) - mg/kg	AK 102	250	< 20.6	2.25 J	< 21.0	-
Residual Range Organics (RRO) - mg/kg	AK 103	11,000	10.7 J	6.11 J	4.23 J	-
Polychlorinated Biphenyls (PCBs)						
Aroclor 1260 - mg/kg	EPA 8082	1	< 0.0517	< 0.0512	ND	-
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0517	< 0.0512	ND	-
Other PCB analytes - mg/kg	EPA 8082	1	ND	ND	ND	-
Aromatic Volatile Organics (BTEX)						
Benzene - mg/kg	EPA 8260B	0.025	< 0.0126	< 0.0118	< 0.0129	< 0.0166
Toluene - mg/kg	EPA 8260B	6.5	< 0.0419	< 0.0393	< 0.0430	< 0.0552
Ethylbenzene - mg/kg	EPA 8260B	6.9	< 0.0209	< 0.0197	< 0.0215	< 0.0276
Total Xylenes - mg/kg	EPA 8260B	10	< 0.0838	< 0.0786	< 0.0860	< 0.1104
Volatile Organic Compounds (VOCs)	EPA 8260B					
Trichloroethene - mg/kg	EPA 8260B	0.020	< 0.00653‡	< 0.0197	< 0.00671‡	< 0.00862‡
Methylene Chloride - mg/kg	EPA 8260B	0.016	**< 0.0259‡**	**< 0.0244‡**	**< 0.0267‡**	**< 0.0343‡**
Other VOC analytes - mg/kg	EPA 8260B	Varies	ND	ND	ND	ND
Total RCRA Metals						
Arsenic - mg/kg	EPA 6020	3.9	**5.93**	**6.59**	**6.43**	-
Barium - mg/kg	EPA 6020	1,100	66.3	65.6	86.6	-
Cadmium - mg/kg	EPA 6020	5	0.266	0.261	0.248	-
Chromium - mg/kg	EPA 6020	25	15.7	13.4	17	-
Lead - mg/kg	EPA 6020	400	2.48	2.59	2.47	-
Selenium - mg/kg	EPA 6020	3.4	< 0.504	< 0.506	< 0.525	-
Silver - mg/kg	EPA 6020	11.2	0.0541 J	0.0438 J	0.0388 J	-
Mercury - mg/kg	EPA 245.1	1.4	< 0.0403	< 0.0403	< 0.0424	-

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
5.93	Reported concentration exceeds the ADEC cleanup level
-	Not applicable or sample not tested for this analyte
< 20.6	Analyte not detected above laboratory reporting limit of 20.6 mg/kg
< 0.00653‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
< 0.0259‡	MDL exceeds cleanup level
mg/kg	Milligram per Kilogram
ppm	Parts per million
ND	Analyte not detected
J	Quantitation is an estimate
QC	Quality Control

TABLE 7.4-2 - SUMMARY OF WATER TREATMENT ANALYTICAL RESULTS

			Sample Number^ (See Table 7.4-1 and Appendix C)						
			Rinsate	Pre-Treatment Water			Post Treatment Water		
Parameter Tested	Method*	Cleanup Level **	Rinsate 1 6/26/2008	Decon-1 7/2/2008	CCW1 7/27/20008	CCW4 8/6/2008	PW1 8/4/2008	PW2 8/6/2008	PW3 9/19/2008
Polychlorinated Biphenyls (PCBs)									
Aroclor 1260 - mg/L	EPA 8082	0.0005	< 0.000104	< 0.000344	< 0.000105	0.000173	0.000167	< 0.000105	< 0.00011
Aroclor 1254 - mg/L	EPA 8082	0.0005	< 0.000104	< 0.000344	< 0.000105	< 0.000105	< 0.000105	< 0.000105	< 0.00011
Other PCB Aroclors - mg/L	EPA 8082	0.0005	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
ND	Analyte not detected
mg/L	Milligram per Liter
< 0.000104	Analyte not detected above laboratory reporting limit of 0.000104 mg/L

TABLE 7.5-2 - SUMMARY OF DRINKING WATER WELL ANALYTICAL RESULTS

			Sample Number^ and Date (See Table 7.5-1, Figure 1.1-3, and Appendix C)		
			Drinking Water Wells		Quality Control
Parameter Tested	**Method***	**Cleanup Level ****	MSW1 8/17/2008	HSW1 8/17/2008	WTB 8/17/2008
Polychlorinated Biphenyls (PCBs)					
Aroclor 1260 - mg/L	EPA 505	0.0005	< 0.0001	< 0.0001	-
Aroclor 1254 - mg/L	EPA 505	0.0005	< 0.0001	< 0.0001	-
Other PCB Aroclors - mg/L	EPA 505	0.0005	ND	ND	-
Volatile Organics Compounds (VOCs)					
cis-1,2-Dichloroethene - mg/L	EPA 524.2	0.07	<0.0005	<0.0005	<0.0005
trans-1,2-Dichloroethene- mg/L	EPA 524.2	0.10	<0.0005	<0.0005	<0.0005
Trichloroethene - mg/L	EPA 524.2	0.005	<0.0005	<0.0005	<0.0005
Tetrachloroethene - mg/L	EPA 524.2	0.005	<0.0005	<0.0005	<0.0005
Dichlorodifluoromethane -mg/L	EPA 524.2	7.3	<0.0005	<0.0005	<0.0005
Chloromethane - mg/L	EPA 524.2	0.066	<0.0005	<0.0005	<0.0005
Methylene Chloride (Dichloromethane) - mg/L	EPA 524.2	0.005	0.00054	<0.0005	0.00082
Other VOC Analytes - mg/L	EPA 524.2	various	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-103-" on the chain of custody form
<0.0005	Analyte not detected above laboratory reporting limit of 0.0005 mg/L
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected

TABLE 7.6-2 - SUMMARY OF MISCELLANEOUS SAMPLE ANALYTICAL RESULTS

			Sample Number^ (See Table 7.6-1, Figure 5.0-1, and Appendices C and D)					
		Cleanup	Flange	Quality Control	Septic Line Pipes		TCLP Characterization	
Parameter Tested	**Method***	**Level****	Flange	TB Flange	Pipe 1	Pipe 2	FSII3S22	Z1S4
Total Solids - percent	SM20 2540G	-	91.5	100	-	-	-	-
TCLP Benzene - mg/L	1312/8260B	0.5	-	-	-	-	-	< 0.0800
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	31.3	< 2.56	-	-	-	-
Diesel Range Organics (DRO) - mg/kg	AK 102	250	**10,500**	-	-	-	-	-
Asbestos Content - percent	600/R-93/116	1	-	-	0	0	-	-
TCLP Metals								
Arsenic - mg/kg	1311/6010B	5.0	-	-	-	-	< 0.500	-
Barium - mg/kg	1311/6010B	100	-	-	-	-	0.357 J	-
Cadmium - mg/kg	1311/6010B	1.0	-	-	-	-	< 0.0500	-
Chromium - mg/kg	1311/6010B	5.0	-	-	-	-	< 0.200	-
Lead - mg/kg	1311/6010B	3.0	-	-	-	-	< 0.500	-
Selenium - mg/kg	1311/6010B	1.0	-	-	-	-	< 1.00	-
Silver - mg/kg	1311/6010B	5.0	-	-	-	-	< 0.200	-
Mercury - mg/kg	1311/7470A	0.2	-	-	-	-	< 0.00200	-
Aromatic Volatile Organics (BTEX)								
Benzene - mg/kg	8021B	0.025	< 0.0131	< 0.0128	-	-	-	-
Toluene - mg/kg	8021B	6.5	< 0.0523	< 0.0513	-	-	-	-
Ethylbenzene - mg/kg	8021B	6.9	< 0.0523	< 0.0513	-	-	-	-
o-Xylenes - mg/kg	8021B	10	0.164	< 0.0513	-	-	-	-
P&M- Xylenes - mg/kg	8021B	10	0.0608	< 0.0513	-	-	-	-

KEY	DESCRIPTION
*	See Appendix C and D for compounds tested, methods, laboratory reporting limits, and method detection limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA). For asbestos, cleanup criteria is established by 29 CFR 1910.100 and 29 CFR 910.134.
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
10,500	Reported concentration exceeds the ADEC cleanup level
< 0.0800	Analyte not detected above laboratory reporting limit of 0.0800 mg/kg
ND	Analyte not detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram

TABLE 8.1-2 - SUMMARY OF LIFT LINER BAG SOIL ANALYTICAL RESULTS

			Sample Number and Lift-Liner Bags Represented (See Table 8.1-1 and Appendix C)												
			Non-TSCA Waste Disposed Off Site												
Parameter Tested	**Method***	**Cleanup Level****	S5 S1 - S10	S14 S11 - S20	S26 S21 - S30	S36 S31 - S40	S48 S41 - S50	S53 S51 - S60	S68 S61 - S70	S1000– S61 - S70	S79 S71 - S80	S83 S81 - S90	S99 S91 - S100	S109 S101 - S110	S112 S111 - S120
Percent Solids	SM20 2540G	-	95.1	95.1	95.7	92.7	94.0	95.5	95.3	95.8	85.8	74.3	95.6	87.7	93.8
Polychlorinated Biphenyls (PCBs)															
Aroclor 1260 - mg/kg	EPA 8082	1	**2.94**	**2.43**	0.598 J	**10.9**	**3.25**	**9.95**	0.787	0.600	< 0.288	< 0.133	**4.36**	< 0.566	**1.51 J**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.519	< 0.515	< 0.313‡	< 0.322‡	< 0.521	< 0.513	< 0.261	< 0.257	< 0.288	< 0.133	< 0.781‡	0.471 J	< 0.785‡
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (VOCs)	AK101/8021B														
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	-	-	-	-	-	-	-	-	-	-	< 0.0107‡	-
Trichloroethene - mg/kg	EPA 8260B	0.020	-	-	-	-	-	-	-	-	-	-	-	< 0.0107‡	-
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	-	-	-	-	-	-	-	-	-	-	< 0.0343	-
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	-	-	-	-	-	-	-	-	-	-	< 0.0343	-
1,4-dichlorobenzene - mg/kg	EPA 8260B	0.64	-	-	-	-	-	-	-	-	-	-	-	0.0199 J	-
1,2,3-trichlorobenzene - mg/kg	EPA 8260B	-	-	-	-	-	-	-	-	-	-	-	-	< 0.0687	-
1,2,4-trichlorobenzene - mg/kg	EPA 8260B	0.85	-	-	-	-	-	-	-	-	-	-	-	0.0319 J	-
4-Isopropyltoluene	EPA 8260B	-	-	-	-	-	-	-	-	-	-	-	-	0.0131 J	-
Other VOC analytes	EPA 8260B	Varies	-	-	-	-	-	-	-	-	-	-	-	ND	-
Total RCRA Metals															
Arsenic - mg/kg	EPA 6020	3.9	-	-	-	-	-	-	-	-	-	-	-	**8.50**	-
Barium - mg/kg	EPA 6020	1,100	-	-	-	-	-	-	-	-	-	-	-	120	-
Cadmium - mg/kg	EPA 6020	5	-	-	-	-	-	-	-	-	-	-	-	0.294	-
Chromium - mg/kg	EPA 6020	25	-	-	-	-	-	-	-	-	-	-	-	19.2	-
Lead - mg/kg	EPA 6020	400	-	-	-	-	-	-	-	-	-	-	-	5.14	-
Selenium - mg/kg	EPA 6020	3.4	-	-	-	-	-	-	-	-	-	-	-	0.215 J	-
Silver - mg/kg	EPA 6020	11.2	-	-	-	-	-	-	-	-	-	-	-	0.293	-
Mercury - mg/kg	EPA 245.1	1.4	-	-	-	-	-	-	-	-	-	-	-	0.0423 J	-

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
2.94	Reported concentration exceeds the ADEC cleanup level
-	Not applicable or sample not tested for this analyte
< 0.519	Analyte not detected above laboratory reporting limit of 0.519 mg/kg
< 0.313‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
~	Duplicate of previous sample
mg/kg	Milligram per Kilogram
ND	Analyte not detected
J	Quantitation is an estimate

TABLE 8.1-2 - SUMMARY OF LIFT LINER BAG SOIL ANALYTICAL RESULTS

			Sample Number and Lift-Liner Bags Represented (See Table 8-1.1 and Appendix C)												
			Non-TSCA Waste Disposed Off Site												
Parameter Tested	**Method***	**Cleanup Level****	S121 S121 - S130	S138 S131 - S140	S148 S141 - S150	S154 S151 - S160	S170 S161 - S170	S179 S171 - S180	S187 S181 - S190	S1001~ S181 - S190	S191 S191 - S200	S204 S201 - S210	S211 S211 - S220	S223 S221 - S230	S237 S231 - S240
Percent Solids	SM20 2540G	-	94.5	86.1	89.3	92.8	89.0	82.6	87.0	88.4	84.3	87.0	82.5	83.2	81.7
Polychlorinated Biphenyls (PCBs)															
Aroclor 1260 - mg/kg	EPA 8082	1	**2.83**	**12.6**	**1.67**	**1.93**	**2.66**	**6.26**	**5.69**	**2.60**	**3.36**	**17.5**	**8.34**	**12.4**	**2.86**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0521	< 0.0574	< 0.0550	< 0.0533	< 0.0557	< 0.0597	< 0.286	< 0.282	< 0.292	< 0.339‡	< 0.358‡	< 0.896‡	< 0.607
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (VOCs)	AK101/8021B														
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	-	< 0.00925‡	-	-	-	-	-	-	-	-	-	-
Trichloroethene - mg/kg	EPA 8260B	0.020	-	-	< 0.00925‡	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	-	< 0.0296	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	-	< 0.0296	-	-	-	-	-	-	-	-	-	-
Other VOC analytes	EPA 8260B	Varies	-	-	ND	-	-	-	-	-	-	-	-	-	-
Total RCRA Metals															
Arsenic - mg/kg	EPA 6020	3.9	-	-	8.04	-	-	-	-	-	-	-	-	-	-
Barium - mg/kg	EPA 6020	1,100	-	-	108	-	-	-	-	-	-	-	-	-	-
Cadmium - mg/kg	EPA 6020	5	-	-	0.389	-	-	-	-	-	-	-	-	-	-
Chromium - mg/kg	EPA 6020	25	-	-	17.2	-	-	-	-	-	-	-	-	-	-
Lead - mg/kg	EPA 6020	400	-	-	6.77	-	-	-	-	-	-	-	-	-	-
Selenium - mg/kg	EPA 6020	3.4	-	-	< 0.549	-	-	-	-	-	-	-	-	-	-
Silver - mg/kg	EPA 6020	11.2	-	-	1.13	-	-	-	-	-	-	-	-	-	-
Mercury - mg/kg	EPA 245.1	1.4	-	-	0.0617	-	-	-	-	-	-	-	-	-	-

			Sample Number and Lift-Liner Bags Represented (See Table 8-1.1 and Appendix C)												
			Non-TSCA Waste Disposed Off Site												
Parameter Tested	**Method***	**Cleanup Level****	S249 S241 - S250	S252 S251 - S260	S267 S261 - S270	S278 S271 - S280	S287 S281 - S290	S1002~ S281 - S290	S296 S291 - S300	S308 S301 - S310	S312 S311 - S320	S323 S321 - S330	S334A S331 - S340	S344A S341 - S350	S358A S351 - S360
Percent Solids	SM20 2540G	-	94.3	94.4	94.7	95.8	95.7	96.0	95.9	95.5	97.0	95.9	81.0	95.7	95.4
Polychlorinated Biphenyls (PCBs)															
Aroclor 1260 - mg/kg	EPA 8082	1	**2.51**	**1.95**	**1.66**	**2.03**	**1.18**	**1.64**	**1.35**	0.692	< 0.509	**6.33**	0.274	0.353 J	**3.73**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.527	< 0.523	< 0.518	< 0.517	< 0.520	< 0.510	< 0.514	< 0.524	< 0.509	< 0.521	< 0.0614	< 0.516	< 0.516
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
2.83	Reported concentration exceeds the ADEC cleanup level
< 0.0521	Analyte not detected above laboratory reporting limit of 0.0574 mg/kg
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
ND	Analyte not detected
< 0.00925‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
~	Duplicate of previous sample

TABLE 8.1-2 - SUMMARY OF LIFT LINER BAG SOIL ANALYTICAL RESULTS

			Sample Number and Lift-Liner Bags Represented (See Table 8-1.1 and Appendix C)												
			Non-TSCA Waste Disposed Off Site												
Parameter Tested	Method*	Cleanup Level**	S369 S361 - S370	S374 S371 - S380	S390 S381 - S390	S1003~ S381 - S390	CD2 S391 - S400	S402 S401 - S410	S420 S411 - S420	S422 S421 - S430	S435 S431 - S440	S441^^ S441 - S450	S456 S451 - S460	S462 S461 - S470	S1006~ S461 - S470
Percent Solids	SM20 2540G	-	96.1	94.7	95.8	95.2	-	97.6	95.7	97.3	87.1	88.9	88.9	96.4	96.7
Polychlorinated Biphenyls (PCBs)															
Aroclor 1260 - mg/kg	EPA 8082	1	**24.2**	**8.27**	**41.4**	**26.4**	**15.3**	0.0805 J	0.340	0.482	0.106	**8.45**	**3.22**	**5.42**	**4.88**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.774	< 0.528	**< 1.55‡**	**< 1.56‡**	< 0.985	< 0.246	< 0.0317	< 0.0313	< 0.0353	< 0.692	< 0.346	< 0.314	< 0.309
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (VOCs)	AK101/8021B														
Tetrachloroethene - mg/kg	EPA 8260B	0.024	-	-	-	-	-	-	-	< 0.0116	-	-	-	-	-
Trichloroethene - mg/kg	EPA 8260B	0.020	-	-	-	-	-	-	-	0.0126	-	-	-	-	-
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	-	-	-	-	-	-	-	< 0.0116	-	-	-	-	-
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	-	-	-	-	-	-	-	< 0.0116	-	-	-	-	-
Toluene	EPA 8260B	6.5	-	-	-	-	-	-	-	0.00150	-	-	-	-	-
p-, ,m- Xylene	EPA 8260B	63	-	-	-	-	-	-	-	0.00417	-	-	-	-	-
Other VOC analytes	EPA 8260B	Varies	-	-	-	-	-	-	-	ND	-	-	-	-	-
Total RCRA Metals															
Arsenic - mg/kg	EPA 6020	3.9	-	-	-	-	-	-	-	**7.71**	-	-	-	-	-
Barium - mg/kg	EPA 6020	1,100	-	-	-	-	-	-	-	75.4	-	-	-	-	-
Cadmium - mg/kg	EPA 6020	5	-	-	-	-	-	-	-	< 0.928	-	-	-	-	-
Chromium - mg/kg	EPA 6020	25	-	-	-	-	-	-	-	14.9	-	-	-	-	-
Lead - mg/kg	EPA 6020	-	-	-	-	-	-	-	-	4.64	-	-	-	-	-
Selenium - mg/kg	EPA 6020	3.4	-	-	-	-	-	-	-	**4.22**	-	-	-	-	-
Silver - mg/kg	EPA 6020	11.2	-	-	-	-	-	-	-	< 0.928	-	-	-	-	-
Mercury - mg/kg	EPA 245.1	1.4	-	-	-	-	-	-	-	0.0248	-	-	-	-	-

			Sample Number and Lift-Liner Bags Represented (See Table 8-1.1 and Appendix C)								
			Non-TSCA Waste Disposed Off Site						Non-TSCA Waste Stored On-Site		
Parameter Tested	Method*	Cleanup Level**	S475 S471 - S480	FST4 S481 - S490	S498 S491 - S500	S510 S501 - S510	S517 S511 - S520	S524 S521 - S530	S534 S531 - S540	S542 S541 - S550	S1007~ S541 - S550
Percent Solids	SM20 2540G	-	95.0	86.9	88.0	97.1	86.7	85.2	90.9	94.4	89.8
Polychlorinated Biphenyls (PCBs)											
Aroclor 1260 - mg/kg	EPA 8082	1	0.152	**9.65**	**6.18**	0.560	**8.65**	**4.13**	**30.1**	**1.02**	**13.9**
Aroclor 1254 - mg/kg	EPA 8082	1	< 0.0523	< 0.0564	< 0.557	< 0.0514	< 0.566	< 0.582	< 0.0546	< 0.524	< 0.551
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
^^	S441 is a replacement for original S441 which required treatment as TSCA material. The final Sample S441 is listed on SGS Work Order 1084561
24.2	Reported concentration exceeds the ADEC cleanup level
114	Reported concentration exceeds TSCA hazardous waste criteria
< 0.774	Analyte not detected above laboratory reporting limit of 0.518 mg/kg
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
J	Quantitation is an estimate
ND	Analyte not detected
< 1.55‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
~	Duplicate of previous sample

TABLE 8.1-2 - SUMMARY OF LIFT LINER BAG SOIL ANALYTICAL RESULTS

			Sample Number and Lift-Liner Bags Represented (See Table 8-1.1 and Appendix C)										
			TSCA Waste Disposed Off Site										
Parameter Tested	**Method***	**Cleanup Level****	PCB2 PCB1 - PCB10	PCB18 PCB11 - PCB20	PCB26 PCB 21 - PCB30	PCB40 PCB31 - PCB40	PCB43 PCB41 - PCB50	PCB1004-- PCB41 - PCB50	S334 PCB51 - PCB60	S342 PCB61 - PCB70	S358 PCB71 - PCB 80	S392 PCB81 - PCB 90	S441 PCB91 - PCB 100
Percent Solids	SM20 2540G	-	94.8	95.4	96.0	95.0	94.6	94.9	95.4	96.6	96.7	95.6	96.7
Polychlorinated Biphenyls (PCBs)													
Aroclor 1260 - mg/kg	EPA 8082	1	**10.7**	**114**	**159**	**40.0**	**93.3**	**90.4**	**58.5**	**142**	**131**	**61.4**	**2610**
Aroclor 1254 - mg/kg	EPA 8082	1	**< 3.12‡**	< 0.0515	**< 3.10‡**	**< 1.56‡**	**< 1.73 ‡**	**< 1.58‡**	**< 3.09‡**	**< 3.08‡**	**< 3.05‡**	**< 1.55‡**	**< 91.9 ‡**
Other PCB Aroclors - mg/kg	EPA 8082	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

			Sample Number and Lift-Liner Bags Represented (See Table 8-1.1 and Appendix C)		
			Quality Control		
Parameter Tested	**Method***	**Cleanup Level****	**STB1** 6/26/2008	**STB2** 7/5/2008	**STB** 8/18/2008
Percent Solids	SM20 2540G	-	100	100	83.7
Volatile Organic Compounds (VOCs)	AK101/8021B				
Tetrachloroethene - mg/kg	EPA 8260B	0.024	< 0.00820‡	**< 0.0273**	< 0.00263 ‡
Trichloroethene - mg/kg	EPA 8260B	0.020	< 0.00820‡	**< 0.0273**	< 0.00206 ‡
cis-1,2-Dichlorethene -mg/kg	EPA 8260B	0.24	< 0.0263	< 0.0273	< 0.0381
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	< 0.0263	< 0.0273	< 0.0381
1,4-dichlorobenzene - mg/kg	EPA 8260B	0.64	< 0.0263	< 0.0273	< 0.0381
1,2,3-trichlorobenzene - mg/kg	EPA 8260B	-	< 0.0525	<0.0547	< 0.0381
1,2,4-trichlorobenzene - mg/kg	EPA 8260B	0.85	< 0.0525	<0.0547	< 0.0381
4-Isopropyltoluene	EPA 8260B	-	< 0.0263	< 0.0273	< 0.0381
Methylene Chloride	EPA 8260B	0.016	**< 0.0326‡**	**< 0.109**	**0.0266**
Other VOC analytes	EPA 8260B	Varies	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
**	Soil and concrete cleanup levels are the most stringent Method 2 levels listed in Table B1, 18 AAC 75 (October 2008). Concentrations of PCBs greater than 50 mg/kg are considered hazardous waste under the Toxic Substance Control Act (TSCA).
^	Sample ID No. preceded by "17201-003" or "17201-103" on the chain of custody form
0.0266	Reported concentration exceeds the ADEC cleanup level
93.3	Reported concentration exceeds TSCA hazardous waste criteria
< 0.582	Analyte not detected above laboratory reporting limit of 0.582 mg/kg
< 0.0273	PQL exceeds regulatory cleanup level
< 0.00820‡	Method detection limit (MDL) is reported because laboratory reporting limit exceeds cleanup level
< 1.73 ‡	MDL exceeds regulatory cleanup level
-	Not applicable or sample not tested for this analyte
ND	Analyte not detected
mg/kg	Milligram per Kilogram

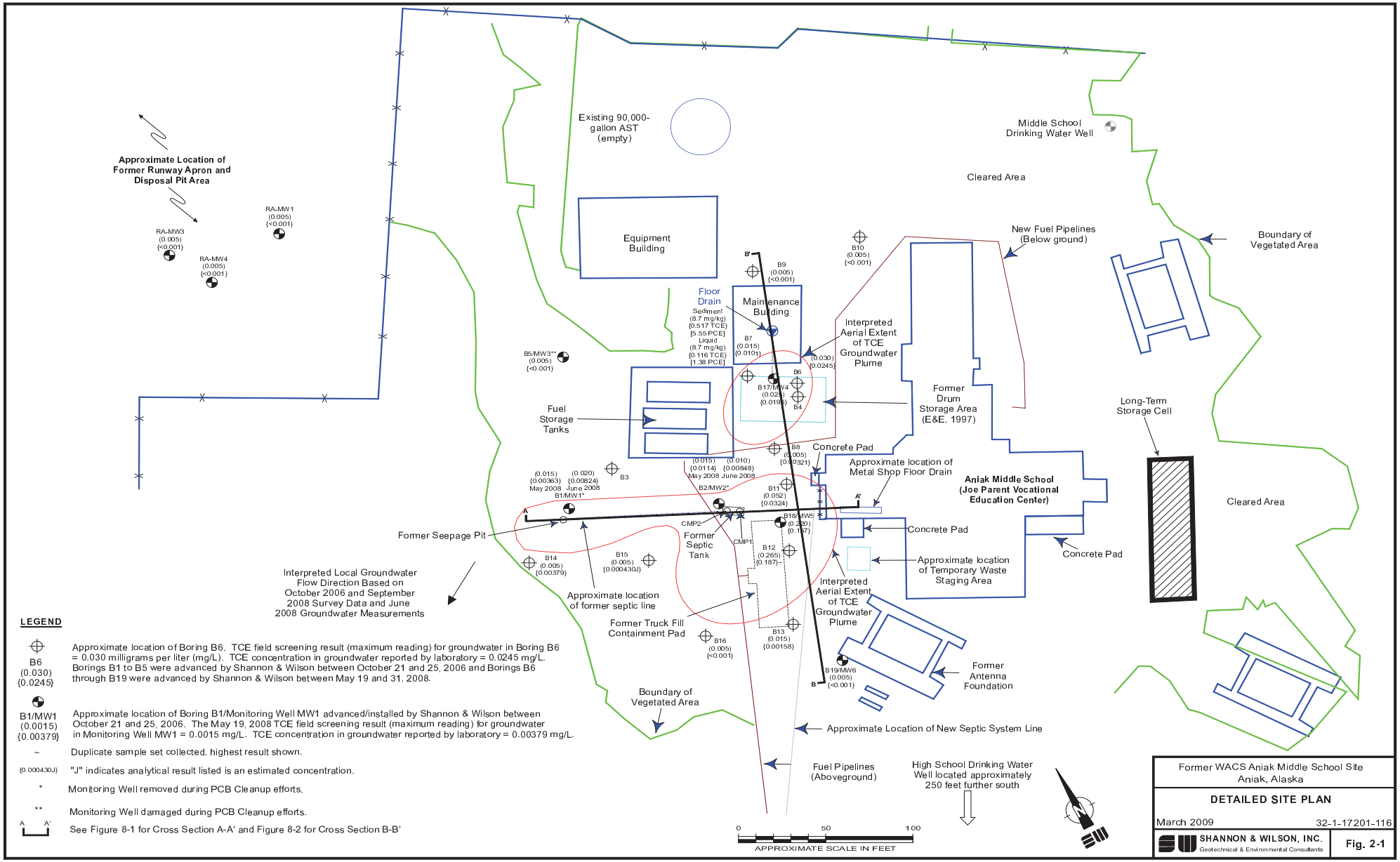
TABLE 10.4-1 - PCB FIELD SCREENING TEST RESULTS VERSUS LABORATORY PCB RESULTS

LABORATORY PCB RESULT (mg/kg)						
	X > 38	0	0	*1*	*6*	**8**
	11 < X < 38	0	*2*	*13*	**10**	1
	4.9 < X < 11	2	*4*	**4**	1	0
	1.1 < X < 4.9	*5*	**39**	4	1	0
	X < 1.1	**65**	30	2	0	0
		X < 1.1	1.1 < X < 4.9	4.9 < X < 11	11 < X < 38	X > 38
		PCB FIELD SCREENING TEST RESULT (mg/kg)				

KEY	DESCRIPTION
65	PCB Field Screening Test Result was accurate relative to the laboratory PCB result.
5	PCB Field Screening Test Result was biased low relative to the laboratory PCB result.
30	PCB Field Screening Test Result was biased high relative to the laboratory PCB result.

Note: The total number of field screening test results obtained = 3,213. The total number of verification samples obtained = 198.

2008 TCE Characterization



LEGEND

B6 (0.030) {0.0245} — Approximate location of Boring B6. TCE field screening result (maximum reading) for groundwater in Boring B6 = 0.030 milligrams per liter (mg/L). TCE concentration in groundwater reported by laboratory = 0.0245 mg/L. Borings B1 to B5 were advanced by Shannon & Wilson between October 21 and 25, 2006 and Borings B6 through B19 were advanced by Shannon & Wilson between May 19 and 31, 2008.

B1/MW1 (0.0015) {0.00379} — Approximate location of Boring B1/Monitoring Well MW1 advanced/installed by Shannon & Wilson between October 21 and 25, 2006. The May 19, 2008 TCE field screening result (maximum reading) for groundwater in Monitoring Well MW1 = 0.0015 mg/L. TCE concentration in groundwater reported by laboratory = 0.00379 mg/L.

~ — Duplicate sample set collected, highest result shown.

{0.000430J} — "J" indicates analytical result listed is an estimated concentration.

* — Monitoring Well removed during PCB Cleanup efforts.

** — Monitoring Well damaged during PCB Cleanup efforts.

A A' — See Figure 8-1 for Cross Section A-A' and Figure 8-2 for Cross Section B-B'

Former WACS Aniak Middle School Site
Aniak, Alaska

DETAILED SITE PLAN

March 2009 — 32-1-17201-116

SHANNON & WILSON, INC.
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Fig. 2-1

TABLE 6-1 - SUMMARY OF SOIL BORING ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/kg)**	Sample Number^ and Collection Depth in Feet (See Table 2-1, Figure 2-1, and Appendices C & F)						
			Borings						
			B6S9 21-22	B7S4 7.5-9.5	B8S10 23-24	B9S8 17.5-18.5	B10S9 23-24	B11S11 25-30	B12S10 25-26
TCE Field Screening - ppb^^	AQR Test Kit	-	12.5 to 25	6.25 to 12.5	0 to 5	0 to 5	0 to 5	0 to 5	40 to 80
PID Headspace Reading - ppm	580B PID	-	1.5	2.8	1.6	22	0.5	5.3	0.6
Percent Solids	SM20 2540G	-	77.3	96.7	84.6	82.5	89.1	80.1	84.8
Halogenated Volatile Organics (HVO)									
cis-1,2-Dichloroethene - mg/kg	EPA 8260B	0.24	<0.0390	<0.0196	<0.0401	<0.0372	<0.0300	<0.0417	0.0105J
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	<0.0390	<0.0196	<0.0401	<0.0372	<0.0300	<0.0417	<0.0292
Trichloroethene - mg/kg	EPA 8260B	0.020	**0.191**	**0.212**	**0.0229J**	<0.0116‡	<0.00936‡	**0.171**	**0.602**
Tetrachloroethene - mg/kg	EPA 8260B	0.024	<0.0122‡	0.00785J	<0.0125‡	<0.0116‡	<0.00936‡	<0.0130‡	<0.00910‡
4-Isopropyltoluene - mg/kg	EPA 8260B	-	<0.0390	<0.0196	<0.0401	0.0190J	<0.0300	<0.0417	<0.0292
Methylene chloride - mg/kg	EPA 8260B	0.016	**<0.0484‡**	**0.0265J**	**<0.0498‡**	**<0.0461‡**	**0.103J**	**<0.0518‡**	**<0.0362‡**
Other HVO Analytes - mg/kg	EPA 8260B	various	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limits, and method detection limits.
**	Soil cleanup level is the migration to groundwater standard listed in Table B1 or B2, 18 AAC 75 (October 2008)
^	Sample ID No. preceded by "17201-013" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.0390	Analyte not detected above laboratory reporting limit of 0.0390 mg/kg
<0.0122‡	Method detection limit of 0.0122 mg/kg shown since laboratory reporting limit exceeds ADEC cleanup criterion
<0.0484‡	Method detection limit of 0.0484 mg/kg exceeds ADEC cleanup criterion
0.191	Reported concentration exceeds the regulated cleanup level
ppb	Parts per billion
ppm	Parts per million
ND	Not Detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
J	Estimated value detected below the laboratory reporting limit but above the method detection limit

TABLE 6-1 - SUMMARY OF SOIL BORING ANALYTICAL RESULTS

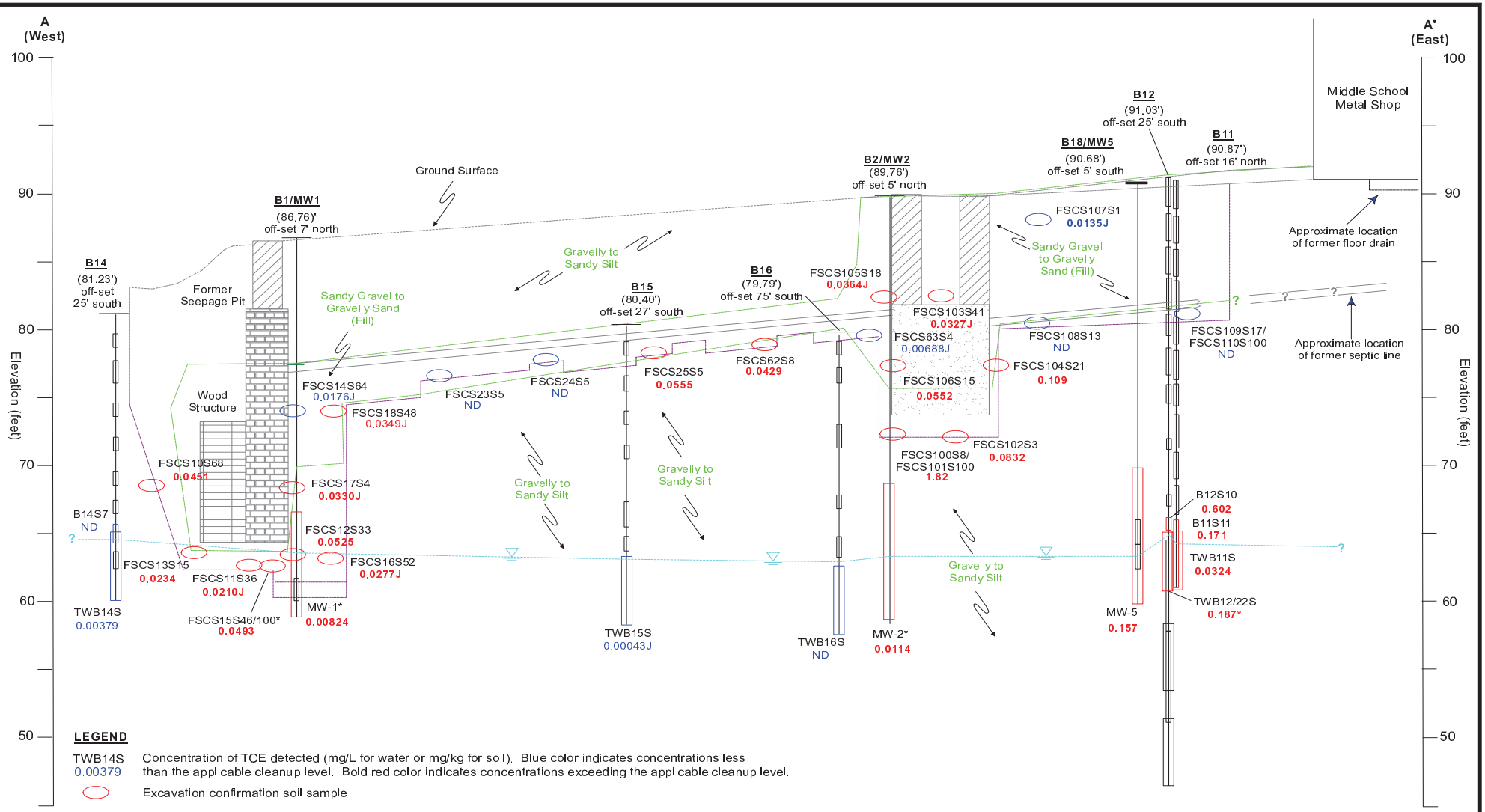
Parameter Tested	Method*	Cleanup Level (mg/kg)**	Sample Number^ and Collection Depth in Feet (See Table 2-1, Figure 2-1, and Appendices C & F)							
			Borings							
			B13S7 16.5-17.5	B14S7 15.5-17	B15S6 16-17	B16S5 15-16.5	B16S6~ 15-16.5	B17S1 25-27	B18S2 27-29	B19S10 22.5-24.4
TCE Field Screening - ppb^^	AQR Test Kit	-	30 to 60	0 to 5	0 to 5	0 to 5	0 to 5	-	-	0 to 5
PID Headspace Reading - ppm	580B PID	-	21	0.3	3.0	1.6	1.6	-	-	1.7
Percent Solids	SM20 2540G	-	78.9	83.6	86.6	84.1	73.3	84.6	83.2	71.8
Halogenated Volatile Organics (HVO)										
cis-1,2-Dichloroethene - mg/kg	EPA 8260B	0.24	**1.05**	<0.0397	<0.0384	<0.0358	<0.0423	-	-	<0.0467
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	0.0853	<0.0397	<0.0384	<0.0358	<0.0423	-	-	<0.0467
Trichloroethene - mg/kg	EPA 8260B	0.020	**0.0384J**	<0.0124‡	<0.0120‡	<0.0112‡	<0.0132‡	-	-	<0.0146‡
Tetrachloroethene - mg/kg	EPA 8260B	0.024	<0.0126‡	<0.0124‡	<0.0120‡	<0.0126‡	<0.0126‡	-	-	<0.0146‡
4-Isopropyltoluene - mg/kg	EPA 8260B	-	<0.0404	<0.0397	<0.0384	<0.0358	<0.0423	-	-	<0.0467
Methylene chloride - mg/kg	EPA 8260B	0.016	**<0.0501‡**	**<0.0492‡**	**<0.0476‡**	**<0.0444‡**	**<0.0524‡**	-	-	**<0.0579‡**
Other HVO Analytes - mg/kg	EPA 8260B	various	ND	ND	ND	ND	ND	-	-	ND
Total Organic Carbon (TOC) - mg/kg	SW9060A	-	-	-	-	-	-	0.163	0.357	0.842

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limits, and method detection limits.
**	Soil cleanup level is the migration to groundwater standard listed in Table B1 or B2, 18 AAC 75 (October 2008)
^	Sample ID No. preceded by "17201-013" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.0404	Analyte not detected above laboratory reporting limit of 0.0404 mg/kg
<0.0126‡	Method detection limit of 0.0126 mg/kg shown since laboratory reporting limit exceeds ADEC cleanup criterion
<0.0501‡	Method detection limit of 0.0501 mg/kg exceeds ADEC cleanup criterion
1.05	Reported concentration exceeds the regulated cleanup level
ppb	Parts per billion
ppm	Parts per million
ND	Not Detected
-	Not applicable or sample not tested for this analyte
mg/kg	Milligram per Kilogram
~	Duplicate of preceding sample
J	Estimated value detected below the laboratory reporting limit but above the method detection limit

TABLE 6-1 - SUMMARY OF SOIL BORING ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/kg)**	Sample Number^ and Collection Depth in Feet (See Table 2-1 and Appendix F)		
			Quality Control		
			STB1 5/20/08	STB2† 5/22/08	STB3 5/30/08
Percent Solids	SM20 2540G	-	100	-	100
Halogenated Volatile Organics (HVO)					
cis-1,2-Dichloroethene - mg/kg	EPA 8260B	0.24	<0.0257	-	<0.0256
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	<0.0257	-	<0.0256
Trichloroethene - mg/kg	EPA 8260B	0.020	<0.00801‡	-	<0.00799‡
Tetrachloroethene - mg/kg	EPA 8260B	0.024	<0.00801‡	-	<0.00799‡
4-Isopropyltoluene - mg/kg	EPA 8260B	-	<0.0257	-	<0.0256
Methylene chloride - mg/kg	EPA 8260B	0.016	**<0.0318‡**	-	**<0.0317‡**
Other HVO Analytes - mg/kg	EPA 8260B	various	ND	-	ND
Volatile Organic Compounds (VOCs)					
Toluene - mg/kg	EPA 8260B	6.5	<0.0513	-	-
Ethylbenzene - mg/kg	EPA 8260B	6.9	<0.0257	-	-
n-Butylbenzene - mg/kg	EPA 8260B	15	<0.0257	-	-
1,3,5-Trimethylbenzene - mg/kg	EPA 8260B	23	<0.0257	-	-
n-Propylbenzene - mg/kg	EPA 8260B	-	<0.0257	-	-
Xylenes (total) - mg/kg	EPA 8260B	63	<0.103	-	-
Naphthalene - mg/kg	EPA 8260B	20	<0.0513	-	-
1,2,4- trimethylbenzene - mg/kg	EPA 8260B	23	<0.0257	-	-
Other VOC Analytes - mg/kg	EPA 8260B	various	ND	-	-

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limits, and method detection limits.
**	Soil cleanup level is the migration to groundwater standard listed in Table B1 or B2, 18 AAC 75 (October 2008)
^	Sample ID No. preceded by "17201-013" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.0257	Analyte not detected above laboratory reporting limit of 0.0257 mg/kg
<0.00801‡	Method detection limit of 0.00801 mg/kg shown since laboratory reporting limit exceeds ADEC cleanup criterion
<0.0318‡	Method detection limit of 0.0318 mg/kg exceeds ADEC cleanup criterion
-	Not applicable or sample not tested for this analyte
†	Trip Blank not analyzed; no methanol in sample upon arrival at the laboratory
ND	Not Detected
mg/kg	Milligram per Kilogram



LEGEND

TWB14S 0.00379 — Concentration of TCE detected (mg/L for water or mg/kg for soil). Blue color indicates concentrations less than the applicable cleanup level. Bold red color indicates concentrations exceeding the applicable cleanup level.

Excavation confirmation soil sample

Soil boring sample

Water sample from temporary or permanent monitoring well

B14 (81.23') — Top of casing or ground surface elevation based on 2006 or 2008 survey data.

Inferred groundwater elevation based on depth to water measurements from individual borings.

ND Non-detect

J Concentration is an estimation detected below the laboratory detection limit but above the method detection limit.

* Duplicate or replicate samples collected from this location. The highest TCE concentration is shown.

Note that the contact between soil types is gradual and the contact of soil/gravel depicts estimated conditions along the cross-section line.

0 10 20
APPROXIMATE VERTICAL SCALE IN FEET

0 20 40
APPROXIMATE HORIZONTAL SCALE IN FEET

Former WACS Aniak Middle School Site
Aniak, Alaska

CROSS SECTION A - A'

March 2009 32-1-17201-116

SHANNON & WILSON, INC.
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Fig. 6-1

TABLE 6-2 - SUMMARY OF TEMPORARY WELL ANALYTICAL RESULTS

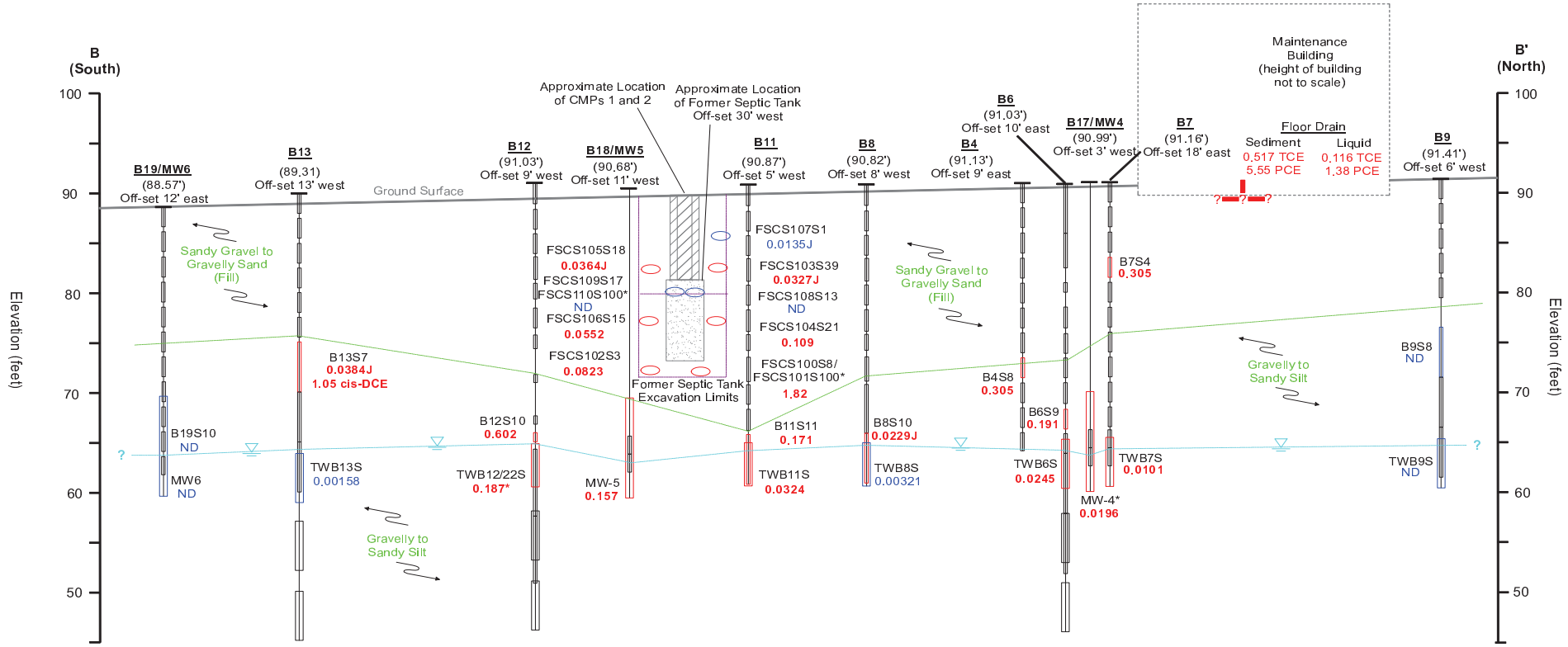
			Sample Number^ and Depth (See Tables 2-1 and 2-2, Figure 2-1, and Appendix F)						
		Cleanup Level	Temporary Wells						
Parameter Tested	Method*	(mg/L)**	TWB6S 26.5-30.5	TWB7S 26-31	TWB8S 25.5-30.5	TWB9S 26-31	TWB10S 25.9-30.9	TWB11S 25.9-30.9	TWB12S 26-31
TCE Field Screening - ppb^^	AQR Test Kit	-	15 to 30	12.5 to 15	0 to 5	0 to 5	0 to 5	27.5 to 52.5	115 to 265
Halogenated Volatile Organics (HVOs)									
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	<0.00100	0.00320	<0.00100	<0.00100	<0.00100	<0.00100	0.00581
trans-1,2-Dichloroethene - mg/L	EPA 8260B	0.10	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	**0.0245**	**0.0101**	0.00321	<0.00100	<0.00100	**0.0324**	**0.176**
Tetrachloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Dichlorodifloromethane - mg/L	EPA 8260B	7.3	<0.00100	<0.00100	0.000600J	<0.00100	<0.00100	0.00166 H	0.00373 H
Methylene Chloride - mg/L	EPA 8260B	0.005	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	0.00140J
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.00100	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
0.0245	Reported concentration exceeds the regulated cleanup level
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
H	Reported concentration may be biased high
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion

TABLE 6-2 - SUMMARY OF TEMPORARY WELL ANALYTICAL RESULTS

			Sample Number^ and Depth (See Tables 2-1 and 2-2, Figure 2-1, and Appendix F)						
		Cleanup Level	Temporary Wells					Quality Control	
Parameter Tested	Method*	(mg/L)**	TWB22S~ 26-31	TWB13S 26.1-31.1	TWB14S 16.1-21.1	TWB15S 16.6-21.6	TWB16S 17-22	WTB2 5/20/2008	WTB3 5/22/2008
TCE Field Screening - ppb^^	AQR Test Kit	-	115 to 265	7.5 to 15	0 to 5	0 to 5	0 to 5	-	-
Halogenated Volatile Organics (HVOs)									
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	0.00572	0.0188	0.000980J	0.000600J	0.00280	<0.00100	<0.00100
trans-1,2-Dichloroethene - mg/L	EPA 8260B	0.10	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	**0.187**	0.00158	0.00379	0.000430J	<0.00100	<0.00100	<0.00100
Tetrachloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Dichlorodifloromethane - mg/L	EPA 8260B	7.3	0.00365 H	0.00475 H	0.000430J	0.00142 H	0.0147 H	<0.00100	<0.00100
Methylene Chloride - mg/L	EPA 8260B	0.005	0.00143J	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100	<0.00100
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.00100	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
0.176	Reported concentration exceeds the regulated cleanup level
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
H	Reported concentration may be biased high
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
~	Duplicate of preceeding sample



LEGEND

TWB13S 0.00158 — Concentration of TCE detected (mg/L for water or mg/kg for soil). Blue color indicates concentrations less than the applicable cleanup level. Bold red color indicates concentrations exceeding the applicable cleanup level.

Excavation confirmation soil sample

Soil boring sample

Water sample from temporary or permanent monitoring well

B6 (91.03') — Top of casing or ground surface elevation based on 2006 or 2008 survey data.

Inferred groundwater elevation based on depth to water measurements from individual borings.

ND Non-detect

J Concentration is an estimation detected below the laboratory detection limit but above the method detection limit.

* Duplicate or replicate samples collected from this location. The highest TCE concentration is shown.

Note that the contact between soil types is gradual and the contact of soil/gravel depicts estimated conditions along the cross-section line.

0 15 30
APPROXIMATE VERTICAL SCALE IN FEET

0 30 60
APPROXIMATE HORIZONTAL SCALE IN FEET

Former WACS Aniak Middle School Site
Aniak, Alaska

CROSS SECTION B - B'

March 2009 32-1-17201-116

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 6-2

TABLE 6-3 - SUMMARY OF ON-SITE MONITORING WELL ANALYTICAL RESULTS

			Sample Number^ and Depth (See Tables 2-1 and 2-2, Figure 2-1, and Appendix F)				
		Cleanup Level	Permanent On-Site Wells				
Parameter Tested	Method*	(mg/L)**	MW-1¤ 21.72	MW-2¤ 24.72	MW-1 23.09	MW-2 26.07	MW-3 17.01
TCE Field Screening - ppb^^	AQR Test Kit	-	7.5 to 15	7.5 to 15	10 to 20	5 to 10	0 to 5
Halogenated Volatile Organics (HVOs)							
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	0.00388	<0.00100	0.00563	<0.00100	<0.00100
trans-1,2-Dichloroethene - mg/L	EPA 8260B	0.10	<0.00100	<0.00100	0.000450J	<0.00100	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	0.00363	**0.0114**	**0.00824**	**0.00848**	<0.00100
Tetrachloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Dichlorodifloromethane - mg/L	EPA 8260B	7.3	<0.00100	0.000720J	0.000350J	0.00126	0.00145
Methylene Chloride - mg/L	EPA 8260B	0.005	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡
Chloromethane - mg/L	EPA 8260B	0.066	<0.00100	<0.00100	<0.00100	0.000370J	<0.00100
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.00100	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
0.0114	Reported concentration exceeds the regulated cleanup level
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
¤	Samples collected on May 19, 2008 prior to initiation of drilling program

TABLE 6-3 - SUMMARY OF ON-SITE MONITORING WELL ANALYTICAL RESULTS

			Sample Number^ and Depth (See Tables 2-1 and 2-2, Figure 2-1, and Appendix F)					
		Cleanup Level	Permanent On-Site Wells				Quality Control	
Parameter Tested	Method*	(mg/L)**	MW-4 27.05	MW-14~ 27.05	MW-5 27.22	MW-6 24.70	WTB1 5/19/2008	WTB5 6/4/2008
TCE Field Screening - ppb^^	AQR Test Kit	-	12.5 to 25	12.5 to 25	100 to 220	0 to 5	-	-
Halogenated Volatile Organics (HVOs)								
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
trans-1,2-Dichloroethene - mg/L	EPA 8260B	0.10	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	**0.0193**	**0.0196**	**0.157**	<0.00100	<0.00100	<0.00100
Tetrachloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Dichlorodifloromethane - mg/L	EPA 8260B	7.3	<0.00100	<0.00100	0.00309	0.00259	<0.00100	<0.00100
Methylene Chloride - mg/L	EPA 8260B	0.005	<0.00100‡	<0.00100‡	0.00116J	<0.00100‡	<0.00100‡	<0.00100‡
Chloromethane - mg/L	EPA 8260B	0.066	0.000310J	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.00100	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
0.0196	Reported concentration exceeds the regulated cleanup level
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
~	Duplicate of preceeding sample

TABLE 6-4 - SUMMARY OF OFF-SITE MONITORING WELL ANALYTICAL RESULTS

			Sample Number^ and Depth (See Tables 2-1 and 2-2, Figures 1-3 and 2-1, and Appendix F)						
			Permanent Off-Site Wells						
Parameter Tested	Method*	Cleanup Level (mg/L)**	RA-MW1 21.01	RA-MW3 22.72	RA-MW4 22.22	RA-MW6 22.85	RA-MW8 25.56	RA-MW9 23.70	RA-MW19~ 23.70
TCE Field Screening - ppb^^	AQR Test Kit	-	0 to 5	0 to 5	0 to 5	0 to 5	0 to 5	7.5 to 15	7.5 to 15
Halogenated Volatile Organics (HVOs)									
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
trans-1,2-Dichloroethene - mg/L	EPA 8260B	0.10	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	**0.0133**	**0.0140**
Tetrachloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Dichlorodifloromethane - mg/L	EPA 8260B	7.3	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Methylene Chloride - mg/L	EPA 8260B	0.005	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡
Chloromethane - mg/L	EPA 8260B	0.066	<0.00100	0.000800J	<0.00100	0.000390J	0.000340J	<0.00100	<0.00100
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.00100	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
0.0133	Reported concentration exceeds the regulated cleanup level
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
~	Duplicate of preceeding sample

TABLE 6-4 - SUMMARY OF OFF-SITE MONITORING WELL ANALYTICAL RESULTS

			Sample Number^ and Depth (See Tables 2-1 and 2-2, and Appendix F)	
		Cleanup Level (mg/L)**	Quality Control	
Parameter Tested	Method*		WTB4 5/26/2008	WTB5 6/4/2008
TCE Field Screening - ppb^^	AQR Test Kit	-	-	-
Halogenated Volatile Organics (HVOs)				
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	<0.00100	<0.00100
trans-1,2-Dichloroethene - mg/L	EPA 8260B	0.10	<0.00100	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100
Tetrachloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100
Dichlorodifloromethane - mg/L	EPA 8260B	7.3	<0.00100	<0.00100
Methylene Chloride - mg/L	EPA 8260B	0.005	<0.00100	<0.00100
Chloromethane - mg/L	EPA 8260B	0.066	<0.00100‡	<0.00100‡
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.00100	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
~	Duplicate of preceeding sample

TABLE 6-5 - SUMMARY OF NATURAL ATTENUATION PARAMETERS

		Sample Number^ and Depth (See Tables 2-1 and 2-2, Figure 2-1, and Appendix F)						
		Permanent On-Site Monitoring Wells						
		MW-1	MW-2	MW-3	MW-4	MW-14~	MW-5	MW-6
Parameter Tested	**Method***	23.09	26.07	17.01	27.05	27.05	27.22	24.7
Alkalinity - mg/L	SM 20 2320B	78.8	111	331	146	146	151	204
Chloride - mg/L	EPA 300.0	2.09	1.06	2.16	3.45	3.61	1.83	1.08
Iron - mg/L	EPA 300.0	0.110	0.111	5.75	0.0234	0.0682	0.0645	1.41
Iron (ferrous/dissolved) - mg/L	EPA 300.0	<0.0200	<0.0200	0.216	0.229	0.142	0.0212	0.248
Dissolved Manganese - mg/L	EPA 300.0	5.03	0.00223	0.0107	0.0713	0.0550	0.0322	0.425
Nitrate-N - mg/L	EPA 300.0	35.1	4.12	3.29	2.67	2.75	2.77	2.20
Nitrite-N - mg/L	EPA 300.0	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Sulfate - mg/L	EPA 300.0	60.5	11.0	45.9	10.1	10.5	14.0	18.2
Methane - mg/L	RSK175	<0.0072	<0.0072	<0.0072	<0.0072	<0.0072	<0.0072	<0.0072
Total Organic Carbon - mg/L	SM 5310B	1.74	1.92	3.89	0.953	0.912	1.98	1.30
pH	field	6.11	5.85	6.32	6.10	6.10	6.06	6.04
Dissolved Oxygen (mg/L)	field	5.25	2.48	3.89	1.51	1.51	3.17	1.35
Oxidation-Reduction Potential (mV)	field	173.2	162.7	137.3	200.6	200.6	122.0	182.1

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, and laboratory reporting limits.
~	Duplicate of preceeding sample
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
<0.0200	Concentration of target analyte not detected above the laboratory reporting limit of 0. 0200 mg/L
mg/L	Milligrams per liter
mV	milliVolts

TABLE 6-6 - SUMMARY OF DRINKING WATER ANALYTICAL RESULTS

			Sample Number^ and Depth (See Table 2-1, Figures 1-3, and Appendix F)		
			Drinking Water Wells		Quality Control
Parameter Tested	Method*	Cleanup Level (mg/L)**	MSW1 8/17/2008	HSW1 8/17/2008	WTB 8/17/2008
Halogenated Volatile Organics (HVOs)					
cis-1,2-Dichloroethene - mg/L	EPA 524.2	0.07	<0.0005	<0.0005	<0.0005
trans-1,2-Dichloroethene- mg/L	EPA 524.2	0.10	<0.0005	<0.0005	<0.0005
Trichloroethene - mg/L	EPA 524.2	0.005	<0.0005	<0.0005	<0.0005
Tetrachloroethene - mg/L	EPA 524.2	0.005	<0.0005	<0.0005	<0.0005
Dichlorodifloromethane -mg/L	EPA 524.2	7.3	<0.0005	<0.0005	<0.0005
Chloromethane - mg/L	EPA 524.2	0.066	<0.0005	<0.0005	<0.0005
Methylene Chloride (Dichloromethane) - mg/	EPA 524.2	0.005	0.00054	<0.0005	0.00082
Other HVO Analytes - mg/L	EPA 524.2	various	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-103-" on the chain of custody form
<0.0005	Analyte not detected above laboratory reporting limit of 0.0005 mg/L
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
~	Duplicate of preceeding sample

TABLE 6-7 - SUMMARY OF QUALITY CONTROL WATER ANALYTICAL RESULTS

			Sample Number^ and Depth (See Table 2-1 and Appendix F)					
		Cleanup	Water Treatment		Quality Control			
		Level	PW1	PW2	Rinsate	WTB4	WTB5	Trip Blank
Parameter Tested	**Method***	**(mg/L)****	5/26/2008	6/30/08	6/4/2008	5/26/2008	6/4/2008	6/30/2008
TCE Field Screening - ppb^^	AQR Test Kit	-	-	-	-	-	-	
Halogenated Volatile Organics (HVOs)								
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
trans-1,2-Dichloroethene - mg/L	EPA 8260B	0.10	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Tetrachloroethene - mg/L	EPA 8260B	0.005	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Dichlorodifloromethane - mg/L	EPA 8260B	7.3	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Methylene Chloride - mg/L	EPA 8260B	0.005	<0.00100	0.00132	<0.00100	<0.00100	<0.00100	<0.00100
Chloromethane - mg/L	EPA 8260B	0.066	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡	<0.00100‡
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND	ND	ND	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, laboratory reporting limts, and method detection limits.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
^^	Field screening result for total chlorinated solvents
<0.00100	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
-	Sample not tested for this analyte
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
~	Duplicate of preceeding sample

TABLE 6-8 - SUMMARY OF FLOOR DRAIN ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/kg)**	Sample Number^ and Collection Depth in Feet (See Table 2-1, Figure 2-1, and Appendix F)	
			Floor Drain	QC
			Drain 1	STB1
			Sediment	5/20/08
TCE Field Screening - ppb^^	AQR Test Kit	-	2,070 to 8,680	-
Percent Solids	SM20 2540G	-	61.5	100
Halogenated Volatile Organics (HVO)				
cis-1,2-Dichloroethene - mg/kg	EPA 8260B	0.24	<0.0674	<0.0257
trans-1,2-Dichloroethene - mg/kg	EPA 8260B	0.37	<0.0674	<0.0257
Trichloroethene - mg/kg	EPA 8260B	0.020	**0.517**	<0.00801‡
Tetrachloroethene - mg/kg	EPA 8260B	0.024	**5.55**	<0.00801‡
4-Isopropyltoluene - mg/kg	EPA 8260B	-	<0.0674	<0.0257
Methylene chloride - mg/kg	EPA 8260B	0.016	**<0.0835‡**	**<0.0318‡**
Other HVO Analytes - mg/kg	EPA 8260B	various	ND	ND
Volatile Organic Compounds (VOCs)				
Toluene - mg/kg	EPA 8260B	6.5	0.149	<0.0513
Ethylbenzene - mg/kg	EPA 8260B	6.9	0.0512J	<0.0257
n-Butylbenzene - mg/kg	EPA 8260B	15	0.0229J	<0.0257
1,3,5-Trimethylbenzene - mg/kg	EPA 8260B	23	0.0593J	<0.0257
n-Propylbenzene - mg/kg	EPA 8260B	-	0.0317J	<0.0257
Xylenes (total) - mg/kg	EPA 8260B	63	0.285	<0.103
Naphthalene - mg/kg	EPA 8260B	20	0.186	<0.0513
1,2,4- trimethylbenzene - mg/kg	EPA 8260B	23	0.176	<0.0257
Other VOC Analytes - mg/kg	EPA 8260B	various	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, and laboratory reporting limts.
**	Soil cleanup level is the migration to groundwater standard listed in Table B1 or B2, 18 AAC 75 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
<0.0674	Analyte not detected above laboratory reporting limit of 0.0674 mg/L
<0.0801‡	Method detection limit of 0.001 mg/L shown since laboratory reporting limit exceeds ADEC cleanup criterion
<0.0200‡	Method detection limit exceeds ADEC cleanup criterion
0.517	Reported concentration exceeds the regulated cleanup level
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
mg/kg	Milligrams per kilogram
ND	Not detected
ppb	Parts per billion
QC	Quality Control
^^	Field screening result for total chlorinated solvents
-	Sample not tested for this analyte

TABLE 6-8 - SUMMARY OF FLOOR DRAIN ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/L)**	Sample Number^ and Collection Depth in Feet (See Table 2-1, Figure 2-1, and Appendix F)	
			Drain Liquid	QC
			Drain2	WTB2
			5/21/2008	5/20/2008
TCE Field Screening - ppb^^	AQR Test Kit	-	2,070 to 8,680	-
Halogenated Volatile Organics (HVOs)				
cis-1,2-Dichloroethene - mg/L	EPA 8260B	0.07	<0.0200	<0.00100
trans-1,2-Dichloroethene- mg/L	EPA 8260B	0.10	<0.0200	<0.00100
Trichloroethene - mg/L	EPA 8260B	0.005	**0.116**	<0.00100
Tetrachloroethene - mg/L	EPA 8260B	0.005	**1.38**	<0.00100
Dichlorodifloromethane -mg/L	EPA 8260B	7.3	<0.0200	<0.00100
Chloromethane - mg/L	EPA 8260B	0.066	<0.0200	<0.00100
Methylene Chloride (Dichloromethane) - mg/	EPA 8260B	0.005	**<0.0200‡**	<0.00100‡
Other HVO Analytes - mg/L	EPA 8260B	various	ND	ND
Volatile Organic Compounds (VOCs)				
Benzene - mg/L	EPA 8260B	0.005	**0.00540J**	<0.000400
Toluene - mg/L	EPA 8260B	1.0	0.0132J	<0.00100
1,3,5-Trimethylbenzene - mg/L	EPA 8260B	1.8	0.00700J	<0.00100
2-Butanone (MEK) - mg/L	EPA 8260B	22	0.135J	<0.0100
Naphthalene - mg/L	EPA 8260B	0.73	0.0350J	<0.00200
Xylenes (total) - mg/L	EPA 8260B	10	0.0238J	<0.00200
1,2,4-Trimethylbenzene - mg/L	EPA 8260B	1.8	0.0254	<0.00100
Other VOC Analytes - mg/L	EPA 8260B	various	ND	ND

KEY	DESCRIPTION
*	See Appendix F for compounds tested, methods, and laboratory reporting limts.
**	Groundwater cleanup levels are listed in Table C, 18 AAC 75.345 (October 2008)
^	Sample ID No. preceded by "17201-013-" on the chain of custody form
<0.0200	Analyte not detected above laboratory reporting limit of 0.00100 mg/L
<0.00100‡	Method detection limit, laboratory reporting limit exceeds ADEC cleanup criterion
<0.0200‡	Method detection limit exceeds ADEC cleanup criterion
0.116	Reported concentration exceeds the regulated cleanup level
J	Estimated value detected below the laboratory reporting limit but above the method detection limit
mg/L	Milligrams per liter
ND	Not detected
ppb	Parts per billion
QC	Quality Control
^^	Field screening result for total chlorinated solvents
-	Sample not tested for this analyte

2001 PCB Cleanup

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample No. ~	Date	Sample Location	Depth (ft.)	Field Screening Result (ppm) ^	Sample Type #	Sample Classification
CNF52	8/11/2001	Area 15, Main Excavation (See Figures 2 and 3)	0.5	>10 but <50	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF52B	8/11/2001	Area 15, Main Excavation (See Figures 2 and 3)	1.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF52C	8/12/2001	Area 15, Main Excavation (See Figures 2 and 3)	2.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF55	8/11/2001	Area 15, Main Excavation (See Figures 2 and 3)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF58	8/12/2001	Area 15, Main Excavation (See Figures 2 and 3)	0.2	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF58B	8/12/2001	Area 15, Main Excavation (See Figures 2 and 3)	1.0	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF63	8/12/2001	Area 15, Main Excavation (See Figures 2 and 3)	0.1	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
Area 15	8/13/2001	CNF52C, CNF55, CNF58B, and CNF63	NA	<1	Composite*	Brown, slightly silty, sandy GRAVEL; moist
AREA 16						
CNF64	8/12/2001	Area 16, Main Excavation (See Figures 2 and 3)	0.1	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF64B	8/13/2001	Area 16, Main Excavation (See Figures 2 and 3)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF65	8/12/2001	Area 16, Main Excavation (See Figures 2 and 3)	0.1	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF66	8/12/2001	Area 16, Main Excavation (See Figures 2 and 3)	0.1	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CNF67	8/12/2001	Area 16, Main Excavation (See Figures 2 and 3)	0.1	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
Area 16	8/13/2001	CNF64B, CNF65, CNF66, and CNF67	NA	<1	Composite*	Brown, slightly silty, sandy GRAVEL; moist
Staging Area						
G1	8/14/2001	Area G1, Staging Area (See Figures 2 and 4)	0.5	>10 but <50	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS44	8/2/2001	Area G2, Staging Area (See Figures 2 and 4)	0.1	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G2	8/14/2001	Area G2, Staging Area (See Figures 2 and 4)	0.5	>10 but <50	Composite	Brown, slightly silty, sandy GRAVEL; moist
G3	8/14/2001	Area G3, Staging Area (See Figures 2 and 4)	0.5	>10 but <50	Composite	Brown, slightly silty, sandy GRAVEL; moist

KEY	DESCRIPTION
~	Sample number preceded by 16491 on chain-of-custody
^	Field screening was conducted using ENSYS PCB test kits for soil. Field screening was generally conducted at 1, 10, and 50 ppm levels for each soil sample.
#	Discrete samples were collected from a single location with an area of less than one square foot. Composite samples were collected from nine locations in general accordance with the guidance provided in EPA 761.289.
Area 1	Bold indicates that the sample was analyzed by the laboratory
*	Sample was composited from composite samples listed in "Sample Location" column
NA	Not Applicable

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample No. ~	Date	Sample Location	Depth (ft.)	Field Screening Result (ppm) ^	Sample Type #	Sample Classification
SS45	8/2/2001	Area G4, Staging Area (See Figures 2 and 4)	0.1	>10 but <50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS55	8/3/2001	Area G4, Staging Area (See Figures 2 and 4)	0.1	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G4	8/14/2001	Area G4, Staging Area (See Figures 2 and 4)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
G5	8/14/2001	Area G5, Staging Area (See Figures 2 and 4)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
G6	8/14/2001	Area G6, Staging Area (See Figures 2 and 4)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS46	8/2/2001	Area G7, Staging Area (See Figures 2 and 4)	0.1	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G7	8/14/2001	Area G7, Staging Area (See Figures 2 and 4)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
G8	8/14/2001	Area G8, Staging Area (See Figures 2 and 4)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS48	8/2/2001	Area G9, Staging Area (See Figures 2 and 4)	0.1	<1		Brown, slightly silty, sandy GRAVEL; moist
SS58	8/3/2001	Area G9, Staging Area (See Figures 2 and 4)	0.1	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G9	8/14/2001	Area G9, Staging Area (See Figures 2 and 4)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS43	8/2/2001	Area G10, Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G10	8/14/2001	Area G10, Staging Area (See Figures 2 and 4)	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS53	8/2/2001	Area G11, Staging Area (See Figures 2 and 4)	0.1	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G11	8/14/2001	Area G11, Staging Area (See Figures 2 and 4)	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS40	8/2/2001	Area G12, Staging Area (See Figures 2 and 4)	0.1	>50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G12	8/14/2001	Area G12, Staging Area (See Figures 2 and 4)	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS52	8/2/2001	Area G13, Staging Area (See Figures 2 and 4)	0.1	>10 but <50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G13	8/14/2001	Area G13, Staging Area (See Figures 2 and 4)	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist

KEY	DESCRIPTION
~	Sample number preceded by 16491 on chain-of-custody
^	Field screening was conducted using ENSYS PCB test kits for soil. Field screening was generally conducted at 1, 10, and 50 ppm levels for each soil sample.
#	Discrete samples were collected from a single location with an area of less than one square foot. Composite samples were collected from nine locations in general accordance with the guidance provided in EPA 761.289.
Area 1	Bold indicates that the sample was analyzed by the laboratory
*	Sample was composited from composite samples listed in "Sample Location" column
NA	Not Applicable

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample No. ~	Date	Sample Location	Depth (ft.)	Field Screening Result (ppm) ^	Sample Type #	Sample Classification
SS61	8/3/2001	Area G14, Staging Area (See Figures 2 and 4)	0.1	>50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS62	8/3/2001	Area G14, Staging Area (See Figures 2 and 4)	0.1	>50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS62B	8/4/2001	Area G14, Staging Area (See Figures 2 and 4)	0.5	>50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS62C	8/4/2001	Area G14, Staging Area (See Figures 2 and 4)	1.0	>10 but <50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS62D	8/4/2001	Area G14, Staging Area (See Figures 2 and 4)	1.5	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G14	8/14/2001	Area G14, Staging Area (See Figures 2 and 4)	0.5	>50	Composite	Brown, slightly silty, sandy GRAVEL; moist
G15	8/14/2001	Area G15, Staging Area (See Figures 2 and 4)	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS42	8/2/2001	Area G16, Staging Area (See Figures 2 and 4)	0.1	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G16	8/14/2001	Area G16, Staging Area (See Figures 2 and 4)	0.5	>50	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS63	8/3/2001	Area G17, Staging Area (See Figures 2 and 4)	0.1	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G17	8/14/2001	Area G17, Staging Area (See Figures 2 and 4)	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS41	8/2/2001	Area G18, Staging Area (See Figures 2 and 4)	0.1	>10 but <50	Discrete	Brown, slightly silty, sandy GRAVEL; moist
G18	8/14/2001	Area G18, Staging Area (See Figures 2 and 4)	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
G19	8/14/2001	Area G19, Staging Area (See Figures 2 and 4)	0.5	>10 but <50	Composite	Brown, slightly silty, sandy GRAVEL; moist
SS54	8/3/2001	East of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS56	8/3/2001	East of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS47	8/2/2001	South of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS57	8/3/2001	South of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS49	8/2/2001	West of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS50	8/2/2001	West of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist

KEY	DESCRIPTION
~	Sample number preceded by 16491 on chain-of-custody
^	Field screening was conducted using ENSYS PCB test kits for soil. Field screening was generally conducted at 1, 10, and 50 ppm levels for each soil sample.
#	Discrete samples were collected from a single location with an area of less than one square foot. Composite samples were collected from nine locations in general accordance with the guidance provided in EPA 761.289.
Area 1	Bold indicates that the sample was analyzed by the laboratory
*	Sample was composited from composite samples listed in "Sample Location" column
NA	Not Applicable

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample No. ~	Date	Sample Location	Depth (ft.)	Field Screening Result (ppm) ^	Sample Type #	Sample Classification
SS51	8/2/2001	West of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS59	8/3/2001	West of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SS60	8/3/2001	West of Staging Area (See Figures 2 and 4)	0.1	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
Outlying Excavation Confirmation Samples						
CS01X	8/4/2001	Location of Excavation CSO1X, See Figure 2	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS101X	8/4/2001	Duplicate of Sample CS01X	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS08X	8/3/2001	Location of Excavation CSO8X, See Figure 2	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS12X	8/4/2001	Location of Excavation CS12X, See Figure 2	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS13X	8/4/2001	Location of Excavation CS13X2, See Figure 2	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS13X2	8/4/2001	Location of Excavation CS13X2, See Figure 2	1.0	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS17X	8/4/2001	Location of Excavation CSO17X, See Figure 2	0.5	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS21X	8/13/2001	Location of Excavation CS21X2, See Figure 2	0.5	>1 but <10	Composite	Brown, slightly silty, sandy GRAVEL; moist
CS21X2	8/14/2001	Location of Excavation CS21X2, See Figure 2	1.0	<1	Composite	Brown, slightly silty, sandy GRAVEL; moist
Overburden Soil Samples						
SP1	8/9/2001	Overburden soil stockpiles	0.5	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SP2	8/9/2001	Overburden soil stockpiles	1.0	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SP3**	8/9/2001	Overburden soil stockpiles	1.0	>1 but <10	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SP4	8/9/2001	Overburden soil stockpiles	1.5	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SP5	8/9/2001	Overburden soil stockpiles	1.0	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SP6	8/14/2001	Overburden soil stockpiles	0.5	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist
SP7	8/14/2001	Overburden soil stockpiles	0.5	<1	Discrete	Brown, slightly silty, sandy GRAVEL; moist

KEY	DESCRIPTION
~	Sample number preceded by 16491 on chain-of-custody
SP3**	The soil represented by this sample was removed from the overburden soil stockpile and placed in supersacks for disposal with the other PCB-impacted material handled during this project.
^	Field screening was conducted using ENSYS PCB test kits for soil. Field screening was generally conducted at 1, 10, and 50 ppm levels for each soil sample.
#	Discrete samples were collected from a single location with an area of less than one square foot. Composite samples were collected from nine locations in general accordance with the guidance provided in EPA 761.289.
Area 1	Bold indicates that the sample was analyzed by the laboratory
*	Sample was composited from composite samples listed in "Sample Location" column
NA	Not Applicable

TABLE 2 - SUMMARY OF ANALYTICAL RESULTS - PCBs

Parameter Tested	Method*	Soil Cleanup Criteria**	Sample Number~ and Depth of Sample in Feet (See Table 1 and Figures 1 through 4)							
			Supersack Characterization							
			PCB1 0.1	Q1 0.1	Q2 0.1	Q3 0.1	Q4 0.1	Q5 0.1	Q6 0.1	Q7 2.5
Field Screening Results - ppm	ENSYS	-	>50	>10 but <50	>10 but <50	>10 but <50	>10 but <50	>10 but <50	>10 but <50	>10 but <50
Total Solids - percent	SM20 2540G	-	96.0	96.0	96.1	95.8	95.9	95.2	96.3	95.0
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - ppm	EPA 8082	1	**23.9**	**5.43**	**7.16**	**5.36**	**10.5**	**4.04**	**3.33**	**15.6**
Other PCB analytes - ppm	EPA 8082	1	<1.56	<0.624	<0.621	<0.609	<0.627	<0.629	<0.617	<0.632

Parameter Tested	Method*	Soil Cleanup Criteria**	Sample Number~ and Depth of Sample in Feet (See Table 1 and Figures 1 through 4)							
			Supersack Characterization			Backfill Characterization			Misc. Characterization	
			Q8 0.1	Q9 4.5	*Q19* 4.5	BF1^^ 1.5	BF2^^ 1.5	BF3^^ 1.5	SL27B 0.5	SL31B 0.5
Field Screening Results - ppm	ENSYS	-	>10 but <50	>10 but <50	>10 but <50	-	-	-	>50	-
Total Solids - percent	SM20 2540G	-	97.1	95.9	96.3	87.8	94.8	96.1	92.5	96.5
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - ppm	EPA 8082	1	**15.2**	**14.5**	**11.2**	<0.0341	<0.0313	<0.0312	**15.1**	**7.66**
Other PCB analytes - ppm	EPA 8082	1	<0.622	<0.621	<0.621	<0.0341	<0.0313	<0.0312	<0.648	<0.620

KEY	DESCRIPTION
-	Sample not analyzed for this parameter
^^	See Table 3 for results of additional analytes
*	See Appendix B for Limits of Detection
**	Cleanup criteria developed using 40 CFR 261
<0.0311	Less Than the Method Detection Limit
ppm	Parts Per Million
~	Sample Number Preceded by 16491 on Chain-of-Custody
14.4	Bold format indicates concentrations above applicable cleanup criteria
CS101X	Samples with Italic font are duplicates of the preceding sample

TABLE 2 - SUMMARY OF ANALYTICAL RESULTS - PCBs

			Sample Number~ and Depth of Sample in Feet (See Table 1 and Figures 1 through 4)							
		Soil	Misc.	Supersack Storage Area				Decontamination Water		
		Cleanup	SL31C	SA1	SA2	SA3	SA4	Decon 1^^		
Parameter Tested	**Method***	**Criteria****	0.5	0.5	0.5	0.5	0.5	-		
Field Screening Results - ppm	ENSYS	-	-	<1	<1	<1	<1	-		
Total Solids - percent	SM20 2540G	-	94.4	90.4	84.1	85.4	87.7	-		
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - ppm	EPA 8082	1	**17.1**	<0.0331	<0.0356	<0.0351	<0.0341	0.00252		
Other PCB analytes - ppm	EPA 8082	1	<0.634	<0.0331	<0.0356	<0.0351	<0.0341	<0.000114		

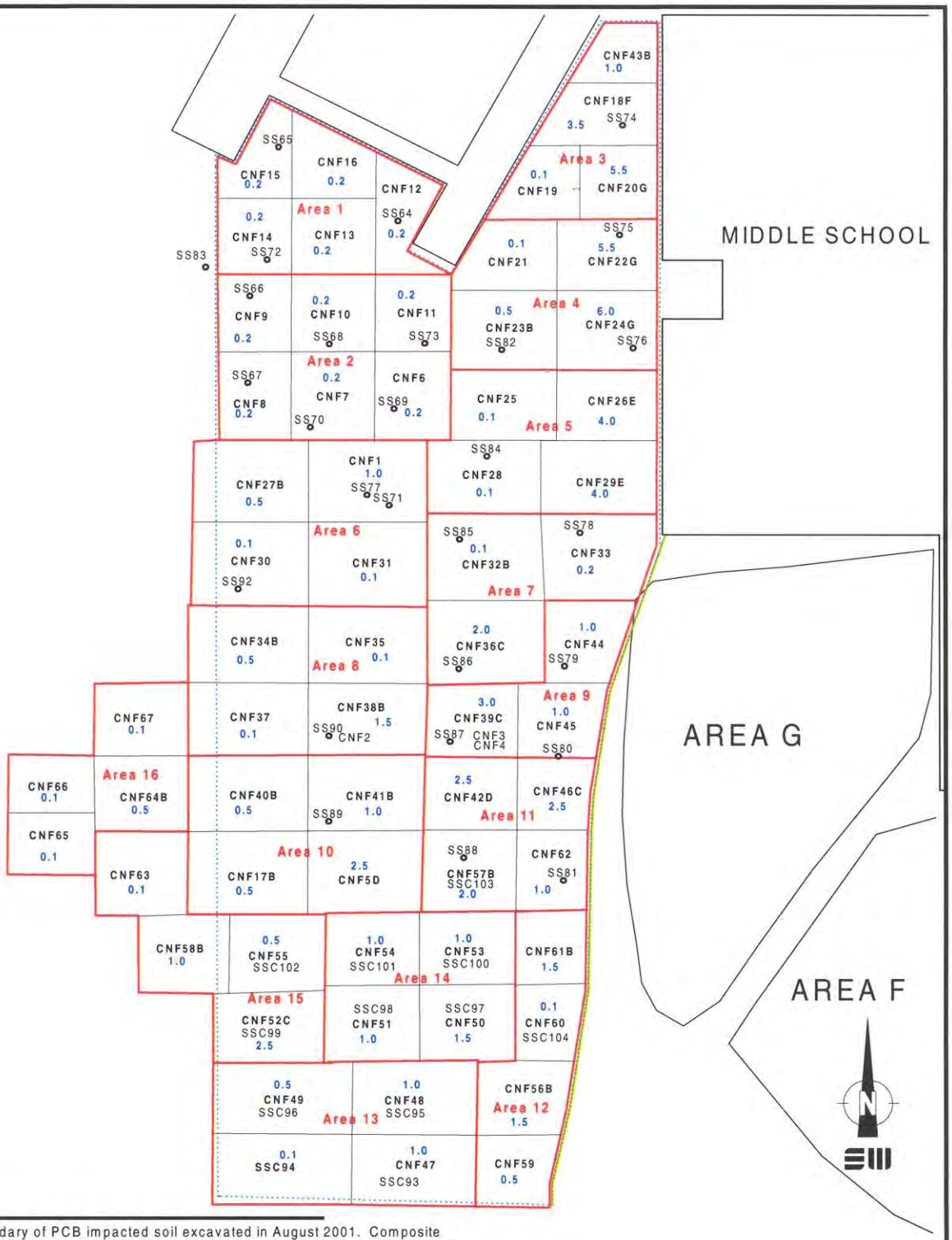
KEY	DESCRIPTION
-	Sample not analyzed for this parameter
^^	See Table 3 for results of additional analytes
*	See Appendix B for Limits of Detection
**	Cleanup criteria developed using 40 CFR 261
<0.0311	Less Than the Method Detection Limit
ppm	Parts Per Million
~	Sample Number Preceded by 16491 on Chain-of-Custody
14.4	Bold format indicates concentrations above applicable cleanup criteria
CS101X	Samples with Italic font are duplicates of the preceding sample

TABLE 2 - SUMMARY OF ANALYTICAL RESULTS - PCBs

			Sample Number~ and Depth of Sample in Feet (See Table 1 and Figures 1 through 4)							
		Soil	Main	Staging Area Excavation			Outlying Excavations			
		Cleanup	Area 16	G1	G14	G19	CS01X	*CS101X*	CS08X	CS12X
Parameter Tested	**Method***	**Criteria****	***	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Field Screening Results - ppm	ENSYS	-	<1	>10 but <50	>50	>10 but <50	<1	<1	<1	<1
Total Solids - percent	SM20 2540G	-	95.3	93.6	92.7	96.1	96.8	96.0	97.2	97.4
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - ppm	EPA 8082	1	0.255	**14.4**	**19.5**	**10.1**	<0.0311	<0.0312	<0.0299	0.426
Other PCB analytes - ppm	EPA 8082	1	<0.0312	<1.61	<1.62	<1.55	<0.0311	<0.0312	<0.0299	<0.0313

			Sample Number~ and Depth of Sample in Feet (See Table 1 and Figures 1 through 4)							
		Soil	Outlying Excavations			Overburden Soil		Supersack Characterization		
		Cleanup	CS13X2	CS17X	CS21X2	SP6	SP10	SS40	SS61	SS62^^
Parameter Tested	**Method***	**Criteria****	1.0	0.5	1.0	0.5	1.5	0.1	0.1	0.1
Field Screening Results - ppm	ENSYS	-	<1	<1	<1	<1	<1	>50	>50	>50
Total Solids - percent	SM20 2540G	-	96.8	97.6	95.4	94.1	93.8	96.6	97.0	97.2
Polychlorinated Biphenyls (PCBs)										
Aroclor 1260 - ppm	EPA 8082	1	0.345	<0.0311	0.250	<0.0319	<0.0320	**8.43**	**13.9**	**29.8**
Other PCB analytes - ppm	EPA 8082	1	<0.0307	<0.0311	<0.0319	<0.0319	<0.0320	<0.0305	<0.0312	<0.0298

KEY	DESCRIPTION
-	Sample not analyzed for this parameter
^^	See Table 3 for additional analytes
*	See Appendix B for Limits of Detection
**	Cleanup criteria developed using 40 CFR 261
***	This sample is a composite of several samples. See Table 1 for sample depths
<0.0311	Less Than the Method Detection Limit
ppm	Parts Per Million
~	Sample Number Preceded by 16491 on Chain-of-Custody
14.4	Bold format indicates concentrations above applicable cleanup criteria
CS101X	Samples with Italic font are duplicates of the preceding sample



LEGEND

Area 1	Approximate boundary of PCB impacted soil excavated in August 2001. Composite Confirmation Samples Area 1 through Area 16 were collected from the areas shown to confirm that the remaining soil contained less than 1 ppm PCBs.
CNF29E 4.0	Approximate area and average depth in feet of the subarea represented by Composite Confirmation Sample CNF29E. Composite samples were collected from nine discreet locations within each of the subareas to assess concentrations of PCBs throughout and at the conclusion of excavation activities. Each of the subareas shown above were excavated to the indicated final average depth prior to collecting the corresponding Composite Confirmation Sample indicated in bold font.
	Approximate boundary of the portions of the November 1997 geotextile liner and gravel cap that was removed during the August 2001 cleanup effort.
	Approximate boundary of remaining geotextile liner and gravel cap that was installed in November 1997.
SSC93	Approximate area from which Composite Sample SSC93 was collected.
SS88	Approximate location of discrete surface Sample SS88.

0 20 40

APPROXIMATE SCALE IN FEET

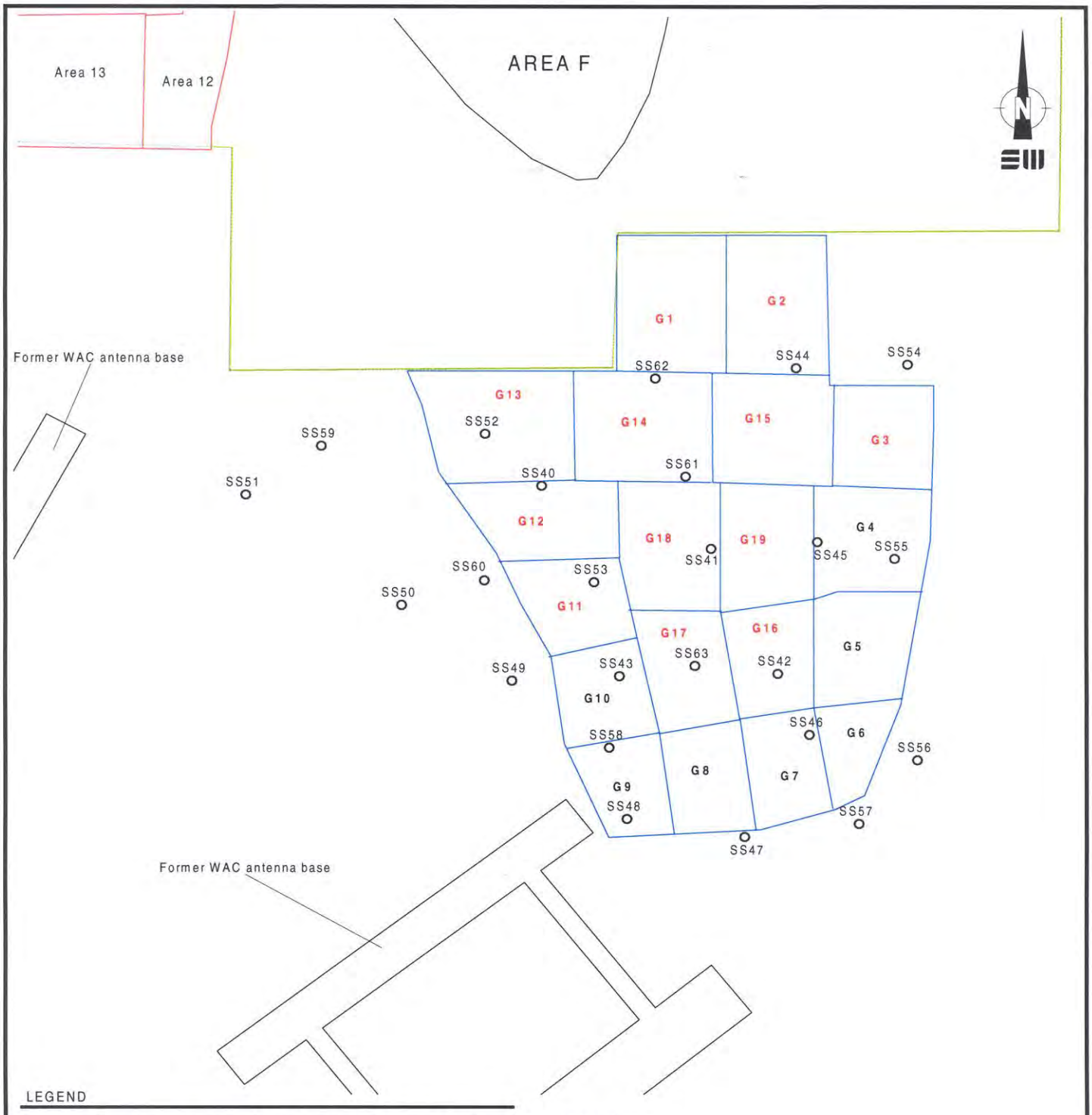
Aniak Middle School PCB Cleanup
Aniak, Alaska

SAMPLING PLAN - MAIN EXCAVATION

December 2001 32-1-16491-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 3



LEGEND

Approximate boundary of PCB impacted soil delineated in August 2001, which had not been identified during previous investigations at the site. Approximately six inches of soil was excavated from this area. Composite Samples G1 through G19 were collected from the underlying soil to assess remaining PCB concentrations. This area was covered with a geotextile fabric and capped with a gravel cap in August 2001.

G1 — Approximate area from which Composite Sample G1 was collected. Composite samples with red font contained greater than one ppm PCBs, based on field screening.

SS63 — Approximate location of discrete surface Sample SS88.

Approximate boundary of remaining geotextile liner and gravel cap that was installed in November 1997.

Approximate boundary of the portions of the November 1997 geotextile liner and gravel cap that was removed during the August 2001 cleanup effort.

0 20 40

APPROXIMATE SCALE IN FEET

Aniak Middle School PCB Cleanup
Aniak, Alaska

SAMPLING PLAN - STAGING AREA

December 2001 32-1-16491-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 4

1998 Site Characterization

TABLE 1 - SAMPLE LOCATIONS

Sample/Boring Number	Tie Point #1 (See Figures 3 and 4)	Distance Tie Point #1 To Sample Location (feet)	Tie Point #2 (See Figures 3 and 4)	Distance Tie Point #2 To Sample Location (feet)	Description
Hand Borings					
B1	MS-2	34.0	MS-4	36.5	
B2	MS-4	6.0	MS-5	6.6	
B3	MS-3	16.0	MS-4	35.2	
B4	MS-4	64.4	MS-2	4.2	
B5	MS-2	40.8	MS-4	75.5	
B6	MS-4	51.6	MS-2	46	
B7	MS-4	36.6	MS-6	60.0	
B8	MS-6	37.0	MS-4	25.0	22.5 ft. perpendicular from school wall.
B9	MS-4	36.5	MS-6	6.5	
B10	MS-4	68.5	MS-6	60.0	
B11	MS-4	82.0	MS-2	99.2	
B12	MS-4	92.5			
B13	MS-2	45.0	MS-4	101.0	
B14	MS-2	20.6	MS-7	16.0	
B15	MS-2	52.5	MS-7	37.0	
B16					14.3 ft. perp. from MS-3/MS-4 wall with garage door. 20 ft. perp. from MS-2/MS-3 wall.
Surface Samples					
SS01	SB-1	4.5			3 ft. perp. from SB-1/SB-2 wall.
SS02	SB-2	37	MS-8	55	
SS03	SB-2	10	MS-8	62	
SS04	MS-8	86	SB-2	125	
SS05	SB-2	45	SB-3	12	
SS06	SB-2	45	SB-3	12	
SS07	SB-2	82	SB-4	58	
SS08	SB-3	52	SB-4	34	
SS09	SB-3	56	MS-9	24	

TABLE 1 - SAMPLE LOCATIONS

Sample/Boring Number	Tie Point #1 (See Figures 3 and 4)	Distance Tie Point #1 To Sample Location (feet)	Tie Point #2 (See Figures 3 and 4)	Distance Tie Point #2 To Sample Location (feet)	Description
SS10	MS-9	21	MS-10	27	
SS11	MS-10	18	MS-1	51	
SS12	MS-8	19	MS-11	20	
SS13	MS-11	10	MS-12	15	
SS14	SWcorner pumphouse	6	West wall water tank	1	
SS15	W corner well house	12	East wall water tank	2	
SS16	N corner pumphouse	21	North wall water tank	1	
SS17	MS-12	78	MS-11	70	
SS18	MS-13	7	MS-14	16	
SS19	MS-13	7	MS-14	16	
SS20	MS-15	13	MS-6	52	
SS21	MS-15	52	MS-6	11	
SS22	MS-6	35	MS-4	66	
SS23	MS-6	69			
SS24	MS-6	81			
SS25	MS-6	85			
SS26					
SS27	HS-1	40	HS-2	48	
SS28	HS-2	12			In front of door.
SS29	HS-2	12			In front of door.
SS30	HS-3	64	HS-1	31	
SS31	HS-3	74	AF-1	54	
SS32					
SS33	AF-1	18	AF-2	33	
SS34	AF-1	19	MS-2	72	
SS35	AF-1	54	MS-2	75	
SS36	AF-1	84	MS-2	65	
SS37	AF-1	84	MS-2	65	

TABLE 1 - SAMPLE LOCATIONS

Sample/Boring Number	Tie Point #1 (See Figures 3 and 4)	Distance Tie Point #1 To Sample Location (feet)	Tie Point #2 (See Figures 3 and 4)	Distance Tie Point #2 To Sample Location (feet)	Description
SS38	HS-3	60.0			
SS39					
Wipe Samples					
WS1	Perp. from north wall	4.0	Perp. from east wall	1.5	Equipment Bldg. Floor inside man door.
WS2	Perp. from east wall	2.0			Equipment Bldg. Two feet inside main garage door.
WS3	Perp. from west wall	20.0	Perp. from north wall	15.0	Equipment Bldg. Stained area on floor.
WS4	Front door	6.0			Middle School. Floor of hallway 6 feet in front of door.
WS5					Middle School. Floor of hallway at entrance to metal shop and building exit.
WS6					Middle School. Floor of hallway at entrance to metal shop and building exit.
WS7					Middle School. Floor of hallway
WS8					Middle School. Floor near wood shop garage door.
WS9					Middle School. Floor inside exit man door of wood shop.
WS10					Middle School. Floor in center of wood shop.
WS11					Middle School. Floor in wood shop in front of entrance to hallway.
WS12					Middle School. Floor of hallway inside main entry doors.
WS13	Perp. from north wall	4.0	Perp. from east wall	4.0	Shop Bldg. Floor inside man door.
WS14	Perp. from to north wall	4.0			Shop Bldg. Floor inside west garage door.
WS15					Shop Bldg. Floor inside west garage door.
WS16	Perp. from east wall	18.0			Shop Bldg. Floor adjacent to floor drain in center.
WS17					High School. Floor of hallway, See Figure 6.
WS18					High School. Floor of hallway, See Figure 6.
WS19					High School. Floor inside main entrance doors.
WS20					High School. Floor inside main entrance doors.
WS21					High School. Floor hallway to gymnasium.
WS22					High School. Floor inside west exit doors.

TABLE 2 - HAND BORING SAMPLE INFORMATION AND SUMMARY OF ANALYTICAL RESULTS

Sample Number	Sample Date	Sample Location (See Figure 3)	Depth (ft. bgs)	PCB Field Immunoassay Screen (ENSYS) (ppm)	Aroclor 1254 (ppm)	Aroclor 1260 (ppm)	Other PCB analytes (ppm)	Sample Classification
Boring B1								
B1S1*	6/5/1998	Soil Boring B1, Sample 1	0.5	>10	<3.45	**17.9**	<3.45	Brown, slightly silty, sandy GRAVEL; moist
B1S2	6/5/1998	Soil Boring B1, Sample 2	3-3.5	>10	-	-	-	Brown, slightly silty, sandy GRAVEL; moist
B1S3*	6/5/1998	Soil Boring B1, Sample 3	6-6.5	>1 but <10	<0.168	2.39	<0.168	Brown, slightly silty, sandy GRAVEL; moist
B1S4	6/5/1998	Soil Boring B1, Sample 4	7-7.5	>1 but <10	-	-	-	Brown, slightly silty, sandy GRAVEL; moist
Boring B2								
B2S1*	6/6/1998	Soil Boring B2, Sample 1	1.0	>10	<3.05	6.29	<3.05	Brown, sandy GRAVEL; moist
B2S2	6/6/1998	Soil Boring B2, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist
B2S3*	6/6/1998	Soil Boring B2, Sample 3	4-4.5	<1	<0.0316	<0.0316	<0.0316	Brown, sandy GRAVEL; moist
B2S4	6/6/1998	Soil Boring B2, Sample 4	6-6.5	<1	-	-	-	Brown, sandy GRAVEL; moist
Boring B3								
B3S1*	6/6/1998	Soil Boring B3, Sample 1	0.5	>10	<3.33	**26.0**	<3.33	Brown, slightly silty, sandy GRAVEL; moist
B3S2*	6/6/1998	Soil Boring B3, Sample 2	2-2.5	>10	<3.31	**30.0**	<3.31	Brown, sandy GRAVEL; moist
B3S3*	6/6/1998	Soil Boring B3, Sample 3	4-4.5	>10	<3.17	**19.2**	<3.17	Brown, sandy GRAVEL; moist
B3S4	6/6/1998	Soil Boring B3, Sample 4	6-6.5	>1 but <10	-	-	-	Brown, sandy GRAVEL; moist
Boring B4								
B4S1*	6/6/1998	Soil Boring B4, Sample 1	0.5	>1 but <10	<0.302	2.94	<0.302	Brown, sandy GRAVEL; moist
B4S2	6/6/1998	Soil Boring B4, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist
Boring B5								
B5S1*	6/6/1998	Soil Boring B5, Sample 1	0.5	>1 but <10	<0.337	5.63	<0.337	Brown, sandy GRAVEL; moist
B5S2	6/6/1998	Soil Boring B5, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist
Boring B6								
B6S1*	6/7/1998	Soil Boring B6, Sample 1	0.5	>10	<3.45	**14.6**	<3.45	Brown, sandy GRAVEL; moist
B6S2*	6/7/1998	Soil Boring B6, Sample 2	2-2.5	<1	<0.0345	0.290	<0.0345	Brown, sandy GRAVEL; moist
Boring B7								
B7S1*	6/7/1998	Soil Boring B7, Sample 1	0.5	>10	<3.47	26.0	<3.47	Brown, sandy GRAVEL; moist
B7S2	6/7/1998	Soil Boring B7, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist

TABLE 2 - HAND BORING SAMPLE INFORMATION AND SUMMARY OF ANALYTICAL RESULTS

Sample Number	Sample Date	Sample Location (See Figure 3)	Depth (ft. bgs)	PCB Field Immunoassay Screen (ENSYS) (ppm)	Aroclor 1254 (ppm)	Aroclor 1260 (ppm)	Other PCB analytes (ppm)	Sample Classification
Boring B8								
B8S1*	6/7/1998	Soil Boring B8, Sample 1	0.5	>10	<3.56	**45.6**	<3.56	Brown, sandy GRAVEL; moist
B8S2*	6/7/1998	Soil Boring B8, Sample 2	2-2.5	>1 but <10	<0.0342	0.645	<0.0342	Brown, sandy GRAVEL; moist
Boring B9								
B9S1*	6/7/1998	Soil Boring B9, Sample 1	0.5	>1 but <10	<3.41	8.83	<3.41	Brown, sandy GRAVEL; moist
B9S2	6/7/1998	Soil Boring B9, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist
Boring B10								
B10S1*	6/7/1998	Soil Boring B10, Sample 1	1.0	<1	<0.168	1.23	<0.168	Brown, sandy GRAVEL; moist
B10S2	6/7/1998	Soil Boring B10, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist
Boring B11								
B11S1*	6/7/1998	Soil Boring B11, Sample 1	0.5	>1 but <10	<0.167	1.13	<0.167	Brown, sandy GRAVEL; moist
B11S2	6/7/1998	Soil Boring B11, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist
B11S10*	6/7/1998	Duplicate of B11, Sample 1	0.5	>1 but <10	<0.167	1.26	<0.167	Brown, sandy GRAVEL; moist
Boring B12								
B12S1*	6/8/1998	Soil Boring B12, Sample 1	0.5	<1	<0.0341	0.652	<0.0341	Brown, sandy GRAVEL; moist
B12S2*	6/8/1998	Soil Boring B12, Sample 2	2-2.5	<1	<0.0310	<0.0310	<0.0310	Brown, sandy GRAVEL; moist
Boring B13								
B13S1*	6/8/1998	Soil Boring B13, Sample 1	0.5	<1	<0.162	1.29	<0.162	Brown, sandy GRAVEL; moist
B13S2	6/8/1998	Soil Boring B13, Sample 2	2-2.5	<1	-	-	-	Brown, gravelly SAND; moist
Boring B14								
B14S1*	6/8/1998	Soil Boring B14, Sample 1	1.0	>1 but <10	<0.166	2.51	<0.166	Brown, sandy GRAVEL; moist
B14S2	6/8/1998	Soil Boring B14, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist
Boring B15								
B15S1*	6/8/1998	Soil Boring B15, Sample 1	0.5	<1	<0.0345	0.141	<0.0345	Brown, sandy GRAVEL; moist
B15S2	6/8/1998	Soil Boring B15, Sample 2	2-2.5	<1	-	-	-	Brown, sandy GRAVEL; moist

TABLE 2 - HAND BORING SAMPLE INFORMATION AND SUMMARY OF ANALYTICAL RESULTS

Sample Number	Sample Date	Sample Location (See Figure 3)	Depth (ft. bgs)	PCB Field Immunoassay Screen (ENSYS) (ppm)	Aroclor 1254 (ppm)	Aroclor 1260 (ppm)	Other PCB analytes (ppm)	Sample Classification
Boring B16								
B16S1*	6/8/1998	Soil Boring B16, Sample 1	0.5	>10	<3.33	**28.2**	<3.33	Brown, sandy GRAVEL; moist
B16S2*	6/8/1998	Soil Boring B16, Sample 2	2-2.5	>10	<3.29	**20.4**	<3.29	Brown, sandy GRAVEL; moist
B16S3*	6/8/1998	Soil Boring B16, Sample 3	4-4.5	<1	<0.173	1.76	<0.173	Brown, sandy GRAVEL; moist
B16S4	6/8/1998	Soil Boring B16, Sample 4	6-6.5	<1	-	-	-	Brown, sandy GRAVEL; moist
B16S10*	6/8/1998	Duplicate of B16, Sample 1	0.5	>10	<3.45	**28.5**	<3.45	Brown, sandy GRAVEL; moist

KEY	DESCRIPTION
*	Sample analyzed by the laboratory
-	Not applicable
ppm	Parts per million
<3.45	Analyte concentration less than the indicated detection limit
PCB	Polychlorinated Biphenyl - Note: analytical method was SW846 8082
	Note: Analyte concentrations shown in bold exceed the applicable regulatory action level of 10 ppm.

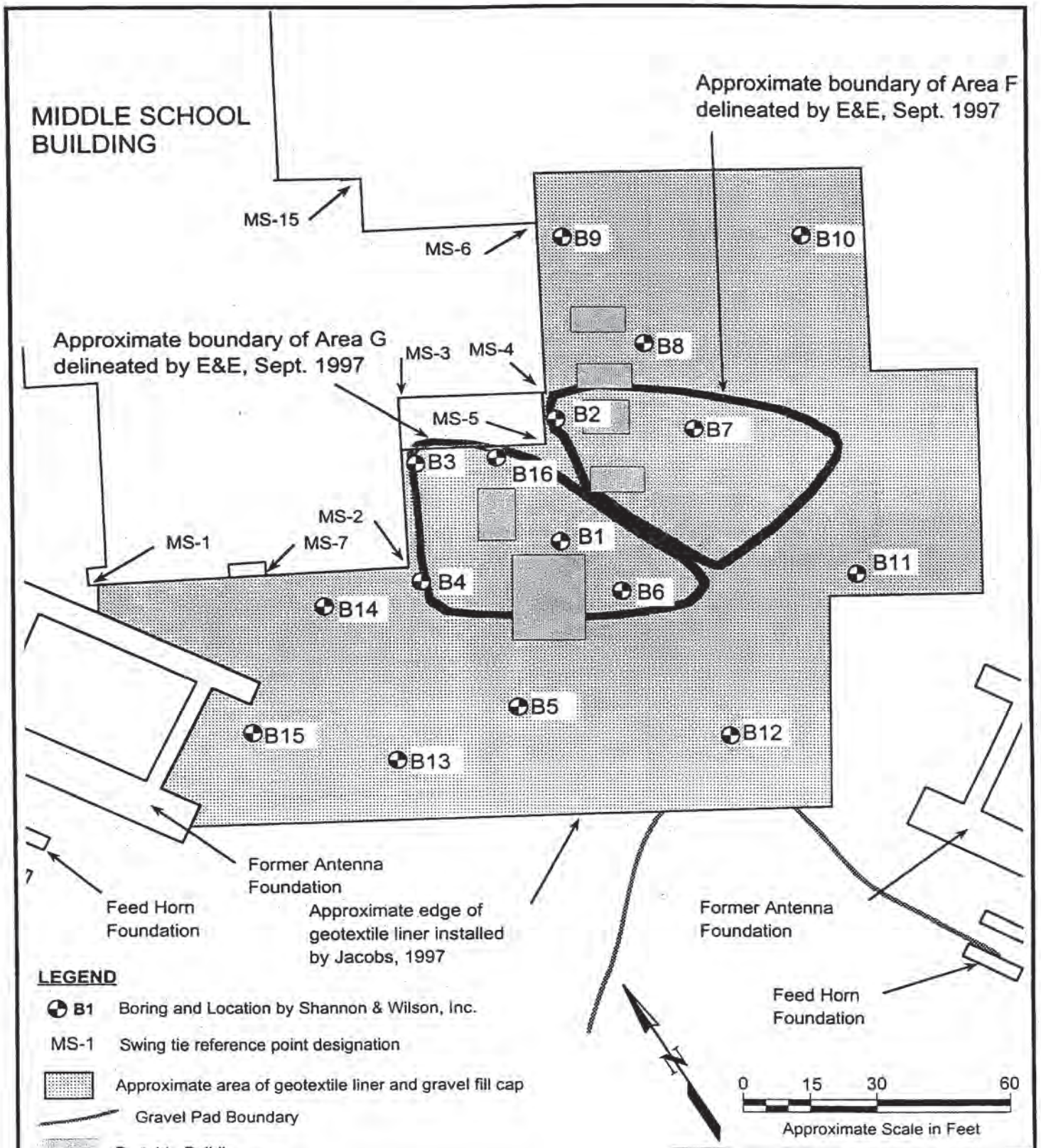
TABLE 3 - SURFACE SAMPLE INFORMATION AND SUMMARY OF ANALYTICAL RESULTS

Surface Sample Number	Sample Date	Sample Location (See Figure 4)	Depth (ft. bgs)	Aroclor 1254 (ppm)	Aroclor 1260 (ppm)	Other PCB analytes (ppm)	Sample Classification
SS01	6/9/1998	Surface Sample No. 1	0-0.03	<0.195	3.39	<0.195	Brown, sandy GRAVEL
SS02	6/9/1998	Surface Sample No. 2	0-0.03	<0.0344	0.113	<0.0344	Brown, sandy GRAVEL
SS03	6/9/1998	Surface Sample No. 3	0-0.03	<0.0344	0.0578	<0.0344	Brown, sandy GRAVEL
SS04	6/9/1998	Surface Sample No. 4	0-0.03	<0.0345	0.0397	<0.0345	Brown, sandy GRAVEL
SS05	6/9/1998	Surface Sample No. 5	0-0.03	<0.0347	0.0812	<0.0347	Brown, sandy GRAVEL
SS06	6/9/1998	Duplicate of SS05	0-0.03	<0.0328	0.0785	<0.0328	Brown, sandy GRAVEL
SS07	6/9/1998	Surface Sample No. 7	0-0.03	<0.0340	0.454	<0.0340	Brown, sandy GRAVEL
SS08	6/9/1998	Surface Sample No. 8	0-0.03	<0.172	1.12	<0.172	Brown, sandy GRAVEL
SS09	6/9/1998	Surface Sample No. 9	0-0.03	<0.0360	0.242	<0.0360	Brown, sandy GRAVEL
SS10	6/9/1998	Surface Sample No. 10	0-0.03	<0.0337	0.503	<0.0337	Brown, sandy GRAVEL
SS11	6/9/1998	Surface Sample No. 11	0-0.03	<0.0313	0.483	<0.0313	Brown, sandy GRAVEL
SS12	6/9/1998	Surface Sample No. 12	0-0.03	<3.26	9.84	<3.26	Brown, sandy GRAVEL
SS13	6/9/1998	Surface Sample No. 13	0-0.03	<0.169	1.08	<0.169	Brown, sandy GRAVEL
SS14	6/9/1998	Surface Sample No. 14	0-0.03	<0.0307	<0.0307	<0.0307	Brown, sandy GRAVEL
SS15	6/9/1998	Surface Sample No. 15	0-0.03	<0.0347	<0.0347	<0.0347	Brown, sandy GRAVEL
SS16	6/9/1998	Surface Sample No. 16	0-0.03	<0.0352	0.0372	<0.0352	Brown, sandy GRAVEL
SS17	6/9/1998	Surface Sample No. 17	0-0.03	<0.335	5.14	<0.335	Brown, sandy GRAVEL
SS18	6/9/1998	Surface Sample No. 18	0-0.03	<0.0328	0.337	<0.0328	Brown, sandy GRAVEL
SS19	6/9/1998	Duplicate of SS18	0-0.03	<0.0318	0.274	<0.0318	Brown, sandy GRAVEL
SS20	6/9/1998	Surface Sample No. 20	0-0.03	<0.0351	0.680	<0.0351	Brown, sandy GRAVEL
SS21	6/9/1998	Surface Sample No. 21	0-0.03	<0.303	5.63	<0.303	Brown, sandy GRAVEL
SS22	6/9/1998	Surface Sample No. 22	0-0.03	<0.0352	<0.0352	<0.0352	Brown, sandy GRAVEL
SS23	6/9/1998	Surface Sample No. 23	0-0.03	<0.0323	0.0585	<0.0323	Brown, sandy GRAVEL
SS24	6/9/1998	Surface Sample No. 24	0-0.03	<0.0339	0.626	<0.0339	Brown, sandy GRAVEL
SS25	6/9/1998	Surface Sample No. 25	0-0.03	<1.63	**10.6**	<1.63	Brown, sandy GRAVEL
SS26	6/9/1998	Surface Sample No. 26	0-0.03	<0.0357	<0.0357	<0.0357	Brown, sandy GRAVEL
SS27	6/9/1998	Surface Sample No. 27	0-0.03	<0.0330	<0.0330	<0.0330	Brown, sandy GRAVEL
SS28	6/9/1998	Surface Sample No. 28	0-0.03	<0.0328	<0.0328	<0.0328	Brown, sandy GRAVEL
SS29	6/9/1998	Duplicate of SS28	0-0.03	<0.0327	<0.0327	<0.0327	Brown, sandy GRAVEL

TABLE 3 - SURFACE SAMPLE INFORMATION AND SUMMARY OF ANALYTICAL RESULTS

Surface Sample Number	Sample Date	Sample Location (See Figure 4)	Depth (ft. bgs)	Aroclor 1254 (ppm)	Aroclor 1260 (ppm)	Other PCB analytes (ppm)	Sample Classification
SS30	6/9/1998	Surface Sample No. 30	0-0.03	<0.0354	<0.0354	<0.0354	Brown, sandy GRAVEL
SS31	6/9/1998	Surface Sample No. 31	0-0.03	<0.0332	<0.0332	<0.0332	Brown, sandy GRAVEL
SS32	6/9/1998	Surface Sample No. 32	0-0.03	<0.0334	0.0321	<0.0334	Brown, sandy GRAVEL
SS33	6/9/1998	Surface Sample No. 33	0-0.03	<0.0309	0.0430	<0.0309	Brown, sandy GRAVEL
SS34	6/9/1998	Surface Sample No. 34	0-0.03	<0.0345	<0.0345	<0.0345	Brown, sandy GRAVEL
SS35	6/9/1998	Surface Sample No. 35	0-0.03	<0.0327	0.0540	<0.0327	Brown, sandy GRAVEL
SS36	6/9/1998	Surface Sample No. 36	0-0.03	<0.0343	0.0639	<0.0343	Brown, sandy GRAVEL
SS37	6/9/1998	Duplicate of SS36	0-0.03	<0.0329	0.0349	<0.0329	Brown, sandy GRAVEL
SS38	6/9/1998	Surface Sample No. 38	0-0.03	<0.0358	<0.0358	<0.0358	Brown, sandy GRAVEL
SS39	6/9/1998	Surface Sample No. 39	0-0.03	<0.0313	<0.0313	<0.0313	Brown, sandy GRAVEL

KEY	DESCRIPTION
-	Not applicable
ppm	Parts per million
<0.0313	Analyte concentration less than the indicated detection limit
PCB	Polychlorinated Biphenyl - Note: analytical method was SW846 EPA 8082
	Note: Analyte concentrations shown in bold exceed the applicable regulatory action levels of 10 ppm.



LEGEND

- B1 Boring and Location by Shannon & Wilson, Inc.
- MS-1 Swing tie reference point designation
- Approximate area of geotextile liner and gravel fill cap
- Gravel Pad Boundary
- Portable Buildings

Note: Building lines shown are based on aerial photographs, not as-built drawings. Building lines are adjusted for estimated roof overhang. Actual swing tie distances, provided in the report, should be used to relocate borings.

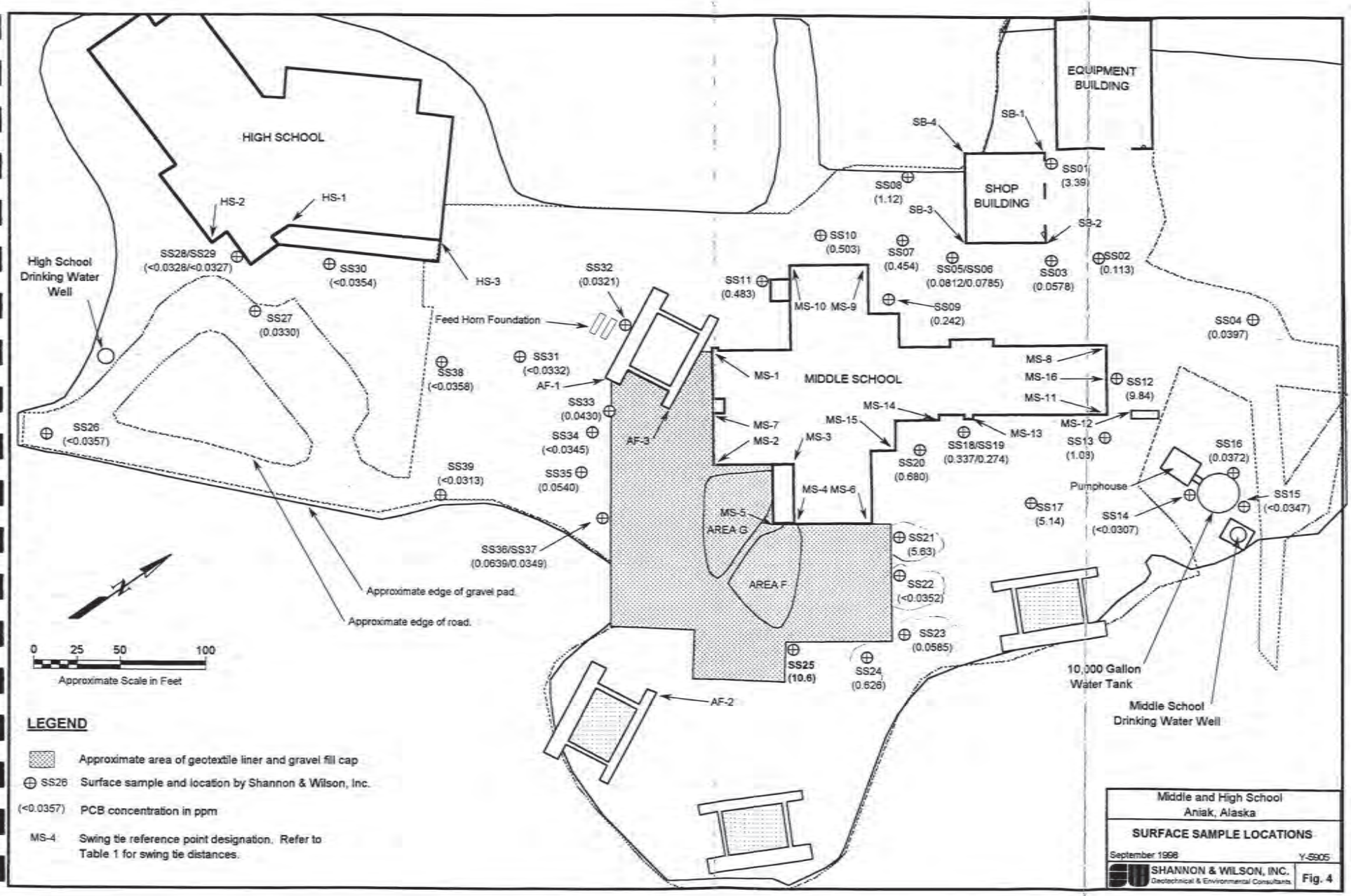
Middle and High Schools
Aniak, Alaska

HAND BORING LOCATIONS

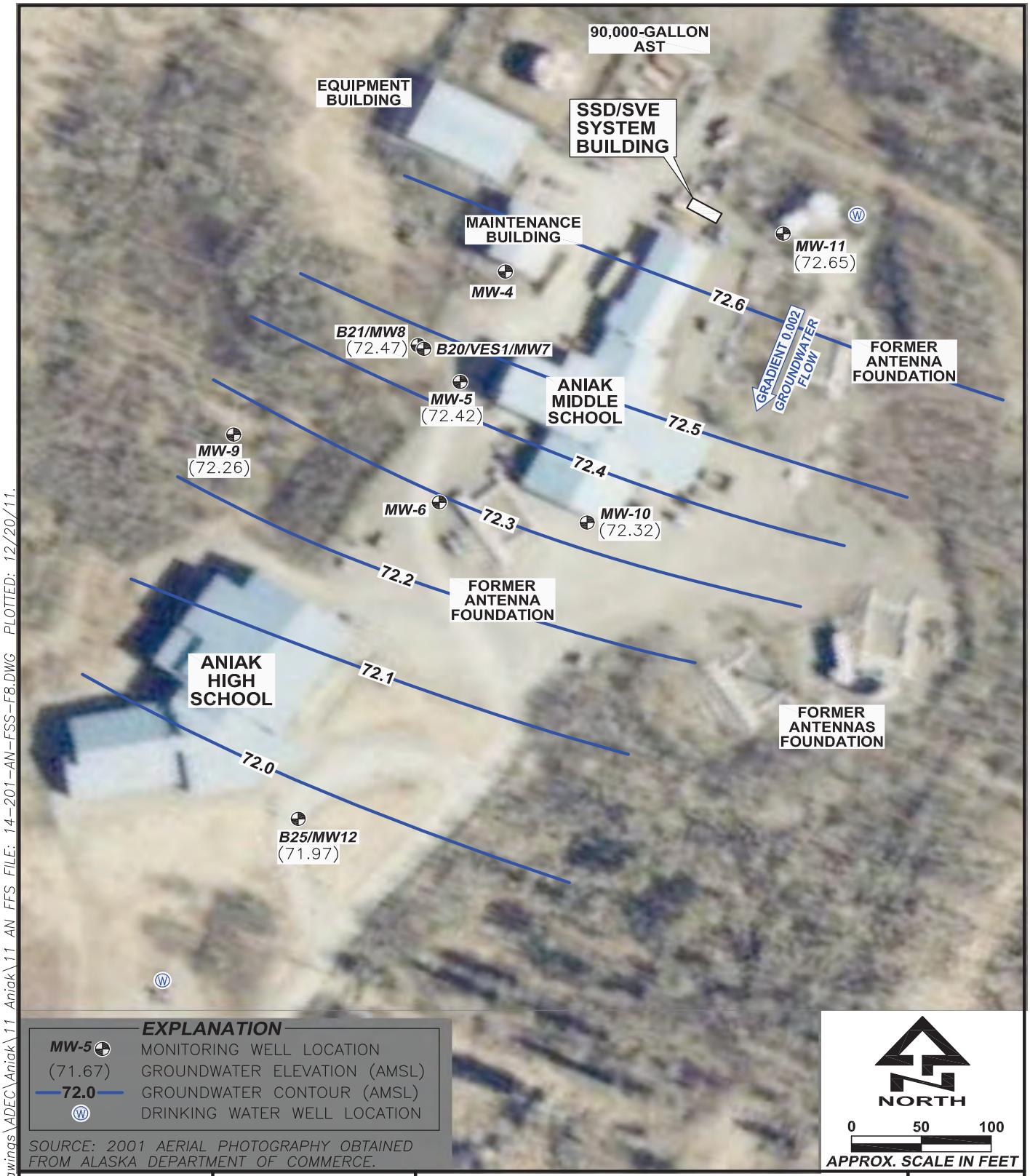
September 1998 Y-5905

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 3


HIGH SCHOOL
HS-1
HS-2
HS-3
High School Drinking Water Well
SS28/SS29 (<0.0328/<0.0327)
SS30 (<0.0354)
SS27 (0.0330)
SS26 (<0.0357)
SS38 (<0.0358)
SS39 (<0.0313)
Feed Horn Foundation
SS32 (0.0321)
SS31 (<0.0332)
AF-1
SS33 (0.0430)
SS34 (<0.0345)
SS35 (0.0540)
AF-3
SS36/SS37 (0.0639/0.0349)
Approximate edge of gravel pad.
Approximate edge of road.
EQUIPMENT BUILDING
SB-1
SB-2
SB-3
SB-4
SHOP BUILDING
SS01 (3.39)
SS08 (1.12)
SS10 (0.503)
SS07 (0.454)
SS05/SS06 (0.0812/0.0785)
SS03 (0.0578)
SS02 (0.113)
SS11 (0.483)
MS-10 MS-9
SS09 (0.242)
SS04 (0.0397)
MS-1
MIDDLE SCHOOL
MS-8
MS-16
MS-11
SS12 (9.84)
MS-14
MS-15
MS-12
MS-13
SS13 (1.09)
MS-7
MS-2
MS-3
SS18/SS19 (0.337/0.274)
SS20 (0.680)
SS16 (0.0372)
Pumphouse
SS15 (<0.0347)
SS14 (<0.0307)
SS17 (5.14)
MS-4 MS-6
MS-5
AREA G
AREA F
SS21 (5.63)
SS22 (<0.0352)
SS23 (0.0585)
SS25 (10.6)
SS24 (0.626)
AF-2
10,000 Gallon Water Tank
Middle School Drinking Water Well
N
0 25 50 100
Approximate Scale in Feet
LEGEND
Approximate area of geotextile liner and gravel fill cap
SS26 Surface sample and location by Shannon & Wilson, Inc.
(<0.0357) PCB concentration in ppm
MS-4 Swing tie reference point designation. Refer to Table 1 for swing tie distances.
Middle and High School
Aniak, Alaska
SURFACE SAMPLE LOCATIONS
September 1998
Y-5905
SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants
Fig. 4

2011 Potentiometric Surface Maps



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oasis ENVIRONMENTAL

DATE: DEC. 2011
CHKD: J.H.P.
DRAWN: C.E.H.
PROJ. No.: 14-201

825 W. 8th Ave., Anchorage, AK 99501, (907) 258-4880

MAY 14, 2011 POTENTIOMETRIC SURFACE MAP

ANIAK MIDDLE SCHOOL/WHITE ALICE SITE
FOCUSED FEASIBILITY STUDY
GROUNDWATER TCE CONTAMINATION
Aniak, Alaska

FIGURE

8

PATH: V:\Project Drawings\ADEC\Aniak\11 Aniak\11 AN FFS FILE: 14-201-AN-FSS-F9.DWG PLOTTED: 12/20/11.

oasis ENVIRONMENTAL

DATE: DEC. 2011
CHKD: J.H.P.
DRAWN: C.E.H.
PROJ. No.: 14-201

825 W. 8th Ave., Anchorage, AK 99501, (907) 258-4880

JUNE 12, 2011 POTENTIOMETRIC SURFACE MAP

ANIAK MIDDLE SCHOOL/WHITE ALICE SITE
FOCUSED FEASIBILITY STUDY
GROUNDWATER TCE CONTAMINATION
Aniak, Alaska

FIGURE

9

PATH: V:\Project Drawings\ADEC\Aniak\11 Aniak\11 AN FFS FILE: 14-201-AN-FSS-F10.DWG PLOTTED: 12/20/11.

oasis ENVIRONMENTAL

DATE: DEC. 2011
CHKD: J.H.P.
DRAWN: C.E.H.
PROJ. No.: 14-201

825 W. 8th Ave., Anchorage, AK 99501, (907) 258-4880

AUGUST 20, 2011 POTENTIOMETRIC SURFACE MAP

ANIAK MIDDLE SCHOOL/WHITE ALICE SITE
FOCUSED FEASIBILITY STUDY
GROUNDWATER TCE CONTAMINATION
Aniak, Alaska

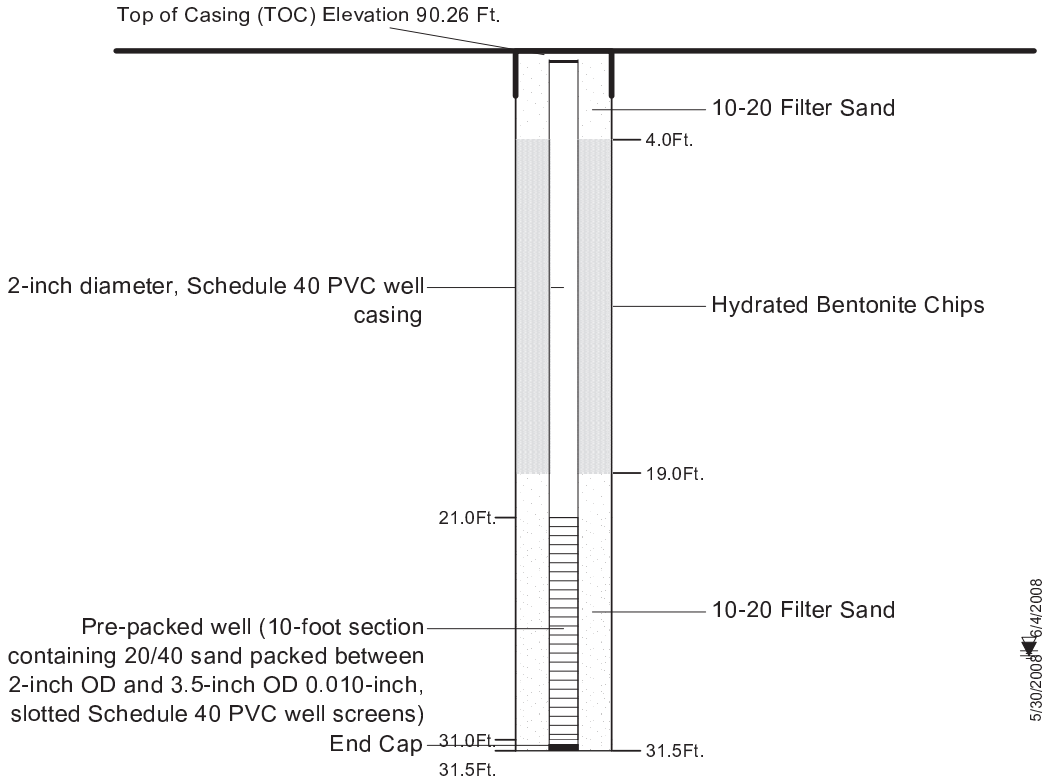
FIGURE

10

Select Environmental Monitoring Point Construction Logs

(MW5, SGP13, SGP14, VES2, AIW, and AIMP)

Casing Description **Backfill Description**



General Soil Stratigraphy

Note: All soil contacts and types inferred from drilling action and cuttings only.
Soil samples were not collected during drilling.

LEGEND

▽ Ground Water Level ATD
▼ Static Ground Water Level

NOTE: All joints use threaded connections.

Former WACS Aniak Middle School Site
Aniak, Alaska

MONITORING WELL MW5
CONSTRUCTION DETAIL

March 2009 32-1-17201-116

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

C-16

MATERIAL DESCRIPTION Elevation: 91.95 Ft.	Depth, Ft.	Symbol	Samples	Ground Water	Depth, Ft.	Penetration Resistance (340 lb. weight, 30" drop) ▲ Blows per foot
Brown, slightly silty, sandy GRAVEL; moist Lithology was inferred from drill cuttings and drill action.				Groundwater Not Encountered During Drilling on 8/7/2009	5 10	
Soft, brown, SILT; moist	13.0		S13		15	▲
Bottom of Boring Boring Completed 8/7/2009	15.0				20 25 30	

0 25 50 75 100

● PID Reading (ppm)

LEGEND

* Sample Not Recovered

3" O.D. Split Spoon Sample

Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. USC letter symbol based on visual classification.

Former WACS Aniak Middle School Site
Aniak, Alaska

LOG OF BORING SGP14

June 2010 32-1-17308-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

H-14

ENVIRONMENTAL LOG 17308-003 SGP BORELOGS.GPJ S&W_GEO1.GDT 6/24/10

MATERIAL DESCRIPTION Elevation: 92.37 Ft.	Depth, Ft.	Symbol	Samples	Ground Water	Depth, Ft.	Penetration Resistance (340 lb. weight, 30" drop) ▲ Blows per foot
Brown, silty, sandy GRAVEL; moist Lithology was inferred from drill cuttings and drill action.				Groundwater Not Encountered During Drilling on 8/5/2009	5 10 15 20	
Medium dense, brown, sandy SILT; moist	23.5		S24		25	▲
Bottom of Boring Boring Completed 8/5/2009	25.5				30	

Penetration Resistance scale: 0, 25, 50, 75, 100

● PID Reading (ppm)

LEGEND

* Sample Not Recovered

3" O.D. Split Spoon Sample

Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. USC letter symbol based on visual classification.

Former WACS Aniak Middle School Site
Aniak, Alaska

LOG OF BORING SGP13

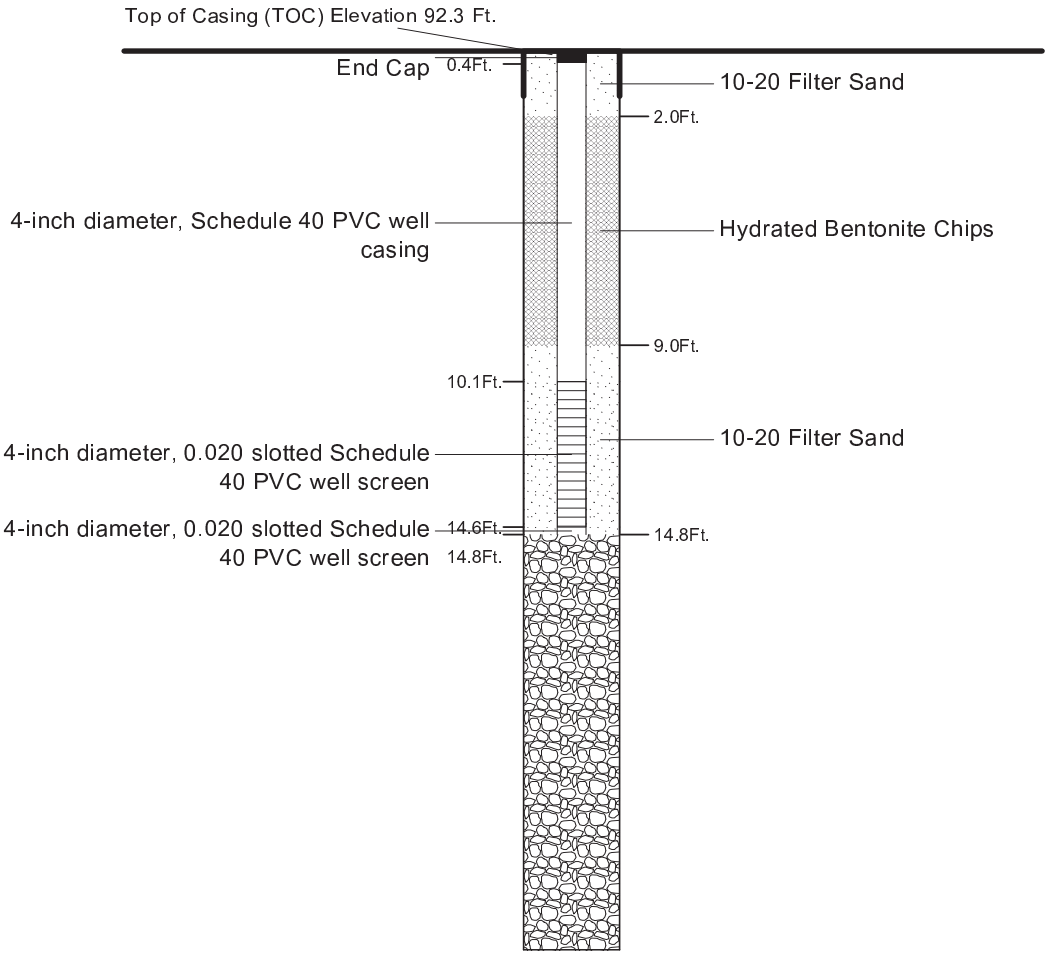
June 2010 32-1-17308-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

H-13

ENVIRONMENTAL LOG 17308-003 SGP BORELOGS.GPJ S&W_GEO1.GDT 6/24/10

Casing Description | **Backfill Description**



LEGEND

▽ Ground Water Level ATD

NOTE: All joints use welded connections.

Former WACS Aniak Middle School Site
Aniak, Alaska

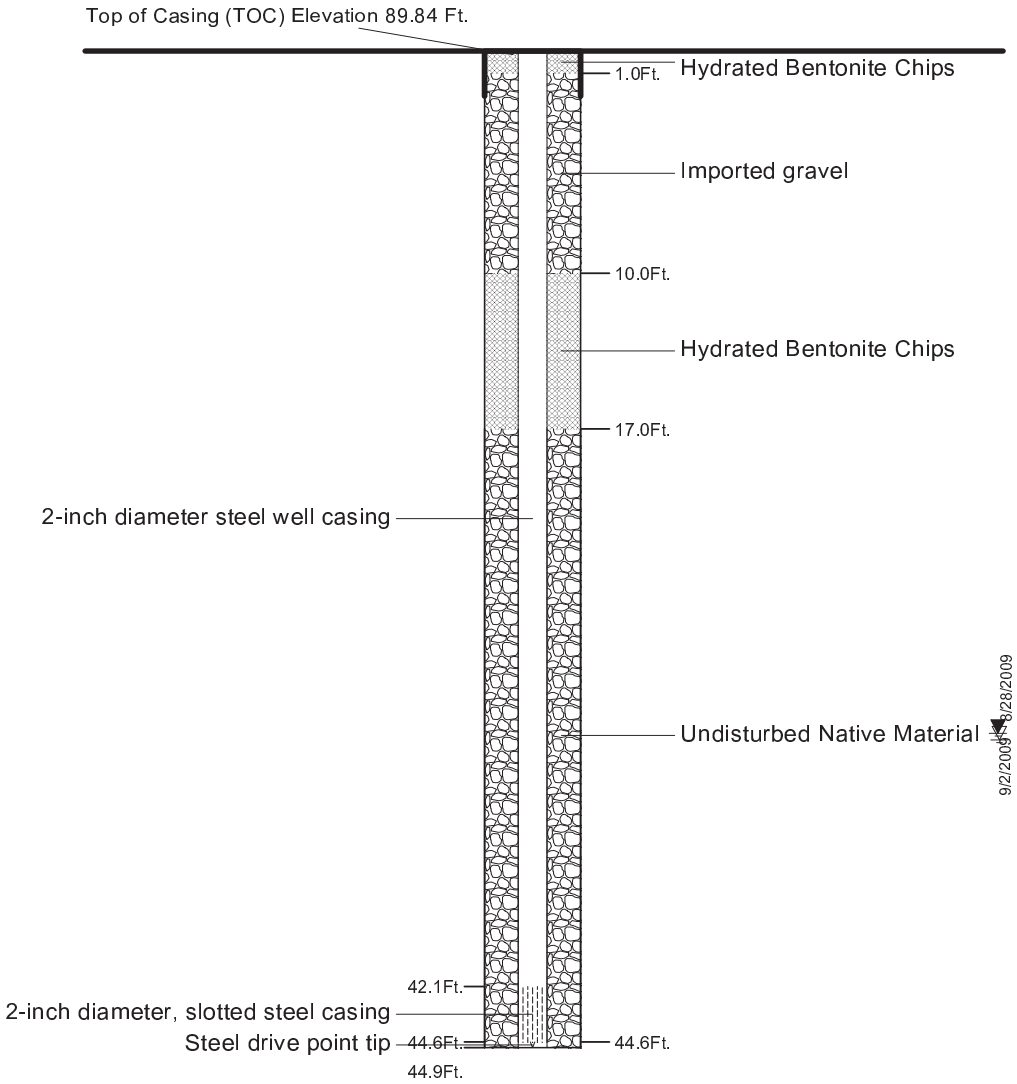
MONITORING WELL VES2
CONSTRUCTION DETAIL

June 2010 | 32-1-17308-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. H-88

Casing Description | **Backfill Description**



LEGEND

- Ground Water Level ATD
- Static Ground Water Level

NOTE: All joints use welded connections.

Former WACS Aniak Middle School Site
Aniak, Alaska

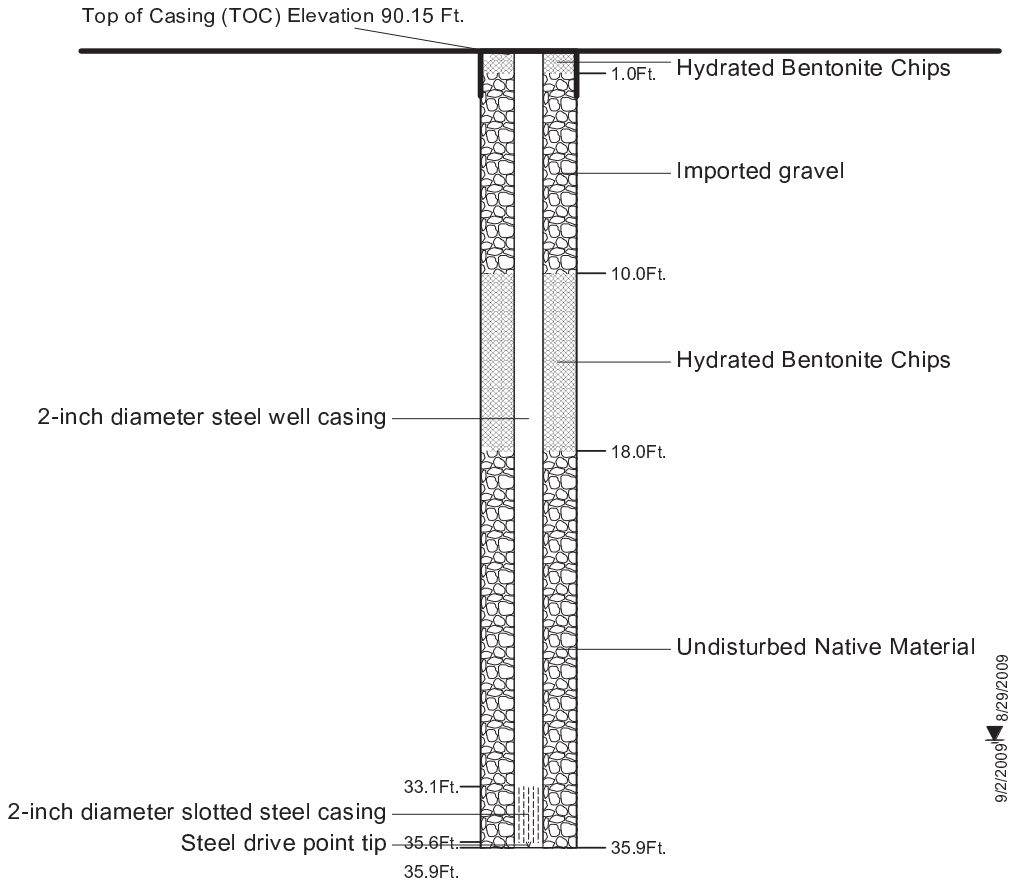
MONITORING WELL AIW CONSTRUCTION DETAIL

June 2010 | 32-1-17308-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. H-89

Casing Description | **Backfill Description**



LEGEND

Ground Water Level ATD

Static Ground Water Level

NOTE: All joints use welded connections.

Former WACS Aniak Middle School Site
Aniak, Alaska

MONITORING WELL AIMP CONSTRUCTION DETAIL

June 2010 | 32-1-17308-003

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Fig. H-90

APPENDIX C

Project Schedule

Table C-1
Project Schedule

Activity	Date
Mobilization	Beginning of May 2015
Site Preparation	May 2015
Excavation and Backfilling	May 22 to August 15, 2015
Waste Transport and Disposal	June to September 2015
Site Restoration	Complete before school resumes in mid-August 2015
Demobilization	End of September 2015

APPENDIX D

Sampling and Analysis Plan

APPENDIX D

SAMPLING AND ANALYSIS PLAN

PCB-CONTAMINATED
SOIL REMOVAL

FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

Prepared for:
PRP Group

DRAFT-FINAL
January 2015

TABLE OF CONTENTS

SECTION **PAGE**

ACRONYMS AND ABBREVIATIONS ..... D-v

1.0 INTRODUCTION D-1-1

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES D-2-1

2.1 PROJECT CHEMIST D-2-1

2.2 FIELD SAMPLERS D-2-1

3.0 FIELD SAMPLING PLAN D-3-1

3.1 SAMPLING PROCEDURES D-3-2

3.1.1 Pre-Excavation Sampling D-3-2

3.1.2 Confirmation and Characterization Sampling D-3-3

3.1.3 Pre- and Post-Construction Sampling D-3-5

3.1.4 Backfill Sampling D-3-5

3.1.5 Waste Characterization Sampling D-3-6

3.1.6 Pre- and Post-Treatment Sampling D-3-6

3.2 SOIL SAMPLING PROCEDURE D-3-17

3.2.1 Headspace Screening Procedure D-3-19

3.3 WASTE LIQUID SAMPLING PROCEDURE D-3-20

3.4 WIPE SAMPLE PROCEDURE D-3-21

3.5 CONCRETE SAMPLE PROCEDURE D-3-23

3.6 SAMPLE LOCATION SURVEY REQUIREMENTS D-3-24

3.7 SAMPLE DOCUMENTATION AND CHAIN-OF-CUSTODY D-3-24

3.7.1 Field Documentation D-3-25

3.7.2 Chain-of-Custody Records D-3-29

3.7.3 Sample Packaging and Shipping D-3-30

3.8 DECONTAMINATION D-3-32

3.9 INVESTIGATION-DERIVED WASTE D-3-33

4.0 QUALITY ASSURANCE PROGRAM PLAN D-4-1

4.1 DATA QUALITY OBJECTIVES D-4-1

4.2 DATA USAGE D-4-2

4.3 DATA QUALITY REQUIREMENTS D-4-2

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

4.3.1 Precision D-4-2
4.3.2 Accuracy D-4-2
4.3.3 Representativeness D-4-3
4.3.4 Completeness D-4-3
4.3.5 Comparability D-4-3
4.3.6 Sensitivity D-4-3
4.4 QUALITY CONTROL SAMPLES AND CRITERIA FOR ANALYTICAL DATA D-4-4
4.5 REGULATORY CRITERIA D-4-5
4.6 ANALYTICAL DATA QUALITY ASSESSMENT D-4-6
4.7 DATA REVIEW AND QUALIFICATION D-4-6
4.8 REPORTING D-4-8
4.9 LABORATORY REQUIREMENTS AND CERTIFICATIONS D-4-9
5.0 CORRECTIVE ACTION, RESPONSE, RE-ESTABLISHMENT OF CONTROL . D-5-1
6.0 REFERENCES D-6-1

FIGURES

Figure D-1 Project Site D-3-9
Figure D-2 Wood Shop Area Sampling Plan D-3-11
Figure D-3 Former Septic System Area Sampling Plan D-3-13
Figure D-4 Confirmation Sampling Approach D-3-15

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

TABLES

Table 3-1 Sample Summary D-3-1

Table 3-2 Sample Containers, Preservatives, and Hold Times for Soil Sampling D-3-18

Table 3-3 Sample Containers, Preservatives, and Hold Times for Waste Liquid Sampling D-3-21

Table 3-4 Sample Containers, Preservatives, and Hold Times for Wipe Sampling D-3-23

Table 3-5 Sample Containers, Preservatives, and Hold Times for Concrete Sampling D-3-24

Table 3-5 Chain-of-Custody Identification Numbers D-3-27

Table 3-6 Hazardous Material Declarations D-3-31

Table 4-1 Quality Control Criteria for Analytical Methods D-4-4

Table 4-2 Soil Reporting and Cleanup Level Requirements D-4-5

Table 4-3 Water Reporting and Action Level Requirements D-4-6

ATTACHMENT

Attachment D-1 Field Data Forms

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
µg/cm^2	micrograms per square centimeters
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
bags	LiftPacs, Super Sacks, or the equivalent
bgs	below ground surface
CCV	continuing calibration verification
CFR	Code of Federal Regulations
cm^2	centimeters square
CoC	chain-of-custody
cy	cubic yard
DQA	data quality assessment
DQO	data quality objective
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
GC/MS	gas chromatography/mass spectroscopy
HCl	hydrochloric acid
HDPE	high density polyethylene
HNO_3	nitric acid
ID	identification number
IDW	investigation-derived waste
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
MeOH	methanol
mg/kg	milligram per kilogram
mL	milliliters
MS	matrix spike
MSD	matrix spike duplicate

PCB	Polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
Project Site	Former WACS Aniak Middle School
QA	quality assurance
QAPP	Quality Assurance Program Plan
QC	quality control
RCRA	Recovery Conservation and Recovery Act
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SSHP	Site Safety and Health Plan
TBD	to be determined
TCE	trichloroethene
TSCA	Toxic Substances Control Act
UST	underground storage tank
VOA	volatile organic analysis
VOC	volatile organic compound
WACS	White Alice Communications Site
WMP	Waste Management Plan

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) is Appendix D of the *PCB-Contaminated Soil Removal Work Plan* (Work Plan) for the Former White Alice Communications Site (WACS) Aniak Middle School in Aniak, Alaska. Jacobs Engineering Group Inc. prepared this SAP under U.S. Army Corps of Engineers, Alaska District Hazardous, Toxic, and Radioactive Waste Contract No. W911KB-11-D-0006, Task Order No. 18, for a third-party contractor (Remediation Contractor) who will perform the work described herein, pursuant to a contract with the State of Alaska.

This SAP presents the requirements and procedures for conducting sampling activities in conjunction with the excavation of polychlorinated biphenyl (PCB)-contaminated soil at the Former WACS Aniak Middle School (Project Site). This SAP is organized as follows:

- Section 2.0 Project Organization and Responsibilities: This section presents the roles of personnel responsible for field sampling and quality assurance (QA)/quality control (QC) activities.
- Section 3.0 Field Sampling Plan (FSP): Sampling protocols and procedures to meet data quality objectives (DQO) presented in the Work Plan, as well as sample collection, preservation, packaging, and laboratory analytical methods, are discussed in this section.
- Section 4.0 Quality Assurance Program Plan (QAPP): Laboratory data quality requirements are discussed in this section.
- Section 5.0 Corrective Action, Response, and Re-establishment of Control: This section addresses the corrective actions that will be initiated when potential or existing conditions are identified that may have an adverse impact on data quantity or quality.
- Section 6.0 References

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2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section presents the roles of personnel responsible for field sampling and QA/QC activities.

2.1 PROJECT CHEMIST

The Project Chemist fulfills the QA role for field sampling efforts and ensures the laboratory is performing the analytical protocols and meeting the QC criteria, as specified in the FSP (Section 3.0) and the QAPP (Section 4.0). The Project Chemist will evaluate the laboratory-generated data packages for completeness and validity and will serve as the primary point of contact for all analytical-, technical-, or chemistry-related issues.

2.2 FIELD SAMPLERS

The field samplers are responsible for collecting samples and field measurements, as well as for documenting field activities in accordance with the procedures stated in the FSP and corresponding operating procedures. Field samplers are also responsible for sample labeling; chain-of-custody (CoC) documentation; ensuring that sample containers, preservation, and holding times are implemented as described in the FSP; packaging and shipping samples to the analytical laboratory; and collecting and reviewing analytical results for use in the field. An Alaska Department of Environmental Conservation (ADEC)-qualified person will be present during sample collection activities.

The following qualifications and requirements define a qualified person according to Alaska Administrative Code (AAC) Title 18, Section 75.990:

- A bachelor's degree or equivalent from a nationally or internationally accredited postsecondary institution in environmental science or engineering, geology, hydrology, physical science, or a related field; and
- At least one year of professional experience in environmental science or engineering, geology, physical science, hydrology or a related field, obtained after the degree was obtained.

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3.0 FIELD SAMPLING PLAN

This section describes the sampling design, rationale, methods, and locations at the Project Site. Specific analytical methods for the analyses to be performed are presented in the QAPP (Section 4.0). Samples submitted for fixed laboratory analysis will be packaged according to the guidelines in Section 3.6.3. Table 3-1 summarizes sample types, frequency, estimated quantities, and analytical methods.

Table 3-1
Sample Summary

Sample Type	Location	Matrix	Estimated Quantity			Analytes
			Primary Samples[1]	Duplicate Samples	MS/MSD Samples	
Pre-Excavation	Wood Shop Area	Soil	78[2]	8	5	PCBs[4]
	Former Septic System Area		9[2]	1		PCBs[4]
Confirmation	Wood Shop Area		151[3]	15	8	PCBs[4]
	Former Septic System Area		76[3]	8	4	PCBs[4]
Characterization	TCE Area		28	3	2	VOCs, RCRA Metals
Pre-Construction	Bag Staging Area		3	2	1	PCBs[4]
	Drum Storage Area		3			PCBs[4]
	Overburden Stockpile Area		7			PCBs[4]
Post-Construction	Bag Staging Area		3	2	1	PCBs[4]
	Drum Storage Area		3			
	Overburden Stockpile Area		7			PCBs[4]
Backfill Sampling	Overburden Stockpile(s)		22	3	2	PCBs[4]
			8	1	1	VOCs, RCRA Metals
	Local Borrow Source Material		1	1	1	PCBs[4], VOCs, RCRA Metals
Waste Characterization Sampling		Containerized Soil	54	-	-	PCBs[4]
		Septic tank (internal surface)	3	-	-	PCBs
		Septic tank (external surface, if tank concrete)	3	-	-	PCBs
		Tank Liquid or Sludge	2	-	-	PCBs, VOC, RCRA Metals
Pre-Treatment	Wastewater	Water	3	1	1	PCBs, VOC, RCRA Metals
Post-Treatment			3			

Notes:
[1]Estimate based on the proposed excavation extent, depths, and sample locations shown on figures.
[2]Potential step-out samples not included in estimate.
[3]Estimate assumes a failure rate of 20% for confirmation samples that remain above 1 mg/kg following removal of initial layer of soil.
[4]PCBs in soil samples to be analyzed by field mobile laboratory. All other analyses and matrices will be analyzed by the fixed laboratory.
For definitions, see the Acronyms and Abbreviations section.

3.1 SAMPLING PROCEDURES

PCB removal action will focus on two locations at the Project Site: the Wood Shop Area and the Former Septic System Area (Figure D-1). Pre-excavation sampling will take place at both locations to determine the extent of soil with PCB contamination for areas that do not have analytical results from previous investigations. During excavation, soil samples will be collected from the excavation sidewalls and floors and analyzed at the Environmental Laboratory Accreditation Program (ELAP)-certified and ADEC-approved onsite mobile laboratory for PCBs to guide excavation activities. Pre-construction and post-construction soil samples will be collected from within the footprint of the Bag Staging Area and Overburden Stockpile Area to document site conditions. Backfill material, both overburden and imported, will be characterized before use. Waste generated during the PCB removal action will be sampled for characterization before shipment to a disposal facility. Also, samples will be collected before and after treatment of wastewater that is generated during the PCB removal action for discharge approval.

Only certified, pre-cleaned sample containers will be used for sample collection. The use of personal protective equipment (PPE), including safety glasses, proper gloves, and appropriate clothing, is required when conducting sampling operations. Health and safety procedures are defined in the Site Safety and Health Plan (SSHP) (Work Plan, Appendix F).

3.1.1 Pre-Excavation Sampling

Pre-excavation samples will be collected every 15 feet around the perimeter of the proposed Wood Shop Area excavation and along the southern extent of the Former Septic System Area to verify the extent of soil with PCB contamination (Figures D-2 and D-3, respectively). At the Wood Shop Area, discrete samples will be collected at approximately 0.5 feet and 2.0 feet below ground surface (bgs).

At the Former Septic System Area, exploratory test pits will be excavated to collect the pre-excavation samples. Test pits will be excavated to 5 feet bgs and a discrete sample will be collected at the base of each test pit.

During the 1998 PCB Cleanup effort, field screening results from confirmation samples FSCS68 and FSCS69, located west of the northwest corner of the former Truck Fill Containment Pad, indicated that PCB-contaminated soil remains in this area. However, additional excavation was not performed and the confirmation samples for FSCS68 and FSCS69 were not submitted to the laboratory for PCB analysis. Therefore, pre-excavation samples will also be collected in areas FSCS68 and FSCS69 at the base of the former excavation, after overburden material is removed (Figure D-3). These pre-excavation samples will be nine-point composite samples to verify subsurface soil PCB concentrations remain above 1 milligram per kilogram (mg/kg) in accordance with Code of Federal Regulations (CFR) Title 40, Pt. 761.61(a)(6) and Subpart O, as detailed below in Section 3.1.2.

In addition, pre-excavation samples will be collected in the vicinity of boring B8 and 2001 Staging Areas G14 and G16 of the Wood Shop Area to verify the presence of PCB concentrations greater than or equal to 50 mg/kg (Toxic Substances Control Act [TSCA] soil) in the upper 2 feet of soil (Figure D-2). Discrete samples will be collected at approximately 0.5 feet and 2.0 feet bgs.

All pre-excavation samples will be analyzed for PCBs (SW8082) at the onsite mobile laboratory. If sample results are above 1 mg/kg for PCBs, step-out pre-excavation samples will be collected 5 feet outward (in a perpendicular direction) from the initial sample locations along the perimeter of the proposed excavation area. Step-out samples will be collected until results are below the cleanup level of 1 mg/kg for PCBs.

3.1.2 Confirmation and Characterization Sampling

Confirmation sampling will be performed at both the Wood Shop Area and Former Septic System Area. During excavation, composite samples will be collected from the floor and sidewalls of the excavation cell until the sample results indicate that the cleanup level of 1 mg/kg for PCBs has been met. Composite samples will be collected in accordance with 40 CFR 761.61(a)(6) and Subpart O. Each subsample will be spaced approximately 5 feet apart (1.5 meters) and up to nine subsamples may be composited into one analytical sample to

characterize an area that does not exceed 15 feet by 15 feet. A typical grid layout is shown in Figure D-4. The number of subsamples collected from the sidewalls will be dependent on the height of the sidewall. For example, a 5-foot high sidewall will have three subsamples, while a 10-foot high sidewall will have six subsamples. No sidewall samples will be collected if the excavation is 1 foot deep or less and the adjacent cell has been confirmed clean.

Confirmation samples will be analyzed for PCBs (SW8082) at the onsite mobile laboratory. If sample results have PCB concentrations greater than 1 mg/kg but less than 10 mg/kg, an additional one foot of soil within the excavation cell will be removed. If sample results have PCB concentrations exceeding 10 mg/kg, an additional 2 feet of soil within the excavation cell will be removed.

Upon confirmation of PCB results below the cleanup level, or if the excavation reaches 15 feet bgs or 2 feet below groundwater, whichever occurs first, characterization samples will be collected as discrete samples from areas where trichloroethene (TCE) remains (TCE Area as shown in the Work Plan, Appendix A, Figure A-7). The discrete samples will be collected from the same excavation cells as PCB samples, which meets the frequency described in ADEC *Draft Field Sampling Guidance* (ADEC 2010). These samples will be submitted to a fixed laboratory for Recovery Conservation and Recovery Act (RCRA) metals (SW6020/7471A) and volatile organic compounds (VOCs [SW8260B]) analyses. At the Wood Shop Area, characterization samples will not be submitted to a fixed laboratory for additional analyses. Soil sampling procedures are discussed further in Section 3.2.

Backfilling will commence once one the following criteria is met:

- Confirmation sample results indicate PCB concentrations at the bottom and sidewalls of the excavation are less than 1 mg/kg (confirmation floor/sidewall sample), or
- Excavation reaches 15 feet bgs and results are less than 10 mg/kg, or 2 feet below groundwater, whichever occurs first.

3.1.3 Pre- and Post-Construction Sampling

One pre-construction sample per 50-foot by 50-foot area will be collected from the footprint of the Bag Staging Area, Drum Storage Area, and the Overburden Stockpile Area prior to use to document site conditions. Following removal of bags (i.e., LiftPacs, Super Sacks, or the equivalent), drums, and stockpiles of overburden material, post-construction samples will be collected at approximately the same locations as the pre-construction samples to ensure that cross-contamination or spills did not occur. Pre- and post-construction samples will be analyzed for PCBs (SW8082) at the onsite mobile laboratory. If post-construction sample results indicate that PCB concentration is greater than 1 mg/kg, then approximately three inches of the ground surface area will be scraped and additional confirmation samples will be collected. An additional three inches of the area will be scraped until clean sample results are obtained.

3.1.4 Backfill Sampling

Overburden materials to be reused as backfill, and imported soil from the local borrow source, will be stockpiled prior to use and sampled. Backfill samples will be analyzed for PCBs (SW8082), VOCs (SW8260B) and RCRA metals (SW6020/7471A) to verify contaminants of concern are below the PCB cleanup level and the most stringent ADEC Method Two cleanup levels (ADEC 2014), and the material is suitable for use as backfill.

For overburden materials, headspace screening samples (see Section 3.2.1) will be collected at a rate of 1 per 10 cubic yards (cy) of stockpiled soils, confirmation samples for PCB analysis will be collected at a rate of 1 per 50 cy of stockpiled soils, and confirmation samples for VOCs and RCRA metals analyses will be collected at a rate of 3 samples plus 1 sample per each additional 200 cy of stockpiled soils in accordance with the ADEC *Draft Field Sampling Guidance* (ADEC 2010).

For the imported soil, one sample will be collected of the borrow material to confirm the analytical results from 2008 and 2009, which showed that the borrow material was free of contamination.

3.1.5 Waste Characterization Sampling

According to the TSCA, soil containing greater than or equal to 50 mg/kg PCB must be handled, stored and disposed of separately from soil containing between 1 and 50 mg/kg PCB. Waste characterization samples will be collected at a rate of one sample for every 50 cy or ONE sample per every 10, 5-yard bags for disposal characterization. The sample will be submitted to the onsite mobile laboratory for PCBs (SW8082).

During the removal of the septic underground storage tank (UST), there is the potential for the recovery of liquid waste and sludge. If sludge and/or liquid waste are encountered, a composite sample will be collected of each media and analyzed for PCBs (SW8082), VOCs (SW8260B), and RCRA metals (SW6020/7470A).

PCB samples will be collected from the tank to profile the tank for disposal. If the tank is steel, the tank will be cut and pressure washed prior to collecting a wipe sample to confirm that the tank has been sufficiently cleaned. The cleaned tank will be disposed of at the local landfill, provided the wipe sample results are less than the applicable cleanup criterion for PCBs of 10 micrograms per 100 square centimeters (10 µg/100 cm^2). If the tank is constructed of concrete, the concrete will be cleaned, and samples will be collected from the external surfaces of the concrete tank in contact with PCB-contaminated soil and from the internal surfaces of the concrete tank in contact with septic waste. Using a decontaminated power or hand tool (hammer drill, sledge hammer, chisel, etc.), concrete chips will be collected from the internal and external surfaces of the concrete (maximum depth of 0.5 inches). Depending on the concrete sample results, the concrete tank will either be reused as backfill if PCB concentration is less than 1 mg/kg, or placed in bags for offsite disposal, if PCB concentration is at or greater than 1 mg/kg.

3.1.6 Pre- and Post-Treatment Sampling

Wastewater generated from decontamination of non-disposable PPE and excavation equipment and rainwater that accumulates in the temporary storage areas will be treated on site with a water treatment system. Prior to treatment, a pre-treatment sample will be collected

to document the contaminant concentrations. Following treatment, a post-treatment sample will be collected to demonstrate that applicable discharge standards are being met. Subsequent pre- and post-treatment samples will be collected at a frequency of one set of samples for approximately 2,000 gallons of treated water. Wastewater samples will be sent to a fixed laboratory and analyzed for PCBs (SW8082), VOCs (SW8260B), and RCRA metals (SW6020/7470A).

Based on pre- and post-treatment analytical sample results, the water will be discharged to a stable, vegetated area following all applicable ADEC regulations and upon ADEC review of data and approval for discharge. Treated water will not be discharged to surface water or in such a way as to cause erosion.

The wastewater post-treatment results will be compared to 18 AAC 75 Table C groundwater cleanup levels (ADEC 2014). If all results are less than the Table C cleanup levels, the treated water will be discharged to a stable, vegetated area within the site boundaries upon ADEC review of the data and approval. Treated water will be discharged to:

- 100 feet or more from surface water;
- 100 feet or more from a private water system, a Class C public water system (as defined in 18 AAC 80.1990), or a fresh water supply system that uses groundwater for a use designated in 18 AAC 70.020(a)(1)(A) and 18 AAC 70.050(a)(2); and
- 200 feet or more from a water source serving a Class A or B public water system, as defined in 18 AAC 80.1990.

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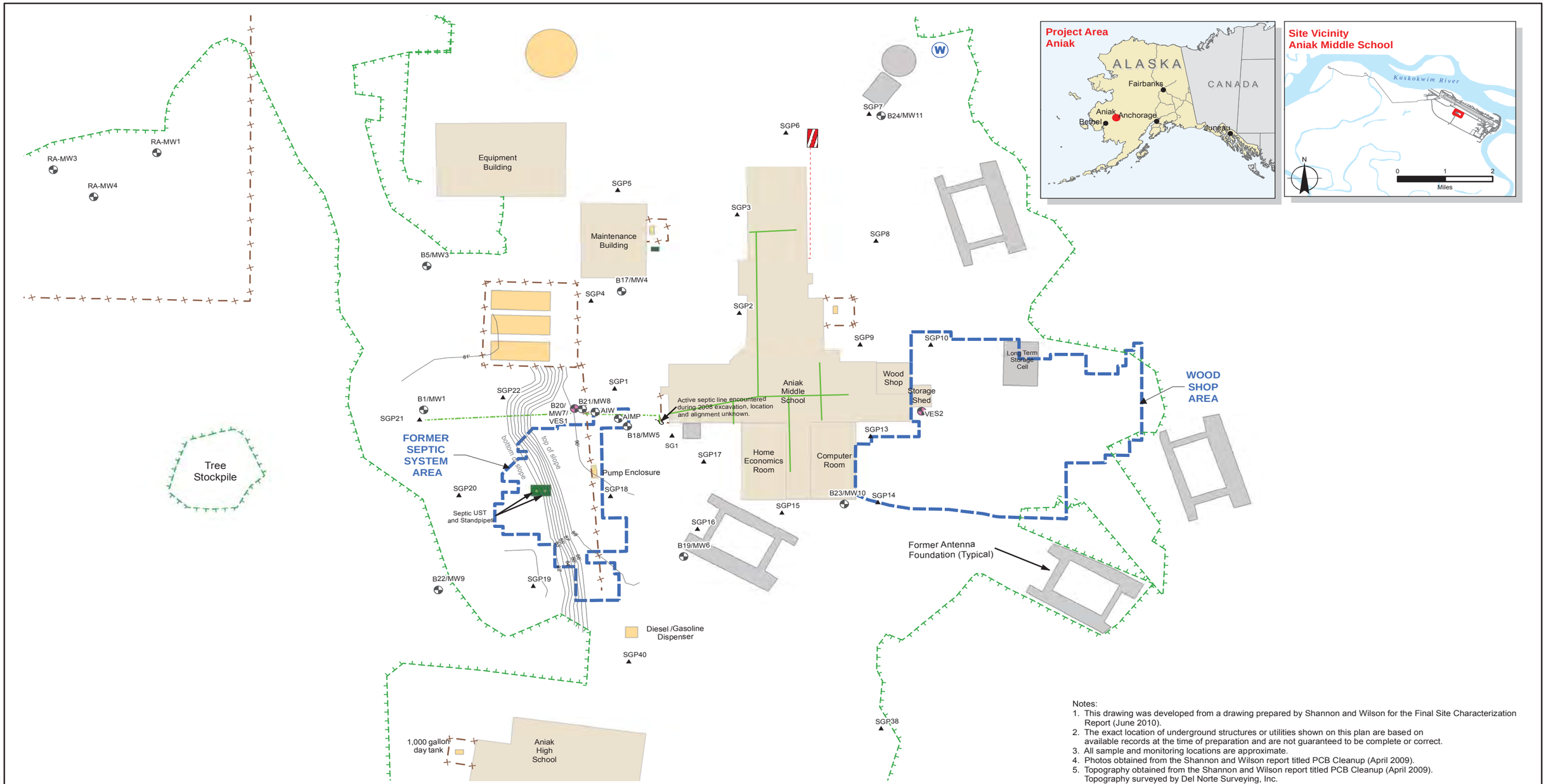

Notes:
1. This drawing was developed from a drawing prepared by Shannon and Wilson for the Final Site Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. Photos obtained from the Shannon and Wilson report titled PCB Cleanup (April 2009).
5. Topography obtained from the Shannon and Wilson report titled PCB Cleanup (April 2009). Topography surveyed by Del Norte Surveying, Inc.

1 inch = 60 feet

0 30 60 90 120
Feet

WGS84 UTM 6N, meters

- Drinking Water Well
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Ground Surface Contour [1 Foot Interval]
- Former Septic Line (Removed in 2008)
- Sanitary Sewer Line
- Underground Electrical Line
- Vegetation Line
- Fence
- Proposed Excavation
- Transformer
- AST
- UST
- Structure
- Building

N

PROJECT SITE

PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 29 OCT 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: D-1

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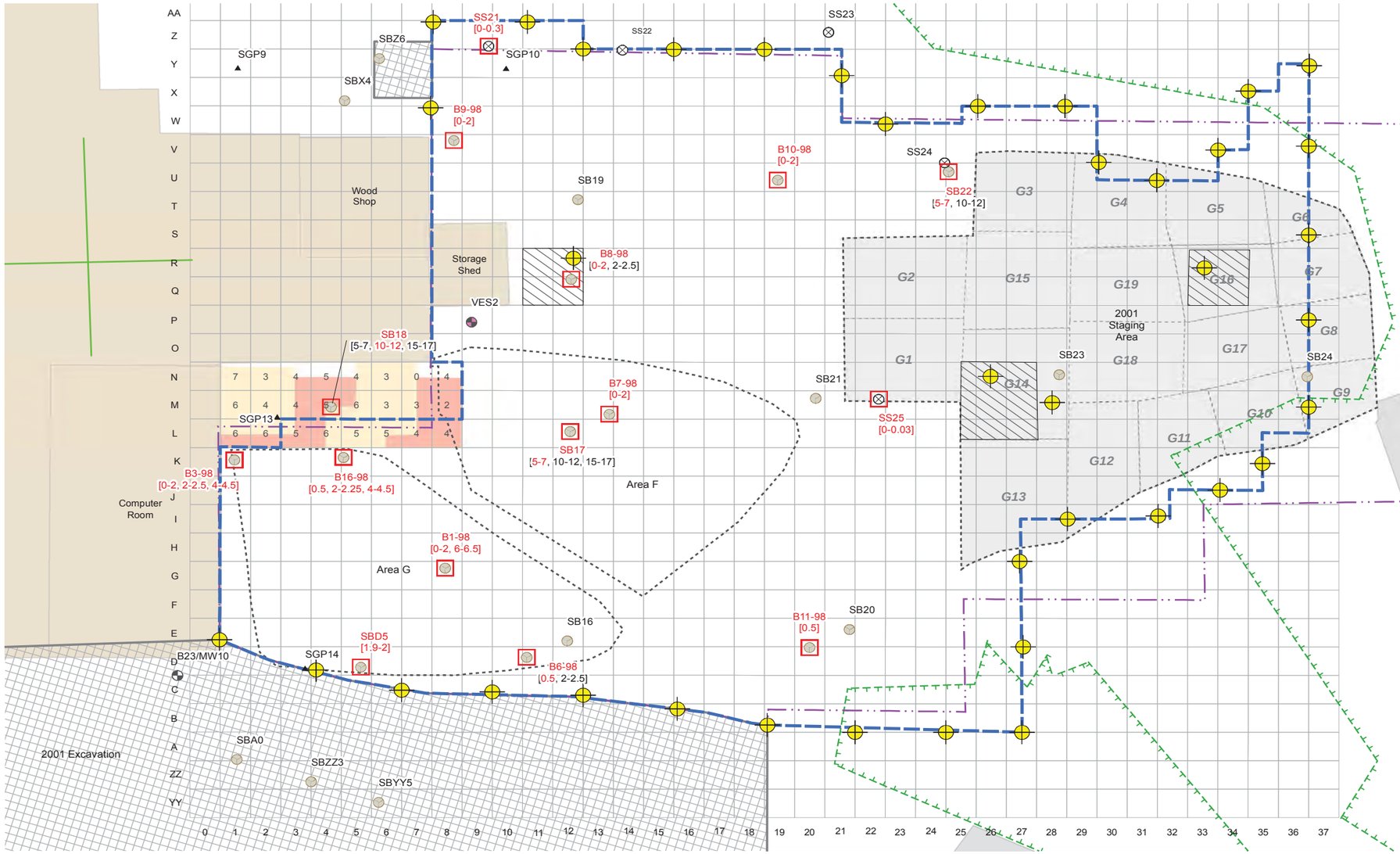

Notes:
1. This drawing was developed from drawings from the Shannon & Wilson reports titled PCB Cleanup (April 2009) and the Final Site Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. Proposed excavation based on historical analytical and field screening results.
5. Hand borings B1-98 through B16-98 were advanced in June 1998, and labeled as B1 through B16 in the Shannon & Wilson report PCB Cleanup (April 2009).
6. G1 through G19 are confirmation samples collected in August 2001 from their respective area within the 2001 Staging Area.
7. Soil borings SB15 through SB24, SBYY5, SBZZ3, SBA0, SBD5, SBX4, and SBZ6 were advanced during the 2009 characterization effort (June 2010).

- Soil with PCB > 1mg/kg [Sample depths in feet bgs and red where exceeding]
- Proposed Pre-Excavation Discrete Sample Location
- Surface Soil Sample (1998)
- Soil Boring
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Defined Areas
- Extent of remaining geotextile liner and gravel cap (1997 and 2001)
- 2001 Excavation
- Potential TSCA Soil
- Proposed Excavation
- Sanitary Sewer Line
- Vegetation Line
- 2008 Excavation Confirmation Sample with PCB > 1 mg/kg
- Staging Area Confirmation Sample (see notes)
- 2008 Excavation Confirmation Sample with PCB < 1 mg/kg
- Building
- Structure

1 inch = 20 feet

0 25 50 75 100
Feet

WGS 1984 UTM Zone 4N Transverse Mercator

N

4 Grid labeled with depth of 2008 excavation from pre-excavation ground surface (feet bgs).

4* * Denotes current ground surface is approximatley 1 to 5 feet higher than pre-excavation ground surface. See Geological Cross Sections in Appendix B.

WOOD SHOP AREA SAMPLING PLAN
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 29 OCT 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: D-2

P:\Aniak\MXD\D2_Aniak_SamplingPlan_Woodshop.mxd watta

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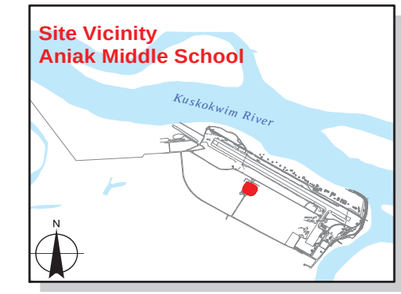

4 Grid labeled with depth of 2008 excavation from pre-excavation ground surface (feet bgs).

4* * Denotes current ground surface is approximatley 1 to 5 feet higher than pre-excavation ground surface. See Geological Cross Sections in Appendix B.

Notes:
1. This drawing was developed from drawings prepared by Shannon & Wilson for the Final Characterization Report (June 2010).
2. The exact location of underground structures or utilities shown on this plan are based on available records at the time of preparation and are not guaranteed to be complete or correct.
3. All sample and monitoring locations are approximate.
4. All discrete samples have prefix "FSCS" and were collected during the 2008 PCB cleanup effort.
5. Proposed excavation based on historical analytical field screening results and project objectives.
6. Soil borings SB1 through SB14, SB26 and SB27 were advanced during the 2009 charaterization effort (June 2010).
7. Soil borings B1 through B5 were advanced in October 2006. Soil borings B6 through B19 were advanced in May 2008. Soil borings B20 through B25 were advanced in August 2009 to install new monitoring wells, MW7 to MW12 (June 2010).

- Soil with TCE > 0.02 mg/kg [sample depths in feet bgs and blue where exceeding]
- Soil with PCB > 1mg/kg [sample depths in feet bgs and red where exceeding]
- Proposed Pre-Excavation Test Pit and Discrete Sample Location
- Proposed Pre-Excavation Composite Sample Location
- Surface Soil Sample (1998)
- Discrete Sample
- Soil Boring
- Soil Gas Probe
- Vapor Extraction Well
- Groundwater Monitoring Well
- Inferred Extent of Remaining TCE Contamination in Soil (TCE Area)
- TSCA Soil
- Proposed Excavation
- Defined Areas
- Aboveground Fuel Line
- Former Wet Septic Line
- Sanitary Sewer Line
- Vegetation Line
- Fence
- UST
- AST
- 2008 Excavation Confirmation Sample with PCB > 1 mg/kg
- 2008 Excavation Confirmation Sample with PCB < 1 mg/kg
- Building
- Structure

1 inch = 25 feet

0 25 50 75
Feet

WGS 1984 UTM Zone 4N Transverse Mercator

FORMER SEPTIC SYSTEM AREA SAMPLING PLAN
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 24 DEC 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: D-3

P:\Aniak\MXD\D3_Aniak_SamplingPlan_FormerSeptic.mxd wattta

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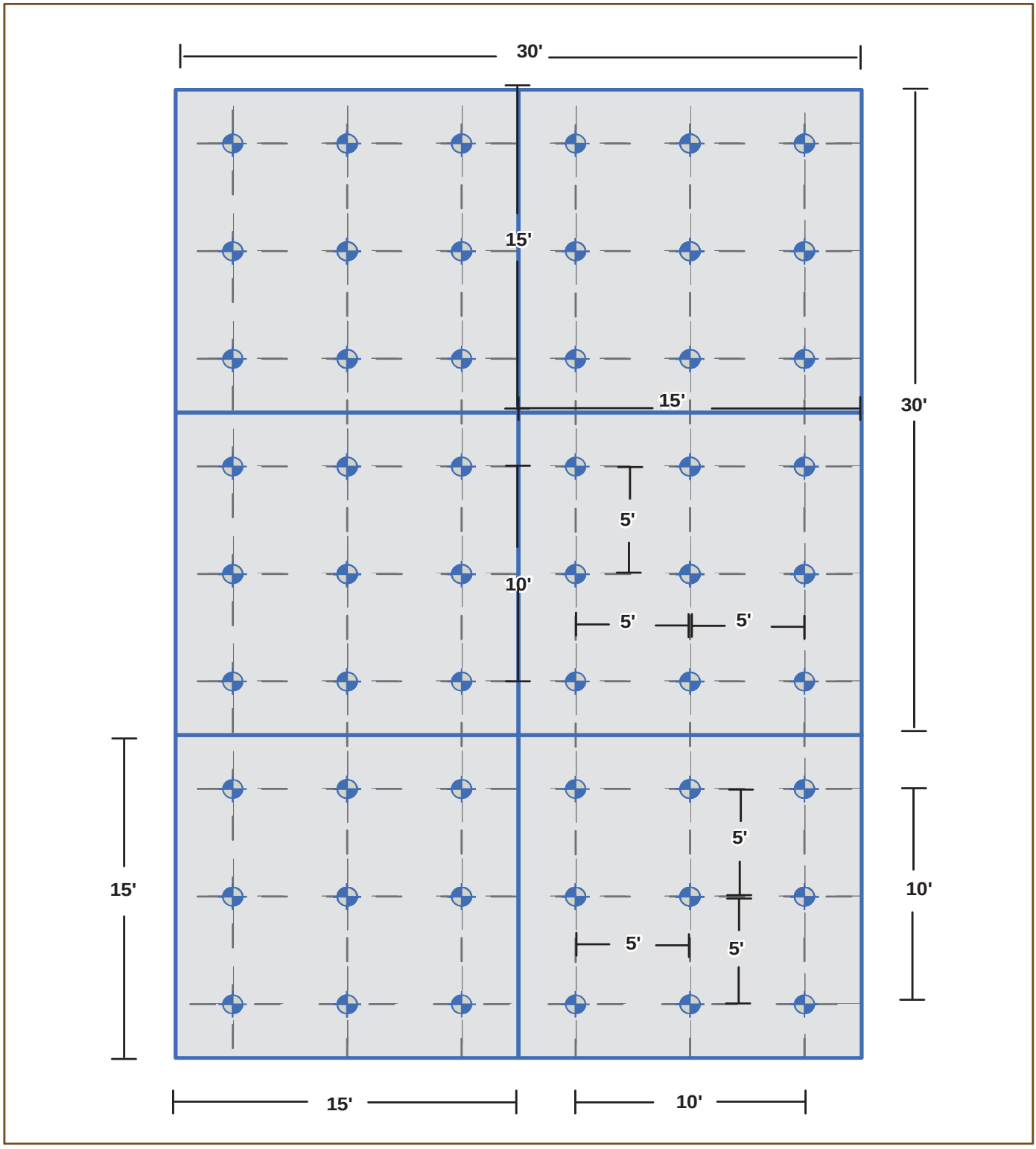

Composite PCB Subsample Soil Sampling Location

15-Foot Square Grid

5-Foot Clipped Grid

EXCAVATION AND CONFIRMATION SAMPLING APPROACH
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 07 Oct 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: D-4

Path: P:\Aniak\MXD\D4_GridSamplingApproach_85X11P.mxd User: wattta

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3.2 SOIL SAMPLING PROCEDURE

Soil sampling for laboratory analysis will be performed in accordance with the following procedures:

1. Don new PPE (gloves, etc.) before starting sample collection.
2. Set out appropriate sample containers for desired analyses.
3. Using decontaminated or disposable sampling equipment, uncover fresh soil.
4. For discrete sample, collect the soil sample from point location and place in the appropriate laboratory-provided sample jar. Samples should be collected in order of volatility of analytes. Samples for VOCs should be collected first, then PCBs and metals. If headspace screening is being utilized, the soil should be placed into a clean, unused plastic bag and measured. Once the location with the highest headspace reading has been determined a new sample should be collected by uncovering fresh soil immediately adjacent to the original sample location and placing the soil directly into the sample jar.
5. For composite sample, collect equal sample amount from each of the subsample locations, place in clean unused plastic bag, homogenize, and place required soil amount in appropriate laboratory-provided sample jar(s). Composite samples will not be analyzed for VOCs.
6. If collecting a sample for VOC (SW8260B) analysis, transfer approximately 25 grams of soil to a pretared jar with septum. Add one vial of methanol (MeOH) (provided by fixed laboratory and containing 25 mL of MeOH) to sample jar. Swirl jar to ensure that the entire sample is submerged beneath methanol. If one vial of MeOH does not completely cover the sample, additional vial of MeOH will be added until the soil is completely submerged and there is some free liquid. If more than one vial of MeOH was added, the total added volume will be noted on the CoC.
7. For all other analyses the appropriate sample jar should be filled with soil, if sufficient volume is available.
8. When the sample collection is complete, make sure all dirt is removed from the lip of the jar.
9. Secure the jar lid.

10. Label the jar with the date, time, sampler(s), sample identification, and requested analyses. DO NOT place a label on a pre-tared container for VOC analysis. Instead, record the sample information on the outside of the pre-tared sample container. Place any new or additional labels on the outside of a re-sealable plastic bag.
11. Place the sample jar into a pre-chilled cooler or refrigerator immediately after collection.
12. Record all appropriate sample information in the field logbook.
13. Decontaminate or dispose of the sampling tool between sampling locations.
14. Collect one duplicate sample for every 10 (or fewer) primary samples. Duplicate samples are not required for waste characterization.
15. Collect one matrix spike (MS)/matrix spike duplicate (MSD) sample pair for each sample shipment/laboratory batch, or at a frequency of one per 20 samples per matrix, whichever is less. Denote MS/MSD samples on the CoC. MS/MSD samples are not required for waste characterization.
16. If submitting to fixed laboratory, pack and ship the cooler, as described in Section 3.6.3. Otherwise, submit sample to mobile laboratory, verifying that transfer of custody has been documented.

Table 3-2 presents container requirements, preservation requirements, and holding times for the samples to be collected.

Table 3-2
Sample Containers, Preservatives, and Hold Times for Soil Sampling

Analyte	Analytical Method	Container	Preservative	Maximum Holding Time
PCBs	SW8082	One 4-ounce amber glass jar, Teflon-lined cap	4 ± 2 °C	None, 40 days to analysis after extraction
Metals	SW6020	One 4-ounce amber glass jar, Teflon-lined cap	4 ± 2 °C	180 days analysis
Mercury	SW7471A	One 4-ounce amber glass jar, Teflon-lined cap	4 ± 2 °C	28 days analysis
VOC	SW8260B	One 4-ounce amber glass jar, Teflon-lined Septa cap	MeOH, 4 ± 2 °C	14 days analysis

Notes:
For definitions, see the Acronyms and Abbreviations section.
Sample containers are suggestions and may be substituted with containers that adhere to method requirements.
Analytical volumes may be combined as long as laboratory volume requirements are met.

Pre-cleaned sample containers certified analyte-free will be obtained from the laboratory prior to project mobilization. The field sampler will perform an inventory of all sample containers and verify the type, volume, preservation, and number are adequate to meet sample collection requirements.

3.2.1 Headspace Screening Procedure

VOCs—in particular TCE—have been identified in the Former Septic System Area. Headspace screening will be used as a semi-quantitative indication of organic vapors, to aid in the identification of VOCs in the TCE-impacted areas and overburden material, and to select soil samples for fixed laboratory analysis. In addition, headspace screening will be used to help determine if overburden materials are suitable for use as backfill, as mentioned in Section 3.1.4. A photoionization detector (PID) equipped with a 10.6 electron-volt lamp will serve as the method of headspace reading for VOC-contaminated soils. The headspace screening procedure for the PID is as follows:

- Calibrate (or verify calibration of) the PID at the beginning of each day. Calibrate the instrument to yield "total organic vapors" in parts per million to a benzene equivalent (e.g., isobutylene). If significant drift in the instrument is suspected or observed, verify proper calibration. Perform operations, maintenance, and calibration in accordance with the manufacturer's specifications. Record all calibration information in the field logbook and/or instrument logbook.
- Breathing zone readings will be collected using the PID by sampling the air for 20 to 30 seconds, allowing measurements to stabilize. All breathing zone information will be recorded in the field logbook. Breathing zone readings should be collected from the locations where workers are most likely to come into contact with vapors, taking into account wind direction. Breathing zone results will be compared to action levels presented in the SSHP (Work Plan, Appendix F).

The following procedure should be used for headspace screening of the soil:

- Fill a clean unused plastic re-sealable bag approximately 40 percent full with the soil to be analyzed, ensuring there is sufficient headspace to allow the vapors to accumulate.
- Allow headspace vapors to develop for at least 10 minutes but no longer than one hour. Shake or agitate the bag for 15 seconds at the beginning and end of headspace development period to assist volatilization. The bag and its contents should be at least 40 degrees Fahrenheit (warmed if necessary) prior to reading headspace vapors. Care should be taken to ensure that all samples are read at approximately the same temperature to

allow for an accurate comparison.

- Subsequent to headspace development, insert the instrument probe into the bag to a point about one-half the headspace depth. Minimize the container opening. Use a filter on the PID intake and do not allow the intake to contact moisture droplets or soil particles.
- Following probe insertion, record the highest meter reading in the field notebook.

Erratic meter response may occur at high organic vapor concentrations or conditions of elevated headspace moisture, in which case a note to that effect will accompany headspace data.

3.3 WASTE LIQUID SAMPLING PROCEDURE

Waste liquid sampling for fixed laboratory analysis will be performed in accordance with the following procedures:

1. Don new PPE (gloves, etc.) before starting sample collection.
2. Set out appropriate sample containers for desired analyses.
3. If required, make sure sampling containers contain appropriate preservative (i.e., nitric acid [HNO_3] for metals, hydrochloric acid [HCL] for TCE). Make sure not to overfill samples containing preservative.
4. Using decontaminated or disposable sampling equipment (e.g., plastic pitcher), collect sample and pour into appropriate sample jar.
5. Samples will be collected according to volatility in order to minimize the loss of volatile compounds (e.g., VOCs, PCBs, and then metals).
6. Fill the volatile organic analysis (VOA) vials until a positive (domed) meniscus forms, being careful not to overflow and displace any preservative. Cap gently, then invert and tap, looking for bubbles. If bubbles are observed, reopen, dribble just enough water to create a positive meniscus, and repeat the process. Discard the sample and use new glassware if the process must be repeated more than three times.
7. Fill non-VOC containers to the shoulder of the bottle, not to the neck or lip. Monitor containers to prevent overfilling and diluting preservatives.
8. When the sample collection is complete, wipe rim of container clean with paper towel or disposable clean cloth.
9. Secure the jar lid.

10. Label the jar with the date, time, sampler, sample identification, and requested analyses.
11. Place the sample jar into a pre-chilled cooler or refrigerator immediately after collection.
12. Record all appropriate sample information in the field logbook.
13. Decontaminate or dispose of the sampling tool between sampling locations.
14. Collect one duplicate sample for every 10 (or fewer) primary samples. Duplicate samples are not required for waste characterization.
15. Collect one MS/MSD sample for each sample shipment/laboratory batch, or at a frequency of one per 20 samples per matrix, whichever is less. Denote MS/MSD samples on the CoC. MS/MSD samples are not required for waste characterization.
16. Pack and ship the cooler, as described in Section 3.3.5.

Table 3-3 presents container requirements, preservation requirements, and holding times for the samples to be collected.

Table 3-3
Sample Containers, Preservatives, and Hold Times for Waste Liquid Sampling

Analyte	Analytical Method	Container	Preservative	Maximum Holding Time
PCBs	SW8082	Two 1 liter amber glass jars, Teflon-lined cap	4 ± 2 °C	None, 40 days to analysis after extraction
Metals	SW6020	One 500 mL HDPE or amber glass jar	pH<2 w/HNO_3	180 days analysis
Mercury	SW7470A	One 500 mL HDPE or amber glass jar	pH<2 w/ HNO_3	28 days analysis
VOCs	SW8260B	Three 40 mL glass VOA vials with Teflon-lined septa caps	pH<2 w/ HCl, 4 ± 2 °C	14 days analysis

Notes:
For definitions, see the Acronyms and Abbreviations section.
Sample containers are suggestions and may be substituted with containers that adhere to method requirements.
Analytical volumes may be combined as long as laboratory volume requirements are met.

3.4 WIPE SAMPLE PROCEDURE

As necessary for waste characterization, wipe samples will be collected from the septic tank if it is a metal tank. Three wipe samples will be collected from the tank surface. Each wipe

sample will be collected from a 100-square-centimeter (cm^2) area. Wipe sampling for laboratory analysis will be performed in accordance with the following procedures:

1. Don new PPE (gloves, etc.) before starting sample collection.
2. Set out appropriate sample containers for desired analyses.
3. Sample area will be cleared of loose materials.
4. A 100 cm^2 (10- by 10-cm) area of the tank surface will be selected for wipe sample collection.
5. Using pre-cleaned forceps, the hexane-soaked wipe provided by the laboratory will be removed from the sample container.
6. Apply moderate pressure on the wipe; the surface area within the 100-cm^2 opening of the template will be swabbed beginning at the upper left corner and wiping across the surface in rows from top to bottom. This process will then be repeated, but will be performed by wiping from bottom to top starting on the lower right corner. Uniform pressure will be applied during the wiping process.
7. The wipe will be folded with the sample side inward and returned to the sample container. It is important that the wipe be performed quickly after the hexane is exposed to air. Wipe samples should not be allowed to air dry prior to placement in the sample container. Excess hexane solvent should not be removed from the sample container. This excess solvent will be extracted with the sample.
8. When the sample collection is complete, wipe rim of container clean with paper towel or disposable clean cloth.
9. Secure the jar lid.
10. Label the jar with the date, time, sampler(s), sample identification, and requested analyses.
11. Place the sample jar into a pre-chilled cooler or refrigerator immediately after collection.
12. Record all appropriate sample information in the field logbook.
13. Decontaminate or dispose of the sampling tool between sampling locations.
14. Pack and ship the cooler as described in Section 3.6.3.

Table 3-4 presents container requirements, preservation requirements, and holding times for the wipe samples to be collected.

Table 3-4
Sample Containers, Preservatives, and Hold Times for Wipe Sampling

Analyte	Analytical Method	Container	Preservative	Maximum Holding Time
PCBs	SW8082	One 4 oz. amber glass jars, Teflon-lined cap	Hexane, 4 ± 2 °C	14 day extraction, 40 days analysis

3.5 CONCRETE SAMPLE PROCEDURE

As necessary for waste characterization, concrete samples will be collected from the septic tank if it is a concrete tank. Three concrete samples will be collected from the tank surface. Concrete sampling for laboratory analysis will be performed in accordance with the following procedures:

1. Don new PPE (gloves, etc.) before starting sample collection.
2. Verify that all equipment and sample containers are properly decontaminated and that the sample containers are new and have been properly prepared.
3. Using decontaminated equipment, such as an excavator or shovel, carefully remove soil from the surface of the concrete, then sweep any remaining soil from the surface. Using a decontaminated power or hand tool (hammer drill, sledge hammer, jackhammer, etc.), chip into the concrete to a maximum depth of 1/2 inch. Be sure to wet the concrete during sampling to control dust. Plastic sheeting will be laid around the sample areas to collect concrete debris.
    - Collect one 50-gram composited sample from a minimum of three locations on the tank surface. A total of three composite samples will be collected from the tank.
4. Homogenize the composite concrete sample in an aluminum pie pan (or similar).
5. Fill jars with homogenized concrete to be analyzed.
6. Wipe the rim of the container and secure the lid tightly.
7. Label container and sample-specific data sheet, if applicable.

8. Place the sample jar into a pre-chilled cooler or refrigerator immediately after collection.
9. Record in the field logbook the sample identification, the number of sample locations collected from for the composite, whether a duplicate sample was collected, any discoloration or odor, or other pertinent details.
10. Decontaminate any reusable sampling equipment or discard used disposable sampling equipment between samples.

The laboratory should grid the concrete pieces prior to analysis. Table 3-5 presents container requirements, preservation requirements, and holding times for the concrete samples to be collected.

Table 3-5
Sample Containers, Preservatives, and Hold Times for Concrete Sampling

Analyte	Analytical Method	Container	Preservative	Maximum Holding Time
PCBs	SW8082	One 8 oz. amber glass jars, Teflon-lined cap	4 ± 2°C	None, 40 days to analysis after extraction

3.6 SAMPLE LOCATION SURVEY REQUIREMENTS

The location of pre-excavation, excavation, and confirmation sample locations will be surveyed to less than 3.3-foot horizontal and 0.5-foot vertical accuracy. Horizontal control shall be based on feet in reference to World Geodetic System 1984 (WGS 1984) latitude/longitude or North American Datum 1983 (NAD 83). Vertical control shall be North American Vertical Datum 1988 (NAVD88, orthometric height). The locations for composite samples should be roughly the center of the composited area.

3.7 SAMPLE DOCUMENTATION AND CHAIN-OF-CUSTODY

The possession and handling of individual samples must be traceable from the time of sample collection until the analytical laboratory reports the results of chemical analysis to the

appropriate parties. Sample handling procedures and documentation are described in this section, as follows:

- Field documentation (field logbook and field data forms)
- Photographs
- Sample numbering system (sample labels)
- CoC records (sample summary table)
- Sample packaging and shipping

3.7.1 Field Documentation

Accurate and comprehensive recordkeeping is critical to documenting sample custody and includes a field logbook, field data forms, photographs, CoC records, and an analytical summary table.

Field Logbook and Field Data Forms

A bound, sequentially paginated field logbook will be maintained daily to document all field activities, including the collection of every sample. All field notes will be entered in indelible (permanent) ink. If any changes are made to the field record, the original notation will be crossed out with a single line, initialed, and dated by the person making the correction. The field logbook will contain all information required to recreate the sampling event. At a minimum, field logbooks will contain the following information:

- Project name and number
- Date and time of work
- Name and location of site
- Names of the field sampling leader and all field personnel and the names and contact information for all pertinent project contacts
- Purpose of proposed work effort
- Summary of equipment preparation procedures, as well as equipment brand names and model and serial numbers
- Description/sketch of work area (building, tank locations, etc.)
- Weather conditions

- Field observations (presence of sheen, stressed biota, etc.)
- Sample locations (include in sketches) – survey coordinates, if applicable
- Date and time of each sample collection event
- Field screening locations and results
- Sample identification number, location, matrix, and depth, if applicable
- Explanation of any deviations from this SAP, including rationale for deviation

In addition to data entry into field logbooks, separate data sheets may be used to complement the logbook information regarding sampling and measurement tasks. The data forms help ensure that proper information is obtained for entry into an electronic database.

Copies of field data forms, if completed, will be submitted daily to the onsite technical lead, who will review each form for completeness before the sampling effort concludes. Completed field data forms will be included in the Remedial Action Report.

Photographs

Field activities, site conditions, and sampling locations will be photographically documented. Photographers must pick reference points and take several pictures throughout the duration of the project (start, middle, and end). Project photographs will be titled with the following information:

- Project or site name
- Subject
- Direction photographer is facing
- Date (year, month, day)
- Photographer's initials

Sample Numbering System

Each CoC submitted to the laboratory will be assigned an identification number. The first four digits define the sampling year (15 = 2015). The next three digits describe the Project Site.

The last two characters are incremented sequentially per CoC (01, 02, etc.). Table 3-5 breaks down example 2015ANK01.

Table 3-5
Chain-of-Custody Identification Numbers

Year	Project Identifier	CoC Number
2015	ANK	01

Each sample will be assigned an identification number (ID). This identifier is a unique character sequence specified by the project, which specifies a distinct point within the Project Site. To aid in the excavation activities and the confirmation of cleanup the Remediation Contractor will develop a 15-foot by 15-foot grid system that overlays the Project Site that corresponds to the grids presented in Work Plan Figures A-7 and A-8. Each excavation cell will have a unique identifier determined by the Remediation Contractor. The sample IDs will be used as follows:

- The sample identification number will begin with the last two digits of the year the sample was taken and a hyphen (i.e., 15-).
- The year will be followed by the sample type:
    - **Pre-excavation soil samples** will be identified using "PRE" followed by excavation area and hyphen, either "WS-" for the Wood Shop Area or "FS-" for the Former Septic System Area, and then by the excavation cell ID and hyphen, and sample depth (e.g., "2" for 2 feet bgs). The depth listed in the sample IDs will correspond to the bottom depth of the sample.
      Example: 15-PREWS-A6-2 = Year 2015 Wood Shop Area, Grid A6, bottom depth of 2 feet bgs
    - **Excavation and confirmation soil samples** will be identified using "EX" followed by excavation area and hyphen, either "WS-" for the Wood Shop Area or "FS-" for the Former Septic System Area, then by the excavation cell ID, sample location (either "F" for floor or cardinal directions "N, S, E, W" for sidewall, and sample depth (bottom depth of the excavation). Example: 15-EXFS-A6F10 = Year 2015 Former Septic System Area, excavation cell A6, floor sample depth of 10 feet bgs
    - **Pre-construction soil samples** will be identified with "PR" followed by sample location, either "BSA" for Bag Staging Area, "DSA" for Drum Storage Area or "OSA" for Overburden Stockpile Area, then by the sample sequential number and hyphen (#-) in order of collection, and sample depth. Example: 15-PROSA12-0.5 = Year 2015 Pre-construction Overburden Stockpile Area,

Sample 12, depth of 0.5 feet bgs

- **Post-construction soil samples** will be identified with “PT” followed by sample location, either “BSA” for Bag Staging Area, “DSA” for Drum Storage Area or “OSA” for Overburden Stockpile Area, then by the sample sequential number and hyphen (#-) in order of collection, and sample depth. Example: 15-PTOSA5-0.5 = Year 2015 Post-construction Overburden Stockpile Area, Sample 5, depth of 0.5 feet bgs
- **Overburden stockpile samples** will be identified with “OS” followed by the sample sequential number (#) in order of collection. Example: 15-OS3 = Year 2015, Overburden stockpile, Sample 3
- **Backfill sample** of material from local borrow source will be identified with “B" followed by the sample sequential number (#) in order of collection. Example: 15-B2 = Year 2015, Backfill, Sample 2
- **Waste characterization samples** will be identified with “WC” followed by the sample location either “BAG” for soil sample collected from bags or “TANK” for samples collected from septic tank, and then by the sample sequential number (#) in order of collection. Example: 15-WCBAG150 = Waste characterization of soil in bag number 150
- **Pre-treatment sample** will be identified with “PRW” followed by the sample sequential number (#) in order of collection. Example: 15-PRW1 = Year 2015, Pre-treatment wastewater, Sample 1
- **Post-treatment sample** will be identified with “PTW” followed by the sample sequential number (#) in order of collection. Example: 15-PTW2 = Year 2015, Post-treatment wastewater, Sample 2

Duplicate samples will be given the same sample ID as the parent sample, with “DUP” followed by asequential number (#) in order of collection appended to the sample type identifier (e.g., 15-PTDUP-01, 15-WCDUP-01). The primary sample associated with the duplicate sample will be documented in the field logbook. Trip blanks will be identified using the CoC number, followed by “-TB”. All MS/MSD samples will be denoted in the comments field of the CoC form.

Sample Labels

Sample labels are necessary to prevent misidentification of samples. Each sample container will be labeled. Where necessary, the label will be protected from water and solvents with clear tape.

Sample labels will include the following information:

- Project code or number
- Sampling date and time
- Sample number
- Sample location
- Sampler's initials
- Preservation
- Analyses requested

Sample containers will have labels that contain the same information as reported on the CoC records. At the time of sampling, appropriate sample numbers will be recorded in the field logbook.

3.7.2 Chain-of-Custody Records

Once a sample is collected, it will remain in the custody of the field team or the designee until it is shipped to the designated analytical laboratory or delivered to the onsite mobile laboratory. When the sample is transferred, a CoC form will be signed by the person(s) transferring custody of the sample container. Samples will be placed in a cooler or other appropriate shipping container. The original, properly completed CoC form for the samples will be contained in the cooler, in accordance with Section 3.6.3. A copy of each CoC form will be emailed to the Project Chemist and to the laboratory. An example CoC form is included in Attachment D-1.

Sample Summary Table

Two separate sample summary tables will be generated: one for the field mobile laboratory and the other for the fixed-based laboratory. The sample summary tables will be used to record the CoC number, sample collection date and time, associated location identification, analyses and turnaround time requested, cooler identification, shipped date, and laboratory name for each sample collected. The tables will be used to track changes to analyses requested and other CoC information after the samples are shipped to the respective mobile and fixed laboratories. The analytical summary table may also record the date preliminary results were received.

3.7.3 Sample Packaging and Shipping

Before packing a sample cooler for shipment to the fixed-based laboratory or delivering to the field mobile laboratory, a second person is required to review the CoC, sample jar labels, and sample summary for consistency before packing. This individual will initial the CoC to indicate that the review was completed and will confirm the presence of appropriate temperature blanks and other packing requirements. For samples submitted to the field mobile laboratory, a custody seal is not needed to be placed on the samples and the sampler is responsible for hand-delivering the samples to the laboratory. Samples and coolers should be packed in the following manner for shipment to the fixed laboratory:

- Place a large, open plastic bag in the cooler.
- Wrap sample jars designated for shipment to the laboratory in bubble wrap and seal in a re-sealable plastic bag before placing in the cooler. Place samples and frozen gel packs inside the large plastic bag in the cooler. All liquid samples should be placed in the fully upright position. Soil samples may be stacked, but only if sufficient padding (bubble wrap) is placed between jars to prevent breakage or cracking of lids. Water samples should never be stacked on top of one another.
- Add the temperature blank inside the large plastic bag in the cooler. The temperature blank should be at least 500 mL plastic container filler with water and labeled “Temp Blank.” It should be stored in the fridge until ready for shipment. Do not place more ice around the temperature blank than around the samples. Intersperse frozen gel packs and samples evenly throughout the cooler..
- Once all samples have been placed in the cooler, seal the large plastic bag (tie off or tape shut) and add a custody seal (signed and dated as other custody seals).

- Fill any remaining void space in the cooler with packing material (e.g., bubble wrap, vermiculite). The packing material serves two functions: 1) to absorb shock from the outside environment and 2) to insulate the samples from the outside temperature. The cooler should be packed in such a manner as to withstand dropping or extremes in temperature to assure that the samples arrive intact and within the required temperature range of 4 ± 2 °C except samples submitted to the field mobile laboratory because the temperature blank may not have had time to cool down.
- Place the completed, signed CoC inside a re-sealable plastic bag (e.g., Ziploc), and tape it to the inside of the cooler lid. A copy of the signed CoC is to be maintained with field files.
- Place two signed and dated custody seals in opposite corners across the front and the back corners of the cooler and cover with clear tape to ensure they arrive sealed at the laboratory.
- Seal the cooler shut with strapping tape or duct tape.
- Place arrow up ("⇑ ⇑") or "Keep Upright" labels on all four sides of the cooler. Place "Fragile" labels on at least two sides of each cooler. Place "Refrigerate – Do Not Freeze" labels on cooler.

All shipments must comply with Department of Transportation/International Air Transportation Association shipping standards as appropriate. Apply appropriate shipping labels to declare any dangerous goods contained in the cooler. Coolers containing the following preservations must be declared appropriately under a hazardous material declaration or as "Excepted Quantity".

Table 3-6
Hazardous Material Declarations

Chemical	UN Number	Hazard Class Label
Methanol	UN1230	3
Hexane	UN1208	3
Hydrochloric acid	UN1789	8
Nitric acid	UN2031	8
Sulfuric acid (<51%)	UN2796	8
Sodium bisulphate	UN2837	8

- Provide the airline with all appropriate information for the air waybill and fill out the dangerous goods shipping documents completely.
- After taking cooler to airport, email a copy of the CoCs and air waybills to fixed laboratory to ensure they know samples are on their way.

If at any time the cooler is opened prior to arriving at the laboratory, custody of the cooler's contents is assumed; therefore, the CoC must be signed and dated when assuming and

relinquishing custody of the samples. Proper CoC procedures must be followed for repacking coolers.

The project laboratory will be informed via telephone or email of cooler shipments, including information concerning the number of samples, analyses requested, sample matrices, and any unique information, such as rapid turnaround time requirements. The laboratory will complete the Cooler Receipt Form (Attachment D-1) when samples are received and will document all sampling and shipping discrepancies. The laboratory will submit a summary via email of all discrepancies found, the Cooler Receipt Form, and the applicable CoCs to the Project Chemist. A verbal and a written report will be provided. If changes need to be made to the CoC after the laboratory has received the coolers, a CoC Variance Form (Attachment D-1) may be utilized.

3.8 DECONTAMINATION

Disposable sample collection equipment will be used as much as possible during the field effort. Disposable equipment will be stored and disposed of with the appropriate waste stream and in accordance with the Waste Management Plan (WMP) (Appendix G of the Work Plan). Disposable equipment that may be used during the project includes sampling spoons (utensils), mixing bowls, pie pans, and re-sealable bags. Sampling equipment and containers will be inventoried and inspected onsite prior to beginning the field effort.

All non-disposable equipment that comes into contact with contaminated material will be dry-decontaminated. Wet decontamination is not anticipated, but will be used to supplement dry decontamination as necessary. Decontamination will include the use of brooms, shovels, adsorbent pads, and other appropriate material necessary to remove contaminated soil from equipment. Should dry decontamination be found ineffective, wet decontamination procedures may be used within a specified decontamination area. Any decontamination rinsate generated will be collected, containerized, and transported for disposal, as detailed in the WMP.

Equipment used onsite will be decontaminated prior to leaving the site to eliminate contaminant migration from the site and the potential for cross-contamination between the sites. Equipment used onsite will be decontaminated when it is no longer required onsite and prior to its return.

3.9 INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW) consists of wastes generated as a result of sampling efforts performed during the field effort. Anticipated IDW generated during the project consists of soiled PPE, disposable sampling tools, and trash. Soiled PPE and disposable sampling tools will not be characterized by analysis. IDW water generated during decontamination will be disposed of offsite in the proper transfer, storage, and disposal facility. All IDW will be handled according to the WMP.

(intentionally blank)

4.0 QUALITY ASSURANCE PROGRAM PLAN

This QAPP presents analytical standards and procedures to be followed for work conducted at the Project Site. The QAPP was developed to detail QA and QC procedures that will be used by the Remediation Contractor and its laboratory subcontractor(s) for all samples collected at the Project Site. This QAPP establishes analytical protocols and documentation requirements to ensure that data are collected, reviewed, and analyzed in a consistent and appropriate manner. Data review will be compliant with ADEC Technical Memorandum, *Environmental Laboratory Data and Quality Assurance Requirement* (ADEC 2009).

The following guidance and objectives are presented in this QAPP:

- Analytical DQOs (data usage, data quality requirements, QC samples and criteria, and regulatory criteria)
- Analytical Data Quality Assessment (DQA) (data review, qualification, and reporting)
- Laboratory requirements and certifications

4.1 DATA QUALITY OBJECTIVES

The analytical DQOs listed in this section have been developed to provide QA and QC criteria for work conducted at the Project Site. This QAPP, the analytical methods (U.S. Environmental Protection Agency [EPA] 2013), ADEC Technical Memorandum (ADEC 2009) and the laboratory-generated limits define the QA/QC requirements for this project. These documents provide guidance and specifications to ensure that the following analytical DQOs are accomplished:

- Data usage
- Analytical data quality requirements (precision, accuracy, representativeness, completeness, comparability, and sensitivity)
- QC samples and criteria for analytical data
- Regulatory criteria

4.2 DATA USAGE

Analytical data will be generated by using analytical methods defined by the EPA *Test Methods for Evaluating Solid Waste* (EPA 2013). Analytical data results will be quantitative, with known and documented analytical precision and accuracy. Hardcopy raw documentation and electronic data deliverables will be generated as a basis for the data validation process and preparation of a DQA.

4.3 DATA QUALITY REQUIREMENTS

The DQOs for this project will be considered met when the quality of the analytical sample data meets precision, accuracy, representativeness, completeness, comparability, and sensitivity requirements specified in this QAPP. Analytical DQOs will be evaluated by reviewing the QA parameters and criteria presented in Sections 4.3.1 through 4.3.6.

4.3.1 Precision

Precision will be evaluated by comparing the following results:

- Primary and field duplicate sample results by calculating the relative percent difference (RPD)
- Laboratory Control Sample (LCS and Laboratory Control Sample Duplicate (LCSD) and/or MS and MSD samples to determine the effect of the sample matrix on the precision of the results generated using the selected analytical method

4.3.2 Accuracy

Accuracy is evaluated by reviewing:

- Calibrations – initial and continuing; acceptability and frequency (deviations are assumed to be noted in case narratives)
- Surrogates – recovery and frequency
- LCS and LCSD recoveries
- MS and MSD recoveries
- Relative response factors and relative standard deviation (deviations are assumed to be noted in case narratives)

- Method blanks
- Gas chromatography second-column confirmation (if required)
- Tune criteria gas chromatography/mass spectroscopy (GC/MS) – acceptability and frequency (deviations are assumed to be noted in case narratives)
- Internal standards (GC/MS) – acceptability and frequency (deviations are assumed to be noted in case narratives)

4.3.3 Representativeness

The following will be reviewed to evaluate representativeness:

- Sample quantities and locations
- Sampling procedures and equipment
- Sample CoCs and field logbooks
- Holding times and preservation

4.3.4 Completeness

Completeness is a quantitative evaluation (expressed as a percentage) of the overall data quality of the results generated. Valid data are considered usable in the context of the project goals. The completeness goal is considered met when 95 percent of sample data are not rejected.

4.3.5 Comparability

Comparability is a qualitative indicator of the confidence with which one data set can be compared to another. To ensure data-set comparability, the following steps will be taken:

- Standard operating procedures and established analytical methods will be followed.
- Instruments will be operated within their calibrated range, according to established procedures that are based on approved methodology.

4.3.6 Sensitivity

Limit of quantitation (LOQ) and limit of detection (LOD) will be compared against project regulatory cleanup levels.

4.4 QUALITY CONTROL SAMPLES AND CRITERIA FOR ANALYTICAL DATA

QC samples include field duplicates, MS/MSD, LCS/LCSD, method blanks, and surrogate spikes. Field QC samples will be collected at the following frequencies:

- Field duplicates – one per every 10 or fewer primary samples per matrix (10 percent)
- MS/MSD – designated for each sample shipment/laboratory batch or at a frequency of one pair per 20 or fewer primary samples per matrix (5 percent)

This QAPP and the method and laboratory acceptance criteria may be referenced by the Project Chemist to assess the data usability and to apply qualifiers to the data summary tables, as appropriate. Table 4-1 presents QC criteria of the LCS percent recovery, MS recovery, and LCS/LCSD and MS/MSD RPD for the analytical methods that will be used for the Former WACS Aniak Middle School project.

Table 4-1
Quality Control Criteria for Analytical Methods

Parameter	SW6020/SW7471A	SW8260	SW8082
Field Duplicate RPD	30% (water), 50% (soil)[1]	30% (water), 50% (soil)[1]	30% (water), 50% (soil)[1]
Temperature Blank	4 ± 2 °C[2]	4 ± 2 °C[2]	4 ± 2 °C[2]
Method Blank	Analyte detection ≤ LOD	Analyte detection ≤ LOD	Analyte detection ≤ LOD
Trip Blank	Not Applicable	Analyte detection ≤ LOD	Not Applicable
Surrogates	Not Applicable	Laboratory Limits	Laboratory Limits
LCS/LCSD Recovery	Laboratory Limits	Laboratory Limits	Laboratory Limits
MS/MSD Recovery	Laboratory LCS Limits	Laboratory LCS Limits	Laboratory LCS Limits
LCS/LSCD, MS/MSD, or laboratory duplicate RPD	≤ 20%	≤ 20%	≤ 20%

Notes:
For definitions, see the Acronyms and Abbreviations section.
[1]Field duplicate precision from ADEC Technical Memorandum, Environmental Laboratory Data and Quality Assurance Requirements: 6-002 (ADEC 2009)
[2]Temperature criteria for samples submitted to the field mobile laboratory will not apply if temperature blank has not had time to cool down.

4.5 REGULATORY CRITERIA

The cleanup level for the primary contaminant of concern (PCBs) at the Project Site is the ADEC direct contact level of 1 mg/kg (ADEC 2014). This limit will be included in the laboratory statement of work, and laboratory LOQs and LODs will be evaluated by the Project Chemist prior to the laboratory subcontract award. Laboratory LOQs will be evaluated against one-tenth of the regulatory limits in *Oil and Other Hazardous Substance Pollution* Control, Tables B1 and C to verify the cleanup level can be achieved by the laboratory (ADEC 2014). For cases in which the laboratory LOQ is greater than the maximum LOQ in Tables 4-2 and 4-3, the LOD will be used. If the one-tenth criterion is not attainable with current technology, then the LOQ and/or LOD should, at a minimum, be less than or equal to the cleanup levels listed in Tables 4-2 and 4-3. Analytical results will be compared against the cleanup levels presented in Tables 4-2 and 4.3. TCE by the med-level SW8260B soil analysis (MeOH preserved) will likely have LOQs at or above the cleanup level; however, this data will be used for characterization only and not to confirm that cleanup is complete.

Table 4-2
Soil Reporting and Cleanup Level Requirements

Analyte	Laboratory LOD (mg/kg) [2]	Maximum Laboratory LOQ (mg/kg)	Cleanup Level (mg/kg)[1]
PCBs by SW8082	TBD	0.1	1
TCE by SW8260B	TBD	0.002	0.02
Arsenic by SW6020	TBD	0.35	3.5
Barium by SW6020	TBD	110	1,100
Cadmium by SW6020	TBD	0.5	5
Chromium by SW6020	TBD	2.5	25
Lead by SW6020	TBD	40	400
Selenium by SW6020	TBD	0.34	3.4
Silver by SW6020	TBD	1.12	11.2
Mercury by SW7471A	TBD	0.14	1.4

Notes:
For definitions, see the Acronyms and Abbreviations section.
[1]ADEC most stringent Method 2 cleanup level between Under 40 Inch Zone and Migration to Groundwater instead in Table B1, 18 AAC 75 (ADEC 2014)
[2]To be determined based on laboratory selected by Remediation Contractor.

Table 4-3
Water Reporting and Action Level Requirements

Analyte	Laboratory LOD (mg/L) [2]	Maximum Laboratory LOQ (mg/L)	Cleanup Level (mg/L)[1]
PCBs by SW8082	TBD	0.00005	0.0005
TCE by SW8260B	TBD	0.0005	0.005
Arsenic by SW6020	TBD	0.001	0.01
Barium by SW6020	TBD	0.2	2.0
Cadmium by SW6020	TBD	0.0005	0.005
Chromium by SW6020	TBD	0.01	0.1
Lead by SW6020	TBD	0.0015	0.015
Selenium by SW6020	TBD	0.005	0.05
Silver by SW6020	TBD	0.01	0.1
Mercury by SW7470A	TBD	0.0002	0.002

Notes:
For definitions, see the Acronyms and Abbreviations section.
[1]18 AAC 75 Table C, Groundwater Cleanup Levels (ADEC 2014)
[2]To be determined based on laboratory selected by Remediation Contractor.

4.6 ANALYTICAL DATA QUALITY ASSESSMENT

The DQA involves reviewing field and laboratory records, maintaining proper recordkeeping, and assessing the field and laboratory data. Regular review of records will be conducted by members of the sampling/analysis team and the Project Chemist. A report will be completed based on the data review and qualifications.

4.7 DATA REVIEW AND QUALIFICATION

The Project Chemist will review the analytical data. This evaluation will consist of a review of CoC and sample receipt records; laboratory case narratives; and laboratory data, including analytical methodology, sample holding times, laboratory blanks, LODs, LOQs, surrogate recoveries, LCS/LCSD recoveries, MS/MSD recoveries, and precision. The analytical data will be evaluated for compliance with project-specific DQOs.

Data quality will be evaluated using the ADEC Technical Memorandum, *Environmental Laboratory Data and Quality Assurance Requirements* (ADEC 2009), method criteria,

laboratory criteria, and best professional judgment, in that order. The data review will identify any data requiring qualifications and identify usability impacts. The contractor will determine whether samples are to be re-collected when data gaps are created as a result of rejected data.

Qualifiers to be applied to the analytical data set, as appropriate, include the following:

- J The analyte was positively identified, but the associated result was less than the LOQ but greater than or equal to the LOD.
- B The analyte was detected in the method blank or the trip blank above the LOD, and the concentration in the sample did not exceed the blank concentration by a factor of 5 (factor of 10 for common laboratory contaminants acetone and methylene chloride).
- U Analyte was not detected and is reported as less than the LOD.
- E The result was nondetect and the LOD exceeds the project action limit
- + The result is biased high.
- – The result is biased low.
- JL(±) The result was an estimated value because the analyte failed recovery criteria in the LCS and/or LCSD sample. The result was either biased low because the LCS and LCSD recovery was less than the lower control limit, or the result was biased high because the recovery exceeded the upper control limit.
- JM(±) The result was an estimated value because the analyte failed recovery criteria in the MS and/or MSD sample. The MS sample recoveries are only evaluated if the parent sample concentration is less than the spike concentration. The qualifier is only applied to the parent sample.
- JS(±) The result was an estimated value because at least one surrogate failed recovery criteria for that sample. For SW8260, results are only qualified if two or more surrogates fail recovery criteria.
- JD The primary and field duplicate samples exceeded precision criteria. The qualifier is applied to the primary and field duplicate samples only.
- JH The numerical result was considered an estimate because the analysis was performed at greater than the method holding time and less than twice the method holding time.
- JI(±) The numerical result was considered an estimate because the internal standard failed QC limits. The result was either biased low because the internal standard failed high, or the result was biased high because the recovery failed low.
- JP The result was considered an estimated value because incorrect or inadequate preservation methods were used.

- JC(±) The result was an estimated value because the analyte failed recovery criteria in the continuing calibration verification (CCV). The result was either biased low because the CCV recovery was less than the lower control limit or biased high because the recovery exceeded the upper control limit.
- R The result was rejected. A rejected result was not usable and, therefore, was deleted from the report.

Qualification will not be required in the following circumstances:

- Surrogate or MS recoveries were outside QC limits, and the sample was diluted by a factor of 5 or greater.
- MS recoveries were outside QC limits, and the spiked concentration was less than the parent sample concentration.
- An analyte was detected in the method blank, but there was no detection in the sample.
- Surrogate, MS, or LCS recoveries exceeded upper control limits, and there was no detection in the sample(s).

Data may be rejected on the following grounds:

- Initial calibration (per compound) criteria not met
- Continuing calibration (per compound) not verified
- All nondetects with the continuing calibration recovery less than control limits
- All nondetects with the LCS recovery less than control limits
- All nondetects with MS recovery of 0 percent
- Any compound with LCS recovery less than 10 percent
- Missed holding times greater than two times the method-specified holding time
- Surrogate recovery of less than 10 percent and a dilution factor of 5 or less

4.8 REPORTING

Analytical data will be tabulated in the Remedial Action Report. A data table will be provided that will include: location identification (ID) number, sample number, lab sample ID, matrix, analytical method, percent moisture, concentration units, results (in correct significant digits), cleanup level, LOD/LOQ for each sample ID/method/analyte/matrix, and data qualifier flags. All analytical results, including duplicate results, will be reported. Rejected data will be presented in a separate table with a brief explanation of the reason for the data rejection. Data quality and usability will be discussed in the DQA. Complete electronic and hardcopy data

deliverables meeting the requirements below will be provided to the Remediation Contractor by the subcontracted laboratory and submitted to the client. As part of the data review, an ADEC Laboratory Data Review Checklist (ADEC 2009) will be completed for each data package and included in the report.

4.9 LABORATORY REQUIREMENTS AND CERTIFICATIONS

An onsite Environmental Laboratory Accreditation (ELAP)-certified and ADEC-approved mobile field analytical laboratory will be used at the field site to guide excavation and determine when excavation is complete. The onsite laboratory will analyze soil for PCBs by method SW8082. All laboratories used to perform work for this project will be required to follow the appropriate program and method requirements to ensure the data quality is acceptable and can be used to support project decisions.

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5.0 CORRECTIVE ACTION, RESPONSE, RE-ESTABLISHMENT OF CONTROL

Corrective action for either field or analytical operations includes response, re-establishment of control, and documentation. Corrective actions shall be approved by the appropriate personnel (Site Manager and/or Project Chemist). Implementation of corrective actions will be documented, and documentation shall be maintained and provided with the deliverables. Implementation of corrective action(s) will depend on the nature of the variance and may include repeating field activities, re-sampling, or documentation in the final report.

Corrective action will be initiated when potential or existing conditions are identified that may have an adverse impact on data quantity or quality. It will be the responsibility of the individual who first recognizes an out-of-control event to initiate corrective action.

Events that may require corrective action include the following, at a minimum:

- Deviation from established procedures
- Deviation from established analytical procedures or controls
- Unsatisfactory results of performance, system, or project QA audits

Corrective action includes notifying the Project Chemist and Site Manager, responding to the situation, reestablishing control, and documenting the corrective action. The appropriate supervisor and task leader will investigate the extent of the problem and take the necessary corrective steps. The corrective action may be immediate or long term. A corrective action requiring immediate response may be re-calculation, re-analysis, or repeating sample collection. Long-term corrective action may be identified through, but not be limited to, performance evaluation samples, QA samples, and in-house laboratory standards.

Immediate corrective action is usually applied to spontaneous, nonrecurring problems. Instrument and equipment malfunctions and nonconforming field procedures are amenable to this type of action. The individual who suspects nonconformance to previously established criteria or protocol in equipment, instruments, data, or methods will immediately notify his/her supervisor. The supervisor and the appropriate task leader will investigate the extent of

the problem and take the necessary corrective steps. If a large quantity of data is affected, the Project Manager, Project Chemist, and the contract administrator may collectively decide how to proceed.

6.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2014 (October). *Oil and Other Hazardous Pollution Control*. 18 AAC 75.

ADEC. 2010 (May). *ADEC Draft Field Sampling Guidance*. Table 2A – Excavated Soil Sample Collection Guide. Draft.

ADEC. 2009 (March). *Environmental Laboratory Data and Quality Assurance Requirements*. Technical Memorandum. Division of Spill Prevention and Response. Contaminated Sites Program.

U.S. Environmental Protection Agency (EPA). 2013 (October). *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. SW-846, Third Edition, Update V.

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ATTACHMENT D-1

Field Data Forms

Chain-of-Custody
Chain-of-Custody Variance
Cooler Receipt Form

Chain-of-Custody Report

Collection Organization: **Chain-of-Custody:** **Cooler ID:** **Admin Number:**

Project: **Laboratory:** **Bill To:** **Report To:**

COC Sample ID	Loc ID	Collection Date	Time	Sampler	Number	Containers Type	Volume	Preservative	Matrix	Analyses Requested Group	QC	TAT	Notes:

Special Instructions:

Relinquish By: Date/Time Relinquish By: Signature/Printed Name Date/Time

Received By: Signature/Printed Name Date/Time Received By: Signature/Printed Name Date/Time

CoC VARIANCE REQUEST

Change Requestor: _____

Laboratory Project Manager: _____

Date/Time Requested: _____

Project Chemist: _____

Site Manager: _____

Contracts Administrator: _____

Project Name/Number _____

Laboratory Sample Delivery Group Number _____

Action to be taken (add analyses, change turnaround time, delete analysis, etc.): _____

Specific Requirements

Sample Number	Lab Sample Number	Action	Added Cost

		Total Additional Cost:	-----

Comments/Justification: _____

_____

_____

Authorization: To ensure proper action is authorized, transmit this form via facsimile to Project Chemist for signature approval. Project Chemist will sign and return this form via facsimile to the Laboratory Project Manager to initiate change implementation.

Client Approval: _____ Date: _____

This form will be used to track changes to the chain-of-custody record and will not be used to modify or increase the value of a delivery order.

Signed Copy Routing: Project Chemist, Site Manager, Contracts Administrator

COOLER RECEIPT FORM

Email or fax this form and the CoC records to Project Chemist within 24 hours of receiving sample.

CoC Number _____ **(One receipt form per cooler)**
Cooler Number/Name on CoC _____
Laboratory and Location _____
Lab SDG _____

1.	Were custody seals on outside of cooler?	**YES**	**NO**
	If yes, how many and where? _____		
	Were signatures and dates correct?	**YES**	**NO**
2.	Were custody papers taped to lid inside of cooler?	**YES**	**NO**
3.	Were custody papers properly filled out (ink, signed, etc.)?	**YES**	**NO**
4.	Did you sign custody papers in the appropriate place?	**YES**	**NO**
5.	Did you attach shipper's packing slip to this form?	**YES**	**NO**
6.	What kind of packing material was used? _____		
7.	Was sufficient ice used (if appropriate)?	**YES**	**NO**
8.	Were all bottles sealed in separate plastic bags?	**YES**	**NO**
9.	Did all bottles arrive in good condition?	**YES**	**NO**
10.	Were all bottle labels complete (number, date, signed, analysis, pres., etc.)?	**YES**	**NO**
11.	Did all bottle labels and tags agree with custody papers?	**YES**	**NO**
12.	Were correct bottles used for the tests?	**YES**	**NO**
13.	Were VOA vials checked for absence of air bubbles and, if present, noted?	**YES**	**NO**
14.	Was sufficient amount of sample sent in each bottle?	**YES**	**NO**
15.	Chain-of-custody identification number: _____		
	Temperature blank reading _____		
	Cooler temperature. _____		
	Identification number of thermometer _____		
16.	Is temperature within 4+/- 2°C?	**YES**	**NO**
17.	Were labels correctly associated with pre-tared containers? (not placed directly on jars)?	**YES**	**NO**
CORRECTIVE ACTION FORM ATTACHED		***YES***	***NO***

Project Chemist contacted? Date/Time _____

Attach associated CoC record and Conversation Confirmer forms.

Explain any discrepancies: _____

_____

_____

APPENDIX E

Contractor Quality Control Plan

APPENDIX E

CONTRACTOR QUALITY CONTROL PLAN

PCB-CONTAMINATED SOIL REMOVAL

FORMER WACS ANIAK MIDDLE SCHOOL ANIAK, ALASKA

Prepared for:
PRP Group

DRAFT-FINAL
January 2015

TABLE OF CONTENTS

SECTION **PAGE**

ACRONYMS AND ABBREVIATIONS ..... E-iii

1.0 INTRODUCTION E-1-1

2.0 ORGANIZATION and RESPONSIBILITIES E-2-1

2.1.1 Project Manager E-2-3

2.1.2 Contractor Quality Control Manager E-2-3

2.1.3 Additional Quality Control Personnel E-2-5

2.2 COORDINATION E-2-5

3.0 QUALITY CONTROL PROCEDURES E-3-1

3.1 CONTROL PHASES E-3-1

3.1.1 Preparatory Phase E-3-1

3.1.2 Initial Phase E-3-2

3.1.3 Follow-Up Phase E-3-3

3.1.4 Additional Preparatory and Initial Phases E-3-4

3.2 INSPECTION AND SURVEILLANCE E-3-4

3.3 PERMITS E-3-5

3.4 CERTIFICATIONS AND LICENSES E-3-5

3.5 TESTING AND SAMPLING E-3-5

3.6 NONCONFORMANCE AND CORRECTIVE ACTION E-3-6

3.7 CHANGE CONTROL E-3-7

3.8 DOCUMENTATION E-3-8

3.8.1 Responsibility E-3-8

3.8.2 Punch List E-3-9

3.8.3 Reports E-3-9

3.8.4 Records and Submittals E-3-9

3.8.5 Forms E-3-10

3.8.6 Document Control E-3-11

3.8.7 Document Retention E-3-11

3.8.8 Schedule E-3-11

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

ATTACHMENTS

Attachment E-1 Resumes of Individuals

Attachment E-2 Preparatory Phase Meeting Agenda and Checklist

Attachment E-3 Initial Phase Checklist Form

Attachment E-4 Environmental Quality Control/Quality Assurance Report

Attachment E-5 Other Forms

ACRONYMS AND ABBREVIATIONS

ADOT&PF	Alaska Department of Transportation and Public Facilities
CQC	contractor quality control
CQCP	Contractor Quality Control Plan
DQCR	Daily Quality Control Reports
DFW	definable feature of work
NCR	nonconformance report
PCB	polychlorinated biphenyl
PRP	Potentially Responsible Party
QC	quality control
SSHP	Site Safety and Health Plan
WACS	White Alice Communications Site

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1.0 INTRODUCTION

This Contractor Quality Control Plan (CQCP) is Appendix E of the *PCB-Contaminated Soil Removal Work Plan* at the former White Alice Communications Site (WACS) Aniak Middle School, Aniak, Alaska. This CQCP is written to address project quality control issues and provides an overview of the three-phase inspection process, site documentation and reporting requirements, and standard forms to be used. This CQCP addresses the following seven key elements of construction-related activities that will occur at the site during the project:

- Responsibility and authority
- Personnel qualifications
- Inspection activities
- Monitoring tests and observations
- Sampling requirements
- Submittals
- Documentation

The purpose of this CQCP is to implement a program to ensure that completed construction activities meet or exceed the design criteria, plans, and specifications. This plan addresses specific quality control (QC) systems to be applied to phases of construction work required to complete the project objectives.

This initial submittal of the CQCP provides the requirement of quality assurance and QC activities to be implemented by the Remediation Contractor. The CQCP is a living document and will be revised and amended, as necessary, throughout the project by the Remediation Contractor.

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2.0 ORGANIZATION AND RESPONSIBILITIES

Site activities will be performed by the Remediation Contractor selected by the Potentially Responsible Party (PRP) Group and their approved subcontractors under contract with the State of Alaska (contracting entity). The Remediation Contractor is required to update this section of this plan to describe the QC organization and project team responsibilities and authority. A project organizational chart and resumes of key personnel are to be provided in the Remediation Contractor's final CQCP as Attachment E-1.

The Remediation Contractor will be responsible for QC and establishing and maintaining an effective QC system. The QC responsibilities of the Remediation Contractor project team for the polychlorinated biphenyl (PCB) removal project will include, but not be limited to:

1. Ensuring appropriate internal QC practices, both onsite and offsite, are employed throughout the duration of the project. This includes ensuring submittals are complete, internally consistent, technically accurate, in compliance with accepted industry practices, and generally free from copy errors, such as misspelling, grammatical errors, etc. The Remediation Contractor QC practices will be internal, meaning the Remediation Contractor will not use Alaska Department of Transportation and Public Facilities (ADOT&PF) technical review and comment procedure as a substitute for the appropriate internal quality checks and corrections. The goal of the QC practices is to identify and correct problems before they are carried forward in the project, and to ensure submittals meet professional standards of quality.
2. Providing a timely and appropriate response to all inquiries from ADOT&PF regarding any aspect of the project. All project delivery team inquiries will be communicated to the Remediation Contractor through the authorized representative of ADOT&PF (authorized representative), and all contractor correspondence will be directed to the authorized representative.
3. Managing and controlling all project performance including subcontracted services.
4. Preparing monthly status reports consisting of a brief summary of work performed, work underway, work planned for the upcoming month, status of laboratory reports

and data received, outstanding laboratory reports or other outstanding data, communications from ADOT&PF, pay estimates and associated work summaries, accident/exposure hours, and other pertinent project information.

5. Preparing updated schedule and status to whether current work is on schedule. If the work is not on schedule, the Remediation Contractor shall state what actions are anticipated in order to get back on schedule.
6. Submitting monthly progress reports, pay estimates, pay estimate summaries of work performed, and schedules to the authorized representative no later than the 10th day of the calendar month following the month covered by the report.
7. Keeping record of each phone conversation and written correspondence (including email) affecting decisions relating to the performance of the contract and providing a summary in the monthly progress report.
8. Organizing and leading a post-award meeting within 30 days of the notice to proceed at a time and location acceptable to ADOT&PF. The meeting will consist of ADOT&PF project delivery team and Remediation Contractor personnel responsible for project execution and QC. The purpose of the meeting will be to ensure understanding of the contract requirements, coordination, and Remediation Contractor orientation. It is anticipated that this meeting will take two hours.
9. Meeting with the authorized representative as often as required during the execution of the contract via conference call or onsite. The meetings will focus on work performance and actual or potential problems. A mutual good faith effort shall be made by all parties to resolve all issues. Meeting minutes will be prepared by the Remediation Contractor and signed by the attendees. It is anticipated that there will be two status meetings during the project planning phase and monthly meetings thereafter.
10. Notifying the authorized representative prior to the start of any onsite work and upon completion of the work effort.

All project personnel are responsible for the quality of work on the project. Roles and responsibilities discussed below are limited to personnel that directly control and/or perform QC activities.

2.1.1 Project Manager

The Project Manager is the principal point of contact for ADOT&PF authorized representative. The Project Manager has the overall responsibility for project execution, budgets, and schedules. The Project Manager's objective is to produce a quality work product within the authorized schedule and budget. To accomplish this goal, the Project Manager will perform the following tasks:

- Establish the objectives, expectations, and scope of work to be performed.
- Serve as liaison for communication with ADOT&PF and subcontractors.
- Coordinate and communicate with the authorized representative and management team to keep them informed of the work progress.
- Arrange for staff and other necessary resources to execute the project.
- Organize, direct, and manage personnel and resources, and establish clear lines of communication.
- Supervise preparation and approval of project-specific procedures and the *PCB-Contaminated Soil Removal Work Plan* (herein referred to as the Work Plan).
- Review all deliverables for conformance with contract entity requirements, scope of work, and this CQCP.

The Project Manager has the authority to approve subcontractor selection and payment, stop work at the site for any reason, and approve invoices to ADOT&PF.

2.1.2 Contractor Quality Control Manager

The Contractor Quality Control (CQC) Manager is assigned singular responsibility by the Project Manager for ensuring all aspects of the CQCP are properly implemented and monitored. The individual in this role must possess sufficient practical, technical, and managerial experience to successfully oversee the implementation of QC activities. The individual must have the oral and written communication skills necessary to implement the

QC programs. The minimum qualifications of the CQC Manager shall include working knowledge of applicable federal, state, and local laws, regulations, and guidance.

The CQC Manager reports directly to the Project Manager in all matters of QC for the project. The CQC Manager shall ensure, by inspection, that the fieldwork performed by the field team complies with approved contract and planning documents.

The CQC Manager will perform the following tasks:

- Ensure that site personnel assigned to the project are aware of—and abide by—the project requirements.
- Monitor the work performed by the subcontractors and construction personnel to ensure contract items and conditions are fulfilled in accordance with work plans, specifications, and standard operating procedures.
- Provide continuing inspection and surveillance of specific craft disciplines to verify that high-quality standards of workmanship are performed and that they conform with approved engineering drawings and specifications.
- Perform or monitor tests, evaluations, or other measurements needed to meet quality requirements.
- Prevent, stop, or correct QC deficiencies, defective work, or noncompliance through control and inspection using the three-phase control process (Section 3.1).
- Exercise “stop work” authority when required to prevent performance inconsistent with contract documents, or if it may result in a hazard to the safety of personnel.
- Investigate, research, define, and isolate quality problems and participate in their resolution.
- Implement required field reporting procedures as outlined in the work plans.
- Keep a daily logbook (or daily activity report) to record all significant project site events.
- Prepare and submit Daily Quality Control Reports (DQCR) to ADOT&PF and Project Manager.
- Initiate and maintain QC records, review procedures, and documentation for completeness, accuracy, and compliance with contract requirements.
- Hold preparatory and initial phase meetings for each definable feature of work (DFW) and perform follow-up inspections, as appropriate.
- Monitor and update the submittal register (if applicable) and review submittals.
- Keep as-built drawings current (redlines) and maintain accurate information to be used in the final report.

2.1.3 Additional Quality Control Personnel

Other QC personnel shall be field engineers and/or technicians who possess adequate formal training and sufficient practical, technical, and administrative experience in executing site surveillance and recording inspection activities. Inspection personnel shall demonstrate construction and remediation knowledge, know the appropriate codes and regulations, have knowledge of equipment installation, understand observation and testing procedures, and know equipment and general site safety.

2.2 COORDINATION

The Remediation Contractor must effectively communicate the content and purpose of the contract documents to the members of the field team to ensure consistency of implementation. A project coordination meeting shall be the primary forum for disseminating the project requirements to the field team, discussing the QC requirements and general terms. Relevant QC topics to be discussed in this meeting shall include, but are not limited to, the following:

- QC documents and organizational roles related to the implementation of design criteria, plans, and specifications
- Three-phase control process (Section 3.1)
- Procedures, responsibilities, authorities, and communication, including modifications to this CQCP; observation, testing, and sampling; and nonconformance identification, documentation, and resolution
- Document control
- Construction schedule

The coordination meeting will involve the key team members, including subcontractors. The coordination meeting also can be combined with the preconstruction meeting (as discussed in Section 3.2 of the Work Plan). Attendance is to be documented, and minutes of the meeting are to be recorded and distributed to the participants by the Remediation Contractor.

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3.0 QUALITY CONTROL PROCEDURES

The QCs applicable to the PCB-removal activities are outlined in the following subsections. The tasks for this project are grouped into the following DFWs:

- Mobilization
- Site preparation
- Excavation of soil including sampling
- Waste material transport and disposal
- Site restoration and demobilization

The following subsections outline the use of operational procedures to ensure QC from the preparatory stages of inspections to delivery of a final product for each DFW.

3.1 CONTROL PHASES

The QCs for all DFW are accomplished using a three-phase control process (preparatory, initial, and follow-up phases), where the definable feature is a task that is separate and distinct from the other tasks and has a specific set of control requirements. Each control phase represents an opportunity to prevent deficiencies that would otherwise result in nonconformance. The three-phase control process is outlined in the following subsections.

3.1.1 Preparatory Phase

The preparatory phase, as it applies to a DFW, includes actions prior to the start of actual field operations. During this phase, the qualifications of individuals are verified, testing controls are prepared, safety concerns are addressed, and any special permits, licenses, and certifications are reviewed. Attachment E-2 includes an agenda for the preparatory phase meeting, a page for the CQC Manager to record notes from the meeting, and a preparatory phase checklist form to identify the control of the DFW. Additional information will probably be added to some of the checklists, depending on the results of discussion during the preparatory phase meeting. Each crew foreman associated with the particular DFW will attend

the preparatory phase meeting, which is conducted by the CQC Manager prior to starting work for each DFW.

Actions during a preparatory phase meeting include:

- Review applicable plans, specifications, work plans, and other contract documents.
- Verify that the work to be performed has been approved by ADOT&PF.
- Verify that any project materials and/or equipment have been submitted, tested, and approved.
- Verify that provisions have been made to provide the required control inspection and testing.
- Examine the work area to verify that the required preliminary work has been completed and complies with the contract.
- Physically examine the required materials and equipment to verify conformance with approved submittals and procedures.
- Review the Site Safety and Health Plan (SSHP) (Work Plan, Appendix F) to ensure safety concerns are adequately addressed and applicable safety requirements have been incorporated into the plan.
- Discuss procedures for executing the work, including repetitive efficiencies, documentation of construction, and tolerances on and workmanship standards for that phase of work.
- Review construction tolerances and workmanship standards for that feature of work.
- Verify permit and other regulatory requirements are met.

A Preparatory Phase Inspection Checklist for this stage of control will be compiled before the preparatory phase meeting. Results of the activities will be discussed during the preparatory meeting. Minutes of the preparatory phase meeting will be included in the DQCRs as an attachment. The minutes will summarize the topics covered in the meeting and will include the checklist in Attachment E-2 for each DFW.

3.1.2 Initial Phase

The initial phase establishes the workmanship standards for each DFW and must be implemented prior to and during startup of each DFW. Thus, this phase is used to get the work off to a proper start. This is the time for the CQC Manager to ensure that the

subcontractor and Remediation Contractor personnel understand the contract standards and desired standards of workmanship. The initial inspection phase is a practical method of performing preventive inspection and resolving conflicts. Attachment E-3 includes the initial phase checklist form.

Actions during the initial phase include:

- Check the preliminary work to verify that it complies with the preparatory inspection control points, the Standard CQCP, and contract requirements.
- Complete the review of the preparatory meeting minutes and action items identified prior to initial phase.
- Establish the standard of workmanship (including demonstrations as appropriate).
- Verify full contract compliance and the required control inspection and testing.
- Verify and review compliance with the SSHP (Work Plan, Appendix F). Review the need for upgrading the safety plan.
- Complete initial phase checklist form (Attachment E-3).

The initial phase meeting shall be attended by field personnel (Remediation Contractor personnel and subcontractors working on the DFW). Those who worked on related (and previously completed) DFWs shall also attend to ensure all workers involved will be present and to provide continuity from one DFW to the next. The initial phase shall be repeated for each new crew that works onsite or at any time during which unacceptable quality standards are encountered. The initial phase will be reported and the topics of the meeting summarized (Attachment E-3) and attached to the DQCR.

3.1.3 Follow-Up Phase

Follow-up inspection, surveillance, and testing are used to verify the continuation of contract compliance and standards of workmanship established during the previous two phases. The follow-up phase is documented via the DQCRs (Attachment E-4). The DQCR for the project will be prepared and signed by the CQC Manager, then submitted to the authorized representative for approval. The DQCR will include any attachments for the preparatory and initial phases that occurred during the day.

Actions during the follow-up phase include:

- Perform and document daily checks to verify continuing compliance with contract requirements.
- Conduct final follow-up checks to correct any deficiencies prior to the start of additional tasks that could be affected by deficient work.

Neither the Remediation Contractor nor its subcontractors shall build upon or conceal nonconforming work. Every DFW is considered complete at the end of the project, after final inspection and contractor turnover occurs.

3.1.4 Additional Preparatory and Initial Phases

As determined by ADOT&PF, additional preparatory and initial phases may be conducted on the same DFWs if:

- Quality of ongoing work is unacceptable;
- There are changes in the applicable CQC staff, onsite production supervision, or work crew;
- Work on a definable feature is resumed after a substantial period of inactivity;
- Other problems develop.

3.2 INSPECTION AND SURVEILLANCE

The CQC Manager is responsible for executing a QC inspection, monitoring, observation, and surveillance system through implementation of the three-phased control process using formal reports. The reports will be the DQCRs and will include any forms or reports of information necessary to summarize and identify the pertinent information for the three-phase control process. Attachment E-2 includes the forms for the preparatory phase inspection elements for each DFW; Attachment E-3 includes the form used during the initial phase inspection of each DFW; and Attachment E-4 is the form used to report the daily and follow-up inspection and surveillance activities for each DFW. Attachments E-2 and E-3 are included as part of the DQCR whenever a preparatory phase or initial phase inspection, respectively, is held.

The CQC Manager shall keep a daily logbook and other records to document inspections, observations of construction techniques, and status of ongoing testing, analytical results, and other data relevant to the QC effort. The CQC Manager shall verify proper procedural technique, sample handling, and chain-of-custody documentation, if required. The CQC Manager shall report the testing results, provide timely authorization to proceed with the work, and initiate nonconformance actions.

3.3 PERMITS

The permits required for the project are identified in the Work Plan. All permits shall be obtained prior to the preparatory phase inspection for the respective DFW and shall be presented and discussed at the preparatory phase meeting. Any permit required for a DFW shall be documented in the preparatory phase checklist (Attachment E-2) and reported as part of the DQCR.

3.4 CERTIFICATIONS AND LICENSES

Certifications and licenses for personnel, equipment, materials, plans, and specifications are identified in the Work Plan and in the preparatory phase checklist (Attachment E-2) for the respective DFW. Each certificate and license shall be presented and discussed at the preparatory phase meeting and reported as part of the DQCR.

3.5 TESTING AND SAMPLING

Testing and sampling requirements for the project are identified in the Work Plan. Requirements for testing and sampling are discussed at the preparatory phase meeting for the respective DFW and shall be reported as part of the DQCR.

Before a particular field test is performed, the CQC Manager shall become familiar with the particular testing method required by the specifications. The CQC Manager shall consult with the subcontractor regarding the field test methods and note any variations or substitutions to the prescribed method. The CQC Manager shall have the authority to stop any testing that

does not conform to specifications. All testing procedures shall be based on the applicable accepted industry methods. Testing may include analytical testing of soils, fluids, or other matrices; American Society for Testing and Materials testing of materials (e.g., concrete slump tests, compaction tests, etc.) and any QC testing work required to verify compliance with contract specifications.

Offsite testing laboratories, if required, shall be approved by the State of Alaska. If required and under special circumstances, offsite testing laboratories may be inspected and audited by the CQC Manager (or designee) to verify that facilities and testing equipment are available and that they comply with testing standards. This inspection and audit would include reviewing all laboratory certifications, verifying that instruments have been calibrated against certified standards, and securing copies of calibration records from the testing laboratory for the job site files.

Actual locations of each test sample, as outlined in the Work Plan, shall be selected to provide adequate representation of the material. During the preparatory phase meeting, the CQC Manager and/or contracting entity authorized representative may select the time and location for the required testing.

3.6 NONCONFORMANCE AND CORRECTIVE ACTION

It is important that any nonconforming material, assembly, or construction method that is identified be corrected through systematic actions. Any time a condition exists that does not comply with drawings, specifications, codes, workmanship standards, or contract requirements, the CQC Manager shall take the following actions:

- Initiate prompt corrective action or stop work if necessary.
- Notify the authorized representative of any nonconformance as soon as possible after it is identified. Notification will include information for the intended corrective action and a schedule to alleviate the nonconformance.
- Document discrepancies on a nonconformance report (NCR) form (Attachment E-5). The NCR shall contain a detailed description of the item or conditions that failed to meet drawing or specification requirements. The NCR register form (Attachment E-5) will be

updated daily and maintained during construction. When an NCR is written, it will be attached to the DQCR.

- The CQC Manager shall evaluate discrepancies to coordinate the resolution and determine methods of correction.
- When corrective action is complete, the item shall again be subject to final inspection.
- In the final correction block of the NCR, the CQC Manager shall note any retest required and performed, nondestructive examination required, or change in replacement parts used in correcting the problem.

3.7 CHANGE CONTROL

A formal process shall identify, document, and track the status of procedural and condition changes in project design and remedial construction work. Changes shall be documented in writing. Such changes shall include the following:

- Changes required to have an "Approved for Construction" drawing or specification
- Changes in conditions
- Differing site conditions
- Variations with estimated quantities
- Conditions that affect the scope of work

Personnel shall notify the CQC Manager and the Remediation Contractor Site Manager immediately once a change is anticipated. All such changes shall be reviewed by, closely coordinated with, and through the authorized representative.

Changes will be documented by the CQC Manager or any other individual initiating a change. The change will then be coordinated with the authorized representative and routed to the Project Manager for review. The Project Manager shall discuss potential changes with ADOT&PF as well as with the Remediation Contractor's technical staff. Upon resolution, the Remediation Contractor project and contract managers, and ADOT&PF representative will sign a change order, modification will be issued as appropriate, and the change will be implemented following approval.

3.8 DOCUMENTATION

This section outlines the procedures to be followed for the identification, use, handling, filing, storage, and disposition of QC records. The Remediation Contractor will maintain current records providing factual evidence that required QC activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall include the following information:

- Contractor/subcontractor and area of responsibility
- Operating plant/equipment with hours worked, idle, or down for repair
- Work performed each day, giving location, description, and by whom
- Test and/or control activities performed, with results and references to specifications/drawings requirements and deficiencies noted with corrective actions taken
- Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements
- Submittals reviewed, with contract reference, by whom, and action taken
- Offsite surveillance activities, including actions taken
- Job safety evaluations stating what was checked, results, and instructions of corrective actions
- Instructions given/received and conflicts in plans and/or specifications
- Contractor's verification statement

3.8.1 Responsibility

The CQC Manager shall monitor the proper implementation of the CQCP and verify that the required records are prepared, protected, retained, readily retrievable, and turned over at project completion to the appropriate government owner.

The CQC Manager shall verify that the required records are prepared to provide documented evidence of the quality of materials, equipment, and installation. Records shall be consistent with applicable codes, specifications, and contracts and shall be adequate for use in the management of the program. Inspection and test records shall identify the inspector or data recorder, type of observation, results, and acceptability or action taken in connection with any deficiency.

3.8.2 Punch List

At the completion of all work or any increment thereof, the CQC Manager shall conduct an inspection of the work and develop a "punch list" of items that do not conform to the approved drawings and specifications. This list of deficiencies shall be included in the CQC documentation and shall include the estimated date by which the deficiencies will be corrected. The CQC Manager or staff shall make a second inspection to verify that all deficiencies have been corrected and so notify the government. These inspections and any deficiency corrections shall be accomplished within the time stated for completion of the entire work (or any particular increment thereof if the project is divided into increments by separate completion dates).

3.8.3 Reports

Individual inspections, tests, and/or observations shall be made and documented by the CQC Manager in accordance with this Standard CQCP, as well as the Work Plan, its associated addenda, and other pertinent documents. The CQC Manager will report all testing and work progress that occur on a particular day in the DQCR and will submit the DQCR to the Project Manager.

Anybody recording features of the work with photographs will identify the work feature and other pieces of information contained in the photograph log.

3.8.4 Records and Submittals

The project QC members shall identify the specific QC records and submittals required to ensure conformance with contract documents. Submittals will be coordinated with the project schedule and managed within the Remediation Contractor's document control system using submittal registers, tracking, transmittal procedures, and transmittal forms established by ADOT&PF. Examples of the submittals include the following:

- Personnel training records, qualifications, and certifications
- Engineering specifications

- Drawings, design review, and changes
- Receipt inspections
- Construction nonconformance and corrective actions
- Field change requests
- Testing procedures and results
- DQCR
- Standard construction procedures
- Statements
- Schedules
- Operations and maintenance manuals
- Samples
- Warranties and guarantees
- Special permits
- As-built drawings
- Surveillance and observations

3.8.5 Forms

Construction QC forms shall be used for recording visual observations, inspections, and testing, which shall represent the basis for acceptance of the work. The CQC Manager shall witness the required field testing and sign the appropriate forms for the work to be accepted. The forms shall be completely filled out, signed, and dated before submittal for review and approval by the CQC Manager. Subcontractors shall complete the appropriate forms and submit them upon completion of each task, rather than hold them until the end of the project.

Inspection and testing forms shall identify the equipment, materials, or installations involved. Installation and maintenance checklists shall be marked, where applicable. Locations, orientations, elevations, test parameters, test results, and other comments shall be included on the forms, as appropriate. Critical items (e.g., cost and schedule impacts, deficiencies, and corrective actions) shall be clearly, concisely, and promptly stated.

3.8.6 Document Control

A standard records management and document control system shall be used for onsite and offsite activities. The Project Manager shall be responsible for implementing a system for the project, and the CQC Manager is responsible for carrying these practices to the field.

Elements of the records management system shall include:

- Master index system
- Logging and issuing document numbers
- Method for determining the status of documents in progress
- Standardizing procedures/forms
- Proper storage of documents
- Retrieving
- Archiving

3.8.7 Document Retention

Project records shall be maintained in a safe and retrievable manner until project closeout. Physical and electronic protection shall be provided until records are delivered to ADOT&PF or are archived. Upon project closeout, field records and files shall be transferred to the Remediation Contractor's office. Archived records shall be protected from loss or damage, as stipulated in the Federal Acquisition Regulations.

3.8.8 SCHEDULE

The construction schedule for the project will be presented to ADOT&PF for review and approval. The construction schedule must be reviewed informally with the authorized representative and site supervisor on a daily basis. Major variances in the schedule must be reported in a clarification/verification report by the site supervisor and attached to the DQCR. Any anticipated change in the schedule shall be reported to the authorized representative and discussed with ADOT&PF.

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ATTACHMENT E-1

Resumes of Individuals

(To Be Provided by Remediation Contractor)

ATTACHMENT E-2

Preparatory Phase Meeting Agenda and Checklist

PREPARATORY PHASE CHECKLIST
MEETING

Project Name: **WACS Aniak Middle School**
Project Number: _____
Definable Feature of Work: **Mobilization** Date _____

AGENDA:

1. Review of contract, Work Plan
2. Definable Feature of Work (DFW)
3. Location of Site Affected
4. Relationship to other DFW
5. Sequence of Work
6. Personnel/Other Certification
7. Safety Hazards List
8. Equipment Certification
9. Permits Required
10. Testing Requirements
11. Review of Submitted Approval
12. Other

NAMES OF THOSE PRESENT:

Name	Affiliation	Name	Affiliation
1.		10.	
2.		11.	
3.		12.	
4.		13.	
5.		14.	
6.		15.	
7.		16.	
8.		17.	
9.		18.	

Points of Discussion:

_____
_____
_____

Authorized Representative Notified (Date): _____

Safety Features Reviewed by: _____

***REVIEW SIGNATURES*:**

CQC Manager _____ Date: _____

Site Manager _____ Date: _____

Site Safety and Health Officer _____ Date: _____

Submitted to Authorized Representative on _____

PREPARATORY PHASE CHECKLIST

Project Name: **WACS Aniak Middle School**
Project Number:
Definable Feature of Work: **Mobilization** Date _____

SEQUENCE OF WORK

CONTROL POINTS	CONTROL REFERENCE, LOCATION	TYPE OF INSPECTION	ACCEPTANCE CRITERIA, REFERENCE
Location designated for support facilities	Field Determined	Observation	State of Alaska, Remediation Contractor criteria
Subcontractor site documentation (insurance certifications, health and safety records, training records for all personnel, subcontracts, letters of commitment)	Subcontractor agreement, SSHP	Observation	Subcontract compliance
Equipment inspection	Contractor equipment operating checklist	Observation	Submission of inspection reports
Equipment operator competency	Operator competency exam	Observation, test	List of competent operators
Monitoring equipment operations and maintenance, calibration	Manufacturer operation manual, SSHP	Observation, test	Calibration and operation to manual standards
Safety orientation	SSHP, CFR 1910.120	Observation	All field personnel must attend
Vehicle and personnel access routes designated and disseminated	WP	Observation	Instruct all personnel
Site security procedures in place	SSHP	Observation	Complete
Field cost tracking system loaded w/ budget	Remediation Contractor agreement/contract	Observation	Compliance
Excavation permits issued (if applicable)	WP	Observation	Compliance
Spill control measures in place	WP, SSHP	Observation	ADEC, Remediation Contractor criteria
Utility tracking performed	Locates	Observation	Verify Location
Identify work areas	WP	Observation	Verify Location
Identify utilities and mark out	WP	Observation	Compliance
Limit disturbances to designated work areas	WP	Observation	Compliance
Install preventive devices and/or engineering controls, if necessary	WP	Observation	Compliance

Notes:
CFR = Code of Federal Regulations
ADEC = Alaska Department of Environmental Conservation
SSHP = Site Safety and Health Plan
WP = Work Plan

PREPARATORY PHASE CHECKLIST
MEETING

Project Name: **WACS Aniak Middle School**
Project Number: _____
Definable Feature of Work: **Site Preparation** Date _____

AGENDA:

1. Review of contract, Work Plan
2. Definable Feature of Work (DFW)
3. Location of Site Affected
4. Relationship to other DFW
5. Sequence of Work
6. Personnel/Other Certification
7. Safety Hazards List
8. Equipment Certification
9. Permits Required
10. Testing Requirements
11. Review of Submitted Approval
12. Other

NAMES OF THOSE PRESENT:

Name	Affiliation	Name	Affiliation
1.		10.	
2.		11.	
3.		12.	
4.		13.	
5.		14.	
6.		15.	
7.		16.	
8.		17.	
9.		18.	

Points of Discussion:

_____

_____

_____

Authorized Representative Notified (Date): _____

Safety Features Reviewed by: _____

***REVIEW SIGNATURES*:**

CQC Manager _____ Date: _____

Site Manager _____ Date: _____

Site Safety and Health Officer _____ Date: _____

Submitted to Authorized Representative on _____

PREPARATORY PHASE CHECKLIST

Project Name: **WACS Aniak Middle School**
Project Number:
Definable Feature of Work: **Site Preparation** Date _____

SEQUENCE OF WORK

CONTROL POINTS	CONTROL REFERENCE, LOCATION	TYPE OF INSPECTION	ACCEPTANCE CRITERIA, REFERENCE
Identify and demarcate area/issues to be secured	WP	Observation	Compliance
Construction of temporary storage areas	WP, WMP	Observation	Compliance
Abandon environmental monitoring points within proposed excavation	WP	Observation	Compliance
Install and maintain runoff and erosion controls	WP, SSHP	Observation	Compliance
Protect environmental monitoring points, buildings, structures, utilities, etc. to remain in place	WP	Observation	Compliance
Verify removal of aboveground fuel pipelines, fuel dispenser, and associated electrical conduits.	WP, SSHP	Observation	Compliance
Verify fuel pipelines are drained and containerized.	WP, SSHP	Observation	Compliance
Verify Storage Shed and Long-term Storage Cell relocated/removed from within the proposed excavation at the Wood Shop Area.	WP, SSHP	Observation	Compliance
Clearing of trees and vegetation as necessary to facilitate excavation.	WP	Observation	Compliance
Verify mobile field laboratory equipment calibrated and operating in accordance with laboratory procedures	SAP	Observation	Compliance
Verify wastewater treatment system operating properly	WP, WMP	Observation	Compliance

Notes:
SSHP = Site Safety and Health Plan
WMP = Waste Management Plan
WP = Work Plan

PREPARATORY PHASE CHECKLIST
MEETING

Project Name: **WACS Aniak Middle School**
Project Number: _____
Definable Feature of Work: **Excavation** Date_____

AGENDA:

1. Review of contract, Work Plan
2. Definable Feature of Work (DFW)
3. Location of Site Affected
4. Relationship to other DFW
5. Sequence of Work
6. Personnel/Other Certification
7. Safety Hazards List
8. Equipment Certification
9. Permits Required
10. Testing Requirements
11. Review of Submitted Approval
12. Other

NAMES OF THOSE PRESENT:

Name	Affiliation	Name	Affiliation
1.		10.	
2.		11.	
3.		12.	
4.		13.	
5.		14.	
6.		15.	
7.		16.	
8.		17.	
9.		18.	

Points of Discussion:

_____

Authorized Representative Notified (Date): _____

Safety Features Reviewed by: _____

***REVIEW SIGNATURES*:**

CQC Manager _____ Date: _____

Site Manager _____ Date: _____

Site Safety and Health Officer _____ Date: _____

Submitted to Authorized Representative on _____

PREPARATORY PHASE CHECKLIST

Project Name: **WACS Aniak Middle School**
Project Number:
Definable Feature of Work: **Excavation** Date _____

SEQUENCE OF WORK

CONTROL POINTS	CONTROL REFERENCE, LOCATION	TYPE OF INSPECTION	ACCEPTANCE CRITERIA, REFERENCE
Identify and stake/spray paint excavation location	WP	Observation	Compliance
Use of proper personal protective equipment	SSHP, WP	Observation	Compliance
Perform pre-excavation sampling	SAP	Observation	Compliance
Remove potential clean overburden, temporarily stockpile	WP, SAP	Observation	Compliance
Excavate impacted area and segregate drums, debris, and soil	WP	Observation	Compliance
Assess atmosphere in and around excavation	SSHP, WP,	Observation	Compliance
Perform waste characterization sampling	WMP	Observation	Compliance
Perform excavation sampling	SAP	Observation	Compliance
Sample documentation including survey location	SAP	Observation	Compliance
Stage waste streams for shipment and disposal	WP, WMP	Observation	Compliance
Mark boundaries of excavation for survey	WP	Observation	Compliance
Decontamination	WP/SAP	Observation	Compliance
General housekeeping procedures	WP	Observation	Compliance

Notes:
SAP = Sampling and Analysis Plan
SSHP = Site Safety and Health Plan
WMP = Waste Management Plan
WP = Work Plan

PREPARATORY PHASE CHECKLIST

Project Name: **WACS Aniak Middle School**
Project Number:
Definable Feature of Work: **Mobilization** Date _____

SEQUENCE OF WORK

CONTROL POINTS	CONTROL REFERENCE, LOCATION	TYPE OF INSPECTIO N	ACCEPTANCE CRITERIA, REFERENCE
Location designated for support facilities	Field Determined	Observation	State of Alaska, Remediation Contractor criteria
Subcontractor site documentation (insurance certifications, health and safety records, training records for all personnel, subcontracts, letters of commitment)	Subcontractor agreement, SSHP	Observation	Subcontract compliance
Equipment inspection	Contractor equipment operating checklist	Observation	Submission of inspection reports
Equipment operator competency	Operator competency exam	Observation, test	List of competent operators
Monitoring equipment operations and maintenance, calibration	Manufacturer operation manual, SSHP	Observation, test	Calibration and operation to manual standards
Safety orientation	SSHP, CFR 1910.120	Observation	All field personnel must attend
Vehicle and personnel access routes designated and disseminated	WP	Observation	Instruct all personnel
Site security procedures in place	SSHP	Observation	Complete
Field cost tracking system loaded w/ budget	Remediation Contractor agreement/contract	Observation	Compliance
Excavation permits issued (if applicable)	WP	Observation	Compliance
Spill control measures in place	WP, SSHP	Observation	ADEC, Remediation Contractor criteria
Utility tracking performed	Locates	Observation	Verify Location
Identify work areas	WP	Observation	Verify Location
Identify utilities and mark out	WP	Observation	Compliance
Limit disturbances to designated work areas	WP	Observation	Compliance
Install preventive devices and/or engineering controls, if necessary	WP	Observation	Compliance

Notes:
CFR = Code of Federal Regulations
ADEC = Alaska Department of Environmental Conservation
SSHP = Site Safety and Health Plan
WP = Work Plan

***REVIEW SIGNATURES*:**

CQC Manager	_____	Date:	_____
Site Manager	_____	Date:	_____
Site Safety and Health Officer	_____	Date:	_____

Submitted to Authorized Representative on _____

PREPARATORY PHASE CHECKLIST

Project Name: **WACS Aniak Middle School**
Project Number: _____

Definable Feature of Work: **Waste Material Transport and Disposal** Date _____

SEQUENCE OF WORK

CONTROL POINTS	CONTROL REFERENCE, LOCATION	TYPE OF INSPECTION	ACCEPTANCE CRITERIA, REFERENCE
Verify drums/bags identified and clean for shipment	WP	Observation	Compliance
Verify that labels and markers on drums/bags match shipping papers	WP, WMP	Observation	Compliance
Verify Contracting Entity signature on manifests	WP, WMP	Observation	Completion
Verify transporter 1 signs and accepts drums for shipment	WP, WMP	Observation	Completion
Track waste to ultimate treatment or disposal	WMP	Observation	Completion
Verify containers adequate for lading	WMP	Observation	Compliance

Notes:
WMP = Waste Management Plan
WP = Work Plan

PREPARATORY PHASE CHECKLIST
MEETING

Project Name: **WACS Aniak Middle School**
Project Number: _____
Definable Feature of Work: **Site Restoration and Demobilization** Date _____

AGENDA:

1. Review of contract, Work Plan
2. Definable Feature of Work (DFW)
3. Location of Site Affected
4. Relationship to other DFW
5. Sequence of Work
6. Personnel/Other Certification
7. Safety Hazards List
8. Equipment Certification
9. Permits Required
10. Testing Requirements
11. Review of Submitted Approval
12. Other

NAMES OF THOSE PRESENT:

Name	Affiliation	Name	Affiliation
1.		10.	
2.		11.	
3.		12.	
4.		13.	
5.		14.	
6.		15.	
7.		16.	
8.		17.	
9.		18.	

Points of Discussion:

_____

_____

_____

Authorized Representative Notified (Date): _____

Safety Features Reviewed by: _____

***REVIEW SIGNATURES*:**

CQC Manager _____ Date: _____

Site Manager _____ Date: _____

Site Safety and Health Officer _____ Date: _____

Submitted to Authorized Representative on _____

PREPARATORY PHASE CHECKLIST

Project Name: **WACS Aniak Middle School**
Project Number:
Definable Feature of Work: **Site Restoration and Demobilization** Date _____

SEQUENCE OF WORK

CONTROL POINTS	CONTROL REFERENCE, LOCATION	TYPE OF INSPECTION	ACCEPTANCE CRITERIA, REFERENCE
Verify overburden acceptability	WP, SAP	Observation	Compliance
Verify borrow source acceptability as backfill	WP	Observation	Compliance
Backfill material free of debris and vegetation	WP	Observation	Compliance
Backfill excavation	SSHP, WP	Observation	Compliance
Match pre-existing grade with no low spots	WP	Observation	Compliance
Equipment/material inventory performed	WP	Observation	Completion
Equipment/material removed from site	WP	Observation	Completion
Site secured	WP	Observation	Compliance
Appropriate signs and placards in place (if applicable)	WP, SSHP	Observation	Compliance
General housekeeping procedures complete	WP	Observation	Compliance
Verify waste accepted by first transporter	WMP	Observation	Compliance
Punch List Complete	Remediation Contractor QC Manual	Observation	100% completion

Notes:
SAP = Sampling and Analysis Plan
SSHP = Site Safety and Health Plan
WP = Work Plan

ATTACHMENT E-3

Initial Phase Checklist Form

Initial Phase Checklist

Project Name: **WACS Aniak Middle School** Date: _____
Project Number: _____
Definable Feature: _____
QA Rep Notified: Yes: _____ No: _____

I. Personnel Present:

	Name	Position	Company/Government
1.			
2.			
3.			
4.			
5.			
6.			

(List additional personnel on reverse side)

II. Identify full compliance with procedures identified during preparatory phase. Coordinate plans, specifications, and submittals, and ensure coordination with other definable features of work (DFWs).

_____
_____
_____
_____

III. Preliminary Work. Establish standard of workmanship and ensure preliminary work is complete and correct. If not, what action is taken?

_____
_____
_____
_____

IV. Check Safety. Review job conditions using EM 385-1-1 and job hazard analysis (Safe Plan of Action).

_____
_____
_____

_____
CQC Manager

ATTACHMENT E-4

Environmental Quality Control/Quality Assurance Report

(Phase Follow-up Form)

Environmental Quality Control/Quality Assurance Report

(ER 415-1-302)

Contract Number / Task Order Number | **UPC/Project Title**

CQC Report Number | **Date or Time Period** | **Location and Team**

Weather Conditions | **Contractor**

Temp Low _____ **Temp High** _____

Wind Speed _____ **Conditions** _____

Quality Control Inspections Performed This Date (Include inspections, results, deficiencies observed, and corrective action.)

Preparatory ☐ see attached checklist

Initial ☐ see attached checklist

Follow-Up ☐

Was the construction deficiency tracking list updated this date? **Yes** ☐ **No** ☐

Field Sampling and Testing

Has field testing been performed this date? **Yes** ☐ **No** ☐

Type of test	Method/Matrix	Results

Have Data Quality Objectives been achieved? **Yes** ☐ **No** ☐

Have Samples Been Collected for Laboratory Analysis? **Yes** ☐ **No** ☐

Type of Test	EPA Test Method/Matrix	Quantity of Samples

Have required amount of QC trip blanks and rinsates been achieved? **Yes** ☐ **No** ☐

Have appropriate QC laboratory tests been ordered ? (matrix spikes, method blanks, surrogates, reference standards, etc.) **Yes** ☐ **No** ☐

Have QA and QC samples been collected in the specified quantity**?** **Yes** ☐ **No** ☐

Have samples been properly labeled and packaged? **Yes** ☐ **No** ☐

Health and Safety

Worker protection levels this date: **Level A** ☐ **Level B** ☐ **Level C** ☐ **Level D** ☐

Was any work activity conducted within a confined space? **Yes** ☐ **No** ☐

Was any work activity conducted within an area determined to be immediately dangerous to life and health? **Yes** ☐ **No** ☐

Were approved decontamination procedures used on workers and equipment as required? **Yes** ☐ **No** ☐

Was a Job Safety Meeting held this date? **Yes** ☐ **No** ☐

Were there any lost time accidents this date? **(If YES, attach copy of completed accident report)** **Yes** ☐ **No** ☐

Was hazardous waste/material released into the environment? **Yes** ☐ **No** ☐

Safety Comments: (Include any infractions of approved safety plan, and include instructions from Government personnel. Specify corrective action taken.)

Work Activities Performed This Date

Reference (NAS ID #/Tech Spec #)	Activity & Location	Quantity	Subcontractor

Environmental Quality Control/Quality Assurance Report

(ER 415-1-302)

Manpower and Equipment

Labor			**Equipment**			
Classification	Number	Hours	Type	Hours Used	Hours Idle	Hours Repair

Total Hours_____ Total Hours_____

Material Received to be Incorporated into Job None ☐

Instructions Given by the Government to the Contractor (Include names, reactions, and remarks.) **Verbal** ☐ **Written** ☐ **None** ☐

Work Progress

Are there any Contractor caused delays?	**Yes** ☐ **No** ☐
Are there any Contractor-potential findings of fact?	**Yes** ☐ **No** ☐
Are there any Government caused delays or potential finding of fact?	**Yes** ☐ **No** ☐
Are there any Government-potential findings of fact?	**Yes** ☐ **No** ☐
Are there any unforeseeable or weather related delays?	**Yes** ☐ **No** ☐

Rework Items Identified Today **(Not corrected by COB)** **Rework Items Corrected Today** **(From Rework Items List)**

Remarks (Include any visitors to project and miscellaneous remarks pertinent to work.)

The above report is complete and correct, and all work reported is believed, to the best of my knowledge, to be in compliance with state and federal requirements, and the contract specifications.

CQC Manager Signature_____ **Date**_____

Site Manager Signature_____ **Date**_____

Contracting Entity Authorized Representative Quality Assurance Comments

Concurs with the QC report? **Yes** ☐ **No** ☐

Additional comments or exceptions:

Signature_____ **Date**_____ **Supervisor's Initial**_____ **Date**_____

ATTACHMENT E-5

Other Forms

Quality Control Nonconformance Report

Quality Control Nonconformance Report Register

QUALITY CONTROL
NONCONFORMANCE REPORT

CLIENT: _____ **PROJECT NO.:** _____

ITEM	NCR NO.
LOCATION	DATE
REF. DWG. CODE OR SPEC.	
NONCONFORMANCE	
QC INSPECTOR	DATE
DISPOSITION ☐ REPLACE ☐ REWORK ☐ REPAIR ☐ USE AS IS	
QC INSPECTOR/DATE AUTH. INSPECTOR/DATE	CLIENT REP./DATE
FINAL STATUS ☐ ACCEPT ☐ REJECT ☐ REMARKS	
FINAL ACCEPTANCE	
QC SUPERVISOR	DATE
AUTHORIZED INSPECTOR	DATE
CLIENT REPRESENTATIVE	DATE

QUALITY CONTROL
NONCONFORMANCE REPORT REGISTER

CLIENT: _____ **PROJECT NO.:** _____

LINE NO.	RECEIVING REPORT NO.: SITE	NCR NO.: SITE	REFERENCE DAILY INSPECTION REPORT NO.	NONCONFORMANCE REPORT DESCRIPTION	DATE ENTERED	DATE CLEARED

APPENDIX F

Site Safety and Health Plan

APPENDIX F

SITE SAFETY AND HEALTH PLAN

PCB-CONTAMINATED
SOIL REMOVAL

FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

Prepared for:
PRP Group

DRAFT-FINAL
January 2015

TABLE OF CONTENTS

SECTION **PAGE**

ACRONYMS AND ABBREVIATIONS ..... F-v

1.0 INTRODUCTION AND PURPOSE F-1-1

2.0 GENERAL PROJECT INFORMATION F-2-1

2.1 CONTAMINANTS OF CONCERN F-2-1

2.1.1 Polychlorinated Biphenyl: F-2-1

2.1.2 Trichloroethylene F-2-1

2.1.2 RCRA Metals (Arsenic, Cadmium, Chromium, Lead, Mercury, Selenium, Silver) F-2-2

2.2 PHYSICAL HAZARDS F-2-3

2.2.1 Remoteness F-2-4

2.2.2 Wildlife F-2-4

2.2.3 Uneven Terrain F-2-4

2.2.4 Weather Conditions F-2-4

2.2.5 Ambient Air Temperature Monitoring F-2-5

2.2.6 Pinches, Cuts, and Scrapes F-2-6

2.2.7 Lifting and Moving F-2-6

2.2.8 Confined Space Entry F-2-7

2.2.9 Heavy Equipment F-2-7

2.2.10 Fire and Hot Work F-2-8

2.2.11 Debris F-2-8

2.2.12 Excavation F-2-9

2.2.13 Loading, Hauling, and Staging Bags F-2-9

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES F-3-1

3.1 HEALTH AND SAFETY MANAGER (HSM) RESPONSIBILITIES F-3-1

3.2 SITE SAFETY AND HEALTH OFFICER (SSHO) RESPONSIBILITIES F-3-1

3.3 REMEDIATION CONTRACTOR RESPONSIBILITIES F-3-2

3.4 SUBCONTRACTOR RESPONSIBILITIES F-3-3

3.5 VISITOR RESPONSIBILITIES F-3-4

4.0 HAZARD ASSESSMENT CRITERIA F-4-1

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

5.0 PERSONNEL TRAINING....F-5-1
6.0 MEDICAL SURVEILLANCE PROGRAM....F-6-1
7.0 RESPIRATORY PROTECTION PROGRAM....F-7-1
8.0 PERSONAL PROTECTIVE EQUIPMENT....F-8-1
8.1 HEARING PROTECTION....F-8-1
8.2 EYE PROTECTION....F-8-2
8.3 PROTECTIVE CLOTHING....F-8-2
8.4 FOOT PROTECTION....F-8-2
8.5 HEAD PROTECTION....F-8-2
8.6 LEVELS OF PERSONAL PROTECTIVE EQUIPMENT....F-8-3
8.6.1 Modified Level D....F-8-3
8.6.2 Level C....F-8-4
9.0 SITE CONTROL....F-9-1
9.1 WORK ZONES....F-9-1
9.2 DUST CONTROL....F-9-1
9.3 COMMUNICATIONS....F-9-2
9.4 SITE SAFETY AND SECURITY....F-9-2
10.0 DECONTAMINATION PROCEDURES....F-10-1
10.1 PERSONNEL DECONTAMINATION....F-10-1
10.2 EQUIPMENT AND VEHICLE DECONTAMINATION....F-10-1
10.3 WASTE HANDLING AND DISPOSAL....F-10-2
11.0 INSPECTIONS....F-11-1
11.1 SITE INSPECTIONS AND SAFETY EVALUATION....F-11-1
11.2 EQUIPMENT INSPECTIONS....F-11-1
11.2.1 Daily/Shift Inspections and Tests....F-11-1
11.2.2 Vehicle Inspections....F-11-2
12.0 EMERGENCY PROCEDURES....F-12-1
12.1 PRE-EMERGENCY PLANNING....F-12-1
12.2 EMERGENCY EQUIPMENT....F-12-1
12.3 EMERGENCY COMMUNICATION....F-12-1

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

12.4 EMERGENCY PROCEDURES F-12-2
12.5 FIRE F-12-3
12.6 PERSONAL PROTECTIVE EQUIPMENT FAILURE F-12-3
12.6.1 Other Equipment Failure F-12-3
12.7 EVACUATION F-12-3
12.8 EMERGENCY RESPONSE AND ACCIDENT FOLLOW-UP F-12-4
12.9 EXPOSURE TO BLOODBORNE PATHOGENS F-12-4
12.10 VEHICLE ACCIDENT F-12-5
12.11 INJURY AND ILLNESS F-12-5
12.12 SPILL OR RELEASE PROCEDURES F-12-6
13.0 SITE POSTINGS F-13-1
14.0 REFERENCES F-14-1

TABLES

Table 1-1 Contact List and Emergency Contacts F-1-8
Table 2-1 Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (°F) F-2-6
Table 4.1 Hazard Assessment F-4-2
Table 7-1 Air Monitoring Requirements and Action Levels F-7-2

ATTACHMENTS

Attachment F-1 Clinic Location Map
Attachment F-2 Project-Site Orientation and Training
Attachment F-3 Hazard Communication Program
Attachment F-4 Project-Specific Forms

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ACGIH	American Conference of Government Industrial Hygienists
ANSI	American National Standards Institute
bags	LiftPacs, Super Sacks, or the equivalent
CFR	Code of Federal Regulations
COC	contaminant of concern
HSM	Health and Safety Manager
mg/m^3	milligrams per cubic meter
MSDS	Material Safety Data Sheet
OFR	Office of the Federal Register
OSHA	Occupational Safety and Health Administration
PADS	Physical Agent Data Sheet
PCB	polychlorinated biphenyl
PEL	permissible exposure limits
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
SM	Site Manager
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TCE	trichloroethene
TLV	threshold limit value
TWA	time-weighted average
VOC	volatile organic compound
WACS	White Alice Communications Site

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FORMER WHITE ALICE COMMUNICATION SITE ANIAK MIDDLE SCHOOL
PCB-CONTAMINATED SOIL REMOVAL
SITE SAFETY AND HEALTH SIGNATURE SHEET

This Site Safety and Health document addresses potential safety risks, work conditions, and contaminants of concern. This plan will be followed by anyone that is authorized by the Site Safety and Health Officer (SSHO), Health and Safety Manager (HSM), or the Site Manager (SM) to enter the project site. Safety shall be everyone's responsibility.

I HEREBY CERTIFY THAT I HAVE READ AND UNDERSTOOD ALL HEALTH AND SAFETY PROCEDURES AS STATED HEREIN:

Name and Affiliation	**Date**	**Signature**
Site Safety and Health Officer		
Health and Safety Manager		
Project Manager		
Site Manager		

Table F-1
Contact List and Emergency Contacts

CONTACT LIST			
Project Manager		Phone: Mobile:	
Site Safety and Health Officer		Phone Mobile:	
Site Manager		Phone: Mobile:	
CQC System Manager		Phone: Mobile	
Project Chemist		Phone: Mobile:	

EMERGENCY CONTACTS	
Aniak Subregional Health Clinic	907-675-4556 (8am-5:30pm, M-F) 907-676-0361 (after hours)
Yukon-Kuskokwim Delta Regional Hospital (Bethel)	907-543-6300
Providence Alaska Medical Center (ER -- Anchorage)	907-212-3111
Providence LifeMed Air Ambulance (24-hr MEDEVAC services)	800-478-5433
Alaska Regional (ER -- Anchorage)	907-264-1222
Poison Control Center	800-222-1222
Fire	907-675-4601
Transport and Evacuation	
Aniak Airport	907-266-0151
U.S. Coast Guard Search and Rescue	1-800-478-5555
Alaska State Troopers, Aniak Alaska State Troopers, Anchorage Alaska State Troopers, Bethel	907-675-4398 907-269-5511 907-543-2294
Spills and Toxins	
National Response Center (Oil and Toxic Chemical Spills)	800-424-8802
Poison Control Center	800-222-1222

1.0 INTRODUCTION AND PURPOSE

This Site Safety and Health Plan (SSHP) is Appendix F of the *PCB-Contaminated Removal Work Plan* for the former White Alice Communications Site (WACS) Aniak Middle School site in Aniak, Alaska. The purpose of this SSHP is to provide safety and health guidance and procedures for field activities at the site during PCB removal activities. A site location map is included in Appendix A as Figure A-1 to the *PCB-Contaminated Soil Removal Work Plan* (Work Plan).

This document is applicable to personnel and all other individuals authorized to access controlled site areas in order to conduct fieldwork. This plan complies with Occupational Safety and Health Administration (OSHA) regulations and with applicable sections of the Code of Federal Regulations (CFR) Title 29, Sections 1910.120 and 1926.65 (29 CFR 1910.120 and 1926.65) and the Office of the Federal Register (OFR) *Hazardous Waste Operations and Emergency Response* (OFR 2005).

Before entering the site, all personnel shall be briefed on this SSHP and commit to follow applicable procedures by signing the Site Project Safety and Health Agreement Signature Sheet (Attachment F-4). A copy of this SSHP and referenced documents shall be made available to all personnel at the site.

The Site Safety and Health Officer (SSHO) and the Health and Safety Manager (HSM) will maintain copies of this SSHP. Copies will be made available at the site with each work crew, as approved by the SSHO. Modifications due to changing field conditions will require approval of individuals identified in Table 1-1. Each supervisor, lead person, laborer, operator, and visitor will be held accountable for working safely and following procedures and guidance set forth in this SSHP.

The selected Remediation Contractor may revise this SSHP to meet their company-specific health and safety requirements but must follow applicable federal, state, and local regulations and guidance, as specified in the statement of work.

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2.0 GENERAL PROJECT INFORMATION

This project will excavate, containerize, transport, and dispose of PCB-contaminated soil from the former WACS Aniak Middle School in Aniak, Alaska. Excavations will be backfilled using site overburden soils determined to be clean by PCB confirmation sampling, as well as locally available, clean material from an offsite location. The town of Aniak is located in western Alaska approximately 300 miles west of Anchorage and 100 miles northeast of Bethel along the Kuskokwim River.

2.1 CONTAMINANTS OF CONCERN

PCBs are the main contaminant of concern (COC) at the project site. Although not the focus of work, volatile organic compounds (VOC), principally trichloroethene (TCE), along with elevated concentrations of lead and other metals, are known to be contaminants in soil at the project site and may be encountered during excavation activities. The primary chemical hazards to workers presented by site contamination are summarized below, and material safety data sheets (MSDS) are included in Attachment F-3:

2.1.1 Polychlorinated Biphenyl:

Hazards associated with PCBs include:

- Exposure routes: Inhalation; skin absorption; ingestion; skin and/or eye contact
- Symptoms: Irritation to eyes, skin, and mucous membranes; visual disturbances; irritation of the respiratory system; headaches; nausea; dizziness; and loss of coordination. Chronic effects include probable reproductive and developmental abnormalities. Probable human carcinogen.
- Target organs: Eyes; skin; respiratory system; central nervous system; liver; kidneys
  - OSHA Permissible Exposure Limits (PEL): 0.5 milligrams per cubic meter (mg/m^3) time-weighted average (TWA); American Conference of Government Industrial Hygienists (ACGIH) Threshold Limit Value (TLV): 0.5 mg/m^3

2.1.2 Trichloroethene:

Hazards associated with TCE include:

- Exposure routes: Inhalation; skin absorption; ingestion; skin and/or eye contact

- Symptoms: Irritation and corneal injury to eye; tearing; burning pain; dermatitis;, peripheral nervous system function impairment; temporary loss of touch; damage to the liver; chemical pneumonitis; irritation of digestive tract; central nervous system effects, such as nausea, headache, dizziness, unconsciousness and coma. Potential occupational carcinogen.
- Target organs: Eyes; skin; respiratory system; central nervous system; liver
  - OSHA PEL: 100 parts per million (ppm) TWA; ACGIH TLV: 50 ppm

2.1.2 RCRA Metals (Arsenic, Cadmium, Chromium, Lead, Mercury, Selenium, Silver):

Hazards associated with heavy metals include:

Arsenic

- Exposure routes: Inhalation; skin absorption; skin and/or eye contact; ingestion
- Symptoms: Ulceration of nasal septum; dermatitis; gastrointestinal disturbances; peripheral neuropathy; respiratory irritation; hyperpigmentation of skin. Potential carcinogen
- Target organs: Liver, kidneys, skin, lungs, lymphatic system
  - OSHA PEL: 0.010 mg/m^3 TWA ; ACGIH TLV: 0.1 mg/m^3

Cadmium (dust or fume)

- Exposure routes: Inhalation; ingestion
- Symptoms: Pulmonary edema; difficulty breathing; cough; chest tightness; substernal pain; headache; chills; muscle aches; nausea; vomiting; diarrhea; loss of the sense of smell; emphysema; proteinuria; mild anemia. Potential occupational carcinogen
- Target organs: Respiratory system; kidneys; prostate; blood
  - OSHA PEL: 0.005 mg/m^3 TWA; ACGIH TLV: 0.01 mg/m^3 (total particulate), 0.002 mg/m^3 (respirable particulate fraction)

Chromium

- Exposure routes: Inhalation; ingestion; skin and/or eye contact
- Symptoms: Irritation of eyes, skin; lung fibrosis
- Target organs: Eyes; skin; respiratory system
  - OSHA PEL: 1.0 mg/m^3 TWA; ACGIH TLV: 0.5 mg/m^3

Lead

- Exposure routes: Inhalation, ingestion, skin and/or eye contact
- Symptoms: Weakness, exhaustion, insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis wrist, ankles, encephalopathy, kidney disease, irritation eyes, hypertension

- Target organs: Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue
  - OSHA PEL: 0.05 mg/m^3 TWA ; ACGIH TLV: 0.05 mg/m^3

Mercury compounds [except (organo) alkyls]

- Exposure routes: Inhalation, skin absorption, ingestion, skin and/or eye contact
- Symptoms: Irritation eyes, skin; cough, chest pain, difficulty breathing, bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, weakness, exhaustion, stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
- Target organs: Eyes, skin, respiratory system, central nervous system, kidneys
  - OSHA PEL: 0.1 mg/m^3 TWA; ACGIH TLV: 0.1 mg/m^3

Selenium

- Exposure routes: Inhalation, ingestion, skin and/or eye contact
- Symptoms: Irritation eyes, skin, nose, throat; visual disturbance, headache, chills, fever, dyspnea, bronchitis, metallic taste, garlic breath, gastrointestinal disturbance, dermatitis; eye, skin burns,
- Target organs: Eyes, skin, respiratory system, liver, kidneys, blood, spleen
  - OSHA PEL: 0.2 mg/m^3 TWA; ACGIH TLV: 0.1 mg/m^3 (metal dust), 0.1 mg/m^3 (soluble compounds)

Silver (metal dust and soluble compounds)

- Exposure routes: Inhalation, ingestion, skin and/or eye contact
- Symptoms: Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance
- Target organs: Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue
  - OSHA PEL: 0.01 mg/m^3 TWA; ACGIH TLV: 0.1 mg/m^3 (metal dust), 0.1 mg/m^3 (soluble compounds)

2.2 PHYSICAL HAZARDS

The following sections discuss potential physical hazards associated with working on the former WACS Aniak Middle School site in Aniak, Alaska.

2.2.1 Remoteness

The project site is located in the community of Aniak in western Alaska. Although Aniak has a clinic, it does not have a hospital and is approximately 100 miles from Bethel and approximately 300 miles from a major medical facility in Anchorage. The relative remoteness of the community must remain in the forefront of workers' minds in the planning and safe execution of site activities. First-aid and limited emergency equipment will be available onsite. In case of emergency, the team will need to travel to the health clinic in Aniak for medical attention. In case of severe emergencies, site workers will require air transport to Bethel or Anchorage for medical attention.

2.2.2 Wildlife

At the site, personnel may encounter wild animals, such as moose, foxes, brown bears, and wolverines. Prudence should be exercised in any potential animal encounter. Workers shall maintain a safe distance from wild animals encountered at the site. Workers should avoid surprising wild animals. Workers shall calmly contact the Site Manager (SM) and/or co-workers in the area *as soon as possible* if a bear is sighted on or near the site.

For potential job sites that may require self-defense, personnel will be provided with an air horn, pepper spray, and safety whistles. The functionality of these safety tools shall be checked periodically and replaced if used in an emergency. All personnel shall be trained in the proper and safe operation of the equipment. Pepper spray should be carried on the belt or on another readily accessible location.

2.2.3 Uneven Terrain

Walking on uneven terrain and stairs can be difficult. Caution must be taken when traversing the site by foot.

2.2.4 Weather Conditions

Due to the constantly and rapidly changing weather in Alaska, personnel are to be advised of the need to dress warmly and in layers, with a waterproof and windproof outer shell. Adequate footwear is required. The need for adequate clothing shall be discussed at project-specific

planning meetings, the preconstruction meeting, site safety orientations, and daily safety meetings.

For the purposes of this SSHP, temperatures below -20 degrees Fahrenheit (°F) will be referred to as extreme cold weather, and temperatures above 80 °F will be referred to as extreme hot weather. Due to the location of Aniak, site personnel should be prepared for both hot and cold temperatures as well as the effects of wind chill throughout the course of the fieldwork. Wind effects on skin and threshold temperatures should be taken into account when assigning work activities.

Field personnel wearing additional personal protective equipment (PPE) during hazardous waste management activities may be susceptible to heat stress. Four environmental factors affect the amount of stress workers experience in hot work areas: temperature, humidity, sun (radiant heat), and wind. Additional stress levels are associated with age, weight, fitness, medical condition, and acclimation to heat. Symptoms of heat stress are heat rash (prickly heat), increased heart rate, loss of concentration, and irritability. These symptoms may lead to fainting or death. The following steps are recommended to reduce the risk of heat stress:

- Move to a cooler place.
- Reduce workload or pace.
- Rest in cool areas (may consider taking longer breaks and monitor stress).
- Wear lightweight clothing.
- Perform strenuous activities when sun is less intense or temperatures are cooler.
- Drink plenty of water (1 quart per person per hour).

2.2.5 Ambient Air Temperature Monitoring

When the ambient air temperature falls below 30 °F or rises above 80 °F, the SSHO will monitor the air temperature and provide work/rest regimens to the SM. Work/rest regimens will be based upon the guidelines in the ACGIH *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* (ACGIH 2010). Table 2-1 presents information regarding wind chill, which supervisors should take into account when assigning duties and arranging a warm up schedule.

Table 2-1
Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (°F)

Wind Chill Chart

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

2.2.6 Pinches, Cuts, and Scrapes

Employees shall inspect objects (e.g., equipment, tools, boxes, cut piping) for rotating parts, sharp points, sharp edges, nails, and possible pinch points that could injure hands, arms, feet, legs, or the body. The potential hazard shall be removed to the extent possible before handling the object. Work gloves shall be used to protect hands. Additionally, task-specific work gloves (e.g., cut-resistant) shall be used when appropriate.

2.2.7 Lifting and Moving

Proper techniques to lift and move objects are important to reduce the potential for back injuries. The following precautions should be implemented when lifting or moving heavy objects:

- Lift will be limited to a maximum of 50 pounds; 25 pounds or less is preferred.
- Identify the center of gravity and an acceptable handhold prior to lifting.

- If mechanical devices are not available, ask another person to assist you.
- Bend at the knees, not at the waist. Let your legs do the lifting.
- Do not twist while lifting.
- Bring the load as close to you as possible before lifting.
- When carrying heavy objects, be sure the path you are taking is free of obstructions and all slip, trip, and fall hazards.
- Use mechanical devices to move objects, investigation-derived waste, or generators that are too heavy to be moved manually.

2.2.8 Confined Space Entry

Confined spaces will not be entered during this project. During the course of excavation activities, an underground storage tank (UST) that has been used as a septic tank will need to be removed and cleaned. Cleaning will occur in such a way as to prevent confined space entry (e.g., cleaning from outside the UST, cutting the UST into pieces, etc).

2.2.9 Heavy Equipment

Working around excavating equipment is one of the more significant hazards associated with activities on this project. This section addresses the general safety procedures to be applied while working around heavy equipment.

Before any machinery or mechanized equipment is used, it will be inspected and certified to be in safe operating condition. A competent person will be designated to be responsible for the daily inspection of all machinery and equipment. Only designated and qualified personnel will operate machinery and mechanized equipment. Equipment deficiencies that affect safe operation will be corrected prior to continuing operation. The SM will determine the competent operator prior to the start of any heavy-equipment operations. Spotters will be used in congested or hazardous locations and during backing operations. The operator and the spotter will agree on hand signals prior to motion. Line of sight will be maintained at all times or motion will cease.

2.2.10 Fire and Hot Work

Fire extinguishers (Type A-B-C or B-C) less than 5 years old will be provided for each vehicle used onsite. They will be inspected prior to placement in a vehicle. Smoking is prohibited on the job site, and a designated smoking area will be established near the site. Flammable and combustible liquids (such as fuel) will be stored in approved containers (OSHA and National Fire Protection Association Code 30). A safety can or approved system will be used for dispensing flammable or combustible liquids; it will be stored in flammable storage cabinets or appropriate storage areas separated from occupied buildings. Flammable material will be separated from oxidizers by at least 20 feet. Vehicle fueling tanks will be grounded, and there will be bonding between the tank and vehicle being fueled. Spills will be cleaned up immediately and reported to the SM; residuals will be disposed of properly.

Prior to excavation in the former Septic System Area, fuel lines supplying the high school will need to be removed. The removal will be completed using non-sparking tools, when appropriate, to avoid accidental ignition. Fuel removed from the lines will be transferred back into the aboveground storage tanks, if possible, or stored in drums. These drums will be stored in a designated marked area and protected from potential damage. A minimum of two 20-pound fire extinguishers will be available onsite during the removal of the fuel lines and stored near the fuel drums at all times.

Hot work (e.g., welding, brazing, high-speed grinding, warming tooling with a weed burner, etc.) will require a trained fire watch and hot work permit issued by the SM or SSHO before work commences.

2.2.11 Debris

Sharp objects, including glass, metal, damaged vegetation, and wood debris may be present around the sites and near several of the offsite monitoring wells. Employees should be cognizant of these potential hazards and mitigate them as they are identified.

2.2.12 Excavation

Excavation activities at this site will commence at the former WACS Aniak Middle School site. If excavation(s) are 4 feet or greater in depth, all sides of the excavation will be cut back, at a minimum, 1:1 slope. Prior to excavation activities, the Work Plan will be reviewed and the following aspects of the excavation will be discussed:

- Specific methods of excavation
- Anticipated depths
- Sloping requirements
- Competent person
- Site layout for equipment, spoils and site controls
- Access, egress, and cave-in protection, if personnel will be entering the excavations
- Perimeter protection, warning, and barricades

2.2.13 Loading, Hauling, and Staging Bags

PCB-contaminated soil will be placed in bags designed from the containment of PCB-contaminated materials, such as Super Sacks, using an excavator and a loader. Once the bag has been filled to maximum capacity, it will be placed on a transport trailer and transported to the Barge Landing Area in Aniak. The containerized soil will be loaded onto a barge by means of another lifting rack on a wheel loader.

When lifting bags, all lifting loops, sleeves, or other lifting devices should be vertical so that no lateral forces will be created in the bag. Lifting loops must not be twisted, and bags should be raised and lowered smoothly. The loader must be at a complete stop before the bag may be raised or lowered.

When transporting bags, the sack must be held close to the mast of the loader to avoid destabilizing the vehicle. The load should not restrict the view of the driver, and the bag must not be dragged. To right a bag that has toppled on its side, a fabric sling must be laced through all the lifting loops to prevent damage to the loops.

Employees shall observe the handling instructions provided with the bags. Under no circumstances shall any person on site stand beneath a filled bag. Employees who are closing the top of a filled bag must maintain at least three points of contact between themselves and the bag to reduce the risk of falling.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section identifies the project organization and personnel responsibilities for the management and implementation of this SSHP.

Safety is an essential part of every worker and line-management function. Safety is the responsibility of each person to ensure that project personnel comply with all safety-related rules and requirements. The assignments in this section have been established to assist with the maintenance of a safe project site.

3.1 HEALTH AND SAFETY MANAGER (HSM) RESPONSIBILITIES

Site management shall have the following responsibilities:

- Understand Remediation Contractor policies, procedures, and this SSHP. Site management may apply more stringent policies or work practices, if deemed necessary.
- Effectively communicate and implement health and safety policies and procedures and this SSHP.
- Provide the resources necessary to maintain a safe and healthful work environment and ensure implementation of health and safety policies and procedures.
- Assign clear responsibilities necessary to achieve a safe and healthful work environment.
- Verify that subordinates and subcontractors are executing these responsibilities properly.
- Enforce health and safety policies and issue disciplinary actions and/or contractual actions when required.
- Ensure that health and safety deficiencies identified in audits and inspections are promptly corrected.

3.2 SITE SAFETY AND HEALTH OFFICER (SSHO) RESPONSIBILITIES

The SSHO monitors health and safety policy compliance on site and reports to the SM. As a member of the site management staff, the SSHO shall have the following responsibilities:

- Support and advise site management in its duty to implement health and safety policies and procedures.
- Assess the work to determine compliance with health and safety policies and procedures, promptly communicating concerns and recommendations to the SM for action.
- Take immediate action on any imminent danger observed.
- Review and approve PPE, safety equipment, and first-aid supplies.

- Ensure health and safety orientation of site employees and subcontractor personnel.
- Ensure prompt and adequate treatment for injured employees and subcontractor personnel.
- Ensure adequate investigation and analysis of accidents (injury and non-injury).
- Provide health and safety information for the education of managers, supervisors, and employees concerning:
  - Accident analysis (cause, trends, results, and corrective actions)
  - Analysis of inspection results and needed corrective actions
  - Safe work procedures
  - Health and safety training requirements
- Communicate and promote health and safety excellence recognition programs.
- Ensure preparation, submittal, and/or maintenance of required health and safety recordkeeping documentation such as inspection reports, training records, injury logs, accident investigation reports, etc.
- Provide health and safety evaluations of employees and supervisors to management as necessary.
- Lead by positive example.

3.3 REMEDIATION CONTRACTOR RESPONSIBILITIES

Remediation Contractor acceptance of the health and safety procedures and policies is the ultimate key to success of the health and safety program. Each employee shall perform the following responsibilities:

- Comply with procedures established for his/her safety and health and for preservation of the environment.
- Assist management and supervision in the positive development of co-worker attitudes toward health and safety and workplace morale.
- Suggest improvements in methods or procedures that prevent incidents and protect the environment.
- Stop, or bring to management's attention, any unsafe acts or conditions and any potentially harmful environmental practices.
- Immediately correct imminent danger situations (e.g., exposure to falls from elevations, electrocution hazards, exposure to unprotected excavations, etc.).

- Notify supervisor when there is insufficient understanding of:
  - Task(s) to be performed
  - Assigned safety equipment
- Promptly report to supervisor incidents or accidents involving personnel or property.
- Learn the approved health and safety safe practices for each work task and put them into practice.
- Ask for assistance from the supervisor or the health and safety department when unsure of a work task or its safe practice.
- Be attentive to safety discussions led by the supervisor, and request explanations of points not understood.
- Never attempt to perform a job alone when good judgment indicates assistance is needed.
- Inspect, use, and maintain the PPE provided.
- Be cautious in walking or moving around the work area to avoid slips, trips, or falls. Be especially cautious when weather conditions create a potentially slippery walking surface.
- Plan ahead and try to anticipate any potential hazards.

3.4 SUBCONTRACTOR RESPONSIBILITIES

Subcontractors will perform the following specific duties:

- Follow the requirements set forth in this plan.
- Attend the site-specific orientation (Attachment F-2).
- Provide the SSHO with copies of MSDS and Physical Agent Data Sheets (PADS) for hazardous chemicals and physical exposures brought to site (Attachment F-3).
- Agree to abide by this SSHP by signing the Site Project Safety and Health Signature Sheet (Attachment F-4) before working onsite.
- Provide the SSHO with copies of required training certifications and medical authorizations to work onsite, including those required by 29 CFR 1910.120(e) and (f) (OFR 2005).
- Ensure workers are trained in safe and proper use of all tools they may use.
- Appoint an onsite Competent Safety Representative for each job site.
- Provide all necessary PPE to employees and ensure its proper use.
- Maintain all necessary records and submit required reports.
- Conduct daily safety briefings.
- Obtain all work permits as required.
- Conduct safety inspections on a daily basis and promptly correct unsafe conditions.
- Conduct regular inspections of equipment. Defective or unsafe equipment must be red-

tagged and immediately taken out of service or repaired.

- Provide inspection documentation and corrective actions to the SSHO on a weekly basis.
- Provide other subcontractor information and subcontractor safety performance requirements, as required.

The SM will inform the subcontractor foreman or leader of any safety and health violations. The SSHO or SM can halt subcontractor work under eminently dangerous conditions and resume work when the unsafe condition is corrected. Repeated violations could cause termination of the subcontract.

3.5 VISITOR RESPONSIBILITIES

A visitor entering a controlled area at the site must:

- Provide the SSHO with copies of required training certifications and medical authorizations, as required by 29 CFR 1910.120 (e) and (f) (OFR 2005);
- Provide the SSHO with copies of MSDS and PADS for any hazardous chemicals brought to the site by the visitor and physical agents caused by the visitor's activities; and
- Comply with the provisions of this SSHP.

Visitors must obtain clearance from the SSHO and sign the Site Project Safety and Health Signature Sheet (Attachment F-4) before entering controlled areas. Visitors will receive a job-specific safety briefing and will be escorted at all times while in controlled areas. Visitors requiring PPE must have the appropriate training and PPE to gain entry to the site. The Remediation Contractor will not be responsible for distributing or obtaining PPE for visitors.

4.0 HAZARD ASSESSMENT CRITERIA

A preliminary hazard assessment of anticipated activities is summarized in Table 4-1 below. As personnel undertake specific activities, they are to assess site conditions and verify that protective measures are in place to mitigate incidents and that required resources are available for the specific activities. Any identified hazards should be brought to the attention of the SM or SSHO immediately, so a stop work order can be issued and/or a plan for protective measures can be initiated until the hazard is mitigated.

At the beginning of each work shift (or more frequently if site conditions indicate additional monitoring is necessary), the SSHO will conduct an area survey to identify hazards and determine appropriate protective measures. The project area will be inspected periodically thereafter for the presence of new physical, biological, and/or chemical hazards.

Table 4-1
Hazard Assessment

Feature of Work	Hazards	Mitigation
General Site Work	Slips, trips, and falls Contact with COCs Working around heavy equipment Working at a remote site	Avoid and mitigate slip and trip hazards. Use caution when walking on uneven terrain. Wear appropriate PPE and be aware of material hazards when working with any chemicals. When working around heavy equipment, maintain visual or audio contact with the equipment operator when in proximity to equipment. Wear high-visibility vest, safety-toed boots, safety glasses, and hard hat. Remain aware of increased hazards associated with requiring transport to offsite medical care.
Mobilization, Site Setup, Excavation	Riding in small planes Construction hazards COCs related to site not addressed under this cleanup plan	Learn emergency procedures from vessel pilot before departure and ensure safety equipment is in place. Remain alert when working around heavy equipment and changing site conditions. Be aware of metal and other contaminated areas. Mitigate potential for exposure and spreading contamination by marking or avoiding areas.
Environmental Media Sampling	Slips, trips, falls Contact with COCs Contact with preservatives Broken glassware	Be aware of material hazards. Wear appropriate PPE. Handle, pack, and unpack glassware carefully. See General Site Hazards.
Excavation Operations	Working around heavy equipment Cave-ins Contact with COCs	Maintain visual or audio contact with the equipment operator when in proximity to equipment. Wear high-visibility vest, safety-toed boots, safety glasses, and hard hat. Inspect the excavation perimeter daily for signs of possible cave-ins. Verify that the excavation is protected from cave-ins and that proper access and egress is provided prior to entering an excavation. Protect workers, visitors, and vehicles from falling into the excavation with warning signs and barricades. Check breathing zone for VOCs.
Waste Management	Contact with COCs Handling drums Loading bags onto barge	Avoid heavy lifting. Look for potential pinch points when working with drums. Wear appropriate PPE for the identified contaminant. See General Site Hazards. Remain alert around heavy equipment, and do not stand underneath or in the path of Super Sacks that are being transported by heavy equipment.
Demobilization	Riding in small planes Construction hazards	Follow procedures for working in and traveling to remote sites in aircraft as listed under Mobilization.

5.0 PERSONNEL TRAINING

Field personnel will have completed the OSHA required 40-hour training in Hazardous Waste Site operations and the yearly 8-hour refresher course update. Prior to start-of-work activities, all personnel working on this project and any new personnel visiting or conducting work on this project shall be briefed on this SSHP. All personnel shall sign the Site Project Safety and Health Signature Sheet (Attachment F-4, Exhibit 1) indicating they have read this SSHP and understand the requirements contained therein. Field personnel will also be trained in the proper use of the required PPE, outlined in Section 8.0.

Prior to work, a daily safety meeting will be held to discuss planned work activities, safety precautions, emergency response updates, employee concerns, site conditions, monitoring results, injury/illnesses that may have occurred, exclusion zone entries, client issues, and other topics of concern to employees. Safety meetings should precede daily work activities, led by the subcontractor with assistance from the SM and the SSHO. The *Site Safety Meeting and Exclusion Zone Entry Log* (Attachment F-4, Exhibit 1) will be used to document the meeting.

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6.0 MEDICAL SURVEILLANCE PROGRAM

This SSHP is intended as a personnel resource. This plan brings together site- and task-specific procedures to create a concise and relevant document designed for usability by all members of the Aniak project team.

All field personnel shall participate in a medical surveillance program. Subcontractors must provide documentation (e.g., a physician's letter) to the SSHO acknowledging employee participation in the medical surveillance program and evidence that each employee has been medically authorized to be onsite during the designated field season. All field personnel with medical limitations are responsible for presenting official medical documentation to the SM and the SSHO of said limitations, so work tasks can be appropriately assigned. Medical authorizations will be retained in field files for the duration of the project. For guidance, the SSHO may contact a medical consultant for issues such as chemical exposure, necessary medical testing, presence of onsite pesticides, and determining baseline cholinesterase levels. Each employee is responsible for notifying the SM or SSHO if an incident or exposure occurs. To monitor exposure to hazardous materials, a monthly Hazardous Material Exposure and Field Activity Report form (Attachment F-4, Exhibit 1) may be required.

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7.0 RESPIRATORY PROTECTION PROGRAM

All employees will be provided protection from occupational exposures where potential hazards exist for exposure to dusts, fumes, mists, radionuclides, toxic gases, vapors, or oxygen deficiency. Where feasible, exposure to contaminants at concentrations presenting potential health hazards will be eliminated by engineering controls. When effective engineering controls are not feasible, use of personal respiratory protective equipment may be required to achieve this goal.

Given the concentrations of PCBs found in the soil and the work procedures that have been developed, it is unlikely airborne concentrations will approach action levels or permissible exposure limits for PCBs during field activities. Total dust levels will be used as a surrogate measure to verify that worker exposure to PCBs is not a concern using PCB concentration as a percentage of the total particulate in the air. The ACGIH recommended permissible exposure limit for particulates not otherwise specified (general dust) is 10 mg/m^3. A Thermo pDR1000AN dust monitor will be used to establish dust in air.

The following action levels have been established to maintain worker safety:

- Sustained results greater than 5 mg/m^3, application of water spray to active work area (excavation area)
- Sustained results greater than 10 mg/m^3, application of water spray to active work area (excavation area and haul route)

TCE is a COC at the Former Septic System Area. Therefore, field crews will use a photoionization detector (PID) equipped with a 10.6-electron-volt lamp as the primary method of air monitoring for TCE. Based on historical monitoring data, the PID is considered protective of site personnel. This method is not considered a quantitative tool, but is the most readily available indicator of organic vapors in the atmosphere. Prior to PID use, background levels must be established by monitoring outside the exclusion zone or controlled area and upwind of the site. The PID reads in units of ppm, and the readings should be sustained for one minute to determine exposure. Air monitoring results will be documented in the field logbooks or on monitoring forms. Monitoring instruments will be calibrated in accordance with manufacturer

instructions. Calibrations will be documented in the field logbooks or on calibration forms. The action levels for PID readings are shown in Table 7-1.

Table 7-1
Air Monitoring Requirements and Action Levels

Instrument and Target Gas	Tasks	Action Levels	PPE or Response	Frequency[1]	Calibration[2]
PID for VOCs (TCE), minimum 10.6 electron volts, calibrated with isobutylene	All tasks	0-10 ppm breathing zone 10-25 ppm breathing zone 25-50 ppm breathing zone >50 ppm breathing zone Measurements are relative to background	Level D Level C Level B; stop and re-evaluate Stop work; re-evaluate	Monitor the breathing zone at the beginning of operations and whenever site conditions change. Levels C and B require continuous monitoring.	Daily

8.0 PERSONAL PROTECTIVE EQUIPMENT

Workers are required to protect themselves from chemical and physical hazards. In accordance with OSHA 29 CFR 1910, Subpart I (Personal Protective Equipment), appropriate PPE will be provided for each worker, properly sized, and used and maintained in a sanitary and reliable condition. PPE will be of design, material, and construction to protect workers from known or anticipated hazards.

In general, field personnel shall wear the following PPE when onsite:

- Safety glasses with side shields or wrap-around design
- Hard hat
- Safety-toed boots
- High-visibility/reflective vest
- Gloves appropriate for the task

Additional PPE (e.g., neoprene boots, impervious gloves, Tyvek coveralls) may be required for specific tasks or if conditions change.

8.1 HEARING PROTECTION

Adequate hearing protection is required in all areas that may expose workers to high levels of noise. This includes work areas around drill rigs and various other forms of noise-generating equipment. Loud noises are considered any noise over 85 decibels. From an arm's length away, if you have to raise your voice to be heard, you may need hearing protection. Hearing protection includes one or a combination of the following:

- Engineering controls (where feasible)
- Ear plugs
- Ear muffs

8.2 EYE PROTECTION

Eye protection (American National Standards Institute [ANSI] Z87.1 or equivalent) is required in all work areas. Eye protection may include the following devices:

- Safety glasses with rigid side shields (basic protection; the minimum required when onsite)
- Chemical goggles (splash, dust, and foreign-object protection for the eyes)
- Face shields with safety glasses or goggles underneath (splash, dust, and flying-particle protection for the whole face)

Fogging of eye protection is exacerbated by cold weather. Mitigate by applying an anti-fog treatment to the lenses or shield and selecting safety glasses that provide maximal ventilation while still meeting industry standards.

8.3 PROTECTIVE CLOTHING

Clothing sufficient to protect workers from contact with substances, such as petroleum or heat and cold is required. When gross contamination is encountered (e.g., during drilling and sampling), clothing required for preventing contact with hazardous substances may include the following items:

- Rain gear or Tyvek coveralls (poly-coated for liquid contact)
- Neoprene boots or poly-coated Tyvek booties
- Nitrile gloves, nitrile gloves over cotton gloves, or leather gloves over nitrile gloves
- Cut-resistant gloves (e.g., when using a self-retracting utility knife or handling opened core sleeves)

8.4 FOOT PROTECTION

Safety-toe footwear (ASTM F2413 or equivalent) is required in all work areas. Safety-toe footwear must extend 2 inches above the ankle and have a defined heel.

8.5 HEAD PROTECTION

Hard hats (ANSI 789.1 or equivalent) shall be worn at all times where overhead hazards exist (e.g., construction, environmental remediation, etc.) Hard hats shall be worn as designed by the

manufacturer. The hat shall be worn with the bill facing forward, and the adjustable ratchet on the rear side of the wearer's head.

8.6 LEVELS OF PERSONAL PROTECTIVE EQUIPMENT

Activities in Aniak will most likely be conducted using modified Level D PPE. Level C PPE may be used if action levels presented in Table 7-1 are exceeded, but this is highly unlikely. If air monitoring results indicate that Level C PPE or higher is needed, then the work procedures will be reevaluated and modified to reduce exposure before continuing.

8.6.1 Modified Level D

Modified Level D PPE will be used for most fieldwork conducted for this project. A work uniform affording minimal contaminant protection is needed for nuisance levels only. The following constitute modified Level D PPE:

- Work clothes (e.g. coveralls)
- Task-appropriate gloves
- Safety-toe boots
- Boots, outer, chemical-resistant (disposable) (optional, as applicable)
- Boot-covers, outer, chemical-resistant (disposable) (optional, as applicable)
- Tyvek suit when there is a high potential for contacting contaminated media (e.g., during decontamination activities)
- Safety glasses with side protection (chemical splash goggles or face shield as applicable)
- Hard hat
- High-visibility outer wear (vest or jacket)
- Bug jacket (optional, for summer work in vegetated areas)
- Escape mask (optional, as applicable)

Additionally, clothing will need to provide adequate protection from inclement weather, which can occur year-round in Aniak.

8.6.2 Level C

Level C PPE is not anticipated to be required during this field effort but may be used at the discretion of the SSHO or if action levels are exceeded. Level C is appropriate when the concentration(s) and type(s) of airborne substance(s) are known and the criteria for using air-purifying respirators are met. The following equipment added to the modified Level D ensemble constitutes Level C PPE:

- Full-face or half-mask air-purifying respirator (National Institute of Occupational Safety and Health [NIOSH]-approved) with cartridges appropriate for the contaminants encountered
- Hooded chemical-resistant clothing (e.g., overalls, two-piece chemical splash suit, disposable chemical-resistant overalls) (optional, as applicable)
- Gloves, outer, chemical-resistant (optional, as applicable)
- Gloves, inner, chemical-resistant (optional, as applicable)

9.0 SITE CONTROL

Access and egress to and from the site will be controlled. Visitors will either be asked to sign a log and/or their visit will be recorded in field logbooks. “Authorized personnel only” signs will be posted at site entrances. Fencing, caution tape, or other materials will be used to set a safety perimeter if there are unsafe conditions present (e.g., an open excavation). Prior to activities at the site, all personnel will be required to attend a site-specific safety briefing, at which details of this SSHP will be covered.

Effective site control procedures will reduce the potential exposure of the project team, other workers in the vicinity, and the surrounding environment to the onsite hazards. Site control includes the following activities:

- Limiting site access to essential personnel
- Establishing work zones within the site and documenting personnel entering and exiting the exclusion zones
- Alerting personnel to the presence of wildlife in the area
- Conducting operations in a manner that reduces the exposure of personnel and equipment and eliminates the potential for offsite dispersion of contaminants
- Establishing decontamination procedures for personnel and equipment

9.1 WORK ZONES

Clearly delineated work zones help ensure the following:

- Site personnel are adequately protected from existing hazards
- Specific activities and hazards are confined to the appropriate areas
- Personnel can be accurately and quickly located and evacuated during an emergency
- Vehicles or all-terrain vehicles will be staged to provide efficient evacuation due to wildlife or other emergencies.

9.2 DUST CONTROL

All excavations, embankments, stockpiles, access roads, plant sites, waste areas, and work areas will be maintained to prevent excess dust from becoming a hazard or nuisance. Dust control measures, such as sprinkling with water, will be performed as work proceeds and whenever a

dust nuisance or hazard occurs. Any dirt or mud that is tracked onto roadways will be cleaned away within the day it is deposited.

9.3 COMMUNICATIONS

Communication among personnel at the project site will be conducted verbally, and/or visually and/or using hand signals, as well as with two-way (common-band-frequency) radios. Verbal communication at the sites may be impaired by onsite background noise caused by heavy equipment and use of PPE. Hand signals to be used among personnel within the exclusion zone will be reviewed during tailgate safety meetings to be conducted before starting work. Communication with personnel not located at the project site will be made via radios or cellular telephones.

9.4 SITE SAFETY AND SECURITY

Site security is essential for the following reasons:

- Preventing unauthorized, unprotected, or unqualified people from exposure to site hazards
- Maintaining established and safe working procedures
- Protecting personnel from wildlife

Site safety and security will be maintained by:

- Limiting access at control points to authorized and essential personnel
- Closing road to through traffic until excavation activities are complete; alternate roads are available for use by limited local traffic
- Assigning the responsibility for enforcing exit and entry requirements
- Requiring the SSHO to approve all visitors to the site

10.0 DECONTAMINATION PROCEDURES

Decontamination protects workers, the public, and the environment by limiting exposure to harmful substances and by preventing the spread of contamination. The SSHO will oversee decontamination procedures to determine their effectiveness and will take corrective actions to rectify any deficiencies.

10.1 PERSONNEL DECONTAMINATION

At areas where an exclusion zone is necessary, all personnel exiting an exclusion zone will follow decontamination procedures. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the exclusion zone before decontamination. The SSHO may approve simplification of the procedures in the field when a determination has been made that decontamination procedures can be less stringent.

Decontamination procedures upon exiting PCB-contaminated sites are as follows:

- Wipe gross contamination from clothes and equipment.
- Scrub boots and gloves in decontamination solution or detergent water, if necessary.
- Step across to the next station and remove coveralls and gloves, if necessary. Deposit in container with plastic liner. Remove coveralls (if applicable) after gloves.
- Remove respirator, if necessary, avoiding touching face with fingers.
- Wash hands and face thoroughly.

10.2 EQUIPMENT AND VEHICLE DECONTAMINATION

Small instruments and equipment will be protected from contamination by draping, masking, or otherwise covering the instruments with plastic to the degree possible without hindering the operation of the unit. Contaminated protective coverings will be removed from the equipment and disposed of in the appropriate containers. Any dirt or obvious contamination on the equipment will be dry brushed or wiped with damp disposable wipes, and the equipment will be dried. The units will be checked, field calibrated, and recharged, if necessary, for the next day's operation.

Equipment used onsite will undergo decontamination prior to leaving the site to eliminate contaminant migration from the site, as well as the potential for cross-contamination of sites. Gross decontamination includes the removal of potentially contaminated materials by use of a shovel or other hand tools and stiff bristle brushes. Equipment used in or driven across PCB source areas will be brushed off onto plastic tarps (dry decontamination) prior to moving to other sites. All materials removed during gross decontamination will be accumulated and managed with similar waste streams, according to the project-specific waste management plan.

10.3 WASTE HANDLING AND DISPOSAL

Waste generated onsite from field activities includes investigation-derived waste, PPE, laboratory waste, field trash, and office trash. Wastes will be containerized, transported to the designated waste staging area, and shipped offsite for disposal. Waste streams that are scented and/or attractive to wildlife shall be contained in an approved, wildlife-proof waste container. Disposal of all wastes will be in accordance with state and federal requirements.

11.0 INSPECTIONS

This section describes site and equipment inspections to be performed on a routine basis at the project site.

11.1 SITE INSPECTIONS AND SAFETY EVALUATION

The following inspections are required:

- The SSHO shall conduct daily safety inspections of the site. Observations noted during the inspection and documented in a form, such as the Daily Quality Control Report (as detailed in the Work Plan Contractor Quality Control Plan, Appendix E) will be provided to ADOT&PF.

The SM shall conduct a safety review of the job site before any new phase of work is initiated and periodically thereafter.

All site inspection results should be reviewed with the Project Manager and site personnel, as applicable. All deficiencies will be corrected. Serious deficiencies must be corrected immediately.

11.2 EQUIPMENT INSPECTIONS

Any machinery or mechanized equipment shall be inspected and tested by a competent person and determined to be in safe operating condition prior to use at the site. Inspections and tests shall be in accordance with the manufacturer's recommendations and shall be documented. Records of tests and inspections shall be maintained at the project office.

11.2.1 Daily/Shift Inspections and Tests

All machinery and equipment shall be inspected daily when in use to ensure safe operating conditions, as indicated below:

- Tests shall be conducted at the beginning of each shift during which equipment is in use to determine that brakes and operating systems are in proper working condition and that all required safety devices are in place and functional.
- Whenever any machinery or equipment is found to be unsafe, or when a deficiency affecting the safe operation of equipment is observed, the equipment shall be immediately taken out of service and its use prohibited until unsafe conditions have been corrected.

- A tag indicating that the equipment shall not be operated shall be placed in a conspicuous location on the equipment and the tag shall not be removed until the deficiency is corrected and verified (see below). Where required, lockout/tagout procedures shall be followed.
- The tag shall remain in its attached location until it is demonstrated to the individual who found the equipment unsafe that the equipment is safe to operate.

When deficiencies are corrected, the machinery or equipment shall be re-tested and re-inspected before being returned to service.

11.2.2 Vehicle Inspections

All motor vehicles owned or rented will be inspected prior to use. All deficiencies found during the inspection will be noted and corrected prior to use of the equipment. Attachment F-4 contains the vehicle inspection form. Vehicles that cannot be brought to safe operating condition will not be used. In addition to pre-use inspections, the vehicle's primary driver will be responsible for ensuring scheduled and periodic maintenance to ensure safe operable conditions. At no time will anyone operate a vehicle he/she believes to be unsafe.

12.0 EMERGENCY PROCEDURES

The following sections describe pre-emergency planning, emergency equipment, emergency communication, emergency procedures, response and accident follow-up, evacuation information and vehicle accident procedures.

12.1 PRE-EMERGENCY PLANNING

The Aniak Subregional Health Clinic is the nearest medical support facility and is located in the southeast area of Aniak, southwest of the east end of the runway. The clinic has an available ambulance. The nearest hospital is located in Bethel at the Yukon-Kuskokwim Delta Regional Hospital or at Providence Hospital in Anchorage.

The on-call providers at the Aniak Clinic include a physician assistant, a nurse practitioner, and community health workers. A volunteer ambulance service can be requested by calling the Aniak Clinic at 907-675-4556 between the hours of 8 a.m. and 5:30 p.m., Monday through Friday, or at 907-676-0361 at other times. Emergency evacuation service to hospitals in Bethel or Anchorage is available, with higher need patients airlifted to Anchorage. Attachment F-1 contains a map showing the clinic location.

12.2 EMERGENCY EQUIPMENT

A first-aid kit will be kept onsite in each field vehicle. A 16-pound A-B-C or B-C fire extinguisher will be available inside the school buildings during all site work.

12.3 EMERGENCY COMMUNICATION

In addition to communication methods described in the SSHP, the following communication and contact methods will be used:

- If cellular telephone services are unavailable, field personnel will utilize two-way radios or the VHF radio to inform crews at the field office, so emergency personnel can be contacted.
- Air horn or safety whistle blast

The following visual hand signals will be used:

- Clutching throat = Personal distress

- Arm waving and pointing toward the exit direction = Evacuate the area

When placing a call for emergency response, report the following information:

- Location of accident or injury
- Your name
- Your company's name
- Type of emergency and perceived severity
- Time of incident
- Type of first-aid or response being given

DO NOT HANG UP until the operator or emergency dispatcher has received complete information and directs you to hang up.

Notify the SSHO and/or the SM and your immediate supervisor immediately after hanging up the phone. Further information or assistance may be needed from you to complete the accident investigation process.

12.4 EMERGENCY PROCEDURES

Should a person become injured, site personnel, along with the SSHO, will determine the severity of the injury(s) sustained. If the victim cannot be treated onsite, evacuation will likely be necessary. Onsite personnel are to call the Aniak Clinic at 907-675-4556 in the event of a medical emergency. The emergency medical responders will then decide where to transport the injured person. In the event a serious injury occurs and further treatment is needed, evacuation to Anchorage will be arranged. Attachment F-1 contains a map of the clinic location.

An *Authorization for Medical Treatment* form (Attachment F-4, Exhibit 6) shall be taken with the employee to the destination medical facility. The site personnel shall complete the top portion of the form, and the doctor at the medical facility shall complete the bottom portion of the form. The SM shall perform the following actions:

- Secure the accident area and complete an accident report with all applicable witness statements.
- Prepare figures depicting the general site layout, directions, emergency contacts, and the location of the medical facility.

12.5 FIRE

Upon notification of a fire, all field crews will assemble at the predetermined point onsite. While hot work is in progress, the equipment necessary to prevent the spread of any fire in remote locations will be available onsite at all times.

A fire watch shall be assigned while hot work is in progress. A *Welding/Brazing/Hot Work Permit* (Attachment F-4, Exhibit 8) shall be completed and approved by the SSHO prior to hot work activities. Upon completion of hot work, the fire watch shall keep watch for an additional 30 minutes to ensure fire does not develop.

12.6 PERSONAL PROTECTIVE EQUIPMENT FAILURE

If any site worker experiences a failure of PPE, that person and his/her buddy will immediately leave the exclusion zone through the decontamination area. The SSHO shall be notified of any defect or failure of PPE. Reentry into the exclusion zone will not be permitted until the equipment has been properly repaired or replaced.

12.6.1 Other Equipment Failure

If other equipment onsite fails to operate properly, the equipment shall be red-tagged and removed from service and the SSHO notified. After completion of repairs, the equipment shall be re-inspected and evaluated and appropriate actions taken. The SSHO will evaluate the safety hazards to site personnel before continuing operations.

12.7 EVACUATION

This site is susceptible to tsunami and earthquake danger, and other hazards that could require evacuation. All site personnel will be familiar with emergency evacuation procedures. These procedures will be covered at site safety orientations and reviewed periodically during daily tailgate meetings.

If an evacuation of the work area is necessary, the following steps should be followed:

- After receiving the signal to evacuate, all non-response personnel are to leave the work area, in an upwind direction, and assemble at a predetermined point.

- The supervisor will account for field team members at the assembly points.

The supervisor will complete an incident report with applicable witness statements as soon as possible after any incident.

Evacuation routes and assembly points shall be designated to facilitate access and provide direction for emergency responders. All onsite personnel will be advised of evacuation routes and assembly points during the safety orientation and/or daily tailgate meetings. The SSHO or SM shall document the actual evacuation routes and assembly points, whenever evacuation occurs.

12.8 EMERGENCY RESPONSE AND ACCIDENT FOLLOW-UP

Following an incident or emergency, the SM or designee shall directly notify the HSM, the Project Manager (PM), and the client as soon as possible. The SM shall be prepared to provide the following information:

- SSHO name
- Project name and number
- Exact location of incident
- Name of victim and their employer
- Nature and extent of injuries
- The name and address of medical facility (if personnel were transported offsite)
- The name of physician providing offsite care
- A phone number where the SSHO can be contacted during the 24 hours following the incident

12.9 EXPOSURE TO BLOODBORNE PATHOGENS

The following procedures will be implemented when potential exposure to bloodborne pathogens occurs:

- The SSHO must be notified immediately when a first-aid incident occurs.
- The SSHO shall provide a report to the HSM, as required by reporting procedures.
- The report shall include names of all first-aid providers who rendered assistance, as well as a description of the incident, including time, date, and types of barriers used.

- If a bloodborne pathogen or other potentially infectious material exposure has occurred, the description of the incident (above) must include an exposure summary. This summary is necessary to ensure proper post-exposure evaluation and prophylaxis occurred, and that follow-up procedures were made immediately available, as per UXB-K policy requirement.
- The report shall be recorded on the first-aid register.

A Hepatitis B vaccination must be offered to all workers who have occupational exposure to blood or other potentially infectious materials.

A government-designated representative will also be notified if any of following events occur:

- Fatal injury
- One or more persons admitted to a hospital
- Property damage in an amount specified by the designated authority

Daily records of all first-aid treatments not otherwise reportable shall be maintained on prescribed forms and provided to the HSM weekly.

12.10 VEHICLE ACCIDENT

The SM and SSHO shall be promptly notified of any accidents involving vehicles. The SM will be responsible for notifying the PM, HSM, and the client representative. A determination of operator drug testing will be made at that time.

12.11 INJURY AND ILLNESS

An initial accident investigation will begin as soon as the incident is reported. At minimum, the following actions will occur:

- The scene will be secured with no movement of material or equipment until a review of the accident is completed.
- Signed statements from witnesses will be obtained.

If an employee requires medical treatment, the Authorization for Medical Treatment form (Attachment F-4) shall be completed. This form should be delivered to the HSM as soon as possible.

12.12 SPILL OR RELEASE PROCEDURES

The SSHO and SM shall be notified immediately when a spill or release occurs. The SSHO or SM shall notify the PM and client as soon as the site is under control. Regulatory agencies will be notified by the PM or the client. Appropriate methods to contain, control, or remove product released shall be followed by personnel involved. Personnel involved with contaminant cleanup shall wear appropriate PPE.

13.0 SITE POSTINGS

The following employment-related posters are required to be displayed prominently at each field office:

- Employee Polygraph Protection Act
- Notice To Employees-Federal Minimum Wage
- You Have A Right To A Safe And Healthful Workplace
- Equal Employment Opportunity Is The Law
- The Alaska Human Rights Law & Federal Law Prohibit Sexual Harassment
- Sexual Harassment Policy
- Unemployment Insurance
- Family and Medical Leave Act
- Safety and Health Protection on the Job
- Alaska Wage and Hour Act
- Notice of Insurance
- Uniformed Services Employment and Reemployment Rights Act
- Map denoting route to nearest care facility
- Emergency phone numbers
- Copy of SSHP
- OSHA 300A Form
- Copy of Deficiency Tracking Log
- Safety and health promotional posters
- Date of last lost workday injury

(intentionally blank)

14.0 REFERENCES

ACGIH (American Conference of Government Industrial Hygienists). 2010. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*. American Conference of Governmental Industrial Hygienists.

Benedetti, Robert P. 2003. *Flammable and Combustible Liquids Code Handbook*. National Fire Protection Association. 4th edition. 2003.

Flexible Intermediate Bulk Container Association. 1998. *Common Sense Handling Guidelines for Flexible Intermediate Bulk Containers*.

OFR (Office of the Federal Register). 2005 (October). *Hazardous Waste Operations and Emergency Response*. National Archives and Records Administration. 29 CFR 1910.120, 1926.65, and 1910.106.

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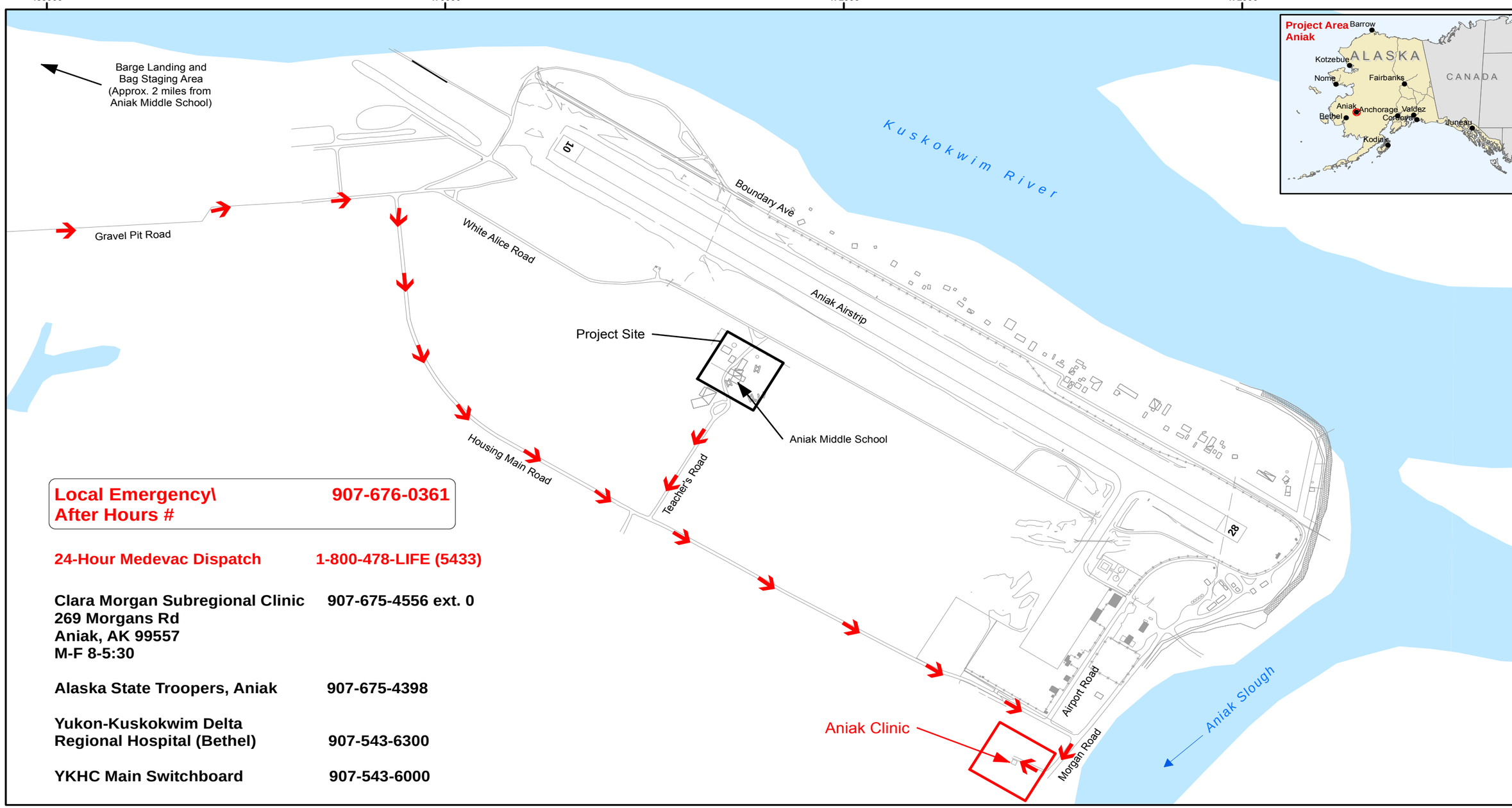
ATTACHMENT F-1
CLINIC LOCATION MAP



Local Emergency\ After Hours # **907-676-0361**

24-Hour Medevac Dispatch **1-800-478-LIFE (5433)**

Clara Morgan Subregional Clinic **907-675-4556 ext. 0**
269 Morgans Rd
Aniak, AK 99557
M-F 8-5:30

Alaska State Troopers, Aniak **907-675-4398**

Yukon-Kuskokwim Delta
Regional Hospital (Bethel) **907-543-6300**

YKHC Main Switchboard **907-543-6000**

Sources:
1. This drawing was developed from a drawing prepared by Shannon & Wilson for the Final PCB Cleanup Work Plan (June 2008) and from http://www.ykhc.org/

N

1 inch = 800 feet

0 400 800 1,200 1,600
Feet

WGS84 UTM 6N, meters

EMERGENCY CLINIC ROUTE
PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE: 29 OCT 2014	PROJECT MANAGER: G. RUTKOWSKI	FIGURE NO: F1-1

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ATTACHMENT F-2
PROJECT SITE ORIENTATION AND TRAINING

Project Site Orientation and Training

1) Sign In
2) Introduction
3) Project Review
    a) Project-wide
    b) Site-specific
4) Emergency Procedures
    a) Emergency numbers
    b) Emergency contact sheet (handout)
    c) Emergency routes (map)
    d) Earthquake event
        i) If outside, stay away from buildings, structures, trees, telephones, and power poles and lines.
        ii) If inside, stay inside; stay away from windows and get under desk or table
        iii) If driving, do not drive under or over bridges or through tunnels; do not park under trees or overhanging objects. Locate an area clear of overhead hazards, park, and remain in the vehicle
5) Personal Protective Equipment (PPE)
    a) Safety glasses
    b) Hard hats
    c) Vest
    d) Steel/composite toe boots
    e) Hearing protection
    f) Gloves
6) Hazard Communication
    a) Chemical inventory list
    b) Material safety data sheets
    c) Physical agent data sheets
    d) Labeling
    e) Training
7) Drug and Alcohol Program
    a) Provide attendees with copies of the following:
        i) Drug and alcohol policy
        ii) Consent to drug and alcohol testing as a condition of employment
        iii) Consent to enter a rehabilitation treatment and counseling
8) Hazardous Waste Program
    a) HAZWOPER 1910.120 and 1926.65
    b) Hazardous substances – polychlorinated biphenyls (PCB)
9) PPE levels, D, C, B, A
10) Work Zones
11) Exclusion Zones
12) Clean Zone

13) Tailgate Meeting
    a) Time
    b) Location
14) Wild Animals
    a) Clear the area
        i) Evaluate and control the area before entry by determining areas of recent sightings
        ii) Conduct a site observation from an offsite, elevated point, if possible
        iii) Conduct a controlled walkthrough in the area
        iv) Arrange briefing by a local specialist if possible
        v) Utilize appropriate noisemakers/deterrents
    b) What to do if you encounter a bear
        i) Make yourself appear big
        ii) Use air horn and pepper spray
        iii) Make loud noises
        iv) Don’t run
    c) What to do if you are attacked by a bear
        i) Surrender, fall to the ground, and play dead
        ii) Lie flat on your stomach or curl up in a ball with you hands covering the back of your neck
        iii) Don’t move until the bear has moved out of sight
        iv) Fight off the attack
    d) What do you do if you encounter a moose
        i) Give them space (at least 100 feet)
        ii) If the moose appears to be alarmed (ears pinned back, raised hackles) back away slowly
        iii) Do not get between a mother and her calf or calves
    e) What to do if you are charged hy a moose
        i) Keep a tree or other large object between you and the animal
        ii) If in an open area, run away
15) Project Safety Agreement
    a) Sign agreement

ATTACHMENT F-3
HAZARD COMMUNICATION PROGRAM

Physical Agent Data Sheets

Material Safety Data Sheets

ANIAK HAZARD COMMUNICATION PROGRAM

PURPOSE AND SCOPE

The purpose of this plan is to provide the minimum requirements to employees for maintaining and implementing this site-specific Hazard Communication Program.

1.0 RESPONSIBILITIES

Responsibilities specific to this Hazard Communication Program are explained in detail below.

1.1 SITE MANAGEMENT

Site Management is responsible for ensuring that this site-specific Hazard Communication Program has been effectively communicated and implemented to all employees assigned to the site. The following is a list of Site Management responsibilities:

- Ensure that Material Safety Data Sheets (MSDS) are maintained in the Aniak Field Office, employees are informed about the MSDSs, and are able to understand and access them.
- Ensure employees are trained in the recognition of hazardous materials and the method and means to protect themselves from these hazards.
- Monitor the work continuously to ensure compliance with this program.
- Confirm each job is properly prepared and employees are aware of any hazardous substances that may be encountered as part of their work or as a result of someone else's work in the area.
- Maintain a list of all workplace chemicals and products containing hazardous materials.
- Maintain MSDSs for the workplace chemicals and products containing hazardous materials.
- Ensure all workplace containers of chemicals or products containing hazardous materials are properly labeled.

1.2 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer shall assist site management in compliance with this Hazard Communication Program.

1.3 SUBCONTRACTORS

Subcontractors are responsible for the following:

- Complying with the provisions of this program and communicating hazards associated with their work during daily pre-job meetings
- Providing copies of the MSDS to the Site Safety and Health Officer for chemicals or products containing hazardous materials brought onsite
- Attending site-specific orientation

1.4 EMPLOYEES

Employees are responsible for the following:

- Understanding risks associated with the chemicals and products containing hazardous materials they are working with and are present in their work location.
- Knowing the proper handling and personal protective equipment required to handle the chemicals and products associated with their assigned task. This training must be documented.
- Knowing where the MSDSs are located for chemicals and products used in the workplace. Employees must be able to understand all forms of labeling and warning for hazards in the workplace.

2.0 DEFINITIONS

Acute	Severe, often dangerous conditions in which relatively rapid changes occur.
Acute Exposure	An intense exposure over a relatively short period.
Asphyxiant	A chemical (gas or vapor) that can cause death or unconsciousness by suffocation. Simple asphyxiants, such as nitrogen, either use up or displace oxygen in the air. They become especially dangerous in confined or enclosed spaces. Chemical asphyxiants, such as carbon monoxide and hydrogen sulfide, interfere with the body's ability to absorb or transport oxygen to the tissues.

Definitions (Continued)

Boiling Point	The temperature at which the vapor pressure of a liquid equals atmospheric pressure or at which the liquid changes to a vapor. The boiling point is usually expressed in degrees Fahrenheit. If a flammable material has a low boiling point, it indicates a special fire hazard.
"C" or Ceiling	A description usually seen in connection with a published exposure limit. It refers to the concentration that should not be exceeded, even for an instant. It may be written as TLV-C or Threshold Limit Value-Ceiling (See also Threshold Limit Value).
Carcinogen	A substance or physical agent that may cause cancer in animals or humans.
C.A.S. Number	Chemical Abstracts Service Number: Identifies a particular chemical;, a service of the American Chemical Society that indexes and compiles summaries of worldwide chemical literature called "Chemical Abstracts."
cc	Cubic centimeter: A volumetric measurement, which, in the case of water, is also equal to one milliliter (mL).
Chemical	As broadly applied to the chemical industry, a naturally occurring substance or a compound produced by chemical reactions for either direct industrial and consumer use or for reaction with other chemicals.
Chemical Reaction	A change in the arrangement of atoms or molecules to yield substances of different composition and properties (See also Reactivity).
Chronic	Persistent, prolonged, or repeated conditions.
Chronic Exposure	A prolonged exposure occurring over a period of days, weeks, or years.
Combustible Liquid	According to the Department of Transportation (DOT) and NFPA, combustible liquids are those having a flash point at or above 100 ºF (37.8 ºC). Combustible liquids do not ignite as easily as flammable liquids. However, combustible liquids can be ignited under certain circumstances and must be handled with caution. Substances, such as wood, paper, etc., are termed "ordinary combustibles."
Concentration	The amount of one substance mixed with—and in the presence of—another substance. For example, five parts (of acetone) per million (parts of air).
Corrosive	A substance that, according to the DOT, causes visible destruction or permanent changes in human skin tissue at the site of contact.

Definitions (Continued)

Dermatitis	An inflammation or irritation of the skin.
Dyspnea	Shortness of breath; difficult or labored breathing.
EPA	Environmental Protection Agency: The EPA is the governmental agency responsible for administration of laws to control and/or reduce pollution of air, water, and land systems.
EPA Number	The number assigned to chemicals regulated by the EPA.
Flammable Liquid	By DOT and NFPA, a flammable liquid is one that has a flash point below 100 ºF. (See also Flash Point)
Flash Point	The lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture and burn when a source of ignition (sparks, open flames, cigarettes, etc.) is present. Two tests are used to determine the flash point: open and closed cup. The test method is indicated on the MSDS after the flash point.
Hazardous Material	Any substance or compound that may produce adverse effects on the health and safety of humans.
Ingestion	Taking a substance into the body through the mouth as food, drink, medicine, or unknowingly, as on contaminated hands or cigarettes, etc.
Inhalation	The breathing in of an airborne substance that may be in the form of gases, fumes, mists, vapors, dusts, or aerosols.
Irritant	A substance that produces an irritating effect when it contacts the skin, eyes, nose, or respiratory system.
LEL	Lower Explosive Limit: Also known as Lower Flammable Limit. The lowest concentration of a substance that will produce a fire or flash when an ignition source (flame, spark, etc.) is present. It is expressed in percent of vapor or gas in the air by volume. Below the LEL or LFL, the air/contaminant mixture is theoretically too "lean" to burn (See also UEL).
Odor Threshold	The minimum concentration of a substance at which a majority of test subjects can detect and identify the substance's characteristic odor.
OSHA	The Occupational Safety and Health Administration is a Federal Agency under the Department of Labor that publishes and enforces safety and health regulations for most business and industries in the United States.
Oxygen Deficiency	An atmosphere having less than the normal percentage of oxygen found in normal air. Normal air contains 20.8% oxygen at sea level.

Definitions (Continued)

Reactivity	A substance's propensity to undergo a chemical reaction or change, which may result in effects that can be dangerous, such as explosion, burning, or generation of corrosive or toxic emissions. Reaction initiators, such as heat, other chemicals, dropping, etc., will usually be specified as "Conditions to Avoid" when a chemical's reactivity is described in an MSDS.
TWA	Time Weighted Average: The average concentration, over a given work period (e.g., 8-hour workday) of a person's exposure to a chemical or a potentially harmful agent. The average is determined by sampling for the contaminant during the period of exposure.
UEL	Upper Explosive Limit: Also known as Upper Flammable Limit. The UEL is the highest concentration of a mixture that will burn or explode when an ignition source is present. Theoretically, above this limit, the mixture is said to be too "rich" to support combustion. The airborne concentration range between the LEL and the UEL constitutes the flammable range or explosive range.

3.0 PROGRAM

3.1 GENERAL

The purpose of the Hazard Communication Program is to communicate the hazards of workplace chemicals and communicate protective measures to control them. Hazard Communication is accomplished by:

- Maintaining a list of all workplace chemicals and products containing hazardous materials
- Labeling workplace chemical and product containers
- Maintaining MSDSs for the workplace chemicals and products containing hazardous materials
- Implementing a training program to communicate the hazards of chemicals and products, as well as appropriate protective measures

Upon completion of Hazard Communication training, employees and subcontractors will understand the components of Hazard Communication and will understand the hazards of

the chemicals and products used in their workplace and the protective measures to control those hazards.

3.2 HAZARD EVALUATION

The manufacturers are responsible for assessing the following:

- Physical hazards, such as flammability, combustibility, explosion, reaction, and radioactivity
- Health hazards, such as irritation, corrosion, sensitization, or toxicity of the chemicals and products they produce.

MSDSs shall be requested for chemicals and products purchased or brought onto the site. The site relies on the evaluation performed by the chemical and product manufacturers or importers, who originated the MSDS, for the accuracy of this information.

MSDSs will be maintained at the Aniak Field Office.

3.3 WRITTEN HAZARD COMMUNICATION

A list of the chemicals or products containing hazardous materials used on Aniak sites will be maintained and updated at least annually or when products are introduced to the site. The Site Manager or Project Manager or their designee will maintain the product list.

3.4 LABELS

Labels and other forms of warnings are to be conspicuously placed on containers so the message is readily visible. The product manufacturer, importer, or distributor will label, tag or mark the product container identifying the hazardous chemicals, appropriate hazard warnings, and name and address of the manufacturer, importer or responsible party.

Labeling Systems

There are multiple labeling systems currently in use including the National Fire Protection Association (NFPA) 704M Labeling System, the Hazardous Materials

Information System (HMIS®), the U.S. Department of Transportation (DOT) Labeling System, and the United Nations Hazard Class Number system.

The HMIS uses colored bars, while NFPA uses colored diamonds. HMIS attempts to convey full health warning information to all employees while NFPA is meant primarily for firefighters and other emergency responders.

NFPA 704M. The NFPA 704 standard, commonly known as the NFPA diamond, is a four-section, multicolor diamond shape indicating health (blue), flammability (red), instability (yellow), and related or special hazards (white) that are presented by short-term, acute exposure to a material during a fire, spill or other emergency-related condition. The diamond sign with these identifiers is found on the outside doors or walls, and on the inside of many facilities that use chemicals in their daily processes. Numbers in the three colored sections range from 0 (least severe hazard) to 4 (most severe hazard). The fourth special hazards section is left blank and is used only to denote special firefighting measures/hazards.

NPCA/HMIS. The National Paint & Coatings Association (NPCA) HMIS uses standard labels to communicate hazards through the use of colors, numbers, letters of the alphabet, and symbols.

The HMIS is a five-part rectangle that provides identification of the chemical, acute health hazard, flammability, reactivity, personal protective equipment designations, and chronic health hazard information.

The chemical identity is conveyed by the chemical name and should be the same as the name on the MSDS. The acute health (blue), flammability (red), and reactivity (yellow) hazards are communicated by numerical ratings similar to the NFPA system.

An alphabetical designation is used to denote recommended personal protective equipment.

Chronic health hazards may be communicated by placing on the label a reference to the specific MSDS, or the actual chronic information may be written on the label, if space allows.

Labels for Transfer Containers

When hazardous materials are transferred from one container to another, the new container will be marked appropriately with the hazard warning.

3.5 WORK PLACE INVENTORY

An up-to-date hazardous chemical inventory must be maintained.

3.6 EMPLOYEE INFORMATION AND TRAINING

Employees shall be informed of operations in their work area where hazardous chemicals are present, the location of the written Hazard Communication Program, list of hazardous chemicals, and MSDSs.

Training will include methods to detect hazardous chemicals in the workplace, physical and health risks of the hazardous chemicals in the workplace, measures employees can take to protect themselves, an explanation of the labeling system, and MSDSs.

Training will be documented using the Hazard Communication and Right-To-Know Training Form.

3.7 TRADE SECRETS

The manufacturer may withhold specific information regarding the chemicals used in a product. Those chemicals will be listed in the MSDSs as a “Trade Secret.” For emergencies, first aid treatment or non-emergency conditions, the product manufacturer will disclose the specific chemical identity to a health professional.

3.8 PHYSICAL AGENT DATA SHEETS

Physical Agent Data Sheets (PADS) are provided for the following hazards following this Hazard Communication Program:

- Cold Stress
- Hand-Arm Vibration
- Heat Stress
- Noise
- Ultraviolet Radiation

3.9 MATERIAL SAFETY DATA SHEETS (MSDS)

A binder with MSDS sheets for each hazardous chemical used at Aniak will be maintained at the Aniak office. The MSDSs provide the following information:

- The chemical or product name and common name of all ingredients that are known health hazards
- The chemical or product name and common name of all ingredients that are known physical hazards
- The physical and chemical characteristics of the hazardous materials, such as vapor pressure and flash point
- The physical risks of the hazardous material, including fire, explosion, and reactivity
- The primary routes of entry
- The Permissible Exposure Limit, Threshold Limit Value, and other exposure limit(s) used by the manufacturer
- Whether the hazardous material is listed in the National Toxicology Program Annual report on Carcinogens, International Agency for the Research on Cancer Monographs, or by OSHA
- Applicable precautions for safe handling and use
- Applicable engineering controls, work practices, or personal protective equipment control measures known to the manufacturer
- Emergency and first aid procedures
- Date the MSDS was prepared and name, address, and telephone number of the manufacturer

MSDS sheets are included in Exhibit D1-3 of the SSHP.

Physical Agent Data Sheets

Cold Stress

Hand-Arm Vibration

Heat Stress

Noise

Ultraviolet Radiation

MATERIAL SAFETY DATA SHEET

ALCONOX®

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	**ALCONOX®**
CHEMICAL FAMILY NAME:	Detergent.
PRODUCT USE:	Critical-cleaning detergent for laboratory, healthcare and industrial applications
U.N. NUMBER:	Not Applicable
U.N. DANGEROUS GOODS CLASS:	Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME:	Alconox, Inc.
ADDRESS:	30 Glenn St., Suite 309, White Plains, NY 10603. USA
EMERGENCY PHONE:	**TOLL-FREE in USA/Canada** 800-255-3924
	International calls 813-248-0585
BUSINESS PHONE:	914-948-4040
DATE OF PREPARATION:	May 2011
DATE OF LAST REVISION:	February 2008

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS

EUROPEAN and (GHS) Hazard Symbols

Signal Word: **Warning!**

EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1
EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 207-638-8 Index# 011-005-00-2
EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC

GHS Hazard Classification(s):
Eye Irritant Category 2A

Hazard Statement(s):
H319: Causes serious eye irritation

Precautionary Statement(s):
P260: Do not breath dust/fume/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P271: Use only in well ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection/

Hazard Symbol(s):
[Xi] Irritant

Risk Phrases:
R20: Harmful by inhalation
R36/37/38: Irritating to eyes, respiratory system and skin

Safety Phrases:
S8: Keep container dry
S22: Do not breath dust
S24/25: Avoid contact with skin and eyes

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

CHRONIC: This product contains an ingredient which may be corrosive.

TARGET ORGANS: ACUTE: Eye, respiratory System, Skin CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Sodium Bicarbonate	144-55-8	205-633-8	1044	33 - 43%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	268-356-1	Not Listed	10 – 20%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Tripolyphosphate	7758-29-4	231-838-7	1469	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Tetrasodium Pyrophosphate	7722-88-5	231-767-1	1140	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Carbonate	497-19-8	207-638-8	1135	1 - 10%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Sodium Alcohol Sulfate	151-21-3	205-788-1	0502	1 – 5%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing dificulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

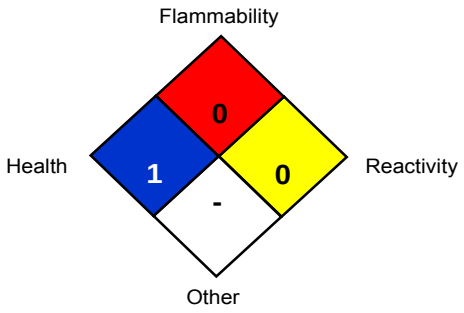
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or eye problems may be aggravated by prolonged contact.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT:	Not Flammable
AUTOIGNITION TEMPERATURE:	Not Applicable
FLAMMABLE LIMITS (in air by volume, %):	Lower (LEL): NA Upper (UEL): NA
FIRE EXTINGUISHING MATERIALS:	As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	This product is non-flammable and has no known explosion hazards.
Explosion Sensitivity to Mechanical Impact:	Not Sensitive.
Explosion Sensitivity to Static Discharge:	Not Sensitive
SPECIAL FIRE-FIGHTING PROCEDURES:	Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	**1**
FLAMMABILITY HAZARD (RED)	**0**
PHYSICAL HAZARD (YELLOW)	**0**

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.
SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sodium Bicarbonate	144-55-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Tripolyphosphate	7758-29-4	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Tetrasodium Pyrophosphate	7722-88-5	5 mg/m³	5 mg/m³	5 mg/m³
Sodium Carbonate	497-19-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Alcohol Sulfate	151-21-3	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Solid
APPEARANCE & ODOR:	White granular powder with little or no odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR=1):	Not Applicable.
BY WEIGHT:	Not Available
EVAPORATION RATE (nBuAc = 1):	Not Applicable.
BOILING POINT (C°):	Not Applicable.
FREEZING POINT (C°):	Not Applicable.
pH:	9.5 (1% aqueous solution)
SPECIFIC GRAVITY 20°C: (WATER =1)	0.85 – 1.1
SOLUBILITY IN WATER (%)	>10% w/w
COEFFICIENT OF WATER/OIL DIST.:	Not Available
VOC:	None
CHEMICAL FAMILY:	Detergent

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable
DECOMPOSITION PRODUCTS: When heated to decomposition this product produces Oxides of carbon (COx)
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids and strong oxidizing agents.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials and dust generation.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

CAS# 497-19-8 LD50 Oral (Rat)	4090 mg/kg
CAS# 497-19-8 LD50 Oral (Mouse)	6600 mg/kg
CAS# 497-19-8 LC50 Inhalation (Rat)	2300 mg/m³ 2H
CAS# 497-19-8 LC50 Inhalation (Mouse)	1200 mg/m³ 2H
CAS# 7758-29-4 LD50 Oral (Rat)	3120 mg/kg
CAS# 7758-29-4 LD50 Oral (Mouse)	3100 mg/kg
CAS# 7722-88-5 LD50 Oral (Rat)	4000 mg/kg

SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.
IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.
SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.
REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: No Data available at this time.
EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:
THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.
PROPER SHIPPING NAME: Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable
UN IDENTIFICATION NUMBER: Not Applicable
PACKING GROUP: Not Applicable.
DOT LABEL(S) REQUIRED: Not Applicable
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable
MARINE POLLUTANT: None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:
This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:
This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):
This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:
This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

Disclaimer: To the best of Alconox, Inc. knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type either express or implied are provided. The information contained herein relates only to this specific product.

ANNEX:

IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

Used to clean: Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

Used to remove: Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

Surfaces cleaned: Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

Cleaning method: Soak, brush, sponge, cloth, ultrasonic, flow through clean-inplace. Will foam—not for spray or machine use.

Directions: Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

SECTION 1: IDENTIFICATION

MSDS ID: MSDSP149

PRODUCT NAME: PRESTONE ANTIFREEZE/COOLANT
Product Number: AF777
Formula Number: YA721, YA718, YA718B

MANUFACTURER: Prestone Products Corporation
39 Old Ridgebury Road
Danbury, CT 06810-5109

INFORMATION PHONE NUMBER: (203) 731-3686

EMERGENCY PHONE NUMBER: CHEMTREC 1-800-424-9300
483-7161 in the District of Columbia

MSDS DATE OF PREPARATION/REVISION: 10/18/99

SECTION 2: PRODUCT COMPONENTS

HAZARDOUS COMPONENTS	CAS#	PERCENT	EXPOSURE LIMITS
Ethylene Glycol (aerosol)	107-21-1	80-96	None Established-OSHA PEL 100 mg/m3 Ceiling ACGIH TLV
Diethylene Glycol	111-46-6	0-8	None Established OSHA PEL, ACGIH TLV

Non-Hazardous Ingredients >1%
Water 7732-18-5

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Eye and upper respiratory irritant. May cause nausea, vomiting, headache, drowsiness, blurred vision, convulsions, coma or death if ingested or inhaled. Prolonged or repeated skin contact may cause dermatitis or skin sensitization.

POTENTIAL HEALTH EFFECTS:

INHALATION: May cause irritation of the nose and throat with headache, particularly from mists. High vapor concentrations caused, for example, by heating the material in an enclosed and poorly ventilated workplace, may produce nausea, vomiting, headache, dizziness and irregular eye movements.

SKIN CONTACT: No evidence of adverse effects from available information.

EYE CONTACT: Liquid, vapors or mist may cause discomfort in the eye with persistent conjunctivitis, seen as slight excess redness or conjunctiva. Serious corneal injury is not anticipated.

INGESTION: Following ingestion, a bitter taste may be noted. May cause abdominal discomfort or pain, nausea, vomiting, dizziness, drowsiness, malaise, blurring of vision, irritability, back pain, decrease in urine output, kidney failure, and central nervous system effects, including irregular eye movements, convulsions and coma. Cardiac failure and pulmonary edema may develop. Severe kidney damage which may be fatal may follow the swallowing of ethylene glycol. A few reports have been published describing the development of weakness of the facial muscles, diminishing hearing, and difficulty with swallowing, during the late stages of severe poisoning.

CHRONIC EFFECTS: Prolonged or repeated inhalation exposure may produce signs of central nervous system involvement, particularly dizziness and jerking eye movements. Prolonged or repeated skin contact may cause skin sensitization and an associated dermatitis in some individuals. Ethylene glycol has been found to cause birth defects in laboratory animals. The significance of this finding to humans has not been determined. See section 11 for additional information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: The available toxicological information and a knowledge of the physical and chemical properties of the material suggest that overexposure in unlikely to aggravate existing medical conditions.

CARCINOGEN: None of the components of these products is listed as a carcinogen or suspected carcinogen by IARC, NTP or OSHA.

SECTION 4: FIRST AID MEASURES

INHALATION: Remove the victim to fresh air. If breathing has stopped administer artificial respiration. If breathing is difficult, have medical personnel administer oxygen. Get medical attention.

SKIN CONTACT: Remove contaminated clothing. Immediately wash contacted area thoroughly with soap and water. If irritation persists, get medical attention.

EYE CONTACT: Immediately flush eyes with large amounts of water for 15 minutes. Get medical attention if irritation persists.

INGESTION: Seek immediate medical attention. Immediately call local poison control center or go to an emergency department. Never give anything by mouth to or induce vomiting in an unconscious or drowsy person.

NOTES TO PHYSICIAN: The principal toxic effects of ethylene glycol, when swallowed, are kidney damage and metabolic acidosis. The combination of metabolic acidosis, an osmol gap and oxalate crystals in the urine is evidence of ethylene glycol poisoning.

Pulmonary edema with hypoxemia has been described in a number of patients following poisoning with ethylene glycol. Respiratory support with mechanical ventilation may be required.

There may be cranial nerve involvement in the late stages of toxicity from swallowed ethylene glycol. In particular, effects have been reported involving the seventh, eighth, and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing and dysphagia.

Ethanol is antidotal and its early administration may block the formation of nephrotoxic metabolites of ethylene glycol in the liver. The objective is to rapidly achieve and maintain a blood ethanol level of approximately 100 mg/dl by giving a loading dose of ethanol followed by a maintenance dose. Intravenous administration of ethanol is the preferred route. Ethanol blood levels should be checked frequently. Hemodialysis may be required.

4-Methylpyrazole (Antizole(R) or Fomepizole), a potent inhibitor of alcohol dehydrogenase, has been used therapeutically to decrease the metabolic consequences of ethylene glycol poisoning. Additional therapeutic modalities which may decrease the adverse consequences of ethylene glycol metabolism are the administration of both thiamine and pyridoxine. As there are complicated and serious overdoses, we recommend you consult with the toxicologists at your poison control center. This antidote is now approved by the F.D.A. and in many cases has replaced ethanol in the treatment of ethylene glycol poisoning.

SECTION 5: FIRE AND EXPLOSION DATA

FLASH POINT: 242 F (117 C) TOC
220 F (104 C) PMCC

AUTOIGNITION TEMPERATURE: Not determined

FLAMMABILITY LIMITS: LEL: 3.2% UEL: 15.3%

EXTINGUISHING MEDIA: For large fires, use alcohol type or all-purpose foams. For small fires, use water spray, carbon dioxide or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES: Do not spray pool fires directly. Cool fire exposed containers with water. Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

UNUSUAL FIRE HAZARDS: A solid stream of water or foam directed into hot, burning liquid can cause frothing.

HAZARDOUS COMBUSTION PRODUCTS: Burning may produce carbon monoxide and carbon dioxide.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Wear appropriate protective clothing and equipment (See Section 8). Collect with absorbent material and place in appropriate, labeled container for disposal or, if permitted flush spill area with water.

SECTION 7: HANDLING AND STORAGE

DANGER: Harmful or Fatal if Swallowed

Do not drink antifreeze or solution.
Avoid eye and prolonged or repeated skin contact.
Avoid breathing vapors or mists.
Wash exposed skin thoroughly with soap and water after use.
Do not store in opened or unlabeled containers.

Keep container away from open flames and excessive heat.
Do not reuse empty containers unless properly cleaned.

Empty containers retain product residue and may be dangerous. Do not cut, weld, drill, etc. containers, even empty.

Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without any obvious ignition sources. Published "autoignition" or "ignition" temperatures cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Use of this product in elevated temperature applications should be thoroughly evaluated to assure safe operating conditions.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

VENTILATION: Use general ventilation or local exhaust as required to maintain exposures below the occupational exposure limits.

RESPIRATORY PROTECTION: For operations where the TLV is exceeded a NIOSH approved respirator with organic vapor cartridges and dust/mist prefilters or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration. Select and use in accordance with 29 CFR 1910.134 and good industrial hygiene practice. For firefighting, use self-contained breathing apparatus.

GLOVES: Chemical resistant gloves such as neoprene or PVC where contact is possible

EYE PROTECTION: Splash-proof goggles.

OTHER PROTECTIVE EQUIPMENT/CLOTHING: Appropriate protective clothing as needed to minimize skin contact. Suitable washing and eye flushing facilities should be available in the work area. Contaminated clothing should be removed and laundered before re-use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Yellow liquid with a mild odor.

pH: Not determined	SPECIFIC GRAVITY: 1.12
BOILING POINT (F): 334 F	VAPOR PRESSURE: Less than 0.1
FREEZING POINT (F): -8 F	VAPOR DENSITY: 2.1
SOLUBILITY IN WATER: 100%	EVAPORATION RATE: Less than 1
PERCENT VOLATILE: None	VISCOSITY: Not determine

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable
CONDITIONS TO AVOID: None known.
INCOMPATIBILITY: Normally unreactive, however, avoid strong bases at high temperatures, strong acids, strong oxidizing agents, and materials reactive with hydroxyl compounds.
DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide.
HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: None known.

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE TOXICITY VALUES:

Ethylene Glycol: LD50 Oral Rat: 4700 mg/kg
LD50 Skin Rabbit: 9530 mg/kg

Diethylene Glycol: LD50 Oral Rat: 12,565 mg/kg
LD50 Skin Rabbit: 11,890 mg/kg

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH:

Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations or doses. Also, in a preliminary study to assess the effects of exposure of pregnant rats and mice to aerosols at concentrations 150, 1,000 and 2,500 mg/m3 for 6 hours a day throughout the period of organogenesis, teratogenic effects were produced at the highest concentrations, but only in mice. The conditions of these latter experiments did not allow a conclusion as to whether the developmental toxicity was mediated by inhalation of aerosol, percutaneous absorption of ethylene glycol from contaminated skin, or swallowing of ethylene glycol as a result of grooming the wetted coat. In a further study, comparing effects from high aerosol concentration by whole-body or nose-only exposure, it was shown that nose-only exposure

resulted in maternal toxicity (1,000 and 2,500 mg/m3) and developmental toxicity in with minimal evidence of teratogenicity (2,500 mg/m3). The no-effects concentration (based on maternal toxicity) was 500 mg/m3. In a further study in mice, no teratogenic effects could be produced when ethylene glycol was applied to the skin of pregnant mice over the period of organogenesis. The above observations suggest that ethylene glycol is to be regarded as an animal teratogen; there is currently no available information to suggest that ethylene glycol caused birth defects in humans. Cutaneous application of ethylene glycol is ineffective in producing developmental toxicity; exposure to high aerosol concentration is only minimally effective in producing developmental toxicity; the major route for producing developmental toxicity is perorally.

Two chronic feeding studies, using rats and mice, have not produced any evidence that ethylene glycol causes dose-related increases in tumor incidence or a different pattern of tumors compared with untreated controls. The absence of carcinogenic potential for ethylene glycol has been supported by numerous invitro genotoxicity studies showing that it does not produce mutagenic or clastogenic effects.

This products contains less than 0.5% tolytriazole which has demonstrates mutagenic activity in a bacterial test system. A correlation has been established between mutagenic activity and carcinogenic activity for many chemicals. Tolytriazole has not been identified as a carcinogen or probable carcinogen by NTP, IARC or OSHA.

SECTION 12: ECOLOGICAL INFORMATION

Ethylene Glycol: LC50 Goldfish: 5,000 mg/L/24 hr. at 20 C static conditions.

Toxicity threshold (cell multiplication inhibition test):
Bacterial (Pseudomonas putida): 10,000 mg/l
Protozoa (Entosiphon sulcatum and Uronema parduczi Chatton-Lwoff): >10,000 mg/l
Algae (Microcystis aeruginosa): 2,000 mg/l
Green algae (Scenedesmus quandricauda): >10,000 mg/l

SECTION 13: DISPOSAL INFORMATION

Dispose of product in accordance with all local, state/provincial and federal regulations.

SECTION 14: TRANSPORT INFORMATION

U.S. DOT HAZARD CLASSIFICATION

PROPER SHIPPING NAME: None
UN NUMBER: None
LABELS REQUIRED: None

DOT MARINE POLLUTANTS: This product does not contains Marine Pollutants as defined in 49 CFR 171.8.

IMDG CODE SHIPPING CLASSIFICATION

DESCRIPTION: Not Regulated

Note: IF A BULK SHIPMENT IS INVOLVED, THE FOLLOWING INFORMATION APPLIES:

U.S. DOT HAZARD CLASSIFICATION

PROPER SHIPPING NAME: Environmentally hazardous substance, liquid, N.O.S. (Ethylene glycol)
UN NUMBER: UN3082
LABELS REQUIRED: Class 9, UN3082

SECTION 15: REGULATORY INFORMATION

EPA SARA 311/312 HAZARD CLASSIFICATION: Acute health, chronic health

EPA SARA 313: This Product Contains the Following Chemicals Subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372):

Ethylene Glycol	107-21-1	80-96%

PROTECTION OF STRATOSPHERIC OZONE: This product is not known to contain or to have been manufactured with ozone depleting substances as defined in 40 CFR Part 82, Appendix A to Subpart A.

CERCLA SECTION 103: Spills of this product over the RQ (reportable quantity) must be reported to the National Response Center. The RQ for this product, based on the RQ for Ethylene Glycol (96% maximum) of 5,000 lbs, is 5,208 lbs. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

CALIFORNIA PROPOSITION 65 - This product may contain the following substances known to the State of California to cause Cancer and/or Reproductive Harm: 1,4-Dioxane (trace amount).

EPA TSCA INVENTORY: All of the components of this material are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT: All of the ingredients are listed on the Canadian Domestic Substances List.

CANADIAN WHMIS CLASSIFICATION: Class D - Division 2 - Subdivision B - (A toxic material causing other chronic effects)

EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS): All of the ingredients are listed on the EINECS inventory.

AUSTRALIA: All of the ingredients of this product are listed on the Australian Inventory of Chemical Substances.

SECTION 16: OTHER INFORMATION

NFPA RATING (NFPA 704) - FIRE: 1
HEALTH: 2
REACTIVITY: 0

REVISION SUMMARY: Section 4: Notes to Physican
Section 9: Specific Gravity
Section 16: Contact Name and Address

This MSDS is directed to professional users and bulk handlers of the product. Consumer products are labeled in accordance with Federal Hazardous Substances Act regulations.

While Prestone Products Corporation believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of tests conducted, the data are not to be taken as a warranty or representation for which Prestone Products Corporation assumes legal responsibility. They are offered for your consideration, investigation and verification. Any use of these data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

If more information is needed, please contact: Stan Prusakowski
Prestone Products Corporation
55 Federal Road
Danbury, CT 06810
(203)830-7865

Material Safety Data Sheet

Revision Date: 11/08/07

Restek Corporation
110 Benner Circle
Bellefonte, PA 16823-8812
(814) 353-1300
(800) 356-1688 **Fax: (814) 353-1309**

I. PRODUCT IDENTIFICATION

Catalog Number / Product Name:	**32012, 32012-5XX, & 32112 / Aroclor 1260 Mix**
Revision Number:	5
Intended use:	For Laboratory use only

II. HAZARD INDENTIFICATION

Emergency Overview:

Physical Hazards:	F - Highly flammable
Health Hazards:	Xn - Harmful

Routes of Entry:	Inhalation Contact Absorption Ingestion
Target Organs Potentially Affected By Exposure:	skin, eyes, respiratory system, CNS, PNS
Chemical Interactions That Change Toxicity:	None Known

Immediate (Acute) Health Effects by Route of Exposure:

Inhalation Irritation:	Can cause severe respiratory irritation, dizziness, weakness, fatigue, nausea, headache and possible unconsciousness.
Skin Contact:	Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Skin Absorption:	May cause irritation and minor systemic damage.Harmful if absorbed through the skin.
Eye Contact:	Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.
Ingestion Irritation:	Irritating to mouth, throat, and stomach. Can cause abdominal discomfort, nausea, vomiting and diarrhea.Harmful if swallowed.
Ingestion Toxicity:	Toxic if swallowed. May cause target organ failure and/or death.

Long-Term (Chronic) Health Effects:

Carcinogenicity:	Contains a probable or known human carcinogen.
Reproductive and Developmental Toxicity:	No data available to indicate product or any components present at greater than 0.1% may cause birth defects.
Inhalation:	Upon prolonged and/or repeated exposure, can cause severe respiratory irritation, dizziness, weakness, fatigue, nausea, headache and possible unconsciousness.
Skin Contact:	Upon prolonged or repeated contact, can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Skin Absorption:	Upon prolonged or repeated exposure, harmful if absorbed through the skin. May cause minor systemic damage.

Material Safety Data Sheet

Revision Date: 11/08/07

III. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS #	EINEC #	% Composition
hexane	110-54-3	203-777-6	99.900000
aroclor® 1260	11096-82-5		0.100000

IV. FIRST-AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen.

Eyes: Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

Skin Contact: Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

Ingestion: Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this MSDS.

V. FIRE FIGHTING MEASURES

Extinguishing Media: Use alcohol resistant foam, carbon dioxide, or dry chemical extinguishing agents. Water spray or fog may also be effective for extinguishing if swept across the base of the fire. Water can also be used to absorb heat and keep exposed material from being damaged by fire.

Fire and/or Explosion Hazards: Vapors may be ignited by heat, sparks, flames or other sources of ignition at or above the low flash point giving rise to a Class B fire. Vapors are heavier than air and may travel to a source of ignition and flash back

Fire Fighting Methods and Protection: Do not enter fire area without proper protection including self-contained toxic breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Flammable component(s) of this material may be lighter than water and burn while floating on the surface. Use water spray/fog for cooling.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide

VI. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Equipment: Exposure to the spilled material may be irritating or harmful. Follow personal protective equipment recommendations found in Section VIII of this MSDS. Additional precautions may be necessary based on special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred. Also consider the expertise of employees in the area responding to the spill.

Methods for Clean-up: Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section VIII at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

VII. HANDLING AND STORAGE

Handling Technical Measures and Precautions: Harmful or irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area. Use spark-proof tools and explosion-proof equipment

Storage Technical Measures and Conditions: Store in a cool dry ventilated location. Isolate from incompatible materials and conditions. Keep container(s) closed. Keep away from sources of ignition

VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

Chemical Name	CAS No.	IDLH	ACGIH STEL	ACGIH TLV-TWA	OSHA Exposure Limit
hexane	110-54-3	1100 ppm IDLH	1000 ppm	50 ppm TWA	500 ppm TWA; 1800 mg/m3 TWA
aroclor® 1260	11096-82-5	ND		No TLV	No PEL established

United Kingdom:

Chemical Name	CAS No.	EINEC No.	WEL-STEL	WEL-TWA
hexane	**110-54-3**	**203-777-6**	**60 ppm STEL; 216 mg/m3 STEL**	**20 ppm TWA; 72 mg/m3 TWA**
aroclor® 1260	**11096-82-5**		**No data.**	**No data.**

France:

Chemical Name	CAS No.	EINEC No.	VLCTs-STEL	VME-TWA
hexane	110-54-3	203-777-6	No data.	**50 ppm VME; 170 mg/m3 VME**
aroclor® 1260	11096-82-5		No data.	**No data.**

Germany:

Chemical Name	CAS No.	EINEC No.	VELs
hexane	110-54-3	203-777-6	50 ppm TWA (exposure factor 8); 180 mg/m3 TWA (exposure factor 8)
aroclor® 1260	11096-82-5		No data.

Personal Protection:

Engineering Measures: Local exhaust ventilation is recommended when generating excessive levels of vapors from handling or thermal processing.

Respiratory Protection: Respiratory protection may be required to avoid overexposure when handling this product. General or local exhaust ventilation is the preferred means of protection. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms.

Eye Protection: Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.

Skin Protection: Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work

IX. PHYSICAL AND CHEMICAL PROPERTIES

Odor:	Mild
pH:	No data available.
Vapor Density:	2.97 (air = 1)
Melting Point:	-95 °C
Flash Point:	No data available.
Flammability:	Highly Flammable
Specific Gravity:	0.672 g/cm3 at 15 °C
Evaporation Rate:	No data available.
Odor Threshold:	No data available.
Solubility:	Negligible; 0-1%
VOC % by weight:	No data available.
Molecular Weight:	No data available.

X. STABILITY AND REACTIVITY:

Stability:	Stable under normal conditions.
Materials to Avoid / Chemical Incompatiability:	Strong oxidizing agents

XI. TOXICOLOGICAL INFORMATION:

Component Toxicological Data:

NIOSH:

Chemical Name	CAS No.	LD50/LC50
Hexane	110-54-3	Inhalation LC50 Rat: 48000 ppm/4H; Oral LD50 Rat: 28710 mg/kg; Dermal LD50 Rabbit: 3000 mg/kg
Polychlorinated biphenyl (aroclor 1260)	11096-82-5	Oral LD50 Rat: 1315 mg/kg

Component Carcinogenic Data:

OSHA:

Chemical Name	CAS No.
No data available	

ACGIH:

Chemical Name	CAS No.
No data available.	

NIOSH:

Chemical Name	CAS No.
No data available.	

NTP:

Chemical Name	CAS No.
No data available.	

IARC:

Chemical Name	CAS No.	Group No.
No data.		Group 1
No data.		Group 2A
No data.		Group 2B

XII. ECOLOGICAL INFORMATION:

Overview: Moderate ecological hazard. This product may be dangerous to plants and/or wildlife.

Mobility: No data

Persistence: No data

Bioaccumulation: No data

Degradability: No data

Ecological Toxicity Data: 0

XIII. DISPOSAL CONSIDERATIONS:

Waste Description of Spent Product: Spent or discarded material is a hazardous waste.

Disposal Methods: Dispose of by incineration following Federal, State, Local, or Provincial regulations.

Waste Disposal of Packaging: Comply with all Local, State, Federal, and Provincial Environmental Regulations.

XIV: TRANSPORTATION INFORMATION:

United States:

DOT Proper Shipping Name: Hexanes

UN Number: UN1208

Hazard Class: 3

Packing Group: II

International:

Material Safety Data Sheet

Revision Date: 11/08/07

IATA Proper Shipping Name:	Hexanes
UN Number:	UN1208
Hazard Class:	3
Packing Group:	II
Marine Pollutant:	No

XV. REGULATORY INFORMATION:

United States:

Chemical Name	CAS#	CERCLA	SARA 313	SARA EHS 313	TSCA
hexane	110-54-3	X	X	-	X
aroclor® 1260	11096-82-5	X	-	-	-

The following chemicals are listed on CA Prop 65:

Chemical Name	CAS #	Regulation
Polychlorinated biphenyls (containing 60 or more percent chlorine by molecular weight)	11096-82-5	Prop 65 Cancer

State Right To Know Listing:

Chemical Name	CAS#	New Jersey	Massachusetts	Pennsylvania	California
hexane	110-54-3	X	X	X	-
aroclor® 1260	11096-82-5	-	X	X	X

EU Directives Classification:
Hazard Symbols

Risk Phrases:	R48/20:Harmful: danger of serious damage to health by prolonged exposure through inhalation R11:Highly Flammable
Safety Phrases:	S16:Keep away from sources of ignition - No smoking S36:Wear suitable protective clothing

XVI: ADDITIONAL INFORMATION

Prior Version Date: 08/09/06

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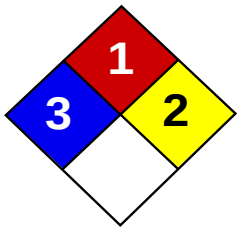

Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:16 PM

Last Updated: 05/21/2013 12:00 PM

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MATERIAL SAFETY DATA SHEET

PRODUCT NAME: BEAR PEPPER MACE (AEROSOL)

MSDS NUMBER: 2010-506 **PRODUCT CODE:** 80346, 80446

MSDS DATE: 02/24/2010 **KEY NUMBER:**

EMERGENCY PHONE #'s: CHEMTREC: 800-424-9300 / 703-527-3888

Mace Personal Defense, Inc.
160 Benmont Avenue - Ste. 1
Bennington, VT 05201
802-447-1503

HEALTH	2	Hazardous
FIRE	3	Flash Point: Below 100°F, 38°C
REACTIVITY	0	Stable
SPECIFIC		-

1. IDENTIFICATION

☐ *See Addendum:* Ref. PAGE:

Chemical Name: OC Spray
Chemical Family: Irritant Agent
CAS #:
Chemical Formula:
CAS Name:
Molecular Weight:
Synonyms / Common Name: OC Spray
DOT Information:

2. PHYSICAL DATA

☐ *See Addendum:* Ref. PAGE:

Appearance: Red/orange liquid
Color: Red/orange
State: Liquid
Odor Characteristics: Pungent
pH: Not known
Viscosity: Not known
Specific Gravity (Water = 1): 0.8144 @ 68F
Vapor Density (Air = 1): Not known
Vapor Pressure: 80 PSIA @ 70 F

Melting Point: Not known
Boiling Point: 370F
Flash Point: < 100F
Freezing Point: Not known
Percent Volatility: Near complete
Evaporation Rate (BAc = 1): Not known
Solubility in Water: Insoluble
Solubility in Oil: Not known
Solubility in Acetone: Not known

3. INGREDIENTS

☐ *See Addendum:* Ref. PAGE:

Material / Components	CAS #:	CAS Name	TLV Units	Approx. %
Oleoresin Capsicum	404-86-4	Oleoresin Capsaicin	None established	
Remaining - Trade Secret - 29 CFR 1910.1200(i).				

4. FIRE AND EXPLOSION HAZARD DATA

☐ *See Addendum:* Ref. PAGE:

Flash Point: < 100F

Flammable Limits in Air % by volume: Lower None; Upper None

Extinguishing Media: Dry chemical, carbon dioxide, water spray or alcohol-resistant foam.

Special Fire Fighting Procedures: Use air-supplied, NIOSH-approved respirator to protect against gases and fumes.

Unusual Fire & Explosion Hazards: Containers may explode in the heat of a fire. Resulting smoke and fumes would be irritating to eyes and mucous membranes.

Mace Personal Defense, Inc.
160 Benmont Avenue - Ste. 1
Bennington, VT 05201
802-447-1503

PRODUCT NAME: BEAR PEPPER MACE (AEROSOL)
MSDS NUMBER: 2010-506
MSDS DATE: 02/24/2010
PRODUCT CODE: 80346, 80446
KEY NUMBER:

5. HEALTH HAZARD DATA

☐ *See Addendum:* PAGE #:

Threshold Limit Value: Not known

Effects of Overexposure:

Inhalation: May cause gagging and coughing with irritation to the lungs.

Skin Contact: May cause skin irritation to sensitive parts upon direct contact.

Eye Contact: May cause eye irritation upon direct contact.

Ingestion: May cause irritation to mouth, throat and stomach upon direct contact.

Delayed Effects: Not known

Medical Conditions Aggravated by Exposure Not known

6. FIRST AID MEASURES

☐ *See Addendum:* PAGE #:

Inhalation: Remove the victim from immediate source of exposure and assure that the victim is breathing. If breathing is difficult, administer oxygen. If the victim is not breathing, adminster CPR. Seek immediate medical attention.

Skin Contact: Promptly flush skin with water until all chemical is removed. If there is evidence of frostbite, bathe (do not rub) with lukewarm water. If water is not available, cover with a clean, soft cloth or similar covering. Seek medical attention.

Eye Contact: Immediately flush eyes with large amounts of water for at least 15 minutes. In case of frostbite, water should be lukewarm, lifting eyelids occasionally to facilitate irrigation. Seek medical attention if symptoms persist.

Ingestion: Ingestion is unlikely because of the physical properties and is not expected to be hazardous. DO NOT induce vomiting unless instructed to do so by a physician.

NOTES TO PHYSICIAN: Contact the Poison Control Center at 1-800-222-1222.

7. REACTIVITY DATA

☐ *See Addendum:* PAGE #:

Stability: Presents no significant reactivity hazard.

Incompatibility: (materials to avoid) Not known.

Hazardous Combustion or Decomposition Products Thermal decomposition may produce phosgene, hydrogen fluoride and irritating fumes.

Hazardous Polymerization: May occur.

Conditions to Avoid: Contents may discharge at elevated temperature.

8. SPILL OR LEAK PROCEDURES

☐ *See Addendum:* PAGE #:

Actions to take for Leaks & Spills Individual pressurized containers pose no significant risk.

Waste Disposal Method: Dispose of in accordance with current laws and regulations.

Mace Personal Defense, Inc.
160 Benmont Avenue - Ste. 1
Bennington, VT 05201
802-447-1503

PRODUCT NAME: BEAR PEPPER MACE (AEROSOL)
MSDS NUMBER: 2010-506
MSDS DATE: 02/24/2010
PRODUCT CODE: 80346, 80446
KEY NUMBER:

9. SPECIAL PROTECTION INFORMATION

☐ *See Addendum:* Ref. PAGE:

Respiratory Protection: Respiratory protection is normally not required in well-ventilated areas, however, NIOSH approved respiratory protection may be required when the material is used in a confined area.

Eye Protection: For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

Skin Protection: Skin contact with refrigerant may cause frostbite. General work clothing and gloves (leather) should provide adequate protection.

Other Clothing: Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn.

Other Equipment:

Engineering Controls: Provide ventilation if working in confined area.

10. HANDLING AND STORAGE

☐ *See Addendum:* Ref. PAGE:

Special Precautions: Avoid breathing vapors and liquid contact with eyes, skin or clothing. Do not puncture or drop cylinders, expose to open flame or excessive heat. Use with adequate ventilation.

Other Precautions:

11. REGULATORY INFORMATION

☐ *See Addendum:* Ref. PAGE:

Workplace Classification:

12. TOXICOLOGICAL INFORMATION

☑ *See Addendum:* Ref. PAGE: 4

Acute Data:

Reproductive / Teratology Data

13. ECOLOGICAL INFORMATION

☐ *See Addendum:* Ref. PAGE:

Fate in the Environment: This product has not been tested for environmental effects.

14. DISPOSAL CONDITIONS

☐ *See Addendum:* Ref. PAGE:

Procedures: Dispose of in accordance with applicable environmental laws and regulations.

15. TRANSPORTATION INFORMATION

☑ *See Addendum:* Ref. PAGE: 4

DOT Classification:

Warning Labels:

Mace Personal Defense, Inc.
160 Benmont Avenue - Ste. 1
Bennington, VT 05201
802-447-1503

PRODUCT NAME: BEAR PEPPER MACE (AEROSOL)
MSDS NUMBER: 2010-506
MSDS DATE: 02/24/2010
PRODUCT CODE: 80346, 80446
KEY NUMBER:

16. OTHER INFORMATION

The information contained herein is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages. Various governmental agencies may have specific regulations concerning the transportation, handling, storage, use or disposal of this product which may not be reflected in this MSDS. The user should review these regulations to ensure full compliance.

12. TOXICOLOGICAL INFORMATION - Ref. Pg. 3

Toxicity: Strong skin and eye irritant. Exposure to capsaicin pepper spray results in temporary blindness, lacrimation (tear production), burning sensation, pain, and redness of the skin, nasal irritation, coughing, bronchoconstriction, and dyspnea.

The following LD values were obtained from the "Capsaicin Technical Fact Sheet" of the National Pesticide Information Center, 1-800-858-7378.

Acute oral LD50 values were determined to be 97.4 mg/kg and 118.8 mg/kg in female and male mice, respectively, and 148.1 mg/kg and 161.2 mg/kg in female and male rats, respectively.

Additional LD50 values for male mice were 60-75 and 190 mg/kg depending on the carrier solution when the capsaicin was administered within the stomach.

Studies using mice have reported LD50 values ranging from 47.2 mg/kg to 2500 mg/kg.

The LD50 in humans has been estimated at 0.5-5 g/kg.

Primary routes of entry: Inhalation, skin and ingestion.

High inhaled amounts may cause dizziness, unconsciousness and asphyxia. Skin contact may cause local irritation and a general allergic reaction in sensitive individuals.

15. TRANSPORTATION INFORMATION - Ref. Pg. 3

GROUND (USA) 49 CFR, 172.101

Proper Shipping Name: Consumer Commodity
Hazard Class or Division: ORM-D

Shipper must be trained and certified. Refer to CFR 49

AIR (USA), IATA
Proper Shipping Name: Consumer Commodity
Hazard Class or Division: 9
UN/ID: ID 8000

Shipper must be trained and certified. Refer to IATA Dangerous Goods Regulations.

WPC Brands, Inc.
P.O. Box 4406
Bridgeton, MO 63044-0406

Material Safety Data Sheet

Complies with OSHA's Hazard Communication Standard, 29 CFR 1910.1200

Hazardous Material Identification System – (HMIS)	
HEALTH – 2	REACTIVITY – 0
FLAMMABILITY – 2	PERSONAL – None

I Trade Name: Repel® 100 Insect Repellent

Product Type: Insect Repellent

Product Item Number: 402000 | **Formula Code Number:** 01-4040

EPA Registration Number	Manufacturer	Emergency Telephone Numbers
305-30	Chemsico Division of United Industries Corporation 8494 Chapin Industrial Drive St. Louis, MO 63114	**For Chemical Emergency:** 1-800-633-2873 **For Information:** 1-888-880-1181 **Prepared by:** C. A. Duckworth **Date Prepared:** March 12, 2009

II Hazards Ingredient/Identity Information

Chemical	%	OSHA PEL	ACGIH TLV
DEET (N,N-diethyl-m-toluamide) CAS# 134-62-3	98.11	NA	NA

III Physical and Chemical Characteristics

Appearance & Odor: Clear liquid, slight odor
Boiling Point: 160 C
Vapor Pressure: 1.67×10^{-3}
Specific Gravity: 0.996
Vapor Density: 6.7
% Volatile (by vol.): 100%
Solubility in Water: NA
Evaporation Rate: Approximately 1 (Butyl Acetate = 1)

IV Fire and Explosive Hazards Data

Flash Point: 311 F(pmcc)
Flame Extension: NA
Autoignition Temperature: N/A
Fire Extinguishing Media: Carbon dioxide, Foam, Dry chemical
Decomposition Temperature: NA
Special Fire-Fighting Procedures: *For Small Fires:* Use Carbon dioxide or dry chemical extinguisher. *For Large Fires:* Use copious amounts of water.
Unusual Fire and Explosion Hazards: Also see Section VII

V Reactivity Data

Stability: Stable
Polymerization: Will not occur
Conditions to Avoid: None
Incompatible Materials: May soften or damage some synthetics such as rayon. May damage leather.
Hazardous Decomposition or Byproducts: None

VI Health Hazard Data

Ingestion (Swallowing): Harmful if swallowed. ***First Aid:*** Call a Poison Control Center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a Poison Control Center or doctor. Do not give anything by mouth to an unconscious person.
Eye Contact: Causes substantial but temporary eye injury. ***First Aid:*** Hold eyelids open and flush slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
Special Notes: Probable mucosal damage may contradict the use of gastric lavage. Use of this product may cause skin reactions in rare cases. If you suspect a reaction to this product, discontinue use. Take off contaminated clothing. Rinse immediately with plenty of water for 15-20 minutes. Contact a Poison Control Center or doctor. Have the product container with you when calling or going for treatment.
Health conditions Aggravated by Exposure: None known
Ingredients listed by NTP, OSHA, or IARC as Carcinogens or Potential Carcinogens: None

VII Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released or Spilled:
Soak up with absorbent material. Wash small quantities away with soapy water.

Waste Disposal: Do not puncture or incinerate. If empty: Place in trash or offer for recycling. If partially filled: Call your local solid waste disposal agency or 1-800-CLEANUP for disposal instructions. Never place unused product down an indoor or outdoor drain.

Handling & Storage Precautions:
Keep away from heat, sparks, or open flame. Exposure to temperatures higher than 130^{0}F may cause bursting.

VIII Control Measures

Read and follow label directions. They are your best guide to using this product effectively, and give necessary safety precautions to protect your health.

IX Transportation Data

DOT Shipping Name: Not regulated by DOT
DOT Hazard Class: NONE

The information and statements herein are believed to be reliable but are not to be construed as warranty or representation for which we assume legal responsibility. Users should undertake sufficient verification and testing to determine the suitability for their own particular purpose of any information or products referred to herein. NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE IS MADE.

Teck

CADMIUM METAL
MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Cadmium Metal

Manufacturer:
Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:
Teck Metals Ltd.
#1700 – 11 King Street West
Toronto, Ontario
M5H 4C7

MSDS Preparer:
Teck Metals Ltd.
Suite 3300 – 550 Burrard Street
Vancouver, British Columbia
V6C 0B3

Date of Last Review: February 1, 2013.

Date of Last Edit: February 1, 2013.

Product Use: Cadmium metal is used as a constituent in easily fusible alloys, in soft solder and solder for aluminum, in electroplating, as a deoxidizer in nickel plating, in process engraving, in electrodes for cadmium vapour lamps, in photoelectric cells, in nickel-cadmium storage batteries, and in pigment manufacture.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs)		LD_{50} / LC_{50} Species and Route	
Cadmium	99.97+ %	7440-43-9	OSHA PEL	0.005 mg/m^3	LD_{50}, rat, oral	225 mg/kg
			OSHA SECAL*	0.015 or 0.05 mg/m^3	LD_{50}, mouse, oral	636 mg/kg
			ACGIH TLV	0.01 mg/m^3 (total dust)		
				0.002mg/m^3 (respirable)		
			NIOSH REL	Lowest feasible level		

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction. OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit, PEL – Permissible Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit, SECAL – Separate Engineering Control Airborne Limit.
*Separate Engineering Control Airborne Limits: To be achieved in specified processes and work places where it is not possible to achieve the PEL through engineering and work practices alone. The OSHA SECAL for cadmium is 0.015 or 0.050 mg/m^3, depending on the processes involved. See Table 1 of 29 CFR § 1910.1027.

Trade Names and Synonyms: Tadanac Cadmium; Cadmium Balls; Cadmium Sticks; Cd; ASTM B440.

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: A bluish-silver lustrous metal that does not burn in bulk. Clouds of finely-divided dust are a fire and explosion hazard, however. When heated strongly in air cadmium oxide fumes will be generated. Freshly formed cadmium fume is an intense pulmonary irritant and may result in development of pulmonary edema several hours after exposure. Inhalation or ingestion of dust or fumes may produce both acute and chronic health effects. Probable cancer hazard. A self-contained breathing apparatus (SCBA) and full protective clothing are required for all emergency response personnel when cadmium is involved in a fire situation. Do NOT use water or foam. Apply dry chemical, dry sand, or special powder extinguishing media.

Potential Health Effects: Cadmium dust and fume have both acute and chronic health effects. Cadmium dust is a pulmonary irritant. Freshly formed cadmium fume is an intense pulmonary irritant, resulting in respiratory distress and possible pulmonary edema that may develop as much as 48 hours after exposure. In severe cases death may result. Long term exposures may cause kidney dysfunction and lung injury (emphysema) as well as other symptoms. Cadmium is classified as a carcinogen or probable carcinogen by IARC, ACGIH, NTP, OSHA and the EU. (See Toxicological Information, Section 11).

Potential Environmental Effects: While cadmium metal has relatively low bioavailability, compounds which it forms with other elements can be potentially toxic to biota at low concentrations. Bioaccumulation of cadmium occurs readily in aquatic and terrestrial food chains, specifically in plants and aquatic organisms. (See Ecological Information, Section 12).

EU Risk Phrase(s): R45 – May cause cancer; R26 – Very toxic by inhalation; R48/23/25 – Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed; R62 – Possible risk of impaired fertility; R63 – Possible risk of harm to the unborn child; R68 – Possible risk of irreversible effects; R50/53 – Very toxic to aquatic organisms - may cause long-term adverse effects in the environment.

SECTION 4. FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Dust:* Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts). Quickly and gently blot or brush away excess chemical. Wash gently and thoroughly with lukewarm gently flowing water and non-abrasive soap for 5 minutes. If irritation persists, repeat flushing. Obtain medical advice. Completely decontaminate clothing, shoes and leather goods before reuse or else discard. *Molten Metal:* Flush contact area to solidify and cool, but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: Take proper precautions to ensure your own safety before attempting rescue (e.g., wear appropriate protective equipment). Remove source of contamination or move victim from exposure area to fresh air immediately. If breathing is difficult, trained personnel should administer medical oxygen. DO NOT allow victim to move around unnecessarily. Treat pulmonary edema as a priority, even if no symptoms (i.e. wheezing, coughing, shortness of breath, etc.) are apparent. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Quickly transport victim to an emergency care facility.

Ingestion: NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. The irritant and emetic action of swallowed cadmium usually leads to spontaneous vomiting. If vomiting occurs naturally, have victim rinse mouth with water again. Immediately obtain medical attention and bring a copy of this MSDS.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable or combustible. Finely-divided metallic dust or powder is a moderate fire hazard and moderate explosion hazard when dispersed in air at high concentrations and exposed to heat, flame or other ignition sources. Freshly formed cadmium powder, in contact with limited amounts of water, may heat spontaneously and may ignite combustible materials in contact with the powder. Fires and explosions may also occur upon contact with certain incompatible materials (see Stability and Reactivity, Section 10).

Extinguishing Media: Do NOT use water or foam. Molten metal reacts violently with extinguishing agents such as water, foam, carbon dioxide, and Halons. Apply dry chemical, dry sand, or special powder extinguishing media (i.e. a Class D extinguisher).

Fire Fighting: If possible, move material from fire area and cool material exposed to flame. Apply dry chemical, sand or special powder extinguishing media to burning cadmium. Highly toxic cadmium oxide fumes evolve in fires. Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

Flashpoint and Method: Not Applicable.

Upper and Lower Flammable Limit: Not Applicable.

Autoignition Temperature: Not Applicable.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Restrict access to the area until completion of clean-up. Clean up spilled material immediately, observing precautions outlined below. Molten metal should be allowed to solidify prior to clean-up. If solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment (see below) and use methods that will minimize dust generation (e.g., vacuum solids). Return uncontaminated spilled material to the process if possible. Place contaminated and non-recyclable material into suitable labelled containers for later disposal. Treat or dispose of waste material in accordance with all local, regional and national requirements, as applicable.

Personal Precautions: Persons responding to an accidental release should wear protective clothing, gloves and a respirator (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust and fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from radiant heat and hot-metal splash as well as a respirator to protect against inhalation of cadmium fume. Workers should wash and change clothing following cleanup of a cadmium spill to prevent personal contamination with cadmium dust.

Environmental Precautions: Cadmium metal has relatively low bioavailability; however, compounds which it forms with other elements can be toxic to aquatic and terrestrial biota. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store cadmium in a DRY, covered area, away from incompatible materials and food or feedstuffs. Cadmium ingots suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas, as well as at the end of the workday. No special packaging materials are required.

EU Safety Phrase(s): S45 – In case of accident or if you feel unwell, seek medical advice immediately (show label where possible); S53 – Avoid exposure – obtain special instructions before use; S60 – This material and its container must be disposed of as hazardous waste; S61 – Avoid release to the environment. Refer to special instructions/Safety Data Sheets

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when cadmium is processed. Appropriate eye protection should be worn where fume or dust is generated. Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, respirator and clothing to protect from radiant heat and hot metal splash should be worn. Safety type boots are recommended.

Do not eat, drink or smoke in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas only. Work clothing should be removed immediately and laundered before reuse if it becomes heavily contaminated. Work clothing should be removed before leaving the plant site and should be changed daily if there is a reasonable probability that the clothing may be contaminated. If using a commercial or industrial laundry service, inform laundry personnel of contaminants' hazards. Workers should shower at the end of each work shift. A double locker-shower system with separate clean and dirty sides is required for cadmium handling operations to avoid cross-contamination of street clothes. Workers should not take dirty work clothes home and launder them with other personal clothing.

Ventilation: Use adequate local or general ventilation to maintain the concentration of cadmium fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Local exhaust is strongly recommended for melting, casting, grinding and welding or flame cutting of cadmium.

Respirators: Where cadmium dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge). When exposure levels are obviously high but the actual concentration is unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Bluish-silver lustrous metal	**Odour:** None	**Physical State:** Solid	**pH:** Not Applicable
Vapour Pressure: 1 mm at 394°C negligible @ 20°C	**Vapour Density:** Not Applicable	**Boiling Point/Range:** 765°C	**Melting Point/Range:** 321°C
Specific Gravity: 8.65	**Evaporation Rate:** Not Applicable	**Coefficient of Water/Oil Distribution:** Not Applicable	**Odour Threshold:** None
Solubility: Insoluble in water			

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur. Metal surfaces tarnish on exposure to moist air. Finely powdered metal or dust can be ignited from a dust cloud in air. Freshly formed cadmium powder, in contact with limited amounts of water, may heat spontaneously and may ignite combustible materials in contact with the powder.

Incompatibilities: Cadmium reacts vigorously with oxidizing agents such as peroxides, chlorates, nitrates, and halogens or interhalogen compounds such as chlorine trifluoride as well as with elemental sulphur, zinc, selenium, or tellurium. Mixtures with nitric acid liberate toxic fumes of nitrogen oxides. Violent explosions can occur when the metal is in contact with fused ammonium nitrate or immersed in hydrazoic acid. Burning metal reacts violently with fire extinguishing agents such as water, foam, carbon dioxide or Halons. Cadmium metal reacts with strong acids giving off flammable hydrogen gas.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting or burning, electric arc welding or overheating a molten bath will generate highly toxic cadmium oxide fumes. These brownish fumes are highly soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Cadmium dust and fume are both pulmonary irritants, but freshly generated cadmium fume is an intense irritant and its small particle size allows it to reach into the lung more readily. The onset of symptoms is frequently delayed by 4 to 10 hours after exposure and is aggravated by physical effort. Pulmonary edema may then develop rapidly. The mortality rate from acute pulmonary disease is about 20% according to the ACGIH. Those surviving an episode of acute poisoning generally recover slowly but without apparent residual effects.

Chronic exposure to cadmium has been associated with a wide variety of gastrointestinal symptoms, pulmonary edema, and kidney malfunction with increased excretion of a specific low molecular weight protein (beta-2-microglobulin). The body to a large extent retains absorbed cadmium, and excretion is very slow. Cadmium has been linked to both prostate cancer and lung cancer, though several researchers have questioned the association with prostate cancer recently.

Individuals with pre-existing lung, liver, kidney, and blood ailments should be precluded from exposure until approved by a physician. Initial and periodic medical examinations are recommended for persons exposed to levels above the exposure limits of cadmium.

Acute:
Skin/Eyes: Contact with dust or fume may cause local irritation but would not cause tissue damage.

Inhalation: Fumes of cadmium (i.e. cadmium oxide) are highly toxic by inhalation. They may cause serious systemic poisoning and possible permanent damage to the lungs. Early symptoms of excessive exposure include dryness of the throat; irritation of the nose, throat, and respiratory tract, headache, coughing, and a metallic taste. After a delay of several hours (up to 10), a person may develop constriction of the chest, persistent cough, and progressive shortness of breath. There may be headache, chills, diarrhea, muscle aches, nausea, vomiting, irritability, and restlessness. Pulmonary congestion may progress rapidly causing wheezing and symptoms of oxygen deficiency. Death may follow. Recovery from an acute exposure episode is slow but generally without ongoing or lingering effects. Milder cases of acute exposure have produced symptoms resembling metal fume fever with some symptoms and signs of acute gastroenteritis as well.

Ingestion: Ingestion of excessive quantities of cadmium dust may cause salivation, choking, nausea, vomiting, diarrhea, abdominal pain, tenseness, blurred vision, dizziness, vertigo, and headache. Convulsions, exhaustion, collapse, shock, and unconsciousness may occur. Death has followed within 24 hours from shock or after 7 to 14 days from acute kidney failure or cardiopulmonary depression.

Chronic:
Prolonged exposure to cadmium dust and/or fume may cause loss of sense of smell, occasional ulcerations of the nasal passages, rhinolaryngitis, cough, shortness of breath, mild anemia, sleeplessness, irritability, loss of appetite, and cadmium-yellow fringe on teeth. The primary target organ for chronic cadmium effects is the kidney with increased excretion of a specific low molecular weight protein (beta-2-microglobulin). Damage to the lungs (of the emphysematous type) has been reported in some studies of cadmium-exposed workers but not found in other studies. Cigarette tobacco contains cadmium and smoking adds to the daily intake of cadmium which may increase the risk of cumulative toxic effects. Clinical evidence of the cumulative effects of cadmium may appear after exposure has ceased. Disease may then be progressive.

The International Agency for Research on Cancer (IARC) has classified cadmium and certain cadmium compounds as Group 1 Carcinogens (carcinogenic to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies

cadmium as a Suspected Human Carcinogen (A2). The National Toxicology Program (NTP) classifies cadmium as a Known Human Carcinogen and OSHA lists cadmium as a Carcinogen. The European Union (EU) classifies cadmium as a Category 2 (Probable) Carcinogen.

SECTION 12. ECOLOGICAL INFORMATION

While cadmium metal is relatively insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of cadmium in bioavailable forms. Compared to most other metals, cadmium is relatively mobile and toxic in the aquatic environment. Water hardness, pH and dissolved organic carbon are three major factors which regulate the degree of cadmium toxicity. In soils, higher acidity (lower pH) results in the release of cadmium ions, which may, in turn, yield higher toxicity to soil organisms and uptake of cadmium by plants.

Cadmium is strongly accumulated by all organisms through the food chain. Bioaccumulation in aquatic organisms is greatest in invertebrates, followed by fish and aquatic plants. Bioaccumulation of cadmium into terrestrial plants can result in higher cadmium concentrations in terrestrial animals that feed on the plants.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process, dispose of in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME ..... Not a regulated product in ingot form
TRANSPORT CANADA AND U.S. DOT HAZARD CLASSIFICATION .... Not applicable
TRANSPORT CANADA AND U.S. DOT PIN ..... Not applicable
MARINE POLLUTANT ..... No
IMO CLASSIFICATION ..... Not regulated

SECTION 15. REGULATORY INFORMATION

U.S.
INGREDIENT LISTED ON TSCA INVENTORY ..... Yes

HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD ..... Yes

CERCLA SECTION 103 HAZARDOUS SUBSTANCES ..... Cadmium ..... Yes ..... RQ: 10lbs. (4.54 kg.)*
*reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers (0.004 inches).

EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE ..... No

EPCRA SECTION 311/312 HAZARD CATEGORIES ..... Immediate (Acute) Health Hazard – Toxic
Delayed (Chronic) Health Hazard – Target Organ Effects (Kidney)
Delayed (Chronic) Health Hazard - Carcinogen

EPCRA SECTION 313 Toxic Release Inventory ..... Cadmium
CAS NO. 7440-43-9 Percent by Weight: 99.97+

CANADIAN:
LISTED ON THE DOMESTIC SUBSTANCES LIST ..... Yes
WHMIS CLASSIFICATION: ..... D1B Materials Causing Immediate & Serious Toxic Effects
D2A Materials Causing Other Toxic Effects - Carcinogen

EUROPEAN UNION:
Ingredients Listed on the European Inventory
of Existing Commercial Chemical Substances (EINECS) ..... Yes
EU Classification ..... Very Toxic, Carc. Cat. 2, Muta Cat. 3, Repr. Cat. 3, Dangerous for the Environment.

SECTION 16. OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2012, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2012, Guide to Occupational Exposure Values.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition (P. G. Urben Ed.) 1995.
- Canadian Centre for Occupational Health and Safety, Hamilton, ON, CHEMINFO Record No. 3454 Cadmium (Rev. 2012-01).
- European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.
- Industry Canada, SOR/88-66 Controlled Products Regulations, as amended.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – present, (multi-volume work), World Health Organization, Geneva.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0020 – Cadmium (April 2005).
- International Labour Office (WHO/ILO) Encyclopedia of Occupational Health & Safety 4th Ed. CD-ROM Version (1998).
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank. (On line version).
- Oak Ridge National Laboratory, Health Sciences Research Division, Toxicity Summary for Cadmium. - November 1991.
- Patty's Toxicology, 5th Edition, (E Bingham, B Cohrssen & C H Powell, Ed.) 2001:
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards (On line version).
- U. S. Dept. of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 12th Report on Carcinogens, June 2011.
- U.S. Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Cadmium (September 2012).
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.127.

Notice to Reader

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HeatMax®

Section 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Air-Activated heating packs of various sizes
(HotHands-2, Foot Warm-Up, Toasti Toes, HotHands Body Warmer, Adhesive Body Warmer & Survival Heat Pack)

SYNONYM: Heating pad wrapped in protective film.

ADDRESS: HEATMAX, INC., 505 HILL ROAD, DALTON, GA 30721
EMERGANCY PHONE NUMBER: (706) 226-1800
For non-emergency information, call: 1-800-432-8629

Section 2: COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS NO.
Iron powder	7439-89-6
Activated charcoal	7440-44-0
Water	N/A
Vermiculite	1318-00-9
Salt	7647-14-5

Section 3: HAZARDS INDENTIFICATION

EMERGANCY OVERVIEW

Appearance and odor: Odorless, solid powder

NO SPECIFIC HAZARDS ASSOCIATED WITH THIS MATERIAL

POTENTIAL HEALTH EFFECTS

Likely routes of exposure: Skin & eye contact
Eye contact: No more than slight irritation
Skin contact: No more than slight irritation or burns
Inhalation: N/A
Ingestion: N/A

Section 4: FIRST AID MEASURES

If in eyes or on skin: Flush eyes with large amount of water until irritation subsides, if irritation persists, get medical attention.

Section 5: FIRE FIGHTING MEASURES

AUTOIGNITION: NOT NOTED UPPER EXPLOSIVE LIMIT: N/A

FLASH POINT: NOT NOTED LOWER EXPLOSION LIMIT: N/A

EXTINGUISHING MEDIA: In case of fire, use water, spray foam, dry chemical or carbon dioxide extinguisher.

FIRE FIGHTING PROCEDURE: NO SPECIAL PROCEDURES ARE REQUIRED.

Section 6: SPILL OR LEAK PROCEDURES

Spill or leak procedures: Spills or leaks should be cleaned with water.
Waste disposal methods: Dispose with regular garbage.

Section 7: HANDLING AND STORAGE

HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES.
STORAGE TEMPERATURE: COOL DRY PLACE
HANDLING/STORAGE PROCEDURE: NONE

Section 8: EXPOSURE CONTROL / PERSONAL PROTECTION

RESPIRATORY PROTECTION: NOT APPLICABLE
VENTILATION PROTECTION: NOT APPLICABLE
EFFECTS OF CHRONIC EXPOSURE: NONE
EYE PROTECTION: NOT APPLICABLE
APPLICABLE GLOVE REQUIREMENT: NOT APPLICABLE
CLOTHING: NOT APPLICABLE
RESPIRATORY PROTECTION: NONE
VENTILATION REQUIREMENT: NONE

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

APPREARANCE: DARK POWDER
ODOR: ODORLESS
DISPERSIBILITY: SLIGHTLY SOLUBLE IN WATER
BOILING POINT: NOT NOTED
BULK DENSITY: (gm per cc) NOT NOTED
SPECIFIC GRAVITY: (water = 1) NOT NOTED
PH: NOT NOTED
VOLATILES: NOT NOTED

Section 10: STABILITY AND REACTIVITY

STABILITY: STABLE WILL NOT POLYMERIZE
MATERIALS TO AVOID: NONE
HAZARDOUS DECOMPOSITION: NONE KNOWN
HAZARDOUS POLYMERIZATION: DOES NOT OCCUR

Section 11: TOXICOLOGICAL INFORMATION

HEATMAX, INC. has not conducted toxicity studies on this product and limited data is available in current scientific literature.

However, toxicity information is available on other closely related material.

Section 12: ECOLOGICAL INFORMATION

ALL NATRUAL INGREDIENTS THAT WILL NOT HARM THE ENVIRONMENT

Section 13: DISPOSAL CONSIDERATIONS

This product is not a "HAZARDOUS WASTE". It can be disposed of with regular garbage.

Section 14: TRANSPORT INFORMATION

THIS PRODUCT IS NOT HAZARDOUS UNDER THE APPLICABLE D.O.T. REGULATIONS

Section 15: REGULATORY INFORMATION

The information given and the recommendations made herein apply to our product(s) alone and not combined with other product(s). Information is based on our research and on data from other reliable sources and are believed to be accurate. No guarantee of accuracy is made. It is the purchaser's responsibility before using any product to verify this data under their own operating conditions and to determine whether the product is suitable for their purposes. **This notice must not be detached from the forgoing MSDS. If the MSDS is copied for any reason, including distribution this notice also must be copied and accompany all redistributed MSDS. FAILURE TO DO SO MAY BE SUBJECT TO PENALTIES UNDER LAW.**

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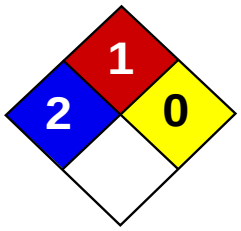

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Chromium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium

Catalog Codes: SLC4711, SLC3709

CAS#: 7440-47-3

RTECS: GB4200000

TSCA: TSCA 8(b) inventory: Chromium

CI#: Not applicable.

Synonym: Chromium metal; Chrome; Chromium Metal Chips 2" and finer

Chemical Name: Chromium

Chemical Formula: Cr

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chromium	7440-47-3	100

Toxicological Data on Ingredients: Chromium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 580°C (1076°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:
Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 (mg/m3) from ACGIH (TLV) [United States] TWA: 1 (mg/m3) from OSHA (PEL) [United States] TWA: 0.5 (mg/m3) from NIOSH [United States] TWA: 0.5 (mg/m3) [United Kingdom (UK)] TWA: 0.5 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 52 g/mole

Color: Silver-white to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 2642°C (4787.6°F)

Melting Point: 1900°C (3452°F) +/- !0 deg. C

Critical Temperature: Not available.

Specific Gravity: 7.14 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:
Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation , sneezing, reddness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconoisis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 05/21/2013 12:00 PM

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Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909
US GHS

Synonyms: Ultra Low Sulfur Diesel; Low Sulfur Diesel; No. 2 Diesel; Motor Vehicle Diesel Fuel; Non-Road Diesel Fuel; Locomotive/Marine Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Skin Corrosion/Irritation – Category 2
Germ Cell Mutagenicity – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Causes skin irritation.
Suspected of causing genetic defects.
Suspected of causing cancer.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/mist/vapours/spray.

Response
In case of fire: Use water spray, fog or foam to extinguish.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.
IF exposed or concerned: Get medical advice/attention.

Storage
Store in a well-ventilated place. Keep cool.
Keep container tightly closed.
Store locked up.

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-34-6	Fuels, diesel, no. 2	100
91-20-3	Naphthalene	<0.1

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned.

First Aid: Ingestion
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO_2, water spray, fire fighting foam, and other gaseous agents.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH:	10 ppm TWA
	15 ppm STEL
	Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA:	10 ppm TWA; 50 mg/m3 TWA
NIOSH:	10 ppm TWA; 50 mg/m3 TWA
	15 ppm STEL; 75 mg/m3 STEL

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear, straw-yellow.	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	320 to 690 °F (160 to 366 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.83-0.876 @ 60°F (16°C)
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	>125 °F (>52 °C) minimum	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.5	**Lower Flammability Limit (LFL):**	0.6
Burning Rate:	ND	**Auto Ignition:**	494°F (257°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This material has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

B: Component Carcinogenicity

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuels, diesel, no. 2 (68476-34-6)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]	
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]	

96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability
No information available.

Bioaccumulation
No information available.

Mobility in Soil
No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions
See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information
Shipping Name: Diesel Fuel
NA #: 1993 **Hazard Class:** 3 **Packing Group:** III
Placard:

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Naphthalene (91-20-3)

CERCLA: 100 lb final RQ; 45.4 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the de minimis levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right- To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Fuels, diesel, no. 2	68476-34-6	No	No	No	Yes	No	No
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

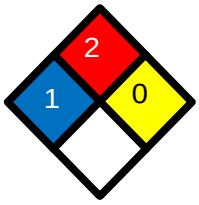
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Fuels, diesel, no. 2	68476-34-6	Yes	DSL	EINECS
Naphthalene	91-20-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	1
Fire	2
Reactivity	0



HMIS® Hazard Rating

Health	1*	Slight
Fire	2	Moderate
Physical	0	Minimal
		*Chronic

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

MATERIAL SAFETY DATA SHEET

Identity:	Eye Wash / Wound Irrigation Sterile, Buffered, Isotonic, Saline

Section 1

Aaxis Pacific **Address:** **24-32 Forge St** **Blacktown, N.S.W.** **2148, Australia**	Telephone: +61 2 9881 3333	Fax: +61 2 9881 3322
	Date Prepared:	15/02/2008
	Prepared by:	Sher Soa

Section II Material Identification Information

Components (Chemical Names & Common Name) Hazardous Component 1% or greater, Carcinogens 0.1% or greater.	CAS No.	%	OSHA PEL	ACGIH TLV	OTHER LIMITS
Sodium Chloride	7647-14-5	1 – 0.1			
Potassium Dihydrogen Phosphate	7778-77-0	1 – 0.1			
Sodium Hydroxide	1310-73-2	1 – 0.1			

Section III Physical/Chemical Characteristics

Physical State:	LIQUID	Specific Gravity (H_2O = 1)			≥ 1
Boiling Point:	100°C	Melting Point:			N/A
Vapour Pressure (mm Hg);	N/A	Evaporation Rate (Water =1)			≥ 1
Vapour Density (Air =1)	Unknown	Water Reactive:			None
Solubility in Water;	Good	Percent Volatile:	N/A	pH:	7.0-7.4
Appearance and Odour:	Clear, Colourless Liquid, Odourless				

Section IV Fire and Explosion Data

Flash Point	Non-Flammable				
Flammability Limits in Air % by Volume:	N/A				
Extinguisher Media:	Carbon Dioxide, Water, Foam				
Special Fire Fighting Procedure:	None	Auto Ignition Temperature			N/A
Unusual Fire and Explosion Hazards:	None	LEL:	N/A	UEL:	N/A

Section V Reactivity Data

Stability	Unstable;	No	Conditions to Avoid:	None
	Stable:	Yes		
Incompatibility (Materials to Avoid):	N/A			
Hazardous Decomposition Products:	N/A			
Hazardous Polymerization May Occur:	May Occur	No	Conditions to Avoid:	None
	May Not Occur:	Yes		

Section VI Health Hazard Data – Potential Acute Health Effects

Eye Contact:	PRODUCT IS INTENDED FOR USE IN OCULAR AREA
Skin Contact	PRODUCT HAS NO EFFECT
Inhalation:	PRODUCT HAS NO EEFECT
Ingestion	MAY CAUSE STOMACH DISCOMFORT IF LARGE AMOUNT INGESTED

Identity:	Eye Wash Sterile, Buffered, Isotonic, Saline (Blue Label)

Section VII Health Hazard Data

Emergency First Aid Procedure	SEEK MEDICAL ASSISTANCE FOR FURTHER TREATMENT, OBSERVATION AND SUPPORT AS NECESSARY
Eye Contact;	NONE REQUIRED
Skin Contact;	NONE REQUIRED
Inhalation;	NONE REQUIRED
Ingestion;	CALL A PHYSICIAN, IF STOMACH DISCOMFORT OCCURS.

Section VIII Control and Protective Measures

Respiratory protection (Specify Type):	NONE			
Protection Gloves:	NONE		Eye Protection	NONE
Ventilation to be Used:	Local Exhaust	N/A	Special:	N/A
	Mechanical (General)	N/A	Other:	N/A
Other protective Clothing and Equipment:	NOT REQUIRED			
Hygienic Work Practices:	KEEP CONTAINER CLOSED WHEN NOT IN USE. ALWAYS READ LABEL BEFORE USE.			

Section IX precaution for Safety Handling and Use Leak Procedure

Steps to be taken if Material is Spilled or Released:	MOP UP OR FLUSH DOWN SANITARY SEWER.
Waste Disposal Methods:	IN ACCORDANCE WITH MUNICIPAL, PROVINCIAL AND FEDERAL REGULATION
Precaution to be taken in handling and Storage:	KEEP AT ROOM TEMPERATURE (15-30°C)
Other Precaution and/or Special Hazards:	KEEP FROM FREEZING READ LABEL BEFORE USING.

HMIS Rating: Health: 0	Flammability:	0	Reactivity	0	Personal Protection	0
NFPA Rating: Health: 0	Flammability	0	Reactivity	0	Personal Protection	0

MATERIAL SAFETY DATA SHEET

I - Product Identification

Product Identifier:

{ Fire Extinguisher ABC Multipurpose Dry Chemical
{ Fire Extinguisher Powder ABC Multipurpose

Chemical Name: ABC Dry Chemical (Mono-Ammonium Phosphate)
Chemical Family: Mixture Formula: $(NH_4)_{H2PO4}$

Product Use:
Used in the application of extinguishing fires.

Manufacturer's Name and Telephone Number:

Flag Fire Equipment
Hwy #2 & Patillo Road, RR#1
Tecumseh, Ontario
N8N 2L9

Emergency Telephone: 519-727-6722
Technical Information: 519-727-6722

II - Hazardous Ingredients

Name	%	Cas #	LD_{50}	LC_{50}
Silica Gel	0.12	112926-00-8	>4500 mg/kg/rat	>2 mg/hr/rat

Other Ingredients

Name	Cas #
Mono Ammonium Phosphate	7722-76-3
Tricalcium Phosphate	12167-74-7
Methyl Hydrogen Polysiloxane	63148-57-2

Fire Extinguishers contain compressed air to ensure a high velocity discharge of product. WHMIS Class A.

III - Physical Data

Physical State	Solid
Odour and Appearance	Yellow Crystal and odourless
Odour Threshold (ppm)	Not Applicable
Vapour Pressure (mm Hg)	Not Applicable
Evaporation Rate	None
Boiling Point (°C)	Not Applicable
Freezing Point (°C)	Not Applicable
pH	4.5 of 1% solution
Specific Gravity	Not Applicable
Solubility in Water	38 grams / 100 ml H_2O

IV - Fire and Explosion Data

Flashpoint (°C) and Method:	Non-flammable
Means of Extinction	None required
Upper Flammable Point	Not Applicable
Lower Flammable Point	Not Applicable
Auto Ignition Temperature (°C)	Not Applicable
Hazardous Combustion Products	None Known

Explosion Data

Sensitivity to Impact	Not Applicable
Sensitivity to Static Discharge	Not Applicable

V - Reactivity Data

† Yes Chemical Stability
† Yes Incompatibility with other substances

Conditions to avoid:

Do not mix with strong Alkalies

Hazardous Decomposition Products

Decomposes if heated above 121°C - 135°C
Ammonia, Carbon Monoxide and Oxides of Nitrogen are produced.

VI - Toxicological Properties

Route of Entry

† Skin Contact † Eye Contact † Inhalation
z Skin Absorption † Ingestion

Effects of Overexposure:

At high dust concentrations, irritation of eyes, skin and mucus membranes by chemical or mechanical action may occur.

Exposure Limits	Not Available
Irritancy of Product	Not Available
Sensitization to Product	Not Available
Carcinogenicity	None. Product is considered a nusisance dust. Silica Gel is a Synthetic Amorphous Silica which is considered a nuisance dust and no medical conditions are abnormally aggravated by this product.
Teratogenicity	None
Reproductive Toxicity	None
Mutagenicity	None
Synergistic Products	Not Available

VII - Preventative Measures

Gloves	None Required
Respirator	If in high dust concentration, wear a properly fitted NIOSH-approved dust respirator
Footwear	None Required
Clothing	None Specified
Eyewear	None Required

Engineering Controls

Adequate ventilation should be available to maintain dust levels below applicable standards on respirable and total nuisance dust. (at recharge stations only)

Leak and Spill Procedure

Ensure clean-up is performed by trained personnel only. Shovel or sweep up dry material for recycling or disposal. Flush residue with water.

Waste Disposal

Review federal, provincial/state, and local government requirements prior to disposal. Disposal by secure landfill may be acceptable.

Handling Procedures	Avoid container damage
Storage Requirements	Cool dry areas
Special shipping information	Fire Extinguisher Class 2.2 UN # 1044

VIII - First Aid Measures

Inhalation:	If breathing difficulty occurs because of dust inhalation, remove to fresh air.
Ingestion:	If person is conscious, give large amounts of water.
Eye Contact:	If eye irritation occurs, flush with copious amounts of water. Get medical attention if irritation persists.
Skin Contact:	Wash with mild soap and water.

IX - Preparation Date of MSDS

Prepared by Department: Health and Safety
Date: 01/01/2002

"Information contained herein is provided without any warranty. Flag Fire Equipment Ltd. will not be liable for any damage which may result from the use or reliance on any information contained herein." Before any product is used, the label should be carefully read.

MSDS Control # 501-90MS

Fire Extinguisher ABC Multipurpose Dry Chemical

Updated MSDS forms may also be obtained on the internet at **www.flagfire.com**

Conforms to ANSI Z400.1-2004 Standard

Material Safety Data Sheet

Fogtech® DX Instant Anti-Fog

1. Product and company identification

Product name	:	Fogtech® DX Instant Anti-Fog
Synonym	:	Moistened towelette wipe in sealed packet
Trade name	:	Fogtech® DX Instant Anti-Fog
Code	:	FTPKD001
Material uses	:	Significantly improves vision through polycarbonate lenses, shields or windows by preventing fogging or misting.
Supplier/Manufacturer	:	MotoSolutions® 966 Coral Drive Rodeo, California, 94572 Tel : 510 799-5100 Fax : 510 799-6607 E-mail : gene@motosolutions.com www.motosolutions.com
MSDS authored by	:	KMK Regulatory Services Inc.
In case of emergency	:	(510) 799-5100

2. Hazards identification

Emergency overview

Physical state	:	Moistened towelette.
Color	:	Water clear.
Signal word	:	WARNING!
Hazard statements	:	BEFORE APPLICATION: FLAMMABLE SOLID. CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION. AFTER APPLICATION AND EVAPORATION OF ALCOHOL CARRIER: NO SIGNIFICANT EFFECTS.
Precautionary measures	:	Keep away from heat, sparks and flame. Avoid contact with eyes. Keep container tightly closed and sealed until ready for use.
OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential acute health effects

Inhalation	:	No known significant effects or critical hazards.
Ingestion	:	No known significant effects or critical hazards.
Skin	:	Moderately irritating to the skin with prolonged contact.
Eyes	:	Temporarily Irritating to eyes.

Potential chronic health effects

Chronic effects	:	No known significant effects or critical hazards.
Carcinogenicity	:	No known significant effects or critical hazards.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.
Target organs	:	Contains material which may cause damage to the following organs: blood, the nervous system, the reproductive system, liver, upper respiratory tract, skin, eyes, central nervous system (CNS).

Over-exposure signs/symptoms

2. Hazards identification

Inhalation : No specific data.

Ingestion : No specific data.

Skin : Adverse symptoms may include the following with prolonged contact:
irritation
redness

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure : None known.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Ethyl Alcohol	64-17-5	60 - 100

Canada

Name	CAS number	%
Ethyl Alcohol	64-17-5	60 - 100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Get medical attention if symptoms occur.

Skin contact : If symptoms occur, immediately flush skin with plenty of water for at least 20 minutes. Get medical attention if symptoms occur.

Inhalation : None known. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

Notes to physician : No specific treatment. Treat symptomatically.

5. Fire-fighting measures

Flammability of the product : Flammable.

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : None known.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up

Small spill : Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose via a licensed waste disposal contractor.

Large spill : Place spilled material in an appropriate container for disposal.

7. Handling and storage

Handling : Avoid contact with eyes. Keep away from heat, sparks and flame. Wash thoroughly after handling.

Storage : Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Ethyl Alcohol	**ACGIH TLV (United States, 2/2010).** STEL: 1000 ppm 15 minute(s). **NIOSH REL (United States, 6/2009).** TWA: 1900 mg/m³ 10 hour(s). TWA: 1000 ppm 10 hour(s). **OSHA PEL (United States, 6/2010).** TWA: 1900 mg/m³ 8 hour(s). TWA: 1000 ppm 8 hour(s).

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Ethyl Alcohol	US ACGIH 2/2010	-	-	-	1000	-	-	-	-	-	
	AB 4/2009	1000	1880	-	-	-	-	-	-	-	
	BC 9/2010	-	-	-	1000	-	-	-	-	-	
	ON 7/2010	-	-	-	1000	-	-	-	-	-	
	QC 6/2008	1000	1880	-	-	-	-	-	-	-	

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : None known.

Engineering measures : None known.

Hygiene measures : Ensure that eyewash stations and safety showers are close to the workstation location. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

Personal protection

Respiratory : Not required under normal conditions of use.

Hands : Not required under normal conditions of use.

Eyes : Not required under normal conditions of use.

Skin : Not required under normal conditions of use.

Environmental exposure controls : Not required.

9. Physical and chemical properties

Physical state : Moistened towelette.

Flash point : Closed cup: -18 to 23°C (-0.4 to 73.4°F) [Pensky-Martens.]

Color : Water clear.

Molecular formula : Not applicable.

Solubility : Soluble in water.

10. Stability and reactivity

Chemical stability : The product is stable.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame).

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials, acids and alkalis.

Hazardous decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Ethyl Alcohol	LC50 Inhalation Vapor LD50 Oral	Rat Rat	124700 mg/m3 7 g/kg	4 hours -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Ethyl Alcohol	Eyes - Moderate irritant Skin - Moderate irritant	Rabbit Rabbit	- -	100 µL 24 hours 20 mg	- -

IDLH : Not available.

Synergistic products : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Ethyl Alcohol	Acute EC50 17.921 mg/L Marine water Acute EC50 2000 ug/L Fresh water Acute LC50 25500 ug/L Marine water Acute LC50 42000 ug/L Fresh water Chronic NOEC 0.375 ul/L Fresh water	Algae - Ulva pertusa Daphnia - Daphnia magna Crustaceans - Artemia franchiscana - Larvae Fish - Oncorhynchus mykiss Fish - Gambusia holbrooki - Larvae - 3 days	96 hours 48 hours 48 hours 4 days 12 weeks

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

International transport regulations

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated.	-	-	-		**Remarks** Special Provision 47
TDG Classification	Not regulated.	-	-	-		-
United States Postal Service	Not regulated.	-	-	-		**Remarks** PCSC Ruling March 15, 2011
IMDG Class	Not regulated.	-	-	-		**Remarks** Special Provision 216
IATA-DGR Class	Not regulated.	-	-	-		**Remarks** Special Provision A46

PG* : Packing group

Exemption to the above classification may apply.

AERG : Not applicable.

Packaging: In sealed packets containing 1.4 grams/2,5 ml of liquid fully absorbed into folded towelette.

15. Regulatory information

United States

HCS Classification : Flammable solid
Irritating material

U.S. Federal regulations : **TSCA 8(a) PAIR**: Octamethylcyclotetrasiloxane; Decamethylcyclopentasiloxane
TSCA 8(a) IUR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): Not determined.
TSCA 8(d) H and S data reporting: Decamethylcyclopentasiloxane

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Ethyl Alcohol
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Ethyl Alcohol: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

State regulations

Massachusetts : The following components are listed: Ethyl Alcohol

New York : None of the components are listed.

New Jersey : The following components are listed: Ethyl Alcohol

Pennsylvania : The following components are listed: Ethyl Alcohol

California Prop. 65

No products were found.

15. Regulatory information

Canada

WHMIS (Canada) : Class B-4: Flammable solid.
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : The following components are listed: Ethyl Alcohol

CEPA Toxic substances : None of the components are listed.

Canada inventory : Not determined.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

International lists : **Australia inventory (AICS)**: Not determined.
China inventory (IECSC): Not determined.
Japan inventory: Not determined.
Korea inventory: Not determined.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): Not determined.

16. Other information

Label requirements : BEFORE APPLICATION:
FLAMMABLE SOLID. CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION.

AFTER APPLICATION AND EVAPORATION OF ALCOHOL CARRIER:
NO SIGNIFICANT EFFECTS.

Hazardous Material Information System (U.S.A.) : **Health :** 1 **Flammability :** 2 **Physical hazards :** 0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) : **Health :** 1 **Flammability :** 2 **Instability :** 0

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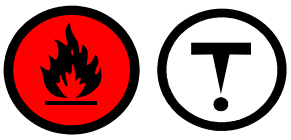
Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Canada

WHMIS (Canada) :



History

Date of issue mm/dd/yyyy : 04/01/2012

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Version : 2

16. Other information

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 °F (-43°C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 °F (>280 °C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

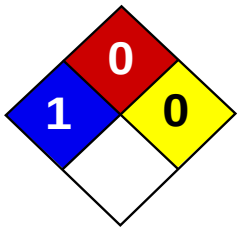
ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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LIQUINOX MSDS

Section 1 : MANUFACTURER INFORMATION

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2005/02/24

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Liquid.

Appearance & odor: Odourless.
Pale yellow.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): @ 20°C (68°F).
17

Vapour density (air=1): >1

Volatiles (%)

By volume: Not available.

Evaporation rate (butyl acetate = 1): < 1.

Boiling point (°C):	100 (212F)
Freezing point (°C):	Not available.
pH:	8.5
Specific gravity @ 20 °C:	(water = 1). 1.083
Solubility in water (%):	Complete.
Coefficient of water\oil dist.:	Not available.
VOC:	None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability:	Not flammable.
Conditions of flammability:	Surrounding fire.
Extinguishing media:	Carbon dioxide, dry chemical, foam. Water Water fog.
Special procedures:	Self-contained breathing apparatus required. Firefighters should wear the usual protective gear. Use water spray to cool fire exposed containers.
Auto-ignition temperature:	Not available.
Flash point (°C), method:	None
Lower flammability limit (% vol):	Not applicable.
Upper flammability limit (% vol):	Not applicable.

Not available.

Sensitivity to mechanical impact:	Not available.
Hazardous combustion products:	Oxides of carbon (COx). Hydrocarbons.
Rate of burning:	Not available.
Explosive power:	Containers may rupture if exposed to heat or fire.

Section 5 : REACTIVITY DATA

Chemical stability:	Product is stable under normal handling and storage conditions.
Conditions of instability:	Extreme temperatures.
Hazardous polymerization:	Will not occur.
Incompatible substances:	Strong acids. Strong oxidizing agents.
Hazardous decomposition products:	See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged and repeated contact may cause irritation.

Inhalation: May cause headache and nausea.

Ingestion: May cause vomiting and diarrhea.
May cause gastric distress.

Effects of chronic exposure: See effects of acute exposure.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available.

Exposure limit of material: Not available.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
If irritation persists, seek medical attention.

Ingestion: Do not induce vomiting, seek medical attention.
Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak / Spill: Contain the spill.
Prevent entry into drains, sewers, and other waterways.
Wear appropriate protective equipment.
Small amounts may be flushed to sewer with water.
Soak up with an absorbent material.
Place in appropriate container for disposal.
Notify the appropriate authorities as required.

Waste disposal: In accordance with local and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing vapors/mists.
Wear personal protective equipment appropriate to task.

Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Avoid extreme temperatures.
Launder contaminated clothing prior to reuse.

Storage requirements: Store away from incompatible materials.
Keep containers closed when not in use.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves / Type:

Wear appropriate gloves.

Respiratory / Type: None required under normal use.

Eye / Type:

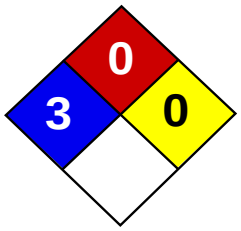
Safety glasses recommended.

Footwear / Type: Safety shoes per local regulations.

Clothing / Type: As required to prevent skin contact.

Other / Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.



Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet
Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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USA

Attached please find the Material Safety Data Sheets required for your recent order(s). Please note that we deliver MSDS documents to you for hazardous materials that you have not ordered previously, or if we have made significant changes to the MSDS content since your last order. In addition, you can access our complete MSDS library at www.sigmaaldrich.com. You may contact the MSDS department at 877-744-1126 or via email at msdsrequest@sial.com if you have any questions or comments.

Beginning in October 2006, we will be upgrading our computer system that produces MSDS documents. In addition to improving the overall look of our MSDS, the documents from our new system will feature improved data quality and increased regulatory data. We will be migrating our data to the new system for several months, and you will receive separate MSDS mailings from each system during this transition period. We will be sending you MSDS documents from the new system as you order those products, so that you may update your records accordingly. Please feel free to contact us with any questions or comments you may have during our transition.

Regulatory Information:
These MSDS documents are written in accordance with US OSHA Hazard Communication Standard 29 CFR 1910.1200.

Certain mixtures or trade name products that are supplied by Sigma-Aldrich, Inc., contain a toxic chemical or chemicals subject to the notification requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. This law requires certain manufacturers to report on annual emissions of specified toxic chemicals and chemical categories. Please refer to Section 15 of the MSDS document to determine if a Sigma-Aldrich product contains any SARA listed materials.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 424-9346 or (703) 412-9810. Please note that if you repackage, or otherwise redistribute, these products to industrial customers, a notice similar to this one should be sent to those customers. Additionally, this information must be permanently affixed to, and included with, all Material Safety Data Sheets that are copied and distributed for these substances.

Delivery #'s: 0831733576

PO#: 05F522-P-009-0065

34966 METHANOL, LC-MS CHROMASOLV(R), > = 99.9%

SIGMA-ALDRICH

Material Safety Data Sheet

Version 3.5
Revision Date 11/12/2007
Print Date 03/18/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Methanol

Product Number : 34966
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : CH4O
Molecular Weight : 32.04 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Methanol			
67-56-1	200-659-6	603-001-00-X	-

3. HAZARDS IDENTIFICATION

Emergency Overview
OSHA Hazards
Flammable Liquid
Target Organ Effect
Toxic by inhalation.
Toxic by ingestion
Toxic by skin absorption
Irritant
Target Organs
Eyes, Kidney, Liver, Heart, Central nervous system

HMIS Classification
Health Hazard: 2
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

NFPA Rating
Health Hazard: 2
Fire : 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation Toxic if inhaled. Causes respiratory tract irritation.
Skin Toxic if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion Toxic if swallowed.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties
Flash point t t.0 °C (51.8 °F) - closed cup

Ignition temperature 455 °C (851 °F)
Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section t3).

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

0000313 6

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Methanol	67-56-1	TWA	200 ppm 262 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
Remarks	Substances for which there is a Biological Exposure Index or Indices.				
		STEL	250 ppm 328 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
	Substances for which there is a Biological Exposure Index or Indices.				
		TWA	200 ppm 260 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		STEL	250 ppm 325 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	200 ppm 260 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	no data available
Melting point	-98.0 °C (-144.4 °F)
Boiling point	64.0 - 65.0 °C (147.2 - 149.0 °F)
Flash point	11.0 °C (51.8 °F) - closed cup
Ignition temperature	455 °C (851 °F)
Lower explosion limit	6 %(V)
Upper explosion limit	36 %(V)
Vapour pressure	546.6 hPa (410.0 mmHg) at 50.0 °C (122.0 °F) 130.3 hPa (97.7 mmHg) at 20.0 °C (68.0 °F)
Density	0.79 g/cm3
Water solubility	completely miscible
Partition coefficient: n-octanol/water	log Pow: -0.77

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
acids, Acid chlorides, Acid anhydrides, Oxidizing agents, Alkali metals, Reducing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 5,628 mg/kg

LC50 Inhalation - rat - 4 h - 64000 ppm

LD50 Dermal - rabbit - 15,800 mg/kg

Irritation and corrosion

Skin - rabbit - Skin irritation - 24 h

Eyes - rabbit - Eye irritation - 24 h

Sensitisation

no data available

Chronic exposure

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

Methyl alcohol may be fatal or cause blindness if swallowed., Cannot be made non-poisonous., Effects due to ingestion may include:, Nausea, Headache, Vomiting, Gastrointestinal disturbance, Dizziness, Weakness, Confusion., Drowsiness, Unconsciousness, May cause convulsions.

Potential Health Effects

Inhalation	Toxic if inhaled. Causes respiratory tract irritation.
Skin	Toxic if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Toxic if swallowed.
Target Organs	Eyes, Kidney, Liver, Heart, Central nervous system,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 19,000.00 mg/l - 96 h
	LC50 - Cyprinus carpio (Carp) - 36,000.00 mg/l - 48 h
Toxicity to daphnia	EC50 - Daphnia magna (Water flea) - 24,500.00 mg/l - 48 h

and other aquatic invertebrates.

EC100 - Daphnia magna (Water flea) - 10,000.00 mg/l - 24 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1230 Class: 3 Packing group: II
Proper shipping name: Methanol

IMDG
UN-Number: 1230 Class: 3 (6.1) Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHANOL
Marine pollutant: No

IATA
UN-Number: 1230 Class: 3 (6.1) Packing group: II
Proper shipping name: Methanol

15. REGULATORY INFORMATION

OSHA Hazards
Flammable Liquid, Target Organ Effect, Toxic by inhalation., Toxic by ingestion, Toxic by skin absorption, Irritant

TSCA Status
On TSCA Inventory

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Methanol	67-56-1	1987-01-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	1987-01-01

000031.37

New Jersey Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	1987-01-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Monsanto
Material Safety Data

POLYCHLORINATED BIPHENYLS (PCBs)

Emergency Phone No.
(Call Collect)
314-694-1000

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: POLYCHLORINATED BIPHENYLS (PCBs)
Aroclor® Series 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, 1268
Therminol® FR Series

MSDS Number: M00018515 Date: 12/95

Chemical Family: Chlorinated Hydrocarbons
Chemical Name: Polychlorinated biphenyls
Synonyms: PCBs, Chlorodiphenyls, Chlorinated biphenyls

Trade Names/Common Names:

PYRANOL® and INERTEEN® are trade names for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL is the generic name for a broad class of fire resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30 - 70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

PYDRAUL® is the trade name for hydraulic fluids that, prior to 1972, may have contained varying amounts of PCBs and other components including phosphate esters.

The product names/trade names are representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

In 1972, Monsanto restricted sales of PCBs to applications involving only closed electrical systems, (transformers and capacitors). In 1977, all manufacturing and sales were voluntarily terminated. In 1979, EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

MONSANTO COMPANY, 800 N. LINDBERGH BLVD., ST. LOUIS, MO 63167

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional nonemergency information, call: 314-694-3344.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile, oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per module (54% chlorine). They were used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic, and other industrial fluids, plasticizers, carbonless copy paper, paints, inks, and adhesives.

Component	CAS No.
chlorinated biphenyl	1336-36-3
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4

There are also CAS Numbers for individual PCB congeners and for mixtures of Aroclor® products.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Seventh).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance and Odor: PCB mixtures range in form and color from clear to amber liquids to white crystalline solids. They have a mild, distinctive odor and are not volatile at room temperature. Refer to Section 9 for details.

WARNING!
CAUSES EYE IRRITATION
MAY CAUSE SKIN IRRITATION

PROCESSING AT ELEVATED TEMPERATURES MAY RELEASE VAPORS OR FUMES WHICH MAY CAUSE RESPIRATORY TRACT IRRITATION

POTENTIAL HEALTH EFFECTS

Likely Routes of Exposure: Skin contact and inhalation of heated vapors

Eye Contact: Causes moderate irritation based on worker experience.

Skin Contact: Prolonged or repeated contact may result in redness, dry skin and defatting based on human experience. A potential exists for developing chloracne. PCBs can be absorbed through intact skin.

Inhalation: Due to the low volatility of PCBs, exposure to this material in ambient conditions is not expected to produce adverse health effects. However, at elevated processing temperatures, PCBs may produce a vapor that may cause respiratory tract irritation if inhaled based on human experience.

Ingestion: No more than slightly toxic based on acute animal toxicity studies. Coughing, choking and shortness of breath may occur if liquid material is accidentally drawn into the lungs during swallowing or vomiting.

Other: Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

Refer to Section 11 for toxicological information.

4. FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. Remove material from skin and clothing.

IF ON SKIN, immediately flush the area with plenty of water. Wash skin gently with soap as soon as it is available. Get medical attention if irritation persists.

IF INHALED, remove person to fresh air. If breathing is difficult, get medical attention.

IF SWALLOWED, do NOT induce vomiting. Rinse mouth with water. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

NOTE TO PHYSICIANS: Hot PCBs may cause thermal burn. If electrical equipment arcs between conductors, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce hydrochloric acid (HCl), a respiratory irritant. If large amounts are swallowed, gastric lavage may be considered.

5. FIRE FIGHTING MEASURES

Flash Point: 284 degrees F (140 degrees C) or higher depending on the chlorination level of the Aroclor product

Fire Point: 349 degrees F (176 degrees C) or higher depending on the chlorination level of the Aroclor product

NOTE: Refer to Section 9 for individual flash points and fire points.

Extinguishing Media: Extinguish fire using agent suitable for surrounding fire. Use dry chemical, foam, carbon dioxide or water spray. Water may be ineffective. Use water spray to keep fire-exposed containers or transformer cool.

PCBs are fire-resistant compounds. They may decompose to form CO, CO2, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

Dielectric fluids having PCBs and chlorinated benzenes as components have been reported to produce polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs) during fire situations involving electrical equipment. At temperatures in the range of 600-650 degrees C in the presence of excess oxygen, PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state and local regulations.

Fire Fighting Equipment: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any cleanup or disposal of PCBs, PCB items, or PCB contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All nonessential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways, and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. Refer to Section 8 for personal protection equipment and clothing.

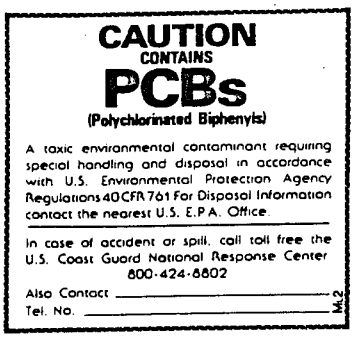
Personnel trained in emergency procedures and protected against attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks, and fight fires in PCB areas.

Refer to Section 13 for disposal information and Sections 14 and 15 for information regarding reportable quantity, and Section 7 for marking information.

7. HANDLING AND STORAGE

Care should be taken to prevent entry into the environment through spills, leakage, use vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked (check regulations, 40 CFR 761, for details).



Storage: The storage of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB waste is strictly regulated by 40 CFR Part 761. The storage time is limited, the storage area must meet physical requirements, and the area must be labeled.

Avoid contact with eyes.
Wash thoroughly after handling.
Avoid breathing processing fumes or vapors.
Process using adequate ventilation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection: Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

Skin Protection: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine the appropriate type glove for a given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contacted. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged skin contact may cause chloracne in some people.

Respiratory Protection: Avoid breathing vapor, mist, or dust. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended when airborne exposure limits are exceeded and, if used, replaces the need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

ATTENTION! Repeated or prolonged inhalation may cause chloracne in some people.

Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of vapor or mist, such as open process equipment.

Airborne Exposure Limits:

Product: Chlorodiphenyl (42% chlorine)

OSHA PEL: 1 mg/m^3 8-hour time-weighted average - Skin*
ACGIH TLV: 1 mg/m^3 8-hour time-weighted average - Skin*

Product: Chlorodiphenyl (54% chlorine)

OSHA PEL: 0.5 mg/m^3 8-hour time-weighted average - Skin*
ACGIH TLV: 0.5 mg/m^3 8-hour time-weighted average - Skin*

*For Skin notation see Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Government Industrial Hygienists, 1995-1996.

9. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTIES OF SELECTED AROCLORS®							
PROPERTY	**1016**	**1221**	**1232**	**1242**	**1248**	**1254**	**1260**
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA—*Not Available*

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

Stability: PCBs are very stable, fire-resistant compounds.
Materials to Avoid: None
Hazardous Decomposition
Products: PCBs may decompose to form CO, CO_2, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surface.
Hazardous Polymerization: Does not occur.

11. TOXICOLOGICAL INFORMATION

Data from laboratory studies conducted by Monsanto and from the available scientific literature are summarized below.
Single exposure (acute) studies indicate:
Oral - Slightly Toxic (Rat LD50 - 8.65 g/kg for 42% chlorinated; 11.9 g/kg for 54% chlorinated)

The liquid products and their vapors are moderately irritating to eye tissues. Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute (NCI) performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed population, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Seventh Annual Report on Carcinogens.

12. ECOLOGICAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquid or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

13. DISPOSAL CONSIDERATIONS

The disposal of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB wastes is strictly regulated by 40 CFR Part 761. For example, all wastes and residues containing PCBs (wiping cloths, absorbent material, used disposable protective gloves and clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

14. TRANSPORT INFORMATION

The data provided in this section are for information only. Please apply the appropriate regulations to properly classify a shipment for transportation.

DOT Classification:	IF WEIGHT OF PCBs TO BE SHIPPED IS OVER ONE POUND, THE FOLLOWING CLASSIFICATION AND LABEL APPLY.	
DOT Label:	LIQUID:	Environmentally Hazardous Substance, liquid, n.o.s. (Contains PCB), 9, UN 3082, III
	SOLID:	Environmentally Hazardous Substance, solid, n.o.s. (Contains PCB), 9, UN 3077, III
DOT Label:	Class: 9	
DOT Reportable Quantity:	One Pound	
IMO Classification:	Polychlorinated Biphenyls, IMO Class 9, UN 2315, II IMO Page 9034, EMS 6.1-02	
IATA/ICAO Classification:	Polychlorinated Biphenyls, 9, UN2315, II	

15. REGULATORY INFORMATION

For regulatory purposes, under the Toxic Substances Control Act, the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such a substance (40 CFR Part 761).

TSCA Inventory: not listed.

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Immediate, Delayed.
SARA Section 313 Toxic Chemical(s): Listed-1993 (De Minimis concentration 0.1%.)

Reportable Quantity (RQ) under DOT (49 CFR) and CERCLA Regulations: 1 lb. (polychlorinated biphenyls) PCBs.

Release of more than 1 (one) pound of PCBs to the environment requires notification to the National Response Center (800-424-8802 or 202-426-2675).

Various state and local regulations may require immediate reporting of PCB spills and may also define spill cleanup levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill cleanup.

16. OTHER INFORMATION

Reason for revision: Conversion to the 16 section format. Supersedes MSDS dated 10/88.

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FOR ADDITIONAL NONEMERGENCY INFORMATION, CONTACT:

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Manager, Product & Environmental Safety

Robert G. Kaley, II
Director, Environmental Affairs

Monsanto Company
800 North Lindbergh Boulevard
St. Louis, MO 63167
(314) 694-3344

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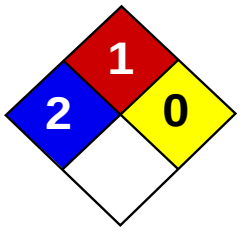

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Selenium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Selenium

Catalog Codes: SLS2629

CAS#: 7782-49-2

RTECS: VS7700000

TSCA: TSCA 8(b) inventory: Selenium

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Se

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Selenium	7782-49-2	100

Toxicological Data on Ingredients: Selenium: ORAL (LD50): Acute: 6700 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.2 (mg/m3) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 78.96 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 684.9°C (1264.8°F)

Melting Point: 217°C (422.6°F)

Critical Temperature: Not available.

Specific Gravity: 4.81 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 6700 mg/kg [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Selenium powder : UN2658 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Selenium Massachusetts RTK: Selenium TSCA 8(b) inventory: Selenium SARA 313 toxic chemical notification and release reporting: Selenium CERCLA: Hazardous substances.: Selenium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 06:24 PM

Last Updated: 05/21/2013 12:00 PM

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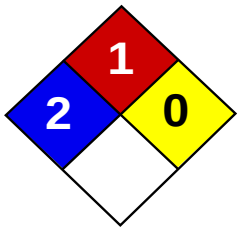

Health	2
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
Silver MSDS

Section 1: Chemical Product and Company Identification

Product Name: Silver

Catalog Codes: SLS4222, SLS2005, SLS3427, SLS1210, SLS2632, SLS4054, SLS1837

CAS#: 7440-22-4

RTECS: VW3500000

TSCA: TSCA 8(b) inventory: Silver

CI#: Not applicable.

Synonym:

Chemical Formula: Ag

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Silver	7440-22-4	100

Toxicological Data on Ingredients: Silver: ORAL (LD50): Acute: 100 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 (mg/m3) from OSHA (PEL) TWA: 0.01 (mg/m3) from OSHA NIOSH Australia: TWA: 0.1 (mg/m3)Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 107.87 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2212°C (4013.6°F)

Melting Point: 961°C (1761.8°F)

Critical Temperature: Not available.

Specific Gravity: 10.4 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Is not dispersed in cold water, hot water.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 100 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Very hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Rhode Island RTK hazardous substances: Silver Pennsylvania RTK: Silver Minnesota: Silver Massachusetts RTK: Silver New Jersey: Silver TSCA 8(b) inventory: Silver TSCA 8(a) PAIR: Silver TSCA 8(d) H and S data reporting: Silver SARA 313 toxic chemical notification and release reporting: Silver: 1% CERCLA: Hazardous substances.: Silver: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Not applicable. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet

Version 3.1
Revision Date 01/17/2012
Print Date 09/19/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Trichloroethylene
Product Number	:	91129
Brand	:	Sigma-Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Carcinogen, Irritant, Mutagen

Target Organs

Liver, Central nervous system, Heart, Lungs

GHS Classification
Acute toxicity, Oral (Category 5)
Skin irritation (Category 2)
Eye irritation (Category 2A)
Germ cell mutagenicity (Category 2)
Carcinogenicity (Category 1B)
Specific target organ toxicity - single exposure (Category 2)
Acute aquatic toxicity (Category 3)
Chronic aquatic toxicity (Category 3)

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H303	May be harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H371	May cause damage to organs.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms	:	TCE Trichloroethene
Formula	:	C_2HCl_3
Molecular Weight	:	131.39 g/mol

Component		Concentration
Trichloroethylene		
CAS-No. EC-No. Index-No.	79-01-6 201-167-4 602-027-00-9	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive. Handle and store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Trichloroethylene	79-01-6	TWA	50 ppm 270 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
Remarks	Skin notation			
		STEL	200 ppm 1,080 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Skin notation			
		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.19-1967			
		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.19-1967			
		Peak	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z2
	Z37.19-1967			
		TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Central Nervous System impairment cognitive decrement Renal toxicity Suspected human carcinogen			
		STEL	25 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Central Nervous System impairment cognitive decrement Renal toxicity Suspected human carcinogen			

	Potential Occupational Carcinogen See Appendix C See Appendix A

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: -84.8 °C (-120.6 °F) - lit.
Boiling point	86.7 °C (188.1 °F) - lit.
Flash point	no data available
Ignition temperature	410 °C (770 °F)
Autoignition temperature	410.0 °C (770.0 °F)
Lower explosion limit	8 %(V)
Upper explosion limit	10.5 %(V)
Vapour pressure	81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F)
Density	1.463 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 2.29 log Pow: 5
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available

Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Oxidizing agents, Strong bases, Magnesium

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 4,920 mg/kg

Inhalation LC50
LC50 Inhalation - mouse - 4 h - 8450 ppm

Dermal LD50
LD50 Dermal - rabbit - > 20,000 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Severe skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Eye irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2A - Group 2A: Probably carcinogenic to humans (Trichloroethylene)
NTP:	Reasonably anticipated to be a human carcinogen (Trichloroethylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
May cause damage to organs.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., Gastrointestinal disturbance, Kidney injury may occur., narcosis

Synergistic effects
no data available

Additional Information
RTECS: KX4550000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 41 mg/l - 96.0 h
	LOEC - other fish - 11 mg/l - 10.0 d
	NOEC - Oryzias latipes - 40 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h
Toxicity to algae	IC50 - Pseudokirchneriella subcapitata (green algae) - 175.00 mg/l - 96 h

Persistence and degradability

Bioaccumulative potential
Does not bioaccumulate.

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1710 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TRICHLOROETHYLENE
Marine pollutant: No

IATA
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene

15. REGULATORY INFORMATION

OSHA Hazards
Carcinogen, Irritant, Mutagen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Trichloroethylene	79-01-6	2008-10-10

16. OTHER INFORMATION

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Therm-O-Rock West, Inc.

Material Safety Data Sheet -- Vermiculite

Date Prepared/Reviewed – October 23, 2001

Product Identification:	Trade Name :	Therm-O-Rock Vermiculite
	Generic Name:	Vermiculite, expanded
	Chemical Name:	Magnesium – Aluminosilicate Mineral
	Formula:	(Mg, Ca, K) (Al, Fe, Mg) $(Si, Al)_4O_{10}$ OH_2 H_2O
	CAS#:	1318-00-9
	Manufacturer:	Therm-O-Rock West, Inc.
	Address:	6732 W. Willis Road, Chandler, AZ 85226
	Telephone:	520-796-1000

Hazard Ratings:	Health	1	0=Least 1=Slight
	Flammability	0	2=Moderate 3=High
	Reactivity	0	E=Extreme

Product Ingredients:

Ingredient Name	CAS Number	%	Permissible Exposure Limit
Magnesium Aluminosilicate Mineral	1318-00-9	100	OSHA ACGIH Not established

Physical Data:

Appearance & Odor: Tan flakes, granules or powder with no odor.
Boiling Point: N/A
Evaporation Rate (=1): N/A
Vapor Pressure: None
Specific Gravity (water=1): 3-12 PCF (bulk density)
Water Solubility (%): Negligible
Melting Point: 1000^0 C
Vapor Density (Air=1): None
% Volatile by Volume: N/A

Fire & Explosion Data:

Flash point (method): None
NFPA Flammable/Combustible liquid classification
Auto-Ignition Temperature: N/A
Flammable Limits: N/A
Unusual Fire or Explosion Hazards: None
Extinguishing Media: N/A
Special Fire-Fighting Procedures: None

Health Hazards:

A. Summary/Risks

A nuisance dust: Inhalation over long periods of high amounts of any nuisance dust may make lungs more vulnerable to respiratory disease. Medical conditions which may be aggravated: pre-existing upper respiratory and lung disease such as, but not limited to bronchitis, emphysema and asthma.
Primary Entry Route(s): Inhalation
Acute Health Effects: Transitory upper respiratory irritant.
Chronic Health Effects: None known
B. Signs/Symptoms of Overexposure
Inhalation: may cause symptoms of nuisance dusts, i.e. coughing, sneezing and minor upper respiratory irritation.
Skin Contact: Not expected to cause any harmful effects.
Ingestion: Not considered harmful.
Skin Absorption: N/A
Eyes: Direct contact may cause physical irritation.
Carcinogen: Not applicable according to OSHA.
C. First Aid/Emergency Procedures
Inhalation: Leave area. Get to fresh air. If symptoms persist consult a physician.
Skin Contact: N/A
Ingestion: N/A
Eyes: Flush with plenty of water while lifting eyelids and rolling eyes. If irritation persists, consult a physician.

Reactivity Data:

Chemical Incompatibilities: None known
Conditions to Avoid: None
Hazardous Decomposition Products: N/A

Spill or Leak Procedures:

Use methods which avoid creating airborne dusts. Remove for disposal.

Waste Management: According to EPA (40 CFR 261.3) waste of this product is not defined as hazardous. Dispose of all waste in accordance with Federal, State and Local regulations.

Special Protection Information:

Goggles: Recommended
Gloves: Not generally required.
Respirator: Wear NIOSH approved dust mask.
Ventilation: Not required but should be used.
Special Considerations for Repair/Maintenance of Contaminated Equipment: N/A

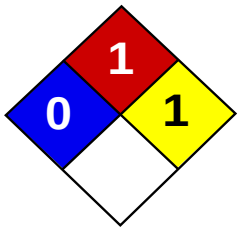
Special Precautions:

Storage Segregation Hazard Classes: N/A
ALWAYS SEGREGATE MATERIALS BY MAJOR HAZARD CLASS
Special Handling/Storage: Repair all broken bags immediately. Avoid creating dust. Maintain good housekeeping practices.
Special Workplace Engineering Controls: Not required.
Other: Comply with all Federal, State and local regulations.

Prepared/Revised by:

Ronald J. Dobkin, President

As of this date of preparation of this document, the foregoing information is believed to be accurate and is provided in good faith to comply with applicable Federal and State law(s). However, no warranty or representation with respect to such information is intended or given.



Health	1
Fire	1
Reactivity	1
Personal Protection	E

Material Safety Data Sheet
Zinc Metal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Zinc Metal

Catalog Codes: SLZ1054, SLZ1159, SLZ1267, SLZ1099, SLZ1204

CAS#: 7440-66-6

RTECS: ZG8600000

TSCA: TSCA 8(b) inventory: Zinc Metal

CI#: Not applicable.

Synonym: Zinc Metal Sheets; Zinc Metal Shot; Zinc Metal Strips

Chemical Name: Zinc Metal

Chemical Formula: Zn

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Zinc Metal	7440-66-6	100

Toxicological Data on Ingredients: Zinc Metal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials, of acids, of alkalis, of moisture. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Zinc + NaOH causes ignition. Oxidation of zinc by potassium proceeds with incandescence. Residues from zinc dust /acetic acid reduction operations may ignite after long delay if discarded into waste bins with paper. Incandescent reaction when Zinc and Arsenic or Tellurium, or Selenium are combined. When hydrazine mononitrate is heated in contact with zinc, a flamming decomposition occurs at temperatures a little above its melting point. Contact with acids and alkali hydroxides (sodium hydroxide, postasium hydroxide, calcium hydroxide, etc.) results in evolution of hydrogen with sufficient heat of reaction to ignite the hydrogen gas. Zinc foil ignites if traces of moisture are present. It is water reactive and produces flammable gases on contact with water. It may ignite on contact with water or moist air.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Flammable solid that, in contact with water, emits flammable gases. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Cover with dry earth, sand or other non-combustible material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

Storage:
Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep from any possible contact with water. Do not allow water to get into container because of violent reaction.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 65.39 g/mole

Color: Bluish-grey

pH (1% soln/water): Not applicable.

Boiling Point: 907°C (1664.6°F)

Melting Point: 419°C (786.2°F)

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, moisture

Incompatibility with various substances:
Reactive with oxidizing agents, acids, alkalis. Slightly reactive to reactive with moisture. The product may react violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with acids, halogenated hydrocarbons, NH_4NO_3, barium oxide, $Ba(NO_3)_2$, Cadmium, CS_2, chlorates, Cl_2, CrO_3, F_2, Hydroxylamine, $Pb(N_3)_2$, $MnCl_2$, HNO_3, performic acid, $KClO_3$, KNO_3, N_2O_2, Selenium, $NaClO_3$, Na_2O_2, Sulfur, Te, water, $(NH_4)_2S$, As_2O_3, CS_2, $CaCl_2$, chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, nonmetals, oxidants, paint primer base, pentacarbonoyliron, transition metal halides, seleninyl bromide, HCl, H_2SO_4, (Mg +$Ba(NO_3)_2$ +BaO_2), (ethyl acetoacetate +tribromoneopentyl alcohol. Contact with Alkali Hydroxides(Sodium Hydroxide, Potassium Hydroxide, Calcium Hydroxide, etc) results in evolution of hydrogen. Ammonium nitrate + zinc + water causes a violent reaction with evolution of steam and zinc oxide. May react with water.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause skin irritation. Dermal exposure to zinc may produce leg pains, fatigue, anorexia and weight loss. Eyes: May cause eye irritation. Ingestion: May be harmul if swallowed. May cause digestive tract irritation with tightness in throat, nausea, vomiting, diarrhea, loss of appetite, malaise, abdominal pain. fever, and chills. May affect behavior/central nervous system and autonomic nervous system with ataxia, lethargy, staggering gait, mild derrangement in cerebellar function, lightheadness, dizzness, irritability, muscular stiffness, and pain. May also affect blood. Inhalation: Inhalation of zinc dust or fumes may cause respiratory tract and mucous membrane irritation with cough and chest pain. It can also cause "metal fume fever", a flu-like condition characterized appearance of chills, headached fever, maliase, fatigue, sweating, extreme thirst, aches in the legs and chest, and difficulty in breathing. A sweet taste may also be be present in metal fume fever, as well as a dry throat, aches, nausea, and vomiting, and pale grey cyanosis. The toxicological properties of this substance have not been fully investisgated.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
New York release reporting list: Zinc Metal Rhode Island RTK hazardous substances: Zinc Metal Pennsylvania RTK: Zinc Metal Florida: Zinc Metal Michigan critical material: Zinc Metal Massachusetts RTK: Zinc Metal New Jersey: Zinc Metal California Director's List of Hazardous Substances: Zinc Metal TSCA 8(b) inventory: Zinc Metal TSCA 12(b) one time export: Zinc Metal SARA 313 toxic chemical notification and release reporting: Zinc Metal CERCLA: Hazardous substances.: Zinc Metal: 1000 lbs. (453.6 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not Available

DSCL (EEC):
R15- Contact with water liberates extremely flammable gases. R17- Spontaneously flammable in air. S7/8- Keep container tightly closed and dry.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 1

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:18 AM

Last Updated: 05/21/2013 12:00 PM

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Alaska Department of Labor and Workforce Development
Labor Standards and Safety
3301 Eagle Street/PO Box 107022
Anchorage, Alaska 99510-7022
(907) 269-4955

PHYSICAL AGENT DATA SHEET

COLD STRESS

HYPOTHERMIA

FROSTBITE

Alaska Department of Labor and Workforce Development
Labor Standards and Safety
3301 Eagle Street/PO Box 107022
Anchorage, 99510-7022
(907) 269-4955

Physical Agent Data Sheet

HYPOTHERMIA

Hypothermia is a temperature-related disorder. Therefore it is necessary to understand human physiology as it pertains to temperature stress.

Man is considered a tropical animal. Normal functioning of the human animal requires a body temperature of 37 degrees Celsius (98.6 degrees Fahrenheit). The body can self-compensate for small upward or downward variations in temperature through the activation of built-in thermoregulatory system, controlled by temperature sensors in the skin. The response to an upward variation in body temperature is the initiation of perspiration, which moves moisture from the body tissues to the body surface. When the moisture reaches the surface it evaporates, carrying with it a quantity of heat. The response to downward variation in body temperature is shivering, which is the body's attempt to generate heat. Shivering is an involuntary contraction and expansion of muscle tissue occurring on a large scale. This muscle action creates heat through friction.

THE DISORDER

Hypothermia is defined as a core temperature of the body less than 35 degrees Celsius (95 degrees Fahrenheit). Hypothermia is also considered the clinical state of sub-normal temperature when the body is unable to generate sufficient heat to efficiently maintain functions.

Many variables contribute to the development of hypothermia. Age, health, nutrition, body size, exhaustion, exposure, duration of exposure, wind, temperature, and wetness of body or clothes, medication and intoxicants (alcohol) may decrease heat production or increase heat loss.

The healthy individual's compensatory responses to heat loss via conduction, convection, radiation, evaporation and respiration may be overwhelmed by exposure. Medication may also interfere with heat generation or regulation. Children will have different symptoms than adults depending on the severity of the cold.

Definitions:

> Conduction: Direct transfer of heat by contact with a cooler object
> Convection: Cool air moving across the surface of the body, heat is transferred to the cool air warming the air.
> Radiation: Heat radiated outward from the warm body to the cooler environment.
> Evaporation: The process of losing heat from the body by vaporization of water from the body surface.
> Respiration: Inspired air raised to body temperature that is then exhaled.

Each of these causes of heat loss can play a large or small role in the development of hypothermia, depending on clothing, head cover, wind, weather, etc.

Once hypothermia develops, two body compartments, the shell (skin) and the core (the remainder of the body) share the heat deficit. The skin constitutes about 10% of a 150 pound mass.

Hypothermia can be recognized as impending, mild, moderate and severe. Below is a brief description of the various stages:

> Impending: Person's core temperature has decreased to 96.8 degrees Fahrenheit (36 degrees C). Individual will increase exercise in an attempt to warm up. The skin may become pale, numb and waxy. Muscles can become tense and shivering may begin. Fatigue and weakness may begin to show.
>
> Mild: Core temperature has dropped to 93.2 degrees Fahrenheit (34 degrees C). Intense, uncontrolled shivering has begun. The individual may still be alert and able to help self; however, movements become less coordinated and the coldness is causing some pain and discomfort.
>
> Moderate: Core temperature has dropped to 87.7 degrees Fahrenheit (31 degrees C). Shivering slows or stops completely, mental confusion and apathy set in. Speech is slow and slurred. Breathing becomes slow and shallow followed by with drowsiness.
>
> Severe: Core temperature is below 87.7 degrees Fahrenheit (31 degrees C). Skin may have a blue-gray color; iris of the eyes may be dilated, may appear drunk, denies problems and may refuse help. This leads to a gradual loss of consciousness. There may be little or no breathing, lack of response to verbal or painful stimuli and may appear dead.

(Temperatures used in above descriptions are approximate. Symptoms may start at different temperatures depending on the individual and circumstances.)

Treatment Preface

Always act on the fact that **"no one is dead until warm and dead."**

Think ABCD – Airway, Breathing, Circulation and Degrees.

In sudden exposure to cold water there is a greater chance for resuscitation with sudden submersion and with prolonged exposure to cold water. Quick onset of hypothermia, easy to reverse. Slow onset, the harder to reverse the process.

The sole consensus regarding prehospital treatment is that all patients at some point should be rewarmed. Core first then extremities. The best way to rewarm the core is by warm air and warm IV solutions.

Initial management principles emphasize prevention of further heat loss, rewarnimg as soon as is safely possible at a "successful" rate and rewarming the core before the shell, in an attempt to avoid inducing lethal side effects during rewarming. This treatment goal is important, since hypothermia itself may not be fatal above 77 degrees Fahrenheit (25 degrees C) core temperature.

The person must be handled very carefully and gently and not be allowed to exercise, as muscular action can pump cold blood to the heart.

Cold blood going to the heart can cause ventricular fibrillation

Hypothermia causes several reactions within the body as it tries to protect itself and retain its heat. The most important of these is vasoconstriction, which halts blood flow to the extremities in order to conserve heat in the core of the body.

Treatment of Hypothermia

Be able to recognize the symptoms of hypothermia in yourself and others. The victim may deny he/she is in trouble. Even mild symptoms demand attention:

> Impending: Seek or build a shelter to get the person out of the cold, windy, wet environment.
> Start a fire or get a cookstove going to provide warmth. Provide the person with a hot drink (no alcohol, coffee or tea). Insulate the person with extra clothes.
>
> Mild: Remove or insulate the patient from the cold ground, protect from the wind, eliminate evaporative heat loss with a vapor barrier. Keep the head and neck covered, remove to a warm environment. Consider covering patient's mouth and nose with a light fabric to reduce heat loss through breathing. Provide the person with a warm, sweetened drink (no alcohol, coffee or tea) and some high-energy food. Limited exercise may help to generate some internal heat, but it depletes energy reserves.
>
> Moderate: Remove the person from the cold environment, keeping the head and neck covered. Apply mild heat (comfortable to your elbow) to the head, neck chest, armpits and groin of the patient. Use hot water bottles, wrapped Thermo-pads, or warm moist towels. Do not place the hot water bottles next to the skin, wrap in cloth first. Offer sips of warm, sweetened liquids (no alcohol, coffee or tea) if the patient is fully conscious, beginning to rewarm and is able to swallow. Patient should be seen by a physician ASAP.
>
> Severe: Place person in a prewarmed sleeping bag with one or two other people. Skin to skin contact in the areas of the chest (ribs) and neck is effective. Exhale warm air near the patient's nose and mouth, or introduce steam into the area. Keep the patient awake. Apply mild heat, with the aim of stopping temperature drop, not rewarming. If patient has lost consciousness be very gentle, as the heart is extremely sensitive. Check for pulse at the carotid artery. If there is any breathing or pulse, no matter how faint, do not give CPR but keep a very close watch for changes in breathing and heart beat (vital signs). If no pulse can be found begin CPR immediately, stopping only when the heart begins to beat or the person applying CPR cannot carry on any longer without endangering themselves.

In all of the above, it is imperative that the victim be removed out of the wet and windy weather, remove all wet clothing, and put the victim into dry clothing and a warm sleeping bag.

Recent research has concluded that the safest and most effective method of treating hypothermia is through inhalation rewarming. Equipment is available; however, out in the field, alternative methods which have been described must be used where equipment is lacking.

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Physical Agent Data Sheet

FROSTBITE

GENERAL INFORMATION

Frostbite is the freezing of some part of the body. Fingers, toes, and even whole arms and legs can be lost as a result of frostbite. Injuries can happen at home, in the cities and also in more isolated areas of the State.

In extreme cold it is important to prevent heat loss from as many areas of the body as possible. Exposed limbs and head are major areas of heat loss, but keeping enough blood flowing to the hands and feet is the key to preventing frostbite. The trunk and the head should be warm enough so that the brain is able to command the blood vessels in the hands and feet to open up and keep the extremities warm.

ESSENTIAL CLOTHING

This includes thermal underwear, insulated footwear or mukluks with liners; double mittens and a parka, preferably down-filled with a good ruff. A parka that can be opened at the neck to allow heat to escape will prevent overheating and sweating. Quilted or skin pants are necessary if no warm shelter is immediately available. Tight cloths, especially tight gloves or tight boots should not be worn. The tightness interferes with good circulation in the hands and feet. If there is a reduction in blood flow to these areas, then the possibility of frostbite increases as the extremity cools down.

FACTORS LEADING TO FROSTBITE

Tall thin persons are more likely to get frostbite than those of stocky build.

People in poor physical condition are more susceptible than those in good health.

Certain diseases slow down the blood flow in the hands and feet especially in elderly people.

Heavy smokers often have poor circulation in the vital organs and decreased circulation in the arms and legs.

Children and elderly people who cannot produce large amounts of body heat for long periods of time can experience a lowering of deep body temperature and frostbite.

Alcohol causes the blood vessels to dilate (become larger). This leads to a false sense of warmth. This also leads to faster loss of heat from the body because of dilation of blood vessels. More important, people act with poor judgment after drinking.

Don't touch cold metal with bare or wet hands. You will freeze to the metal and tear the skin if pulled away without proper thawing with warm water, heat or urine.

Be careful when handling gasoline, kerosene or liquids other than water. Contact with bare skin in cold temperatures can cause instant frostbite.

> *Frostbite is more likely to occur when you are injured, frightened or careless.*

HOW TO RECOGNIZE FROSTBITE

Exposed parts of the body should be inspected routinely. This is done best with a partner. Just before freezing, the skin, especially the face with its many blood vessels, becomes bright red. Then small patches of white appear, as freezing actually occurs.

The loss of the sensations of touch, pressure and pain may occur without awareness of any numbness or other sensations. Therefore, it is important to test these sensations often. Wear clothing that is not restrictive but loose.

There may be no pain associated with frostbite if the freezing or temperature change is slow. Only if there is a rapid change in temperature does the body register pain.

The skin becomes less elastic. This is best noted in the finger pads. If touched or squeezed the pads will remain pitted. Any further cooling will result in frostbite.

Serious freezing is most common in the feet, followed by the hands and then the head (nose, ears). This is because of the poorer circulation in the feet and hands. Also with the poorer circulation there is in conjunction less sensation to these areas. Exposed head areas are less likely to freeze because of a better blood supply.

EARLY TREATMENT OF FROSTBITE

Early rewarming.

Thawing and refreezing should always be avoided.

Limbs should be rewarmed in stirred water just above normal body temperature (100 – 105 degrees Fahrenheit). Always use a thermometer to get accurate temperatures. Never try to thaw in cold water or snow. Since feeling is lost, fires, stoves, exhaust pipes, etc., should never be used. Serious damage to the skin could result.

Rewarming is an acutely painful experience and medication to alleviate pain should be given if available. After thawing, a deep aching pain may persist for several days, depending upon severity of the injury. Pain is a good sign; this tells us that the nerves are still alive and functioning.

A dull purple color, swelling and/or blistering of the extremity after thawing indicate a more serious injury and require medical attention.

SUMMARY

Poor circulation and poor production of body heat will lower resistance to frostbite.

Most cases of frostbite occur as a result of lack of knowledge, careless preparation, unavoidable accident, or the effects of alcohol on judgment. Forethought can prevent injury.

If freezing does occur, proper rewarming in warm water will give maximum benefit. The injured limb should be handled gently and a medical judgment made of the extent of injury and the need for further treatment.

Physical Agent Data Sheet (PADS)
- Hand-Arm Vibration

1.0 Description

Hand-arm vibration is caused by the use of vibrating hand-held tools, such as pneumatic jack hammers, drills, gas powered chain saws, and electrical tools such as grinders. The nature of these tools involves vibration (a rapid back and forth type of motion) which is transmitted from the tool to the hands and arms of the person holding the tool.

2.0 Health Hazards

Vibration Syndrome and Vibration-Induced White Finger (VWF) are the major health hazards related to the use of vibrating tools. Carpal Tunnel Syndrome is another health problem that has been linked in one study to the use of smaller hand-held vibrating tools.

^back to the top

Vibration Syndrome

Vibration Syndrome is a group of symptoms related to the use of vibrating tools and includes -some or all of the following: muscle weakness, muscle fatigue, pain in the arms and shoulders, and vibration-induced white finger. Many researchers believe that other symptoms--headaches, irritability, depression, forgetfulness, and sleeping problems--should also be included in descriptions of Vibration Syndrome.

Vibration-Induced White Finger

Vibration-Induced White Finger (VWF), also known as "Dead Finger" or "Dead Hand" is the result of impaired circulation (poor blood supply in the fingers, caused by the prolonged use of vibrating tools. VWF may appear after only several months on the job, or may not appear until twenty to forty years on the job.

The harmful health effects of vibrating tools are related to the length of time that a worker has been using vibrating tools and to the frequency of the vibration (how fast the tool goes back and forth). The longer a person uses a vibrating tool, and the faster the tool vibrates, the greater the risk of health effects. The length of the initial symptom-free period of vibration exposure (i.e., from first exposure to the first appearance of a white finger) is known as the latent interval. It is related to the intensity of the vibration - the shorter the latent period, the more severe the resulting VWF if vibration exposure continues.

Temporary tingling or numbness during or soon after use of a vibrating hand tool is not considered to be VWF, however tingling and numbness in the fingers lasting more than an hour after finishing work may indicate early stages of VWF. Table 1 lists the stages that Vibration White Finger may progress through if exposure continues.

^back to the top

Table 1
Stages of Vibration White Finger
(Taylor-Pelmear System)

Stage	Condition of Fingers	Work & Social Interference
00	No tingling, numbness or blanching of fingers	No complaints
OT	Intermittent tingling	No interference with activities
ON	Intermittent numbness	No interference with activities
TN	Intermittent tingling and numbness	No interference with activities
1	Blanching of a fingertip with or without tingling and/or numbness	No interference with activities
2	Blanching of one or more fingers beyond tips, usually during winter	Possible interference with activities outside work, no interference at work
3	Extensive blanching of fingers; frequent episodes in both summer and winter	Definite interference at work, at home, and with social activities; restriction of hobbies
4	Extensive blanching of most fingers; frequent episodes in both summer and winter	Occupation usually changed because of severity of signs and symptoms

The technical name for VWF is Raynaud's Syndrome of Occupational Origin. Raynaud's Syndrome may also occur in people who do not use vibrating hand-held tools. Several different kinds of medical illnesses can cause Raynaud's Syndrome. Raynaud's Syndrome also appears in some people who are otherwise entirely healthy.

It is important that people with Raynaud's Syndrome avoid the extensive use of vibrating tools because they can develop the most severe complications of VWF very quickly.

Many of the symptoms of Vibration Syndrome will disappear shortly after a worker stops using the types of tools which transmit vibration to the hands and arms. Fatigue and muscular pain in the arms and shoulders will generally disappear. In the early stages, if

a worker stops using vibrating tools, VWF will not get any worse and may get slightly better.

Carpal Tunnel Syndrome

Carpal Tunnel Syndrome (CTS) is a group of symptoms in the hand which arise from pressure on one of the nerves which passes through the palm side of the wrist. The early symptoms are similar to the early symptoms of white finger and consist of tingling in the fingers. For the most part only the thumb, index, and middle fingers are affected in CTS. Later, symptoms can progress to numbness. Pain in the wrist and fingers may also develop. CTS may occur in people using small hand tools like pneumatic screwdrivers. Carpal Tunnel Syndrome also occurs among people having repetitive motion of the wrist or fingers, such as using a cash register, or picking fish from a net; or with forceful motion of the wrist, such as in using a wrench. Pinching or flexing with the wrist bent upwards, downwards, or sideways increases the occurrence of CTS.

The symptoms of CTS are frequently worse at night and a person may be awakened from sleep by pain or the feeling of pins and needles in fingers, hand or wrist.

Carpal Tunnel Syndrome may improve if diagnosed in the early stages and exposure to the type of activity which caused it is stopped. In moderate cases most of the symptoms of CTS can be relieved by a surgical operation which relieves the pressure on the nerve which causes the CTS symptoms. If the surgery is performed too late, only some of the symptoms may be relieved. In very severe cases the symptoms are irreversible and may include weakness of the hand due to loss of muscle function.

^back to the top

3.0 Preventing Hand-Arm Vibration Diseases

Job Modification to Reduce Vibration Exposure

Wherever possible, jobs should be redesigned to minimize the use of hand-held vibrating tools. Where job redesign is not feasible, ways to reduce tool vibration should be found. Where practical, substitute a manual tool for a vibrating tool. Whenever possible, high vibration tools should be replaced by improved, low vibration tools designed to absorb vibration before it reaches the handgrip.

Determine vibration exposure times and introduce work breaks to avoid constant, continued vibration exposure. A worker who is using a vibrating tool continuously should take a 10 minute break after each hour of using the tool.

Medical Evaluation

Workers whose occupations place them at risk for developing VWF should have pre-employment physicals and thereafter should be checked at least annually by doctors who know about the diagnosis and treatment of VWF. Diagnostic tests which can be

used include plethysmography, arteriography, skin thermography, and sensory tests,, such as two point discrimination depth sense, pinprick touch and temperature sensation. X-rays may also be useful.

Workers that have a past history of abnormalities in blood circulation and especially workers who have Raynaudis Syndrome should not be permitted to use vibrating hand-held tools. Workers who have moderate to severe symptoms of VWF should be reassigned to work which removes them from further direct exposure to vibrating tools.

If workers develop symptoms of tingling or numbness, or if their fingers occasionally become white or blue, or painful especially when cold, they should be examined by a doctor who knows about the diagnosis and treatment of VWF and CTS.

Work Practices

Workers using vibrating hand-held tools should wear multiple layers of warm gloves and should wear anti-vibration gloves whenever possible. Before starting the job, warm the hands. This is especially important when it is cold. workers using vibrating tools should not allow the hands to become chilled. If the hands of a worker using vibrating tools become wet or chilled, he should dry them and put on dry, warm gloves before resuming exposure to vibration. Workers exposed to cold should dress adequately to keep the whole body warm because low body temperature can make a worker more susceptible to VWF.

A worker using a vibrating hand-held tool should let the tool do the work by grasping it as lightly as possible, consistent with safe work practice. The tighter the tool is held, the more vibration is transmitted to the fingers and hand. The tool should rest on a support or on the workpiece as much as possible. The tool should be operated only when necessary and at the minimum speed (and impact force) to reduce vibration exposure.

Tools should be regularly maintained to keep vibration to a minimum. Keeping chisels and chainsaws sharp, for example, will reduce vibration. Using new grinder wheels will also reduce vibration.

Education

Employees who use or will be using vibrating hand-held tools should receive training about the hazards of vibration and they should be taught how to minimize the ill effects of vibration.

Smokers are much more susceptible to VWF that non-smokers, and the VWF in smokers is usually more severe, therefore workers who use vibrating hand-held tools should not smoke.

^back to the top

4.0 Recommended Exposure Limits

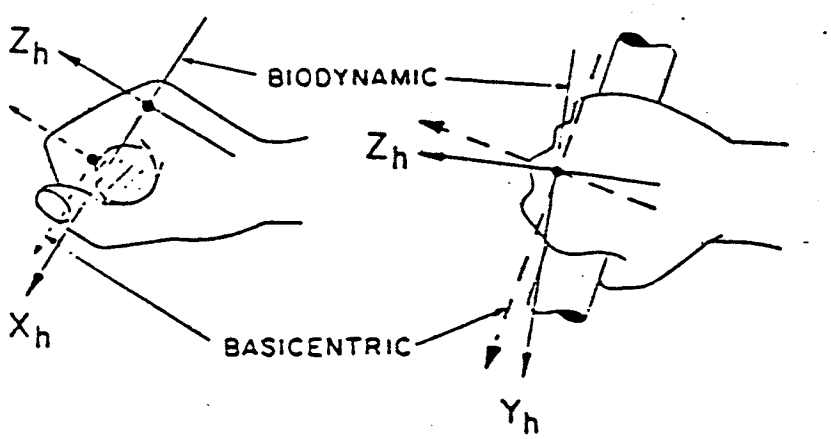
Table 2 contains the American Conference of Governmental Industrial Hygienists (ACGIH) recommendations on the limits for exposure of the hand to vibration.

Table 2 **Threshold Limit Values for Exposure of the Hand to Vibration in Either X_h, Y_h, Z_h, Directions**		
Total Daily Exposure Duration[a]	**Values of the Dominant,[b] Frequency-Weighted, rms, Component Acceleration Which Shall Not be Exceeded a_k, (a_{keg})**	
	m/s^2	**g[c]**
4 hours and less than 8	4	0.40
2 hours and less than 4	6	0.61
1 hour and less than 2	8	0.81
less than 1 hour	12	1.22

[a] The total time vibration enters the hand per day, whether continuously or intermittently.

[b] Usually one axis of vibration is dominant over the remaining two axes. If one or more vibration axes exceeds the Total Daily Exposure then the TLV has been exceeded.

[c] g = 9.81 m/s . d



Biodynamic and basicentric coordinate systems for the hand, showing the directions of the acceleration components (ISO 5349 and ANSI S3.34-1986).

Physical Agent Data Sheet (PADS)
- Heat Stress

1.0 Description

Heat stress is caused by working in hot environments like laundries, bakeries, or around boilers or incinerators. Four environmental factors affect the amount of heat stress felt by employees in hot work areas: temperature, humidity, radiant heat (such as from the sun or a furnace), and air velocity. How well or how poorly an individual reacts to heat stress is dependent on personal characteristics such as age, weight, fitness, medical condition, and acclimatization.

The body has several methods of maintaining the proper internal body temperature. When internal body temperature increases, the circulatory system reacts by increasing the amount of blood flow to the skin so the extra heat can by given off.

Sweating is another means the body uses to maintain stable internal temperatures. When sweat evaporates, cooling results. However, sweating is effective only if the humidity level is low enough to permit evaporation and if the fluids and salts lost are replaced.

^back to the top

2.0 Health Effects—Heat Disorders

Heat stroke, the most serious health problem for workers in hot environments is caused by the failure of the body's internal mechanism to regulate its core temperature. Sweating stops and the body can no longer rid itself of excess heat. Signs include: mental confusion, delirium, loss of consciousness, convulsions or coma; a body temperature of 106 degrees Fahrenheit or higher; and hot dry skin which may be red, mottled or bluish. Victims of heat stroke will die unless treated promptly. While medical help should be called, the victim must be removed immediately to a cool area and his/her clothing soaked with cool water. He/she should be fanned vigorously to increase cooling. Prompt first aid can prevent permanent injury to the brain and other vital organs.

Heat exhaustion develops as a result of loss of fluid through sweating when a worker has failed to drink enough fluids or take in enough salt, or both. The worker with heat exhaustion still sweats, but experiences extreme weakness or fatigue, giddiness, nausea, or headache. The skin is clammy and moist, the complexion pale or flushed, and the body temperature normal or slightly higher. Treatment is usually simple: the victim should rest in a cool place and drink salted liquids. Salt tablets are not

recommended. Severe cases involving victims who vomit or lose consciousness may require longer treatment under medical supervision.

Heat cramps, painful spasms of the bone muscles, are caused when workers drink large quantities of water but fail to replace their bodies' salt loss. Tired muscles, those used for performing the work, are usually the ones most susceptible to cramps. Cramps may occur during or after working hours and may be relieved by taking salted liqids by mouth or saline solutions intravenously for quicker relief, if medically determined to be required.

Fainting may be a problem for the worker unacclimatized to a hot environment who simply stands still in the heat. Victims usually recover quickly after a brief period of lying down. Moving around, rather that standing still, will usually reduce the possibility of fainting.

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impairs a worker's performance or even results in temporary total disability. It can be prevented by showering, resting in a cool place, and allowing the skin to dry.

^back to the top

3.0 Medical Conditions Aggravated By Exposure to Heat

Persons with heart or circulatory diseases or those who are on "low salt" diets should consult with their physicians prior to working in hot environments.

4.0 Preventing Heat Disorders

One of the best ways to reduce heat stress on workers is to minimize heat in the workplace. However, there are some work environments where heat production is difficult to control, such as when furnaces or sources of steam or water are present in the work area, or when the workplace itself is outdoors and exposed to varying warm weather conditions.

5.0 Acclimatization

Humans are, to a large extent, capable of adjusting to the heat. This adjustment to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more endurable.

On the first day of work in a hot environment, the body temperature, pulse rate, and general discomfort will be higher. With each succeeding daily exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body

becomes acclimated to the heat, the worker will find it possible to perform work with less strain and distress.

Gradual exposure to heat gives the body time to become accustomed to higher environmental temperatures. Heat disorders in general are more likely to occur among workers who have not been given time to adjust to working in the heat or among workers who have been away from hot environments and who have gotten accustomed to lower temperatures. Hot weather conditions of the summer are likely to affect the worker who is not acclimatized to heat. Likewise, workers who return to work after a leisurely vacation or extended illness may be affected by the heat in the work environment. Whenever such circumstances occur, the worker should be gradually reacclimatized to the hot environment.

^back to the top

6.0 Lessening Stressful Conditions

Many industries have attempted to reduce the hazards of heat stress by introducing engineering controls, training workers in the recognition and prevention of heat stress, and implementing work-rest cycles. Heat stress depends, in part, on the amount of heat the worker's body produces while a job is being performed. The amount of heat produced during hard, steady work is much higher than that produced during intermittent or light work. Therefore, one way of reducing the potential for heat stress is to make the job easier or lessen its duration by providing adequate rest time. Mechanization of work procedures can often make it possible to isolate workers from the heat source (perhaps in an air-conditioned booth) and increase overall productivity by decreasing the time needed for rest. Another approach to reducing the level of heat stress is the use of engineering controls which include ventilation and heat shielding.

7.0 Number and Duration of Exposures

Rather than be exposed to heat for extended periods of time during the course of a job, workers should, wherever possible, be permitted to distribute the workload evenly over the day and incorporate work-rest cycles. Work-rest cycles give the body an opportunity to get rid of excess heat, slow down the production of internal body heat, and provide greater blood flow to the skin.

Workers employed outdoors are especially subject to weather changes. A hot spell or a rise in humidity can create overly stressful conditions. The following practices can help to reduce heat stress:

Postponement of nonessential tasks

Permit only those workers acclimatized to heat to perform the more strenuous tasks, or

Provide additional workers to perform the task keeping in mind that all workers should have the physical capacity to perform the task and that they should be accustomed to the heat.

^back to the top

8.0 Thermal Conditions in the Workplace

A variety of engineering controls can be introduced to minimize exposure to heat. For instance, improving the insulation on a furnace wall can reduce its surface temperature and the temperature of the area around it. In a laundry room, exhaust hoods installed over those sources releasing moisture will lower the humidity in the work area. In general, the simplest and least expensive methods of reducing heat and humidity can be accomplished by:

Opening windows in hot work areas,

Using fans, or

Using other methods of creating airflow such as exhaust ventilation or air blowers.

9.0 Rest Areas

Providing cool rest areas in hot work environments considerably reduces the stress of working in those environments. There is no conclusive information available on the ideal temperature for a rest area. However, a rest area with a temperature near 76 degrees Fahrenheit appears to be adequate and may even feel chilly to a hot, sweating worker, until acclimated to the cooler environment. The rest area should be as close to the workplace as possible. Individual work periods should not be lengthened in favor of prolonged rest periods. Shorter but frequent work-rest cycles are the greatest benefit to the worker.

^back to the top

10.0 Drinking Water

In the course of a day's work in the heat, a worker may produce as much as 2 to 3 gallons of sweat. Because so many heat disorders involve excessive dehydration of the body, it is essential that water intake during the workday be about equal to the amount of sweat produced.

Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst drive. A worker, therefore, should not depend on thirst to signal when and how much to drink. Instead, the worker should drink 5 to 7 ounces of fluids every 15 or 20 minutes to replenish the necessary fluids in the body. There is no optimum temperature of drinking water, but most people tend not to drink warm or very cold fluids

as readily as they will cool ones. whatever the temperature of the water, it must be palatable and readily available to the worker. Individual drinking cups should be provided, never use a common drinking cup.

Heat acclimatized workers lose much less salt in their sweat than do workers who are not adjusted to the heat. The average American diet contains sufficient salt for acclimatized workers even when sweat production is high. If, for some reason, salt replacement is required, the best way to compensate for the loss is to add a little extra salt to the food. Salt tablets should not be used. CAUTION: PERSONS WITH HEART PROBLEMS OR THOSE ON A "LOW SODIUM" DIET WHO WORK IN HOT ENVIRONMENTS SHOULD CONSULT A PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

^back to the top

11.0 Protective Clothing

Clothing inhibits the transfer of heat between the body and the surrounding environment. Therefore, in hot jobs where the air temperature is lower than skin temperature, wearing clothing reduces the body's ability to lose heat into the air.

When air temperature is higher than skin temperature, clothing helps to prevent the transfer of heat from the air to the body. The advantage of wearing clothing, however, may be nullified if the clothes interfere with the evaporation of sweat.

In dry climates, adequate evaporation of sweat is seldom a problem. In a dry work environment with very high air temperatures, the wearing of clothing could be an advantage to the worker. The proper type of clothing depends on the specific circumstance. Certain work in hot environments may require insulated gloves, insulated suits, reflective clothing, or infrared reflecting face shields. For extremely hot conditions, thermally-conditioned clothing is available. One such garment carries a self-contained air conditioner in a backpack, while another is connected to a compressed air source which feeds cool air into the jacket or coveralls through a vortex tube. Another type of garment is a plastic jacket which has pockets that can be filled with dry ice or containers of ice.

^back to the top

12.0 Recommended Exposure Limits

These Threshold Limit Values (TLVS) refer to heat stress conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse health effects. The TLVs shown in Table I are based on the assumption that nearly all acclimatized, fully clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 38 degrees Celsius (100.4 degrees Fahrenheit).

Since measurement of deep body temperature is impractical for monitoring the workers' heat load, the measurement of environmental factors is required which most nearly correlate with deep body temperature and other physiological responses to heat. At the present time, Wet Bulb Globe Temperature Index (WBGT) is the simplest and most suitable technique to measure the environmental factors. WBGT values are calculated by the following equations:

Outdoors with solar load: WBGT = 0.7 NWB + 0.2 GT + 0.1 DB

Indoors or Outdoors with no solar load: WBGT = 0.7 NWB + 0.3 GT

Where: WBGT = Wet Bulb Globe Temperature Index
NWB = Natural Wet Bulb Temperature
DB = Dry Bulb Temperature
GT = Globe Temperature

The determination of WBGT requires the use of a black globe thermometer, a natural (static) wet-bulb thermometer, and a dry bulb thermometer.

Higher heat exposures that shown in Table I are permissible if the workers have been undergoing medical surveillance and it has been established that they are more tolerant at work in heat than the average worker. Workers should not be permitted to continue their work when their deep body temperature exceeds 38.0 degrees Celsius (100.4 degrees Fahrenheit).

^back to the top

Table 1
Permissible Heat Exposure Threshold Limit Values
(Values are given in degrees Centigrade WBGT (Fahrenheit)]

	Work Load		
Work- Rest Regimen	**Light**	**Moderate**	**Heavy**
Continuous work	30.0 (86.0)	26.7 (80.1)	25.0 (77.0)
75% Work, 25% Rest/Hour	30.6 (87.1)	28.0 (82.4)	25.9 (78.6)
50% Work, 50% Rest/Hour	31.4 (88.5)	29.4 (85.0)	27.9 (82.2)
25% Work, 75% Rest/Hour	32.2 (90.0)	31.1 (88.0)	30.0 (86.0)

13.0 References

1. "Working in Hot Environments," US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, 1986.

2. "Threshold Limit Values and Biological Exposure Indices for 1986 - 1987," American Conference of Governmental Industrial, Hygienists, 6500 Glenway Avenue, Building D-7, Cincinnati, OH 45211-4438.

Physical Agent Data Sheet (PADS) – Noise

1.0 Description

Sound is created when a vibrating source (like a bell, motor or a stereo speaker) sends sound waves through the air to your ear. Every sound has two aspects: its pitch (frequency) and its loudness (intensity). On a stereo, frequency is determined by the bass/treble control. Intensity is determined by the volume control. Noise (unwanted sound) is usually made up of many frequencies. The disturbing and harmful effects of noise depend both on the loudness and the frequency of the tones making up noise.

Loudness is measured in units called decibels (dB). A conversational voice is about 65 dB. A shout is 90 dB or greater.

Frequency is measured in units called Hertz (Hz). The frequency of a locomotive horn is about 250 Hz. The frequency of a table saw is about 4,000 Hz.

^back to the top.

2.0 Health Effects

Excessive noise can destroy the ability to hear, and may also put stress of other parts of the body, including the heart.

For most effects of noise, there is no cure, so that prevention of excessive noise exposure is the only way to avoid health damage.

Hearing

The damage done by noise depends mainly on how loud it is and on the length of exposure. The frequency or pitch can also have some effect, since high-pitched sounds are more damaging than low-pitched sounds.

Noise may tire out the inner ear, causing temporary hearing loss. After a period of time away from the noise hearing may be restored. Some workers who suffer temporary hearing loss may find that by the time their hearing returns to normal, it is time for another work shift so, in that sense, the problem is "permanent."

With continual noise exposure, the ear will lose its ability to recover from temporary hearing loss, and the damage will become permanent. Permanent hearing loss results from the destruction of cells in the inner ear, cells which can never be replaced or repaired. Such damage can be caused by long-term exposure to loud noise or, in some cases" by brief exposures to very loud noises.

Normally, workplace noise first affects the ability to hear high frequency (high-pitched) sounds. This means that even though a person can still hear some noise, speech or other sounds may be unclear or distorted.

Workers suffering from noise-induced hearing loss may also experience continual ringing in their ears, called "tinnitus." At this time, there is no cure for tinnitus, although some doctors are experimenting with treatment.

^back to the top.

Other Effects

Although research on the effects of noise is not complete, it appears that noise can cause quickened pulse rate, increased blood pressure and a narrowing of the blood vessels over a long period of time, these may place an added burden on the heart.

Noise may also put stress on other parts of the body by causing the abnormal secretion of hormones and tensing of the muscles.

Workers exposed to noise sometimes complain of nervousness, sleeplessness and fatigue. Excessive noise exposure also can reduce job performance and may cause high rates of absenteeism.

^back to the top.

3.0 Permissible Exposure Limit

The Action level for noise is an average noise level of 85 dB for an eight-hour day. When employees are exposed to noise levels, which exceed the Permissible Exposure Limit, the employer must install or use engineering or administrative controls to lower the noise levels. While these controls are being designed or installed employees must wear hearing protection. If the controls still do not reduce noise exposures to below 90 dB, hearing protection must continue to be worn.

^back to the top.

4.0 Protective Measures

Suitable hearing protectors (earplugs or muffs) must be made available at no cost to employees who are exposed to an average of 85 dB or greater for an eight-hour day. Employees must be given the opportunity to select from three different types of appropriate hearing protectors.

Hearing tests (audiometric exams) must be given to employees who are exposed to an average of 85 dB or greater for an eight-hour day. Hearing tests will show whether employees are experiencing any hearing losses. Hearing tests are also useful in

showing how well the earplugs and earmuffs are working. Hearing tests must be given annually.

Employees should also receive training in the effects of noise on hearing, an explanation of the hearing tests, and instruction on the proper fitting and care of earplugs or muffs.

Noise away from work can also cause hearing loss. Hearing protectors should be worn when operating noisy equipment or tools such as chain saws, brush cutters, power lawn mowers, or when using firearms.

Refer to Alaska Administrative Code, Occupational Health and Environmental Control 04.0104 for specific regulations on Noise Exposure and Hearing Conservation Programs.

Physical Agent Data Sheet (PADS) - Ultraviolet Radiation

1.0 Description

Ultraviolet (UV) is the name for a band of energy on the electromagnetic spectrum that lies between visible light and x-rays. UV has some of the properties of visible light and other properties of the x-rays. Like visible light, some UV is actually visible but most is invisible like x-rays. UV, like light, cannot penetrate very far into most solids. Some UV, like x-rays, can ionize atoms or molecules which visible light cannot do.

Common sources of UV include the sun (especially when reflected by water, snow or ice), sun tanning lamps, mercury discharge lamps, welding arcs, plasma torches, and some lasers.

2.0 Health Hazards

The nature and seriousness of UV injuries depend on the length of exposure, the intensity of the UV, the type or wavelength of UV, the sensitivity of the individual, and the presence of certain chemicals (photosensitizers).

Skin

UV from the sun causes sunburns and skin cancer. UV from other sources can also cause skin burns varying in degree from mild reddening of the skin (first degree burns) to more severe and painful blistering (second degree burns). Long-term skin exposure to UV can cause actinic skin (a dry, brown, inelastic wrinkled skin) and skin cancer. Fair skinned individuals are more likely to develop both sunburns and skin cancer.

Some drugs, such as the antibiotic tetracycline, can cause skin burns from UV to happen faster and to be more severe. Products containing coal tar can also cause this reaction. These substances are called photosensitizers.

UV exposure may trigger cold sores (Herpes Simplex) in some individuals.

Eyes

When UV is absorbed by the eyes and eyelids, it can cause keratoconjunctivitis or "welders' flash." This is a very painful condition that feels like grit in the eyes and may make the eyes water and very sensitive to light. The condition usually occurs 6-12 hours after exposure and may last 6-24 hours. The painful injury may make a person unwilling or unable to open his/her eyes during this time period, but most discomfort is gone within 48 hours with no lasting injury. The maximum sensitivity of the eye occurs at a UV wavelength of 270 manometers.

Cataracts or clouding of the lens of the eye can occur during high exposures to wavelengths in the range of 295-300 nanometers.

3.0 Skin Safety and Health Precautions

Skin burns from high, short-term exposure to UV and skin cancer from long-term exposure can be prevented by covering exposed skin with clothing and protective equipment such as gloves and face shields.* Barrier creams or lotions with sun protection factors (SPF) of 15-18 will also help prevent skin burns.

* Welders' helmets should provide protection for the neck area as well as the face and eyes.

Eyes

Tinted goggles and/or face shields should be worn to prevent burns of the cornea and eyelids. Selection of the appropriate degree of tint should be based on the anticipated wavelength and intensity of the UV source. (see Table 1)

Table 1
Shade No. 3.0: is for glare of reflected sunlight from snow, water, sand, etc.; stray light from cutting and welding, metal pouring and work around furnaces and foundries; and soldering (for goggles or spectacles with side shields worn under helmets in arc welding operations, particularly gas-shielded arc welding operations).
Shade Nos. 4.0 and 5.0: are for light acetylene cutting and welding; light electric spot welding.
Shade Nos. 6.0 and 7.0: are for gas cutting, medium gas welding, and non-gas-shielded arc welding using current values up to 30 amperes.
Shade Nos. 8.0 and 9.0: are for heavy gas cutting and nongas-shielded arc welding and cutting using current values from 30 to 75 amperes.
Shade Nos. 10.0 and 11.0: are for arc welding and cutting using current values from 75 to 200 amperes.
Shade Nos. 12.0 and 13.0: are for arc welding and cutting using current values from 200 to 400 amperes.
Shade No. 14.0: is for arc welding and cutting using current

values over 400 amperes (including carbon arc welding and cutting), and for atomic hydrogen welding.
NOTE: ordinary window glass, 1/811 in thickness, is sufficient protection for the eyes and skin against the ultraviolet radiation from ordinary sources such as sunlight. In cases of extremely intense sources of ultraviolet and visible radiation, it is not adequate.

In sunny conditions on water, snow and ice, extra precautions should be taken to protect against reflected sunlight. Sunglasses with side shields should be worn. When applying protective ointments or lotions, special attention should be paid to the nose, lips, underside of the chin, and tops of the ears.

In workplaces, operations such as welding which produce high levels of UV should be performed behind enclosures or barriers to absorb the radiation and shield nearby workers.

UV sources like mercury discharge lamps should be operated only with all safety devices in place and in accordance with manufacturer's instructions.

4.0 First Aid Procedures

Skin burns: immediate application of cold (cold water, ice, cold clean cloths) to the affected area will reduce the severity and relieve pain associated with first and second degree burns. Do not apply any burn ointments, creams, or butter to skin burns.

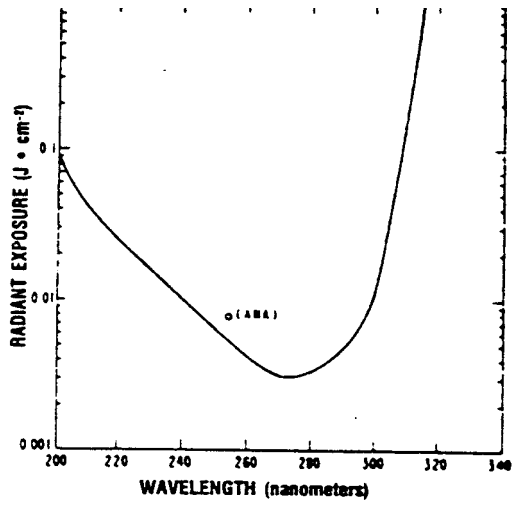
Eyes: place sterile dressings over the eyes of a person suffering from UV burns of the eyes and seek medical attention.

5.0 Recommended Exposure Limits[2]

The following section is very technical and is included for the use of safety and health professionals who have the skills and equipment to measure UV levels.

These threshold limit values (TLVS) refer to ultraviolet radiation in the spectral region between 200 and 400 nm and represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect. These values for exposure of the eye or skin apply to ultraviolet radiation from arcs, gas and vapor discharges, flourescent and incandescent sources, and solar radiation, but do not apply to ultraviolet lasers. These values do not apply to ultraviolet radiation exposure of photosensitive individuals or of individuals concomitantly exposed to photosensitizing agents. These values should be used as guides in the control of exposure to continuous sources where the exposure duration shall not be less that 0.1 sec (Figure 1).

Figure 1



These values should be used as guides in the control of exposure to ultraviolet sources and should not be regarded as a fine line between safe and dangerous levels.

6.0 Recommended Values

The threshold limit value for occupational exposure to ultraviolet radiation incident upon skin or eye where irradiance values are known and exposure time is controlled are as follows:

1. For the near ultraviolet spectral region (320 to 400 nm), total radiance incident upon the unprotected skin or eye should not exceed 1 mW/cm for periods greated than 110 seconds (approximately 16 minutes) and for exposure times less than 10 seconds should not exceed one J/cm.

2. For the actinic ultraviolet spectral region (200 to 315 nm), radiant exposure incident upon the unprotected skin or eye should not exceed the values given in Table 2 within an 8-hour period.

Table 2 **Relative Spectral Effectiveness by Wavelength***		
Wavelength (nm)	**TLV (mJ/cm^2)**	**Relative Special λEffectiveness S**

200	100	0.03
210	40	0.075
220	25	0.12
230	16	0.19
240	10	0.30
250	7	0.43
254	6	0.5
260	4.6	0.65
270	3.0	1.0
280	3.4	0.88
290	4.7	0.64
300	10	0.30
305	50	0.60
310	200	0.015
315	1000	0.003

* See Laser TLVS.

3. To determine the effective irradiance of a broadband source weighted against the peak of the spectral effectiveness curve (270 nm), the following weighting formula should be used:

$$E_{eff} = \Sigma\ E\lambda\ S\lambda\ \Delta\ \lambda$$

where:

E_{eff} = effective irradinace relative to a monochromatic source at 270 nm in W/cm^2 [J/ (s cm^2)]

$E\lambda$ = spectral irradiance in W/(cm nm)

$S\lambda$ = relative spectral effectiveness (unitless)

$\Delta\ \lambda$ = band width in manometers

4. Permissible exposure time in seconds for exposure to actinic ultraviolet radiation incident upon the unprotected skin or eye may be computed by dividing 0.003 J/cm^2 by E_{eff} in W/cm^2. The exposure time may also be determined using Table 3 which provides exposure times corresponding to effective irradiances in μ W/cm^2.

Table 3 Permissible Ultraviolet Exposures	
Duration of Exposure Per Day	**Effective Irradiance E_{eff} μ(W/cm^2)**
8 hrs	0.1
4 hrs	0.2
2 hrs	0.4
1 hr	0.8
30 min	1.7
15 min	3.3
10 min	5.0
5 min	10.0
1 min	50.0
30 sec	100.0
10 sec	300.0
1 sec	3,000.0
0.5 sec	6,000.0
0.1 sec	30,000.0

5. All the preceding TLVs for ultraviolet energy apply to sources which subtend an angle less than 80 degrees. Sources which subtend a greater angle need to be measured only over an angle of 80 degrees.

Conditioned (tanned) individuals can tolerate skin exposure in excess of the TLV without erythemal effects. However, such conditioning may not protect persons against cancer.

7.0 Reference

1. Sunlight and Man. Fitzpatrick et all Eds. University of Tokyo Press, Tokyo, Japan (1974).

2. Threshold Limit Values and Biological Exposures Indices for 1986 - 1987. American Conference of Governmental Industrial Hygienists, 6500 Glenway Avenue, Building D-7, Cincinnati, Ohio 45211-4438.

Material Safety Data Sheets

Alconox

Antifreeze

Arsenic

Aroclor 1260

Bear Spray

Bug Spray (DEET)

Cadmium Metal

Chromium Metal

Chemical Hand Warmer

Diesel-Range Organics

Eyewash

Fire Extinguisher (A-B-C)

Fogtech

Gasoline-Range Organics

Lead Metal

Liquinox or Alconox

Mercury Metal

Methanol

Polychlorinated Biphenyls (PCBs)

Selenium

Silver Metal

Trichloroethene (TCE)

Vermiculite

Zinc Metal

ATTACHMENT F-4
PROJECT-SPECIFIC FORMS

Exhibit 1: Site Project Safety and Health Agreement Sign-off Sheet

Exhibit 2: Approval of Modifications

Exhibit 3: Visitor Check-in Log

Exhibit 4: Air Monitoring Record

Exhibit 5: Exposure Monitoring Log

Exhibit 6: Authorization for Medical Treatment

Exhibit 7: Daily Health and Safety Report

Exhibit 8: Welding/Brazing/Hot Work Permit

Exhibit 9: Health & Safety Calibration Log

Exhibit 10: Accident/ Incident Investigation Report

Exhibit 11: Vehicle Accident Report

Exhibit 12: Rental Equipment Condition Report for Automobiles/Trucks

Exhibit 13: Standard Equipment Inspection Form

Exhibit 14: Hazardous Material Exposure and Field Activity Report

Exhibit 15: Site Safety Meeting and Exclusion Zone Entry Log

Site Project Safety and Health Agreement Sign-Off Sheet

Title	Signature	Date
Project Team:	**"I am familiar with and agree to abide by this SSHP."**	

Approvals of Modifications

Change Number	Effective Date	Table Number Changed	Content of Change	Health and Safety Manager	Client Approval

Visitor Check-In Log

Project Name:		Project No.:	Date:	
Name	Representing	Destination	Time (24-Hour)	
			In	Out

Air Monitoring Record

Employee Name: _____ **Employee No.:** _____ **Company:** _____ **Title:** _____

Project Name: _____ **Project Number:** _____

Date Sampled: _____ **Sampled By:** _____

Sampling Method and Analyte: _____

Collection Media:

____ Charcoal Tube ____ Filter (Total) ____ Passive Dosimeter Collector Mfg: _____

____ Silica Gel ____ Filter (Resp.) ____ Other: _____ Size/Type: _____

____ Chromosorb ____ Impinger _____ Lot #: _____

Sample Type:

____ Personal - TWA ____ Blank Does Sampling Represent Typical Exposure? _____

____ Personal Peak ____ Bulk Temperature _____ Collector Mfg: _____

____ Area ____ Other _____ Humidity: _____ Wind: _____

____ Source _____

Activities During Sample Collection:

_____

_____

_____

_____

Sample Pump: Mfg & Model #: _____ Serial #: _____

Calibrator: Type: _____ Mfg & Model #: _____ Serial #: _____

Calibration Date: _____ Calibrated By: _____

Sample #	Time On	Time Off	Total Time	Pre Cal Flow Rate	Post Cal Flow Rate	Average Flow Rate	Sample Volume	Analytical Result	TWA

Descriptive Data: (Engineering controls or PPE used, work activities, sample interferences etc.)

_____

_____

Date: _____ Signature: _____

Send results to: File; Project Manager; H&S; Employee

Exposure Monitoring Log

Project Name:	Project No.	Date:
Location Monitored:	Atmospheric Conditions:	
Activity Monitored:		
Site No.		

Time (24-Hour Clock)	Background	Readings								
		Monitor (depth)	FID (ppm)	PID (ppm)	$\%O_2$	%LEL	H_2S	Mini-Ram	Other	Samplers Initials

Authorization for Medical Treatment

TO: Dr. _____ Address: _____ Date: _____

This form signed by our representative is your authority to render treatment to:

_____
(Employee)

in accordance with the provisions of and under the conditions prescribed by the Workers' Compensation Act. Unless the case is an emergency, kindly obtain authorization for surgery, radical procedures, or hospitalization from the insurance carrier. Send your bill and report to us at the address listed below.

_____
Authorized Representative

Date of Injury:_____ Location: _____ Job No._____

How Injury Occurred:_____

Please complete and return by mail to the following address to ensure prompt payment of charges:

_____
_____
_____

FOR DOCTOR'S USE ONLY

Diagnosis of Injury:_____

Disposition of Patient:

____ Occupational ____ Non-Occupational ____ Unable to Determine

____ Able to resume regular duties

____ Able to resume regular duties next workday

____ Able to resume restricted duties with the following limitations: _____
_____

____ Unable to return to work, estimated length of disability: _____

Return for follow-up visit on _____(Date) _____
Doctor's Signature

Daily Health and Safety Report

Contract Number/Delivery Order Number: _____

Project Title: _____

Location: _____

Date: _____

List Contractors/Organizations Present: _____

WEATHER CONDITIONS

Temp Low:		Temp Hi:	Comments:

Wind Speed: _____ Conditions: _____

Zero Accident Process

Safe Plans of Action in effect today: **Yes** ☐ **No** ☐

Total Project SPAs generated to date: _____

Were any Safety Observation Reports (SORs) generated today? (List Individually) **Yes** ☐ **No** ☐

Total SORs for today: _____ Total SORs since mobilization: _____

Health and Safety Inspections

Check any of the following inspections performed today:

- ☐ Heavy Equipment
- ☐ Hand Tools
- ☐ Site Office
- ☐ Drill Rig
- ☐ Misc. Electrical
- ☐ Excavation
- ☐ PPE
- ☐ Other
- ☐ Cranes
- ☐ Storage Areas
- ☐ Sanitation Facilities
- ☐ Monitoring Instruments
- ☐ Misc. Equipment
- ☐ Exclusion Zone
- ☐ Operations

List:

Daily Health and Safety Report (Continued)

Observation/Comments made during the daily inspections :

Air Monitoring			
Was air monitoring performed within the breathing zone today?	☐ **N/A**	☐ **Yes**	☐ **No**
Did the air monitoring results exceed the PEL?	☐ **N/A**	☐ **Yes**	☐ **No**
Have Air Samples Been Collected for Laboratory Analysis?		☐ **Yes**	☐ **No**

TYPE OF TEST (personal, area, perimeter)	**TEST METHOD/MATRIX**	**QUANTITY OF SAMPLES**

General Health and Safety			
WORKER PROTECTION LEVELS THIS DATE: ☐ LEVEL A ☐ LEVEL B ☐ LEVEL C ☐ LEVEL D ☐ N/A			
Was any work activity conducted within a confined space?		☐ **Yes**	☐ **No**
Was any work activity conducted within an area determined to be immediately dangerous to life and health?		☐ **Yes**	☐ **No**
Were approved decontamination procedures used on workers and equipment as required?	☐ **N/A**	☐ **Yes**	☐ **No**
Was a Safety Tailgate Meeting held this day? (See attached)		☐ **Yes**	☐ **No**
Was there any “Lost Time” accidents this day? (If YES, attach copy of completed accident report)		☐ **Yes**	☐ **No**
Was hazardous waste/materials released into the environment? (If YES, attach copy of spill report)		☐ **Yes**	☐ **No**

(SM)	Health and Safety
Date	Date

Welding/Brazing/Hot Work Permit

PERMIT #_____

Issued by: _____

Approved by SSHO: _____

Date Permit Issued: _____ Time Permit Issued: _____ Expiration Date: _____

Operation to be Performed: _____

Location of Operation: _____

Special Precautions:

TESTING				
Location of Testing	**Time**	**Percentage of LEL**	**Percentage of O_2**	**Initials**

CHECKLIST			
Item	**N/A**	**Yes**	**Initials of Inspector**
Surround equipment and operation safe for hot work			
Tank purged			
Extinguisher present			
No combustibles within 35 feet of operation or items protected by covers or removed from area			
No flammables within 50 feet			
Worker has proper protective equipment to perform function			
Safety blankets available			
Flammable gases greater than 10% present additional precaution needed to perform operation			
Fire watch required			
Welding unit inspected			
Adequate ventilation available			

The location where the work is to be performed has been examined, necessary precautions taken to provide for worker safety and for the area to be a fire safe environment for performing these functions. Permission is granted for the work to be performed.

Signature of SSHO performing inspection and issuing the permit:

I am fully qualified to perform this operation and understand my responsibilities outlined by the inspection just conducted.

Signature of welder/on scene supervisor performing operation:

Health & Safety Instrument Calibration Log

PROJECT NO.: _____

PROJECT LOCATION: _____

PROJECT ACTIVITY: _____

Date	Time	Instrument	Mfg Model	Serial No.	Calibration Gas	Lot No.	Concentration	BKG Counts	Span Settings	Initials

FIELD TEAM LEADER SIGNATURE _____

Accident/Incident Investigation Report

Date of Accident/Incident:_____ Time of Accident/Incident:_____ Company:_____

Date of Investigation:_____ Job Number:_____ Client:_____

Location of Accident/Incident:_____

Did injury result? Yes/No _____, If yes, provide Employee Name(s):_____

S.S. No.:_____ Skill:_____Yrs. in this Skill:_____Yrs. with Company:_____

Describe Type of Injury:_____

Was property damaged ? Yes/No _____, Describe damage/owner:_____

_____

Is damaged property secured/maintained? Yes/No_____, Person Maintaining_____

Names of Witnesses/Coworkers (With Social Security No.):_____

_____

Weather / Wind Conditions:_____

List/Describe all personal protective equipment (PPE) in use by person exposed or injured:_____

_____

If Chemicals Involved:

Name(s) of Chemical(s) Encountered:_____

_____

Form of Chemicals (Solid, Liquid, Gas, Vapor, Dust, Mist Fume):_____

Describe Radiological Materials (if any):_____

Volume or Quantity Released:_____

Description of Accident/Incident:_____

_____

_____

_____

_____

Accident/Incident Investigation Report (Continued)

Contributing Factors:_____

_____

What **corrective actions** are being taken to prevent recurrence? Also list the person responsible for implementing and the target completion date for each item.

_____

_____

_____

Was an SPA/JSA developed for the task being performed? Yes/No_____, If yes, attach a copy.

Was a permit issued? Yes/No_____, If yes, attach a copy of the permit in effect at time of the Accident/Incident.

Indirect cause of Accident/Incident: **Lack of**: Training____, Resources____, Belief____ (*explain)

_____

Basic cause of Accident/Incident: **Failure to**: Plan____, Direct____, Organize____, Control____(*explain)

_____

INVESTIGATION TEAM MEMBERS:

Injured / Involved:	_____ Name	_____ Signature
Supervisor:	_____ Name	_____ Signature
Site Manager:	_____ Name	_____ Signature
Health and Safety Representative:	_____ Name	_____ Signature
_____ Name (Others)	_____ Title	_____ Signature
_____ Name (Others)	_____ Title	_____ Signature

Client Representative(s) Contacted:_____

Agency Representative(s) Contacted:_____

* Attach additional sheets and supplemental data & information as necessary.

** Distribution: Original must be filed on-site; 1 copy must be sent promptly to the Corporate Health and Safety Department.

Accident/Incident Investigation Report (Continued)

Witness Statement

Please print or type.

Name:_____ Title:_____

Social Security Number:_____Date:_____ Time:_____

Temporary Address:_____ Phone No._____

_____

Permanent Address:_____ Phone No._____

_____

Location at Time of Accident:_____

Describe, to the best of your knowledge, what happened just before, during, and just after the accident:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Signature

Vehicle Accident Report

CLAIM REPORTING:
RISK MANAGEMENT DEPT.: Toll Free: (877)832-1721 Phone: (225)768-5141 Fax: (225)768-5492

Company or Subsidiary Name: _____

Date of Accident: _____ Time of Accident: ☐ AM ☐ PM

Location of Accident: Client Facility/Project Site ☐ Office ☐ Other ☐

Nearest Intersection, City & State: _____

COMPANY VEHICLE:

Driver: _____ Date of Birth: _____

Office / Project No. Assigned to: _____

Name(s) of Passengers: _____

Work Address: _____

Home Address: _____

Work Phone No. _____ Home Phone No. _____

Supervisor Name: _____ Supervisor Phone No. _____

Vehicle Owner: _____ Company Owned ☐ Leased ☐ Rental ☐ Personal ☐

Vehicle No.: _____ Make and Model: _____

License No.: _____ Vehicle Identification No.: _____

Has Driver completed Jacobs Recognized Driver Training? Yes ☐ No ☐

OTHER VEHICLE:

Driver: _____

Home Address: _____

Work Phone No. _____ Home Phone No. _____

Driver's License no. (Including State) _____

Vehicle Owner: _____ Make and Model: _____

Relation to Owner: _____

Insurance Company: _____

Insurance Agent: _____ Insurance Agent Phone No.: _____

Vehicle Accident Report (Continued)

Policy No.: _____

INCIDENT DESCRIPTION

Contact with Other Vehicle ☐ Fixed Object ☐ Pedestrian ☐ Other ☐

Details: _____

_____

_____

DESCRIPTION OF DAMAGE TO VEHICLE:

Company Vehicle: _____

Est. Repair Cost $ _____ Where Vehicle can be seen: _____

Other Vehicle: _____

Est. Repair Cost $ _____ Where Vehicle can be seen: _____

INJURIES / WITNESSES:

Company Vehicle: Name and age of Injured ☐ Witnesses ☐

_____

Relation to Driver of Company Vehicle: _____

Other Vehicle: Name and age of Injured ☐ Witnesses ☐

_____

Relation to Other Vehicle: _____

Name of Investigating Officer: _____

Badge No. _____ Police Report No. _____ Citations: _____

OTHER PROPERTY DAMAGE:

Owner's Name, Address and Phone No. _____

_____

Describe Damage: _____

_____

Report Submitted By: _____ Date: _____

Vehicle Accident Report (Continued)

DIAGRAM OF ACCIDENT

Rental Equipment Condition Report for Automobiles/Trucks

CLIENT _____ PROJECT NO. _____

VEHICLE TYPE _____AGENCY RECEIVED FROM _____MAKE/MODEL _____ MILEAGE Out _____ MILEAGE In _____

"Yes or No" Where Appropriate "G" - New or in Good Condition "R" - Requires Repairs "N" - Items Not Applicable

BODY & INTERIOR

☐ Inspection Sticker _____ ☐ Upholstery _____

☐ License/Sticker_____ ☐ Heater/Defroster _____

☐ Door Locks _____ ☐ Air Conditioner _____

☐ Door Handles _____ ☐ Steering _____

☐ Lighting System _____ ☐ Floor Boards/Mats _____

☐ Body _____ ☐ Paint _____

ENGINE & OPERATING SYSTEMS

☐ Oil Level and Condition _____ ☐ Oil Leaks _____

☐ Operating Condition _____ ☐ Cooling System/Hoses _____

☐ Water Lvel/Anti-Freeze _____ ☐ Transmission _____

☐ Tire Condition/Lugs _____ ☐ Transmission Level/Condition _____

☐ Battery Condition __ _____ ☐ Corrosion/terminal Connections_____

☐ Tire Pressure _____ ☐ Lug Nuts_____ ☐ Fan/ Alternator_____ ☐ Belts _____

☐ Control Panel, Gauges _____ ☐ Spare Tire _____

☐ Jack, Tire Tool _____ ☐ Exhaust System _____

☐ Windshield Wipers _____ ☐ Brakes _____

Rental Equipment Condition Report for Automobiles/Trucks (Continued)

☐ Windows, Windshield _____ ☐ Parking Brake _____

REMARKS:

Initial Inspection By _____ _____Date

Standard Equipment Inspection Form

Make	Type	Year of Manufacture	Date	Model	Serial No.	Hours	Employee ID	Inspector Name

			Engine	Attachment	Attachment
Fill in appropriate boxes	Company Name				
	Supervisor Name				

A. SERVICE CHECKS PRE-FIELD MOBILIZATION:

ITEM	*OK*	*AMT NEEDED*	*ITEM*	*OK*	*AMT ADDED*
Radiator & Freeze Protection			Batteries		
Transmission			Differential/Plan		
Final Drives			Tandems		
Engine			Fuel Level		
Hydraulic System			Drain Fuel Sediment		
Lubrication Points			Pivot Shaft		

B. EQUIPMENT INSPECTION PRE-FIELD MOBILIZATION

	CONDITION Bad/Good/ Excellent	*Attn Needed*	*Explanation*	*Corrected? (Y/N)*
Engine Compartment				
Radiator				
Fan & Shrouds				
Air Induction and Filter				
Belts Pulleys				
Exhaust & Rain Cap				
Battery & Cables				
Hydraulic Cylinders				
Operators Comp.				
Controls & Linkages				
Hoses & Lines				
Oil Leaks				
Fuel Leaks				
Coolant				
Fasteners				
Cracks				
Guards & Covers				
Cutting Edges				
Sprockets				
Rollers & Idlers				
Tracks or Tires				

Standard Equipment Inspection Form (Continued)

B. EQUIPMENT INSPECTION PRE-FIELD MOBILIZATION (continued)

	CONDITION Bad/Good/ Excellent	***Attn Needed***	***Explanation***	***Corrected? (Y/N)***
Engine				
Governor Control				
Trans Operation				
Trans Linkage				
Steering System				
Service Brakes				
Parking Brake				
Unusual Noise				
Gauges Operational				
Gauges Normal				
Backup Alarm				
Heater & Fan				
Switches				
Wipers & Washer				
Lights				
Horn				
Seat & Seat Belts				
Windows				
Doors				
General Appearance:				
Machine Damage:				

NOTES:

NOTES (continued)**:**

Standard Equipment Inspection Form (Continued)

Deficiencies noted: ☐ Yes ☐ No Explain: _____

Deficiencies fixed: ☐ Yes ☐ No Date: _____

Inspection 100% complete ☐ Yes ☐ No

Subcontractor Signature _____ Date all items passed inspection: _____

Jacobs Representative _____ Date: _____

Hazardous Material Exposure and Field Activity Report

Employee's Office Location: _____

For: _____ Month _____ Year_____

NAME OF EMPLOYEE: _____

CHECK HERE FOR: ____"NO SITE VISITS"

PART I - SITE VISITS TO NON-EXCLUSION ZONES

SITE NAME/ LOCATION	ACTIVITY	DURATION OF SITE VISIT (HOURS)

PART II - SITE VISITS TO EXCLUSION ZONES (For additional room, use back of form)

SITE NAME/ LOCATION	PROTECTION ACTIVITY	CHEMICAL OR OTHER MATERIALS PRESENT	EXPOSURE POTENTIAL (I.M.S.)	DURATION OF SITE VISIT HOURS	LEVEL OF USED

***I = Incidental** Potential for exposure is 1/10 or under the exposure limit level.
M = Moderate Potential for exposure is >1/10 up to, but not including, the exposure limit level.
S = Significant Potential for exposure at or above exposure limit level.

_____
EMPLOYEE SIGNATURE DATE

Return to: Jacobs Safety Officer, Jacobs Engineering, 4300 B Street, Suite 600, Anchorage, AK 99503

Site Safety Meeting and Exclusion Zone Entry Log

Facility: _____ Conducted by: _____
Date: _____ Time: _____
Client: _____ Project Number: _____
Specific Location: _____
Type of Work: _____
Chemicals Brought to Site: _____
MSDSs available: _____Yes _____No

HEALTH AND SAFETY TOPICS PRESENTED

Protective Clothing/Equipment: _____

Chemical Hazards: _____

Physical
Hazard:

_____

Emergency Procedures: _____
Emergency Response
Hospital/Clinic: _____
Address: _____
Special Equipment: _____

Evacuation Route:

General Discussion Information:

Site Tailgate Meeting and Exclusion Zone Entry Log (Continued)

ATTENDEES

Entered Exclusion Zone	Printed Name	Company	SS#	Signature
__Yes __No				
__Yes __No				
__Yes __No				
__Yes __No				
__Yes __No				
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__Yes __No				
__Yes __No				

APPENDIX G

Waste Management Plan

APPENDIX G

WASTE MANAGEMENT PLAN

PCB-CONTAMINATED
SOIL REMOVAL

FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

Prepared for:
PRP Group

DRAFT-FINAL
January 2015

TABLE OF CONTENTS

SECTION **PAGE**

ACRONYMS AND ABBREVIATIONS ..... G-iii

1.0 INTRODUCTION G-1-1

2.0 ANTICIPATED WASTES STREAMS G-2-1

2.1 PERSONAL PROTECTIVE EQUIPMENT/DISPOSABLE SAMPLING EQUIPMENT G-2-3

2.2 ONSITE LABORATORY WASTE G-2-3

2.3 GENERAL SITE TRASH G-2-3

2.4 WASTEWATER G-2-3

3.0 CONTAINERIZATION AND STAGING G-3-1

4.0 LABELING G-4-1

5.0 OFFSITE SHIPMENT AND DISPOSAL G-5-1

6.0 TRACKING/SHIPMENT G-6-3

6.1 WASTE TRACKING G-6-3

6.2 SHIPPING G-6-3

6.3 BILLS OF LADING G-6-3

6.4 WASTE MANIFESTS G-6-3

6.4.1 Manifest Reporting G-6-4

TABLE

Table G-2-1 Anticipated Waste Streams G-2-2

ATTACHMENTS

Attachment G-1 Temporary Storage Area Schematic

Attachment G-2 Waste Tracking Form Example

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
bags	LiftPacs, Super Sacks®, or the equivalent
CFR	Code of Federal Regulations
cy	cubic yard
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
IDW	investigation-derived waste
mg/kg	milligrams per kilogram
PCB	polychlorinated biphenyl
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
TSCA	Toxic Substance Control Act of 1976
USACE	U.S. Army Corps of Engineers
WACS	White Alice Communications Site
WMP	Waste Management Plan

1.0 INTRODUCTION

This Waste Management Plan (WMP) is Appendix G of the *PCB-Contaminated Soil Removal Work Plan* (Work Plan) for the former White Alice Communications Site (WACS) Aniak Middle School in Aniak, Alaska. Jacobs Engineering Group Inc. prepared this WMP under U.S. Army Corps of Engineers (USACE), Alaska District Hazardous, Toxic, and Radioactive Waste Contract No. W911KB-11-D-0006, Task Order No. 18, for a third-party contractor (Remediation Contractor) who will perform the work described herein pursuant to a contract with the State of Alaska.

This WMP describes the procedures for handling, containerization, labeling, shipment, tracking, and disposal of the wastes generated during PCB removal activities, in accordance with the Toxic Substance Control Act (TSCA), the U.S. Department of Transportation (DOT), and Alaska Department of Environmental Conservation (ADEC) regulations. The Remediation Contractor will update and finalize this WMP to include specific details on waste handling, transportation and disposal for approval prior to waste disposal.

The waste generator at the former WACS Aniak Middle School is ADEC. The address and the U.S. Environmental Protection Agency (EPA) waste generator number for former WACS Aniak Middle School is as follows:

Generator Name and Address:
State of Alaska – ADEC
1.4 Mile Teachers Road
Aniak, Alaska 99557

EPA Waste Generator Number: AK0002265007

The remediation activities at the former WACS Aniak Middle School site will be comprised primarily of soil excavation and offsite transport and disposal of contaminated soil to appropriate, permitted disposal facilities.

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2.0 ANTICIPATED WASTES STREAMS

Anticipated waste streams, quantities, packaging, and disposal facilities are listed in Table G-2-1. The primary waste stream will be PCB-contaminated soil. PCB concentrations greater than 50 milligrams per kilogram (mg/kg) have been encountered during previous investigation and cleanup efforts in the vicinity of the Former Septic System Area and Wood Shop Area. Soil with PCBs greater than or equal to 50 mg/kg must be handled as TSCA waste and as DOT hazardous waste.

Soil will be segregated based on the level of PCB contamination. Preexisting data and pre-excavation sample results will be used to guide the initial excavations and segregate soil in accordance with this WMP. All generated waste will be sampled in accordance with the Sampling and Analysis Plan (SAP) (Work Plan, Appendix D). Review of waste stream sample results will be used to determine the appropriate disposal option and verify that the waste streams are properly managed.

Table G-2-1
Anticipated Waste Streams

Waste Stream	Waste Classification	Estimated Quantity	Probable Packaging	Proper Shipping Name	Disposal Facility Type
Comingled PCB- and TCE-contaminated soil and debris; and PCB-contaminated soil and debris containing PCBs between 1 mg/kg and 49 mg/kg	Non-TSCA/RCRA regulated	2,090 cy	Super Sack®	Non-regulated waste, solid (soil and debris containing PCB < 50 mg/kg)	Offsite Subtitle D Landfill
Soil containing PCBs greater than or equal to 50 mg/kg	TSCA	150 cy	Super Sack®	Environmentally hazardous substances, solid, N.O.S. (soil containing PCB ≥ 50 mg/kg)	Offsite Subtitle C Landfill
Non-Impacted Debris containing PCBs less than 1 mg/kg and not suitable as backfill	Non-TSCA/RCRA regulated	100 cy	Super Sack®	Nonhazardous waste, solid (debris and liner material)	Offsite Subtitle D Landfill
Septic Tank sludge and liquid	TBD	3,000 gallons	55-gallon drums or portable ISO tank	TBD	TBD
Sampling Equipment, PPE	Non-TSCA/RCRA regulated	1 cy	Super Sack®	Nonhazardous waste, solid (PPE, sampling equipment)	Offsite Subtitle D Landfill
Onsite Laboratory Waste	Hazardous waste	10 gallons	5-gallon sealable metal cans	Toxic Substance (Dichloromethane) 6.1, UN1593, III Flammable Liquid (Hexanes) 3, UN1208, II	Offsite Subtitle C Landfill
General Site Trash	Not regulated	1 cy	Garbage bags	Not applicable	Village of Aniak Landfill
Wastewater (e.g., decontamination water and rain water in storage areas or excavation)	Nonhazardous waste	2,000 gallons	55-gallon drums or portable ISO tank	Not applicable	Onsite Water Treatment System and ADEC Discharge Permit

Notes:
TBD: To be determined by Remediation Contractor
TCE= trichloroethene
For definitions, see the Acronyms and Abbreviations section.

2.1 PERSONAL PROTECTIVE EQUIPMENT/DISPOSABLE SAMPLING EQUIPMENT

Investigation-derived waste (IDW), such as personal protective equipment (PPE) and disposable sampling equipment, will likely include used nitrile sampling gloves, Tyvek suits, sampling spoons, pie pans, used empty glass jars, and other disposable sampling equipment. This waste will be bulked and staged in a Super Sack® for offsite transport and disposal in an offsite Subtitle D Landfill.

2.2 ONSITE LABORATORY WASTE

The subcontracted onsite laboratory will be responsible to the proper storage, management, transportation, and disposal of the waste solvents generated during the operation of the mobile laboratory. The unused soil from the samples delivered to the laboratory will be disposed of with the applicable PCB-contaminated soil waste stream. The Remediation Contractor will verify that the subcontracted onsite laboratory is properly handling the waste while onsite.

2.3 GENERAL SITE TRASH

Miscellaneous trash, including paper towels and similar materials with incidental levels of contamination, will be disposed of as ordinary industrial refuse. No tracking or documentation will be required.

2.4 WASTEWATER

Wastewater will consist of water generated from decontamination of non-disposable PPE and excavation equipment and rainwater that may accumulate in the temporary storage areas. Generated wastewater will be collected in 55-gallon, open-top drums and temporarily stored at the Project Site (see Section 3.0). The wastewater will be treated onsite with a water treatment system to meet the State of Alaska regulatory discharge requirements.

The onsite water treatment system will consist of a series of portable sediment filtration units, granulated activated carbon filter units, sample ports and a pump. Pre- and post-treatment

wastewater samples will be collected in accordance with the SAP (Work Plan, Appendix D). Treated water will be stored in clean drums. Based on pre- and post-treatment analytical sample results, the water will be discharged to a stable, vegetated area upon following all applicable ADEC regulations and upon ADEC review of data and approval for discharge. Treated water will not be discharged to surface water or in such a way as to cause erosion.

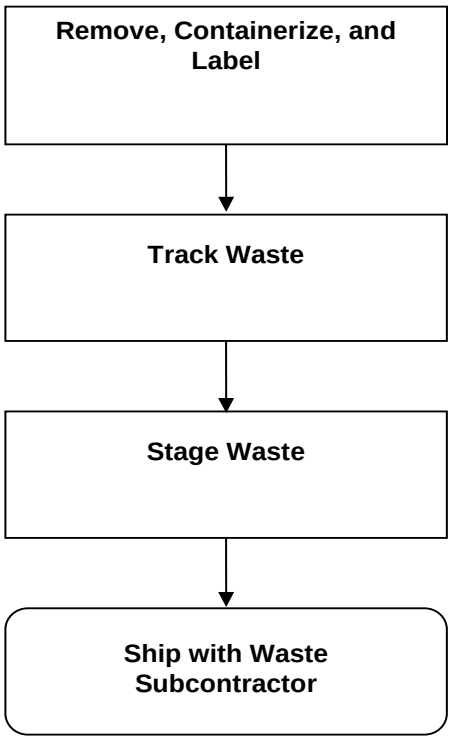
The wastewater post-treatment results will be compared to 18 AAC 75 Table C groundwater cleanup levels (ADEC 2014). If all results are less than the Table C cleanup levels, the treated water will be discharged within the site boundaries upon ADEC review of the data and approval. Treated water will be discharged to:

- 100 feet or more from surface water
- 100 feet or more from a private water system, a Class C public water system (as defined in 18 AAC 80.1990), or a fresh water supply system that uses groundwater for a use designated in 18 AAC 70.020(a)(1)(A) and 18 AAC 70.050(a)(2)
- 200 feet or more from a water source serving a Class A or B public water system, as defined in 18 AAC 80.1990

3.0 CONTAINERIZATION AND STAGING

Waste that is generated will be processed according to Flow Diagram G-3-1. Waste will be containerized, labeled, tracked, staged, shipped, and disposed of according to this WMP.

Flow Diagram G-3-1: Waste Generation



Solid wastes (contaminated soil, and spent sampling equipment and PPE) will be placed within respective waste containers and staged on liners. All containers will be closed except while workers are actively adding or removing waste.

PCB-contaminated soil and debris excavated from the proposed excavation areas will be placed in UN listed, lift-liner bags (LiftPacs, Super Sacks®, or the equivalent). Debris, including non-impacted debris not suitable as backfill and PCB-contaminated debris, will be placed in double-walled lift-liner bags or similar containers that are suitable for high loading capacity and are resistant to puncture. Bags utilized for the project must comply with DOT

shipping requirements established in 49 CFR 173. The Remediation Contractor must specify the type, size, and manufacturer of the bags that will be used for the project in their final WMP.

Three temporary storage areas will be constructed at the site to store potentially clean soil, waste for offsite disposal, and wastewater. The potentially clean soil and wastewater will be stored at the Overburden Stockpile Area and Drum Storage Area, respectively. Both storage areas will consist of 18-inch-high gravel berms, nonwoven geotextile and 20-mil polyethylene liner system atop the existing ground surface. Within the Drum Storage Area, drums will be placed on wooden pallets. The overburden stockpile will be covered with 12-mil reinforced polyethylene liner to prevent accumulation of rainwater in the area. The cover will be kept open during the day to allow placement of materials in the area and will be secured at night.

Waste identified for offsite disposal will be staged at the Bag Staging Area near the Barge Landing at the site (Work Plan, Appendix A, Figure A-2). Surface soil samples will be collected prior to and following use within the planned footprint of the area in accordance with the SAP (Work Plan, Appendix D).

At the Bag Staging Area, two staging areas will be constructed. One staging area will be used to store TSCA waste, and the other staging area will be used to store non-TSCA waste. At both staging areas, constructed minimum 6-mil reinforced liner will be placed on the ground surface and anchored with sand bags prior to staging the bags.

If potentially non-impacted debris (e.g., concrete, Septic UST tank material) is encountered and waste characterization samples are needed to confirm debris does not contain PCBs, a Non-Impacted Debris Area will be constructed at the Project Site to temporarily store this material while awaiting sample results. Surface soil samples will be collected prior to and following use within the planned footprint of the area in accordance with the SAP (Appendix D). The area will consist of 18-inch high gravel berms and lined with a nonwoven geotextile and 20-mil polyethylene liner system atop the existing ground surface. Any stockpiles will be covered with 12-mil reinforced polyethylene liner, anchored, inspected, and

maintained in accordance with the WMP. However, if a small amount of non-impacted debris is encountered and space is available, the Drum Storage Area may be used to store the debris prior to transport to the Bag Staging Area. If stockpiles of debris are placed at the Drum Storage Area they will be covered and anchored.

The bags and liner will be inspected for damage or deterioration on a daily basis throughout the duration of the project. If damage occurs, corrective action will be implemented as soon as possible after discovery.

The liner system for each temporary storage area will be placed on ground surface that is relatively flat and free of debris. Any pointed rocks and other items that could puncture the liner will be removed from the ground surface prior to placement of liner. Berms will be constructed using clean borrow source material, and the covers will extend outside these bermed areas and be held down with sand bags, tires or other type of anchor material. A schematic of a temporary storage area is included in Attachment G-1.

If water accumulates in the bermed areas, it will be pumped through the onsite water treatment system and discharged onto the ground surface upon ADEC approval (refer to Section 2.4).

All temporary storage areas will be decommissioned and restored to their pre-existing conditions upon project completion. Decommissioning will include removal and disposal of liner to the appropriate disposal facility, and removal and reuse of berm material as backfill upon confirmation of samples meeting the backfill cleanup requirements in accordance with the SAP (Work Plan, Appendix D).

(intentionally blank)

4.0 LABELING

All wastes will be labeled as they are generated. Container markings shall be applied to the containers with an indelible marker of contrasting color on the upper side (not the top) of the container in approximately 1-inch letters with all markings located together. Waste container labels shall contain the following information:

- Generator Name (ADEC)
- Site Name (WACS Aniak Middle School)
- Type of waste (nonhazardous, hazardous, non-regulated, etc.)
- TSCA markers (for materials containing PCB concentrations greater than 50 mg/kg)
- Container number
- Product/phase description (decontamination water, solvent, soil, etc.)
- Profile number, if available
- Start date
- Container weight (if known)

(intentionally blank)

5.0 OFFSITE SHIPMENT AND DISPOSAL

In general, contaminated materials and wastes generated during this PCB removal action must be transported outside the State of Alaska for treatment or disposal to an appropriate disposal facility. Table G-2-1 presents the probable disposal facility for each anticipated waste stream. Waste profiles are to be prepared by the Remediation Contractor for the different waste streams and submitted to the disposal facility for acceptance of the waste. The Remediation Contractor is to propose the facilities to be used for treatment, storage and/or disposal, identify whether transfer facilities are to be used, and how the waste will be tracked in their final WMP for approval.

Hazardous waste will be handled in accordance with 40 CFR Parts 260-268, and 40 CFR 761 (TSCA) requirements. Waste characterization analytical results will be provided to the appropriate disposal facility before bags are transported for offsite disposal. PCB-contaminated waste must be disposed of at the appropriate disposal facility within 270 days following generation of the waste unless EPA is notified 30 days in advance.

Waste profiles, waste manifests/bills of lading, Notice of Canadian Transit (as necessary), and certificates of disposal will be provided as needed by the Remediation Contractor. Upon completion and receipt of the applicable documentation, the containerized waste will be transported offsite for disposal. The Remediation Contractor is to include the names, physical addresses, telephone numbers, and EPA identification numbers of disposal facility and transporters in their final WMP for approval prior to mobilization.

All waste is expected to be removed from the site before the end of one construction season. However, if the waste cannot be removed from the site in one construction season, the Remediation Contractor is to notify ADOT&PF. Waste that cannot be removed from the site may be staged in bags at the Project Site or other approved location that is protected from possible flood waters, but the Remediation Contractor must include a contingency plan in their final WMP. However, TSCA waste (PCBs greater than 50 mg/kg) may not be stored for more than 270 days unless written notification is provided to EPA at least 30 days before the initial 270 day limit expires (40 CFR 761.65).

(intentionally blank)

6.0 TRACKING/SHIPMENT

Tracking and shipment of waste will be performed by the Remediation Contractor or their subcontractor. If a subcontractor will be used to transport and/or dispose of wastes, the Remediation Contractor is to provide the contractor contact information.

6.1 WASTE TRACKING

At project completion, a waste tracking log is to be maintained and submitted to the ADEC project manager or his/her designee. The waste tracking log is to be updated daily until the waste/materials are in transit to the treatment, storage, and disposal facility/recycler. An example waste tracking log is included as Attachment G-2.

6.2 SHIPPING

Waste will be shipped using 49 CFR Parts 100 through 180, as a first preference.

6.3 BILLS OF LADING

Bills of lading are to be prepared for the shipment of waste and will be completed to meet the following requirements, as applicable:

- 49 CFR 172 Subpart B (Table of Hazardous Materials and Provisions)
- 49 CFR 172 Subpart C (Shipping Papers)
- 49 CFR 172 Subpart G (Emergency Response Information)

6.4 WASTE MANIFESTS

Nonhazardous and hazardous manifests will be prepared to track waste from Aniak to the final point of disposal and will include all information required to comply with federal, state, and local regulations for labeling, transport, shipment, and disposal of wastes from the site. The waste manifests are to be submitted to ADEC project manager or designee for signature.

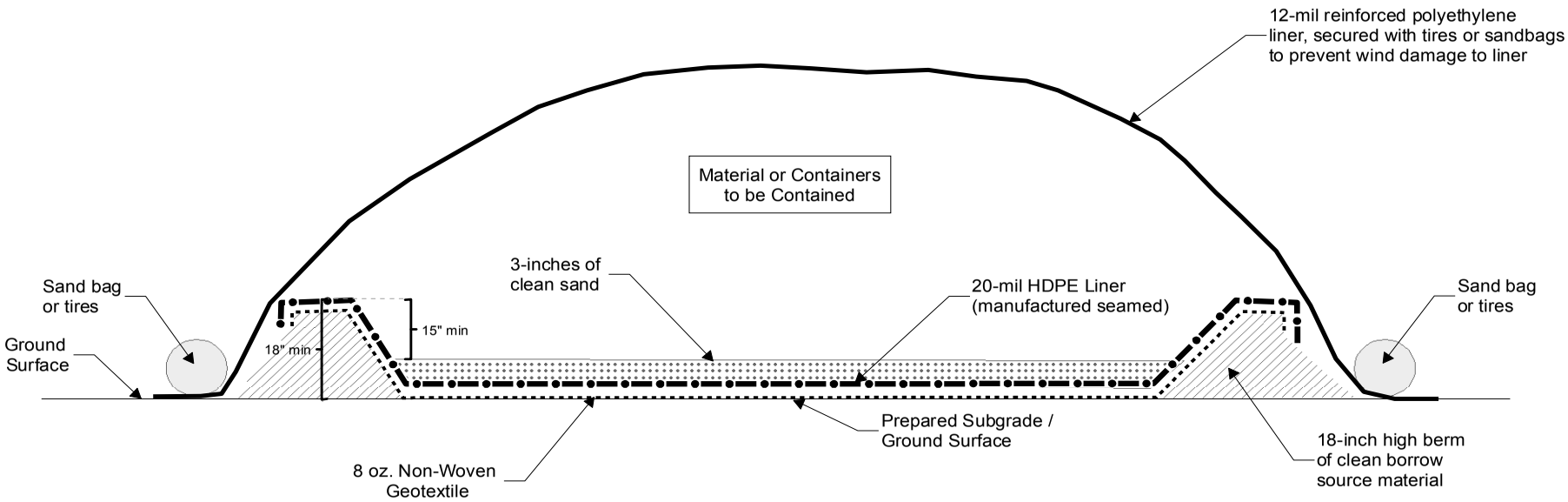
6.4.1 Manifest Reporting

The Remediation Contractor is to compile, prepare, and submit for signature the following items as a package:

- Nonhazardous/hazardous waste manifests
- Generator's waste material profile sheets
- Canadian waste transportation manifests (as necessary)
- Canadian transit notices (as necessary)
- Bills of lading

ATTACHMENT G-1

Temporary Storage Area Schematic



DRAWING NOT TO SCALE

20-mil HDPE Liner (maufactured seamed)

12-mil Reinforced Polyethylene Liner

8 oz. Non-Woven Geotextile

Ground surface

Clean sand

Clean borrow source material

TEMPORARY STORAGE AREA SCHEMATIC

PCB-CONTAMINATED SOIL REMOVAL WORK PLAN
FORMER WACS ANIAK MIDDLE SCHOOL
ANIAK, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	07 OCT 2014	G. RUTKOWSKI	G-1

ATTACHMENT G-2

Waste Tracking Form Example

Waste Tracking Log for WACS Aniak Middle School

Container Number	Type of Waste	Generation Date and Time	Initials	Product/phase description (waste stream physical characterization)	Waste Container (ex. Supersack, Drum, etc)	Weight (lbs)	Date Staged	Staging area	Comments	Date Shipped	Transporter	Date Received	TSDF	Manifest No.

APPENDIX H

Fuel System Plans

From: Tim Terry [TMT@shanwil.com]
Sent: Thursday, September 18, 2008 2:19 PM
To: Halverson, John E (DEC)
Subject: Aniak- Total Control Shop Drawings Part 1 of 2
Attachments: CP-A1_Electrical.pdf

John,

The electrical drawings for the Fueling System at Aniak are crossed out with a note that the Total Control Shop Drawings should be used. John Fachan, the engineer who stamped the drawings, provided the attached electrical drawings (Total Control Shop Drawings) presumed to have been used to construct the Fueling System at Aniak. These drawings have been forwarded to Statewide Petroleum Services who are re-installing the fuel pipelines and associated components. If you have any questions, please feel free to contact me.
Thanks.

Tim Terry
Associate
Shannon & Wilson, Inc.
5430 Fairbanks Street, Suite 3
Anchorage, Alaska 99518

Ph: (907) 561-2120
Fax: (907) 561-4483
email: tmt@shanwil.com

From: Tim Terry [TMT@shanwil.com]
Sent: Thursday, September 18, 2008 2:20 PM
To: Halverson, John E (DEC)
Subject: Aniak- Total Control Shop Drawings Part 2 of 2
Attachments: CP-A1_PANEL LAYOUT.pdf; CP-A2_Electrical.pdf; CP-A2_PANEL LAYOUT.pdf; COMPONENT SCHEDULE, A1, & T1.pdf; COMPONENT SCHEDULE, A2, CH1, & ST1-Layout1.pdf

John,

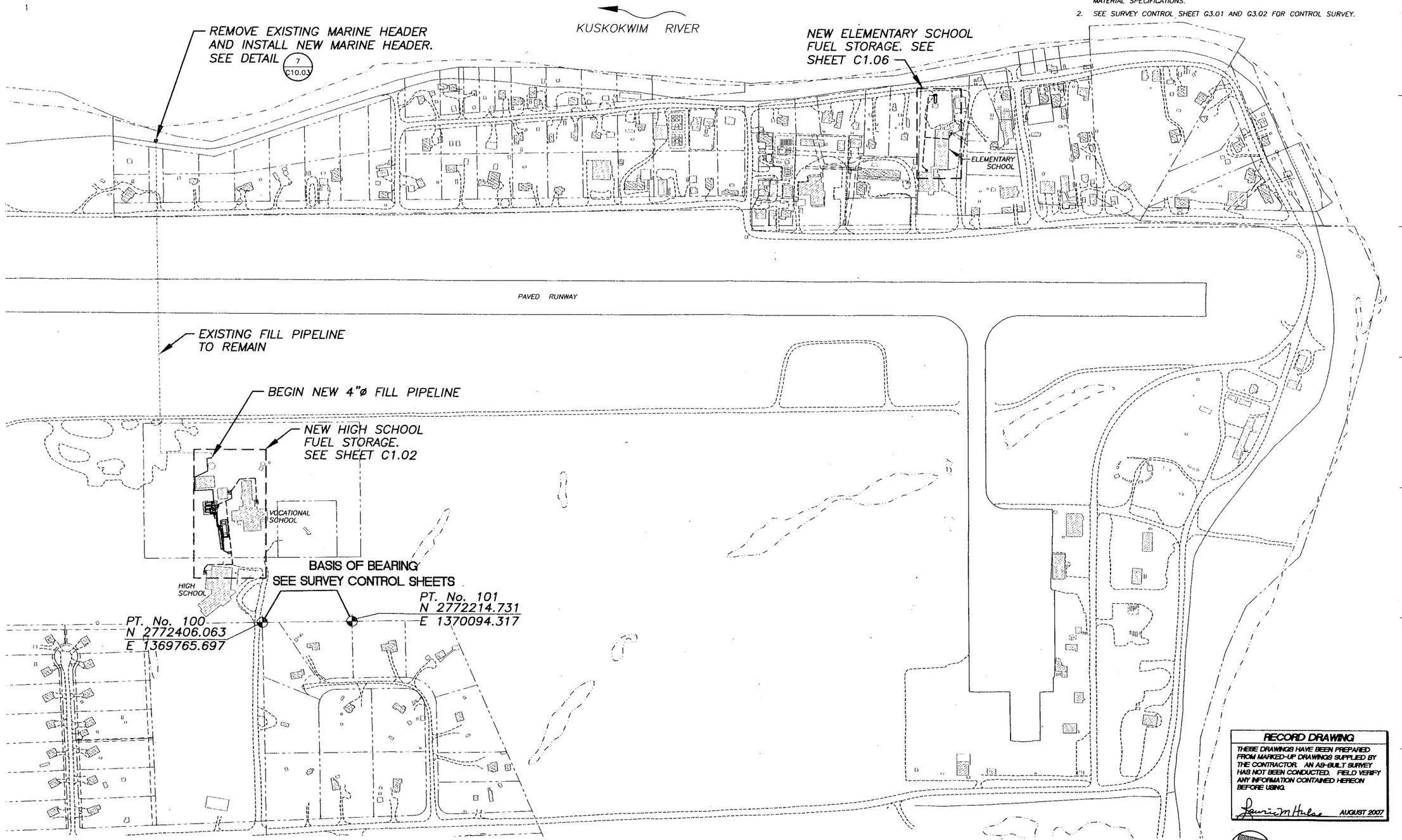
Here is Part 2 of 2 of the electrical drawings (Total Control Shop Drawings) presumed to have been used to construct the Fueling System at Aniak. If you have any questions, please feel free to contact me. Thanks.

Tim Terry
Associate
Shannon & Wilson, Inc.
5430 Fairbanks Street, Suite 3
Anchorage, Alaska 99518

Ph: (907) 561-2120
Fax: (907) 561-4483
email: tmt@shanwil.com

NOTES

1. SEE SHEET G2.01 AND G2.02 FOR GENERAL NOTES, LEGEND, ABBREVIATIONS, AND MATERIAL SPECIFICATIONS.
2. SEE SURVEY CONTROL SHEET G3.01 AND G3.02 FOR CONTROL SURVEY.



RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

Laurie M Hulse AUGUST 2007

ANIAK PROJECT LAYOUT PLAN

SCALE: 1" = 200'

REVISIONS		
MARK	DATE	DESCRIPTION
1		

STATE OF ALASKA 49th LAURIE M. HULSE No. CE-10854 REGISTERED PROFESSIONAL ENGINEER

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK PROJECT LAYOUT PLAN

SHEET NO: C1.01

DRAWN BY: RFH	DESIGNED BY: LMH
DATE: 6/06/05	SCALE: AS NOTED

JOB NUMBER: 03-028

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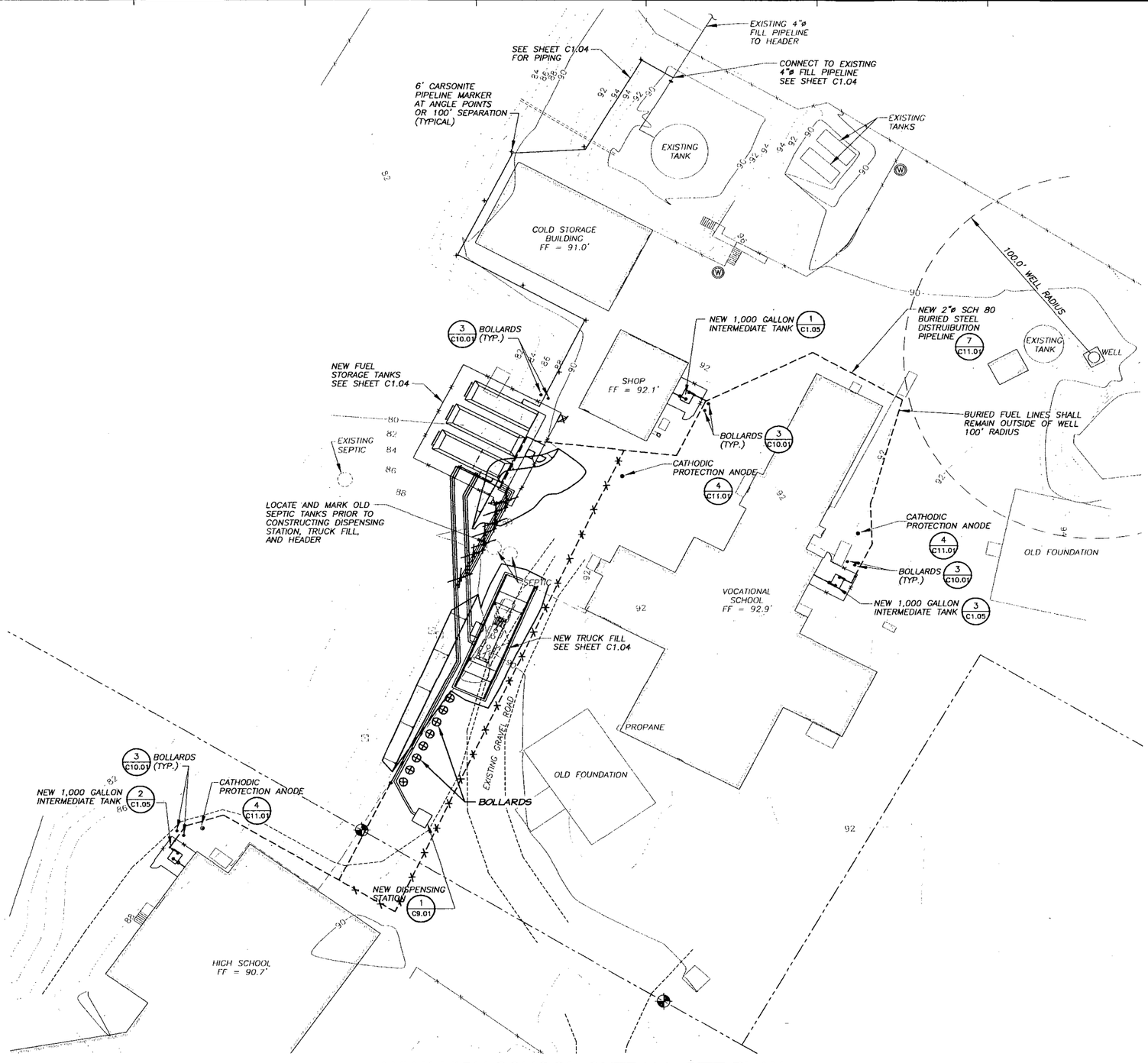
LAYOUT: C1.01
XREF: 03028_00_B001, 03028_00_X100, LMH-STAMP-50, SIGT-ENG



ANIAK HIGH SCHOOL OVERALL SITE PLAN

NOTES

1. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.
3. SEE SHEET C1.03 FOR GRADING PLAN. SEE SHEET C1.10 FOR PIPING PLAN.
4. SEE STRUCTURAL SHEETS S1.01 – S1.05 FOR TANK FOUNDATION AND FRAMING PLANS.
5. SEE PILE LAYOUT SHEET S1.01 FOR COORDINATES OF TANK LOCATIONS.
6. SEE SHEET C1.01 FOR BASIS OF BEARING.

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

Laurie M Hulse AUGUST 2007

0 30 60
SCALE IN FEET

REVISIONS		
MARK	DATE	DESCRIPTION
1		

STATE OF ALASKA 49th LAURIE M. HULSE No. CE-10584 REGISTERED PROFESSIONAL ENGINEER

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- PLANNING

MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA

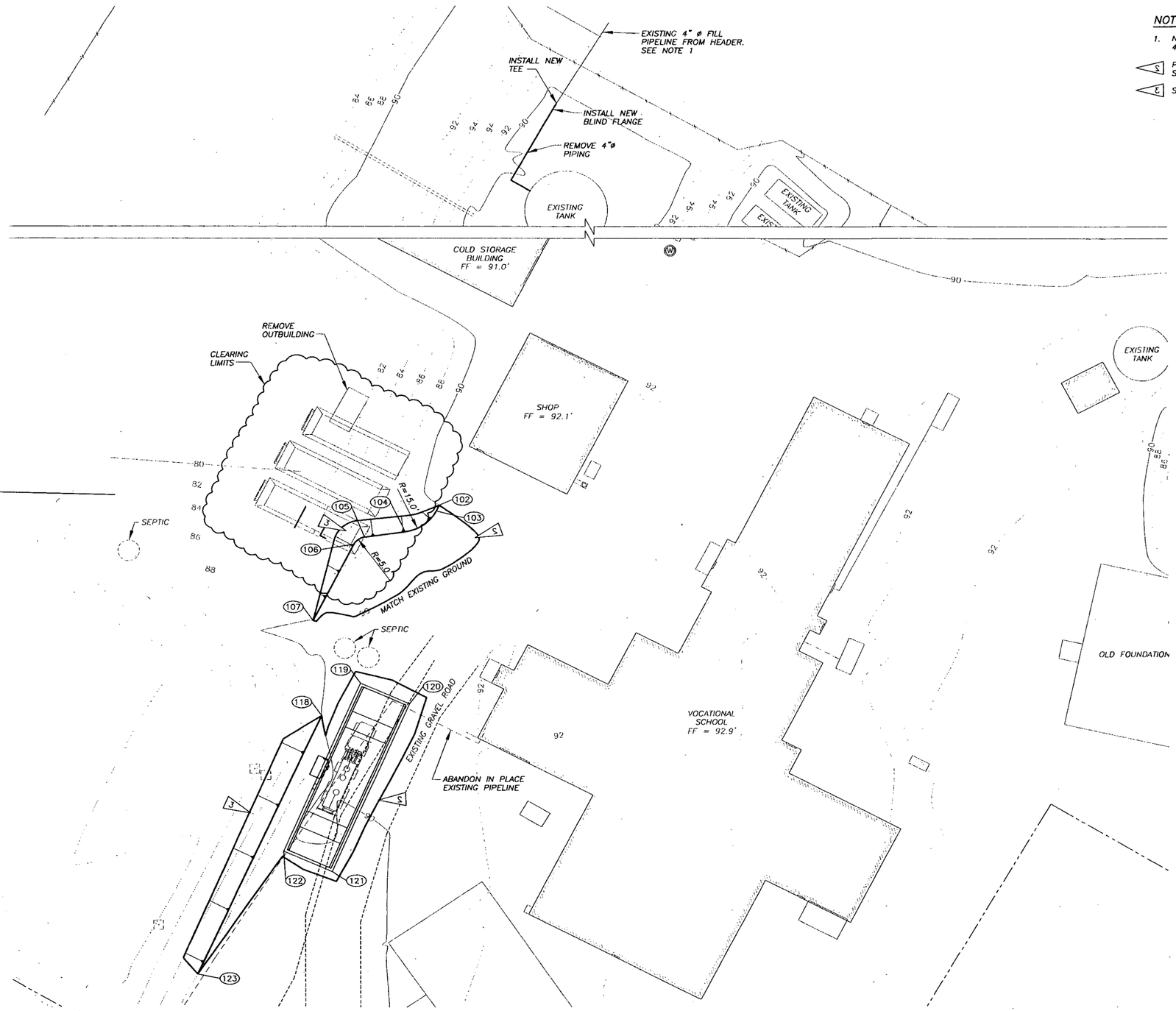
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL OVERALL SITE PLAN

SHEET: C1.02

DRAWN BY: RFH	CHECKED BY: LMH
DATE: 6/06/05	SCALE: AS NOTED
JOB NUMBER: 03-028	

H:\jobs\03-028 Middle Kuskokwim Energy Project\ccd\drawings\03028_00_C0102, 1=30, 08/21/07 at 16:51 by mmhn
LAYOUT: C1.02
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG



NOTES

1. NOT SHOWN ON DRAWING IS REMOVAL OF EXISTING MARINE HEADER. CUT EXISTING 4" ø PIPE BACK 4 FT AND INSTALL NEW MARINE HEADER PER DETAIL 7 ON SHEET C10.03.

S PROVIDE GRAVEL FILL COMPACTED TO 95% MAXIMUM DENSITY AS NEEDED TO PROVIDE ACCESS TO STAIRS. GRADE TO ELEVATION 90.0 FT.

3 SIDE SLOPE = 2:1

COORDINATE TABLE

POINT	NORTHING	EASTING	DESCRIPTION	ELEVATION
102	2772946.92	1369877.22	TOP SLOPE	90.0'
103	2772944.76	1369876.12	P.C.	90.0'
104	2772936.77	1369864.87	P.T.	90.0'
105	2772934.69	1369850.11	P.C.	90.0'
106	2772932.03	1369846.36	P.T.	90.0'
107	2772902.76	1369831.27	TOP SLOPE	90.0'
118	2772866.43	1369834.27	TOP SLOPE	90.0'
119	2772878.85	1369848.50	BOTTOM FILL	88.0'
120	2772871.04	1369866.18	BOTTOM FILL	88.0'
121	2772807.01	1369837.89	BOTTOM FILL	88.0'
122	2772814.82	1369820.21	BOTTOM FILL	88.0'
123	2772767.99	1369788.63	TOP SLOPE	90.0'

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

Laurie M Hulse AUGUST 2007

0 20 30
SCALE IN FEET

ANIAK HIGH SCHOOL DEMOLITION AND GRADING PLAN

REVISIONS

MARK	DATE	DESCRIPTION
1		

STATE OF ALASKA 49th REGISTERED PROFESSIONAL ENGINEER LAURIE M. HULSE No. CE-10584

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- PLANNING

MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL DEMOLITION AND GRADING PLAN

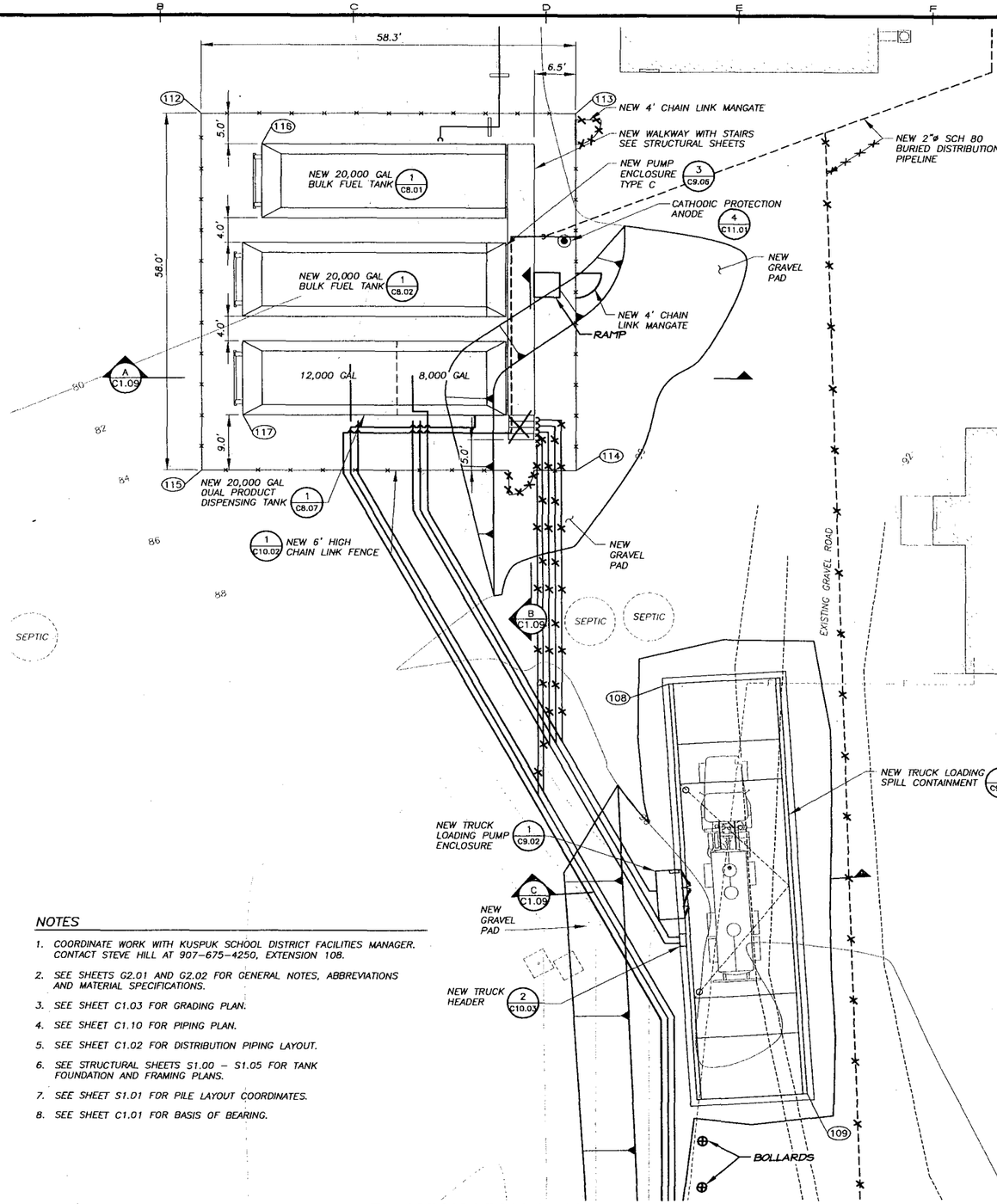
SHEET NO: C1.03

DRAWN BY: RFH | DESIGNED BY: LMH

DATE: 6/06/05 | SCALE: AS NOTED

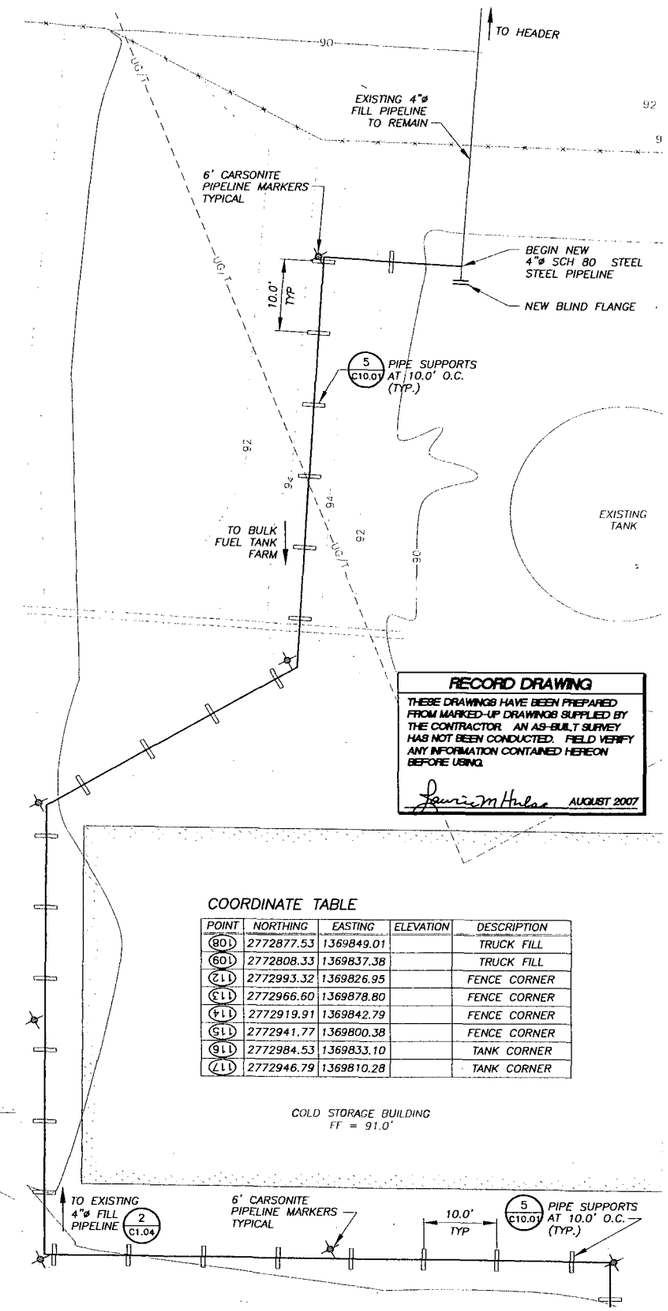
JOB NUMBER: 03-028

H:\jobs\03-028 Middle Kuskokwim Energy Project\cad\drawings\03028_00_C0103, 1=20, 08/21/07 at 16:51 by mmhn
LAYOUT: C1.03
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG



1 / C1.04 ANIAK HIGH SCHOOL FUEL STORAGE SITE PLAN

SCALE: 1" = 10'



2 / C1.04 FILL PIPE CONNECTION DETAIL

SCALE: 1" = 10'

0 10 20
SCALE IN FEET

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

Laurie M Hulse AUGUST 2007

COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
801	2772877.53	1369849.01		TRUCK FILL
601	2772808.33	1369837.38		TRUCK FILL
701	2772993.32	1369826.95		FENCE CORNER
1301	2772966.60	1369878.80		FENCE CORNER
1401	2772919.91	1369842.79		FENCE CORNER
1501	2772941.77	1369800.38		FENCE CORNER
1601	2772984.53	1369833.10		TANK CORNER
1701	2772946.79	1369810.28		TANK CORNER

NOTES

1. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.
3. SEE SHEET C1.03 FOR GRADING PLAN.
4. SEE SHEET C1.10 FOR PIPING PLAN.
5. SEE SHEET C1.02 FOR DISTRIBUTION PIPING LAYOUT.
6. SEE STRUCTURAL SHEETS S1.00 – S1.05 FOR TANK FOUNDATION AND FRAMING PLANS.
7. SEE SHEET S1.01 FOR PILE LAYOUT COORDINATES.
8. SEE SHEET C1.01 FOR BASIS OF BEARING.

REVISIONS

MARK	DATE	DESCRIPTION
1		

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE
ANIAK HIGH SCHOOL FUEL STORAGE SITE PLAN

SHEET
C1.04

DRAWN BY: RFH
CHECKED BY: LMH
DATE: 6/06/05
SCALE: AS NOTED
JOB NUMBER: 03-028

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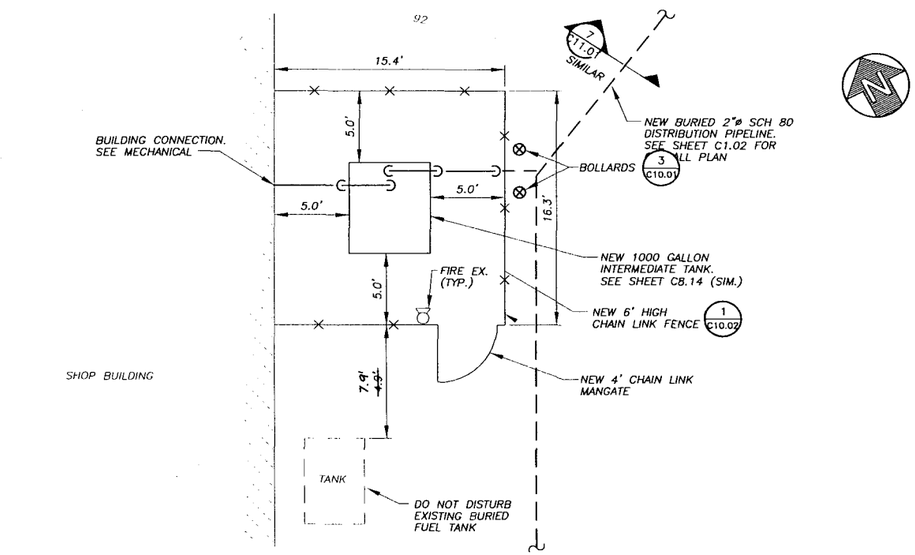
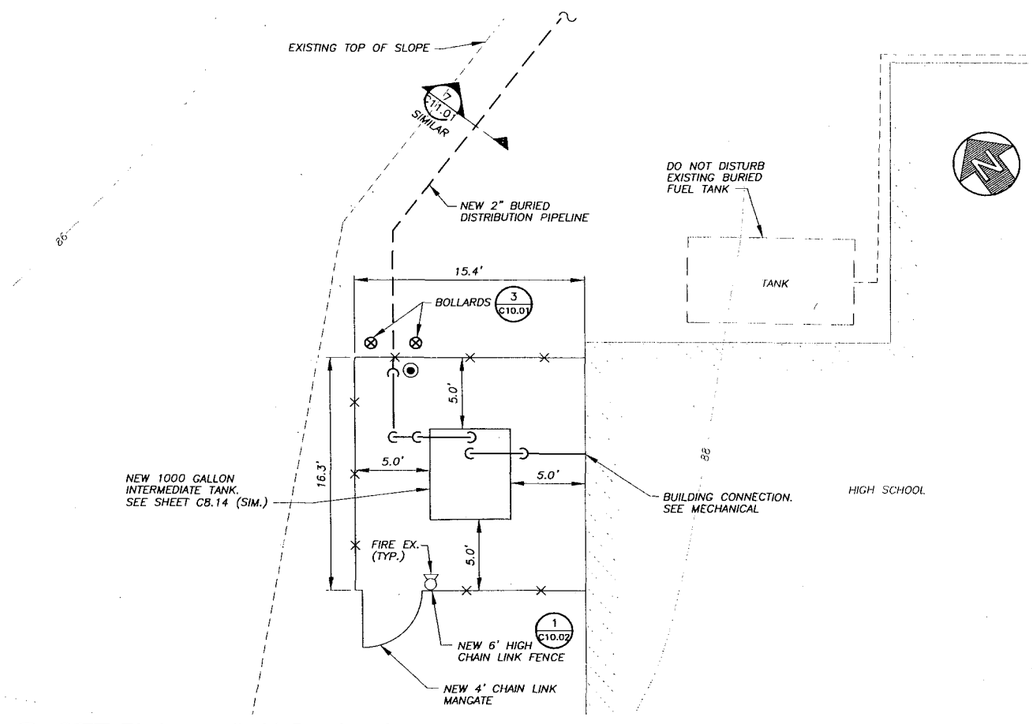
LAYOUT: C1.04
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG



1 C1.05 SITE PLAN - SHOP BUILDING

SCALE: 1" = 5'

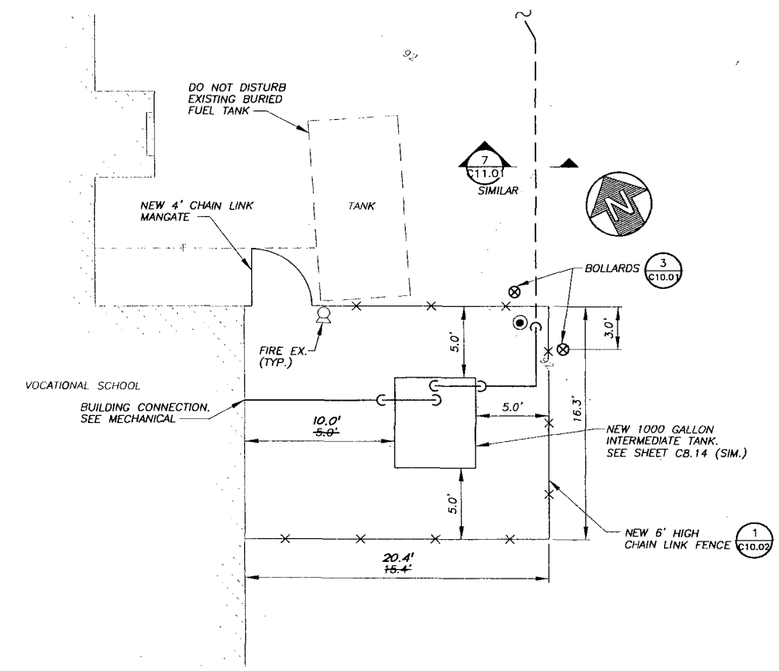


2 C1.05 SITE PLAN - HIGH SCHOOL

SCALE: 1" = 5'

NOTES

1. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.
3. SEE SHEET C1.11 FOR PIPING PLANS.
4. SUPPORT PIPELINE WITH CONCRETE PIPE SUPPORTS AS NEEDED WITHIN FENCED AREAS. SEE PIPE SUPPORT DETAIL 5 ON SHEET C10.01.
5. SEE SHEET C1.02 FOR DISTRIBUTION PIPING LAYOUT.



3 C1.05 SITE PLAN - VOCATIONAL SCHOOL

SCALE: 1" = 5'

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

Laurie M Hulse AUGUST 2007

0 5 10
SCALE IN FEET

REVISIONS			
MARK	DATE	DESCRIPTION	
1			

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AIDEA/AEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL & MIDDLE SCHOOL INTERMEDIATE TANKS SITE PLANS

SHEET: C1.05

DRAWN BY: KK/RFH | CHECKED BY: LMH

DATE: 6/06/05 | SCALE: AS NOTED

JOB NUMBER: 03-028

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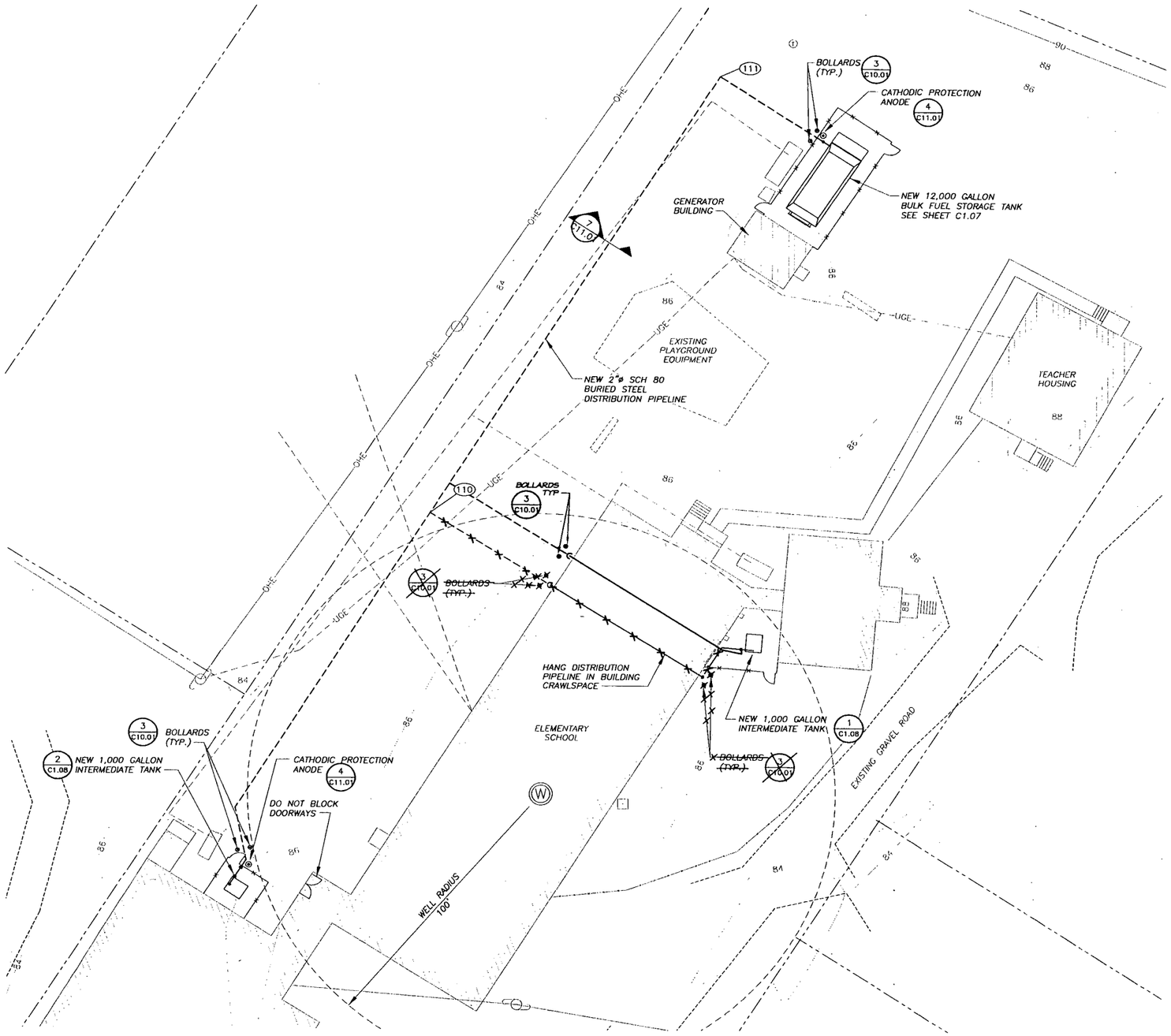
LAYOUT: C1.05
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG



ANIAK ELEMENTARY OVERALL SITE PLAN

NOTES

1. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.
3. SEE SHEET C1.11 FOR PIPING PLAN.
4. SEE STRUCTURAL SHEETS S1.01 – S1.02 FOR TANK FOUNDATION AND FRAMING PLANS.
5. SEE SHEET S1.02 FOR PILE LAYOUT COORDINATES.
6. CONTACTOR SHALL VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.
7. SEE SHEET C1.01 FOR BASIS OF BEARING.

COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
011	2772801.82	1373282.42	———	PIPE TEE
111	2772957.18	1373380.16	———	PIPE BEND

RECORD DRAWING

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Laurie M Hulse AUGUST 2007

0 20 40
SCALE IN FEET

REVISIONS		
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MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL OVERALL SITE PLAN

SHEET: C1.06

DRAWN BY: KK/RFH	CHECKED BY: LMH
DATE: 6/06/05	SCALE: AS NOTED

JOB NUMBER: 03-028

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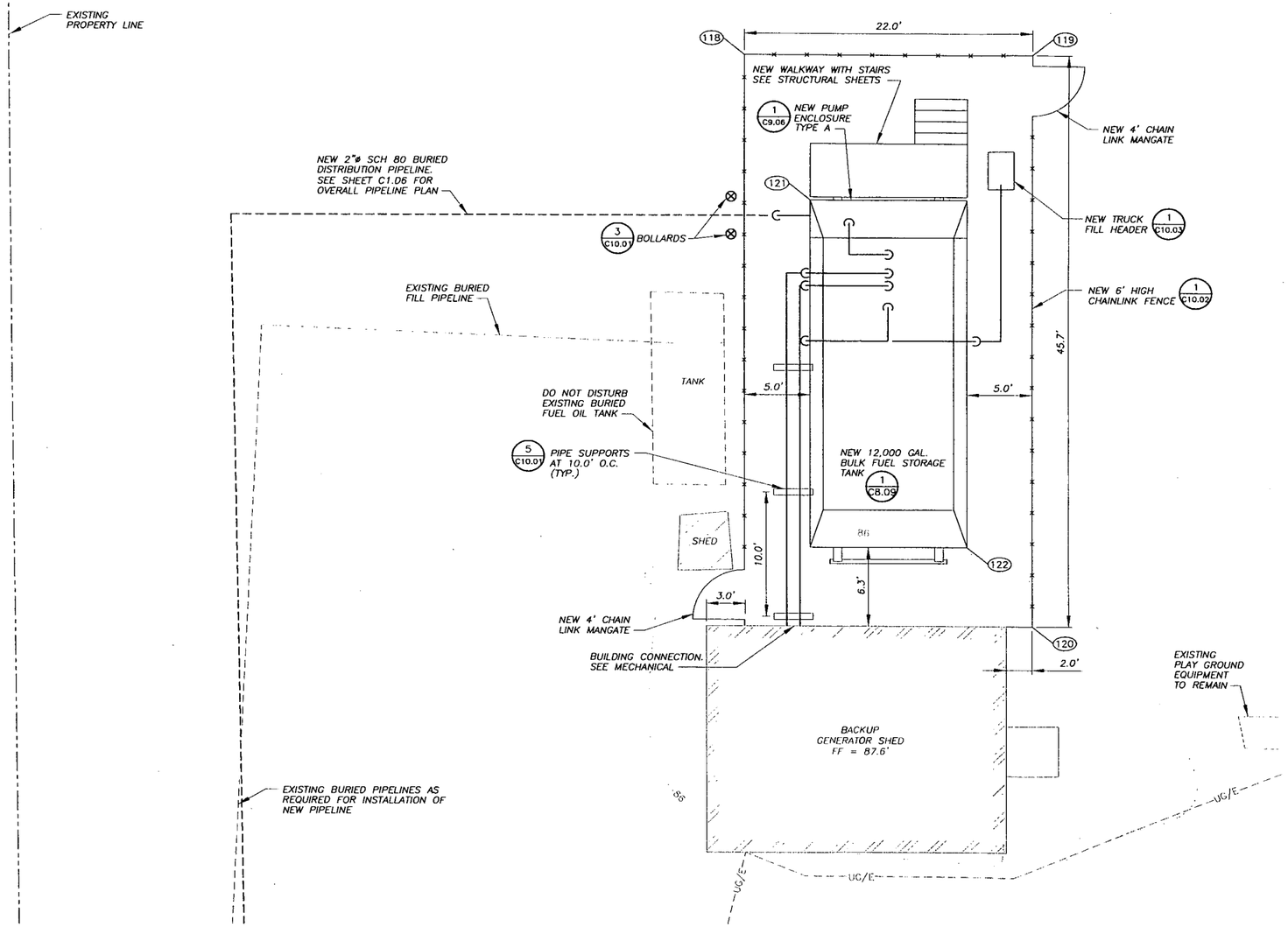
LAYOUT: C1.06
XREF: 03028_00_B001, 03028_00_V100, LMH-STAUF-SIG, SDGT-ENG



1 C1.07 SITE PLAN - ANIAK ELEMENTARY SCHOOL FUEL STORAGE

SCALE: 1" = 5'

NOTES

1. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.
3. SEE SHEET C1.11 FOR PIPING PLAN.
4. SEE SHEET C1.06 FOR DISTRIBUTION PIPING LAYOUT.
5. SEE STRUCTURAL SHEETS S1.00 – S1.05 FOR TANK FOUNDATION AND FRAMING PLANS.
6. SEE SHEET S1.02 FOR PILE LAYOUT COORDINATES.
7. SEE SHEET C1.01 FOR BASIS OF BEARING.

COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
118	2772946.60	1373419.97		FENCE CORNER
119	2772934.60	1373438.42		FENCE CORNER
120	2772896.26	1373413.50		FENCE CORNER
121	2772934.17	1373417.86		TANK CORNER
122	2772904.30	1373412.76		TANK CORNER

RECORD DRAWING

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Laurie M Hulse AUGUST 2007

0 5 10
SCALE IN FEET

REVISIONS

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL FUEL STORAGE SITE PLAN

SHEET: C1.07

DRAWN BY: KK/RFH | CHECKED BY: LMH

DATE: 6/06/05 | SCALE: AS NOTED

JOB NUMBER: 03-028

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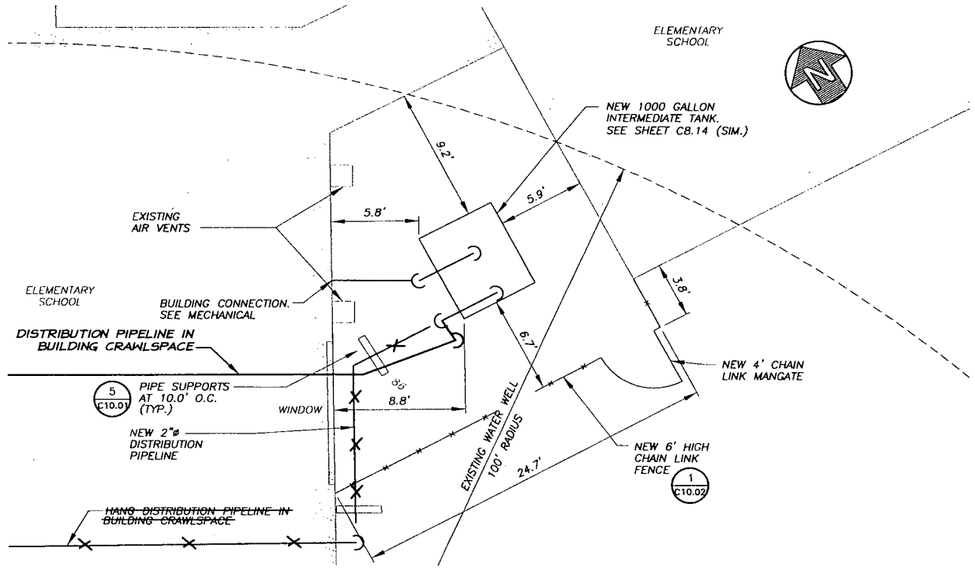
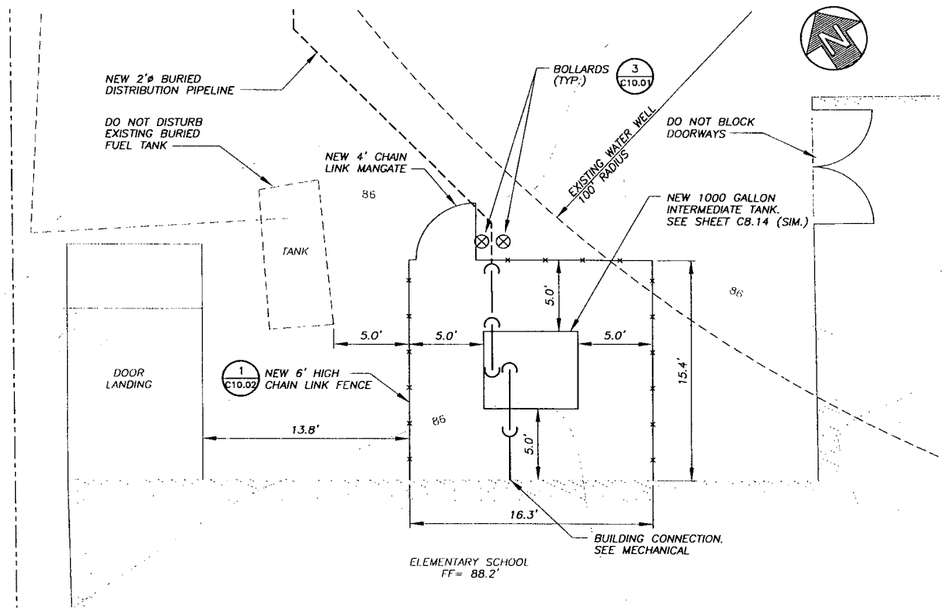
LAYOUT: C1.07
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG



1 C1.08 SITE PLAN - ANIAK ELEMENTARY SCHOOL

SCALE: 1" = 5'



2 C1.08 SITE PLAN - ANIAK ELEMENTARY SCHOOL

SCALE: 1" = 5'

NOTES

1. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.
3. SEE SHEET C1.11 FOR PIPING PLAN.
4. SEE SHEET C1.06 FOR DISTRIBUTION PIPING LAYOUT.

RECORD DRAWING

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Laurie M Hulse AUGUST 2007

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SCALE IN FEET

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AIDEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL INTERMEDIATE TANKS SITE PLANS

SHEET: C1.08

DRAWN BY: KK/RFH	CHECKED BY: LMH
DATE: 6/06/05	SCALE: AS NOTED

JOB NUMBER: 03-028

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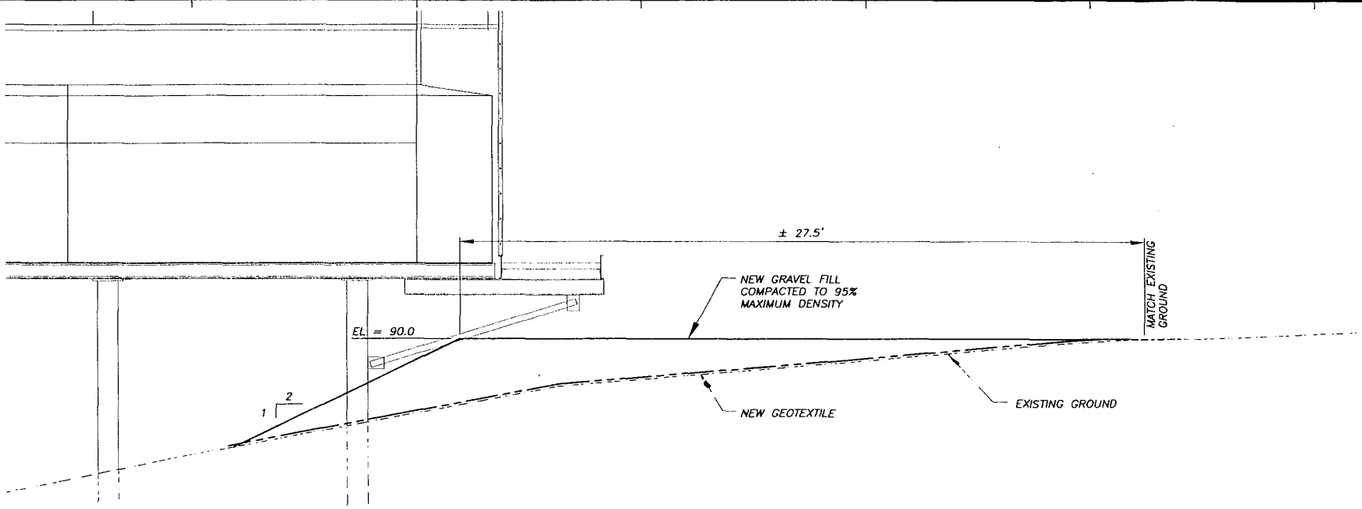
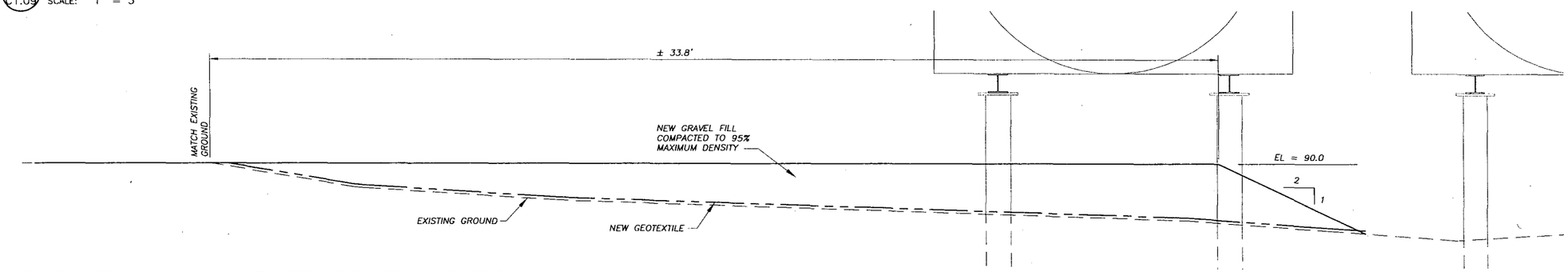
LAYOUT: C1.08
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG

NOTES

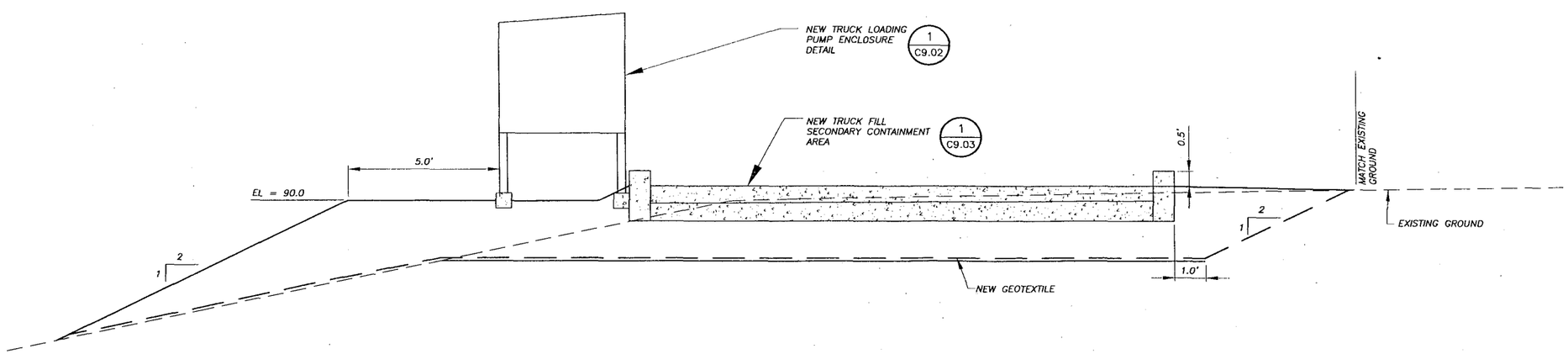
1. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.
2. SEE STRUCTURAL SHEETS S1.00 – S1.05 FOR FOUNDATION AND CROSS BRACING DETAILS.



A / C1.09 SECTION – ANIAK HIGH SCHOOL TANK FARM
SCALE: 1" = 3'



B / C1.09 SECTION – ANIAK HIGH SCHOOL TANK FARM
SCALE: 1" = 2'



B / C1.09 SECTION – ANIAK HIGH SCHOOL TANK FARM
SCALE: 1" = 2'

RECORD DRAWING

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AUGUST 2007

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT
AIDEA/AEA
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL TANK SECTIONS

SHEET: C1.09

DRAWN BY: RFH	DESIGNED BY: LMH
DATE: 6/06/05	SCALE: AS NOTED

JOB NUMBER: 03-028

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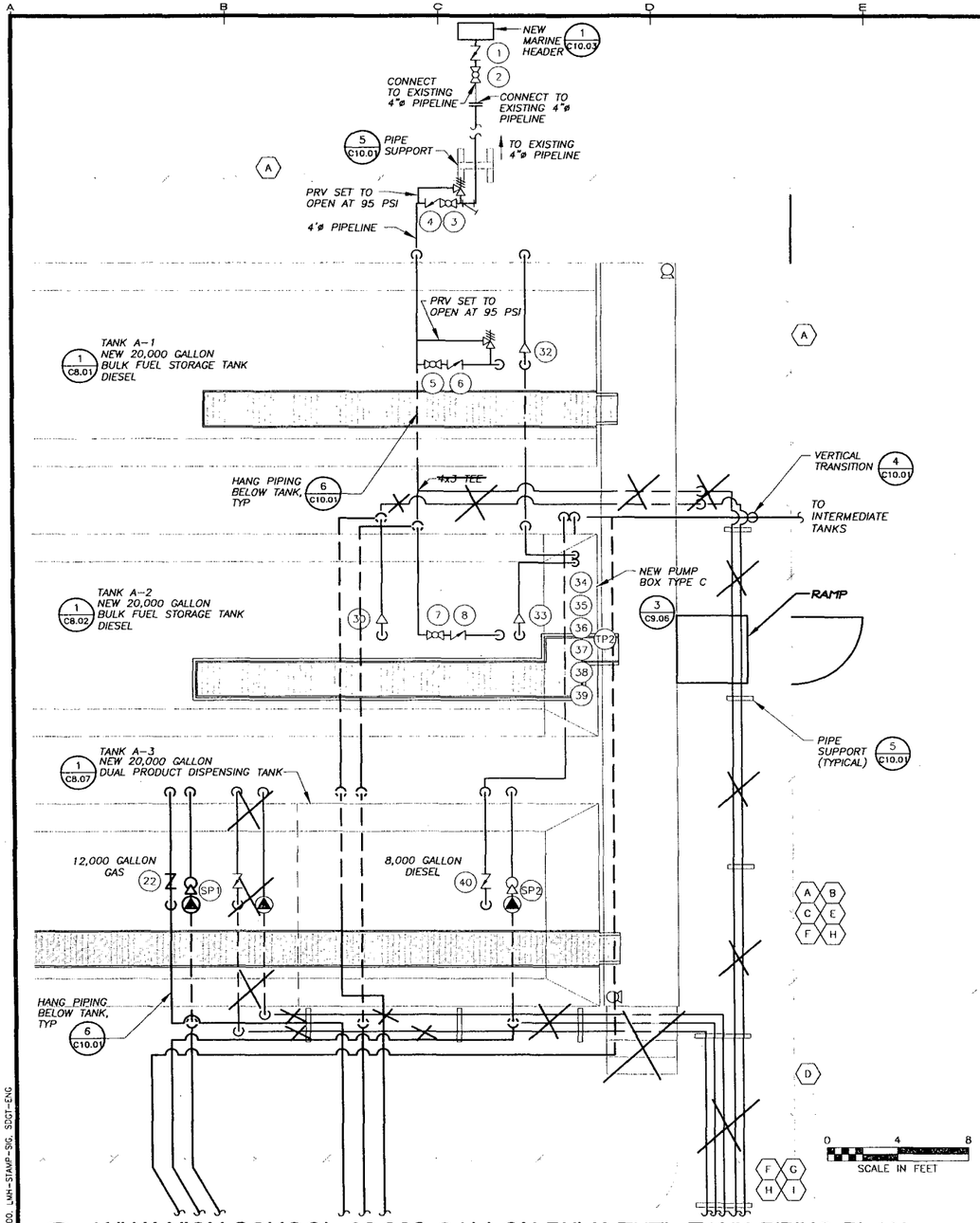
LAYOUT: C1.09
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG



ANIAK HIGH SCHOOL 20,000 GALLON BULK FUEL TANK PIPING PLAN

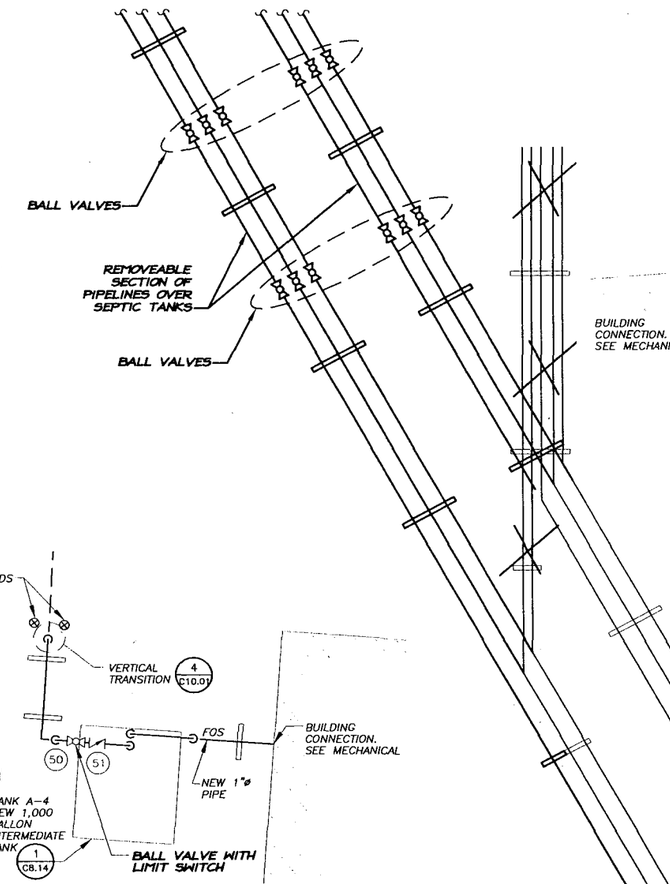
1/C1.10 SCALE: 1" = 4'

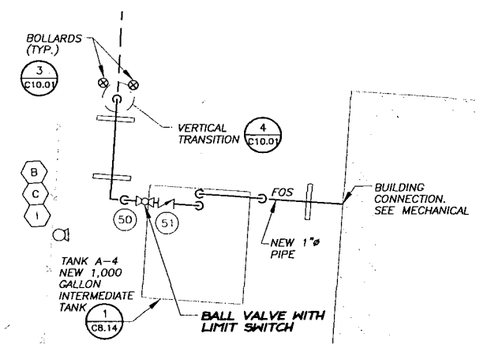
NOTES

1. SEE SHEET G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS, AND MATERIAL SPECIFICATIONS.
2. SEE SHEET G2.03 FOR TANK SCHEDULE.
3. SEE SHEET C12.01 FOR PLACARD, VALVE AND PUMP TAG SCHEDULES.
4. ALL PIPING 2"ø AND SCH 80 UNLESS OTHERWISE NOTED.
5. SEE SHEET C1.06 FOR OVERALL PIPELINE LAYOUT.

LEGEND

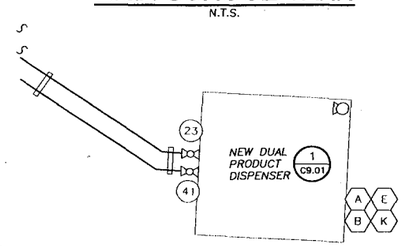
- FLANGED BALL VALVE
- FLEX FITTING
- CHECK VALVE
- MOTOR ACTUATED BALL VALVE
- STRAINER
- ANGLE CHECK & BACK PRESSURE VALVE
- BLIND FLANGE
- PRESSURE RELIEF VALVE
- TRANSFER PUMP
- SUBMERSIBLE PUMP
- PRESSURE GAUGE
- FILTER
- ANTI-SIPHON VALVE
- REDUCER
- METER
- VERTICAL TRANSITION
- EQUIPMENT TAG NUMBER
- FIRE EXTINGUISHER
- PLACARD





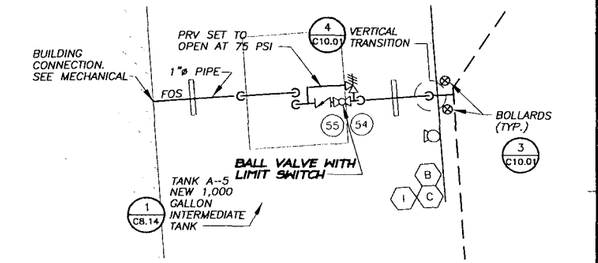
HIGH SCHOOL TANK

N.T.S.



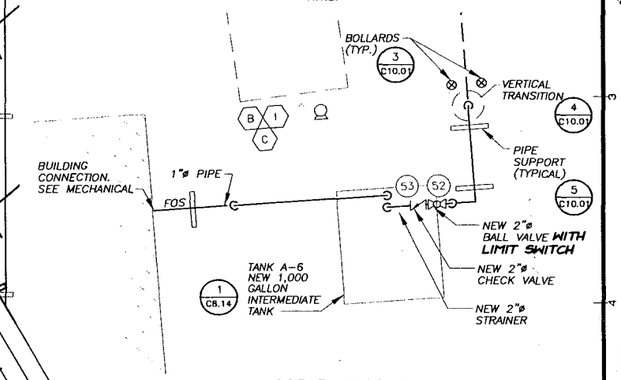
DISPENSER BUILDING

N.T.S.



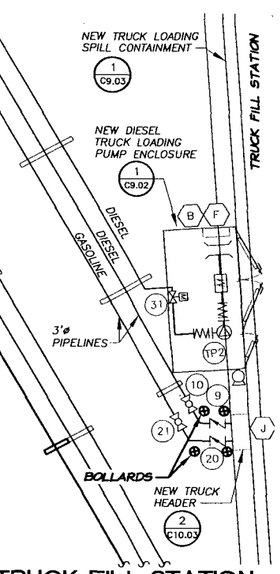
SHOP TANK

N.T.S.



VOC. TANK

N.T.S.



TRUCK FILL STATION

N.T.S.

RECORD DRAWING

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Laurie M Hulse AUGUST 2007

REVISIONS			
MARK	DATE	DESCRIPTION	
1			

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MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL PIPING PLAN

SHEET: C1.10

DRAWN BY: KK/RFH | CHECKED BY: LMH

DATE: 6/06/05 | SCALE: AS NOTED

JOB NUMBER: 03-028

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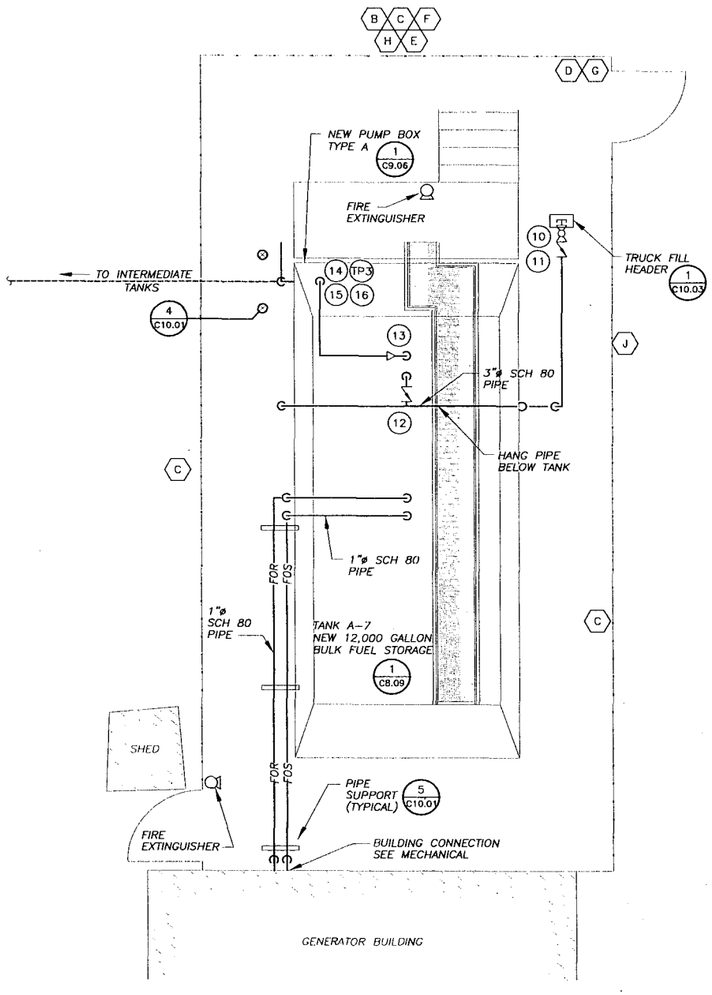
LAYOUT: C1.10
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDCT-ENG



1 C1.12 ANIAK ELEMENTARY SCHOOL 12,000 GALLON BULK FUEL TANK PIPING PLAN

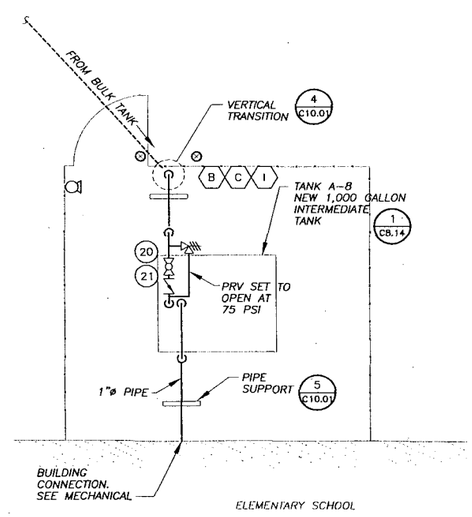
SCALE: 1" = 4'

LEGEND

- FLANGED BALL VALVE
- FLEX FITTING
- CHECK VALVE
- MOTOR ACTUATED BALL VALVE
- STRAINER
- ANGLE CHECK & BACK PRESSURE VALVE
- BLIND FLANGE
- PRESSURE RELIEF VALVE
- TRANSFER PUMP
- SUBMERSIBLE PUMP
- PRESSURE GAUGE
- FILTER
- ANTI-SIPHON VALVE
- REDUCER
- METER
- VERTICAL TRANSITION
- EQUIPMENT TAG NUMBER
- PLACARD
- —FOS— FUEL OIL SUPPLY
- —FOR— FUEL OIL RETURN
- FIRE EXTINGUISHER

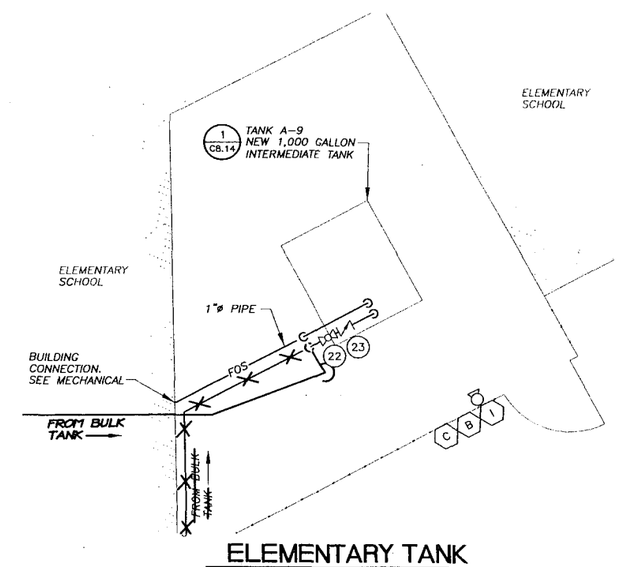
NOTES

1. SEE SHEET G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS, AND MATERIAL SPECIFICATIONS.
2. SEE SHEET G2.03 FOR TANK SCHEDULE.
3. SEE SHEET C12.01 FOR PLACARD, VALVE AND PUMP TAG SCHEDULES.
4. SEE SHEET C1.06 FOR OVERALL PIPELINE LAYOUT.
5. ALL PIPELINES ARE 2"ø AND SCH 80, UNLESS NOTED OTHERWISE.



ELEMENTARY TANK

N.T.S.



ELEMENTARY TANK

N.T.S.

RECORD DRAWING

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Laurie M Hulse AUGUST 2007

0 4 8
SCALE IN FEET

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AIDEA/AEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL PIPING PLAN

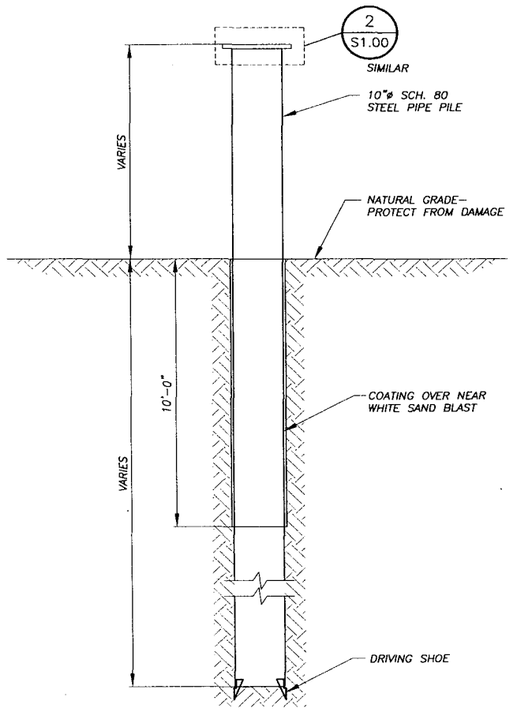
SHEET: C1.11

DRAWN BY: KK | CHECKED BY: LMH

DATE: 6/06/05 | SCALE: AS NOTED

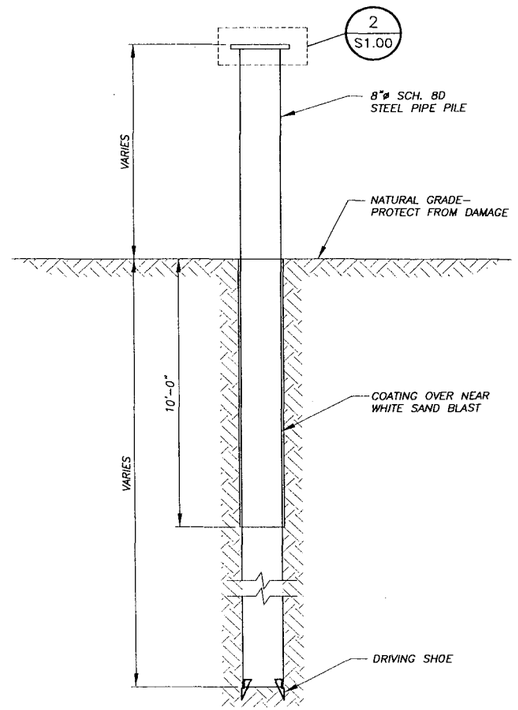
JOB NUMBER: 03-028

H:\Jobs\03-028 Middle Kuskokwim Energy Project\cad\drawings\03028_00_C0111, 1=4, 08/21/07 at 16:52 by mmhn
LAYOUT: C1.11
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SDGT-ENG



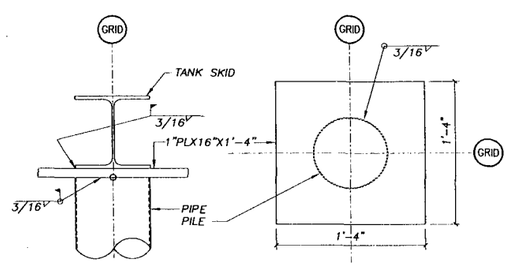
1 S1.00 10 INCH DIAMETER PILE DETAIL

SCALE: 3/4" = 1'-0"



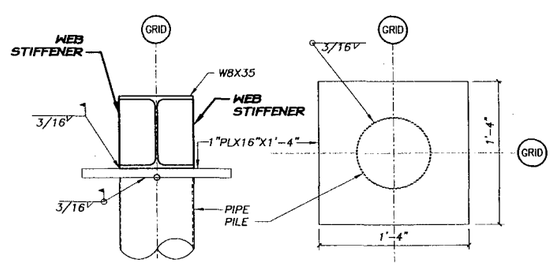
3 S1.00 8 INCH DIAMETER PILE DETAIL

SCALE: 3/4" = 1'-0"



2 S1.00 PILE CAP DETAIL AT TANKS

SCALE: 1 1/2" = 1'-0"



4 S1.00 PILE CAP DETAIL AT POWER PLANTS

SCALE: 1 1/2" = 1'-0"

FOUNDATION NOTES

1. THE PILE FOUNDATION SYSTEM HAS BEEN DESIGNED IN ACCORDANCE WITH THE GEOTECHINICAL RECOMMENDATIONS OF HATTENBURG DILLEY & LINNELL.
2. THE CONTRACTOR SHALL BE RESPONSIBLE TO ACCURATELY LAY OUT THE CONTROL POINTS FOR ALL THE WORK ON THE SITE.
3. VEHICLES OR EQUIPMENT MAY NOT BE OPERATED ON UNFROZEN NATIVE VEGETATION WITHOUT AN APPROVED METHOD OF PROTECTION. ALL TRAFFIC WILL BE RESTRICTED TO THE ESTABLISHED ROADS DURING THIS PERIOD OF THAW. DURING THE MONTHS WHEN THE ACTIVE LAYER IS THAWED, EXTREME CARE MUST BE UTILIZED TO AVOID EXCESSIVE DISTURBANCE. ANY DAMAGED VEGETATION AREAS SHALL BE RESEEDED AND FERTILIZED.
4. REFER TO "PILE SCHEDULE" FOR A VILLAGE BY VILLAGE RECAP OF PILE REQUIREMENTS. ON SHEET G2.04.
5. INSTALL PILING IN ACCORDANCE TO THE FOUNDATION PLAN AND THE TYPICAL PILE DETAILS PROVIDED ON THIS SHEET.
6. DRIVE PILE TO DEPTH USING APPROPRIATE HAMMER. IF REFUSAL IS ENCOUNTERED PRIOR TO DEPTH, MECHANICAL THAWING OF SUBSURFACE MAY OCCUR TO CONTINUE ADVANCING PILE. CONTACT ENGINEER IMMEDIATELY IF DESIRED DEPTH IS NOT REACHED.
7. DRIVE SHOE: OPEN ENDED CUTTING SHOE, CONFORMING TO ASTM A148. VERSA STEEL VS708 AND VS710 PILE SHOE, OR APPROVED EQUAL.
8. **BLOW COUNTS 10 AND BELOW WITH A 24000 POUND HAMMER ARE CONSIDERED A SIGNIFICANT DEVIATION FROM THE DESIGN CRITERIA. WORK SHALL STOP AND THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY TO REDESIGN THE PILE TO PROVIDE ADEQUATE CAPACITY.**

RECORD DRAWING

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AUGUST 2007

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET NAME: FOUNDATION NOTES AND PILE DETAILS

SHEET: S1.00

DRAWN BY:	CHECKED BY:
RFH	LMH
DATE: 6/06/05	SCALE: AS NOTED

JOB NUMBER: 03-028

H:\jobs\03-028 Middle Kuskokwim Energy Project\cad\drawings\03028_00_S100, 1=24, 08/23/07 at 14:07 by mmhn
LAYOUT: S1.00
XREF: 03028_00_B001; LMH-STAMP-SIG; SDGT-ENG

NOTES

1. SEE SHEET S1.00 FOR FOUNDATION NOTES.
2. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.

RECORD DRAWING

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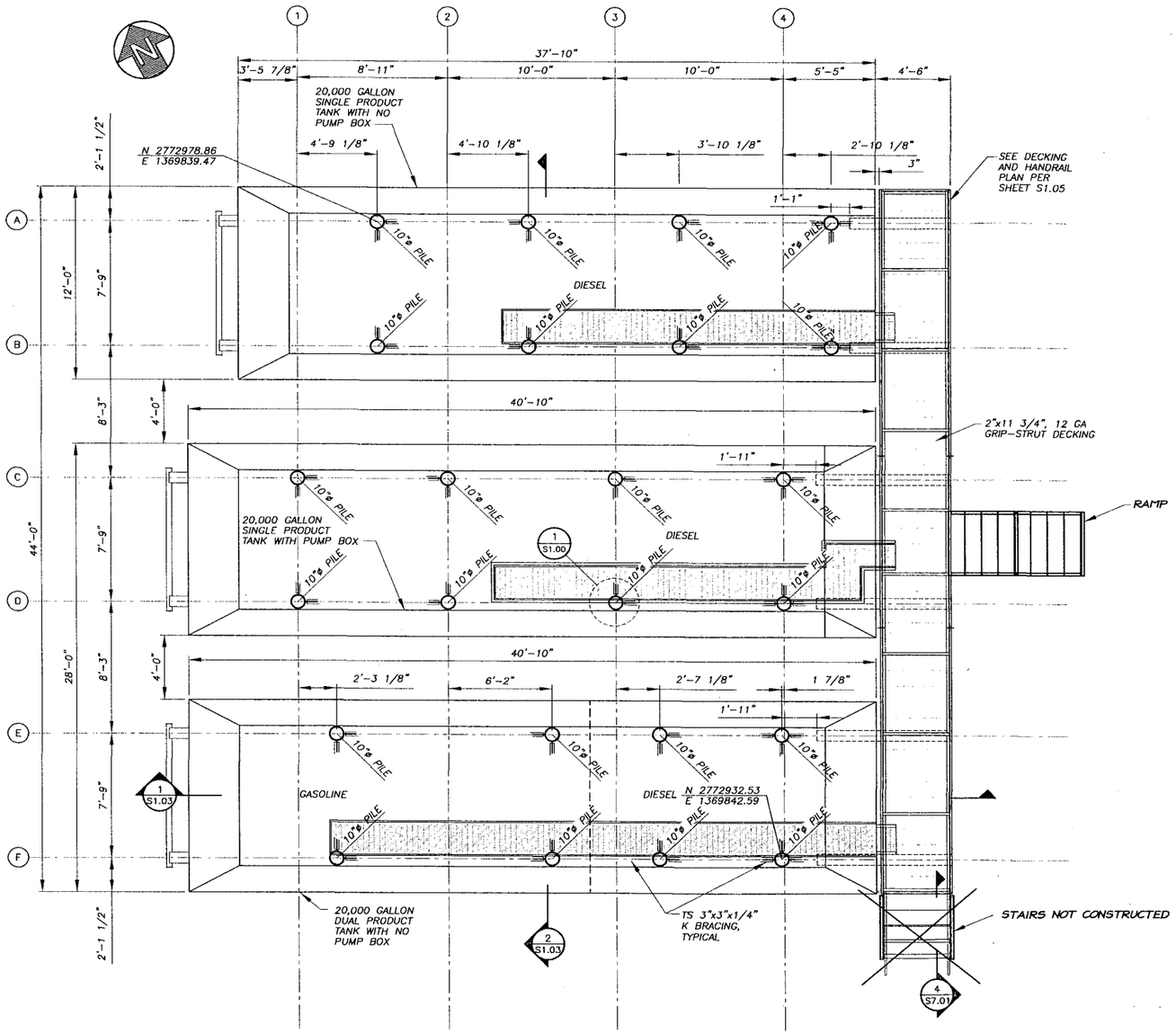
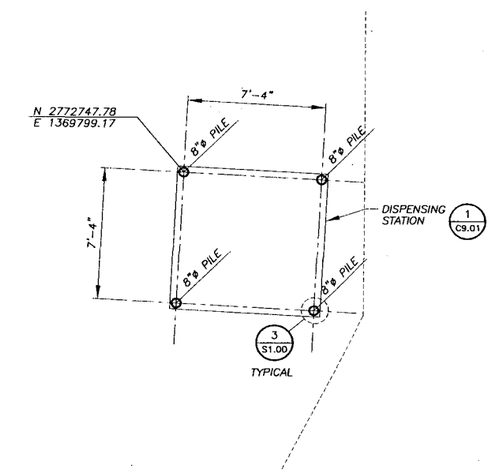
David G. Thompson AUGUST 2007



ANIAK HIGH SCHOOL FUEL STORAGE FOUNDATION AND FRAMING PLAN

SCALE: 1/4" = 1'-0"



1/S1.01 ANIAK DISPENSING STATION FOUNDATION PLAN

SCALE: 1/4" = 1'-0"

0 4 8
SCALE IN FEET

REVISIONS		
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1		

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MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL FUEL STORAGE FOUNDATION AND FRAMING PLAN

SHEET: S1.01

DRAWN BY: KK/RFH | CHECKED BY: LMH

DATE: 6/06/05 | SCALE: AS NOTED

JOB NUMBER: 03-028

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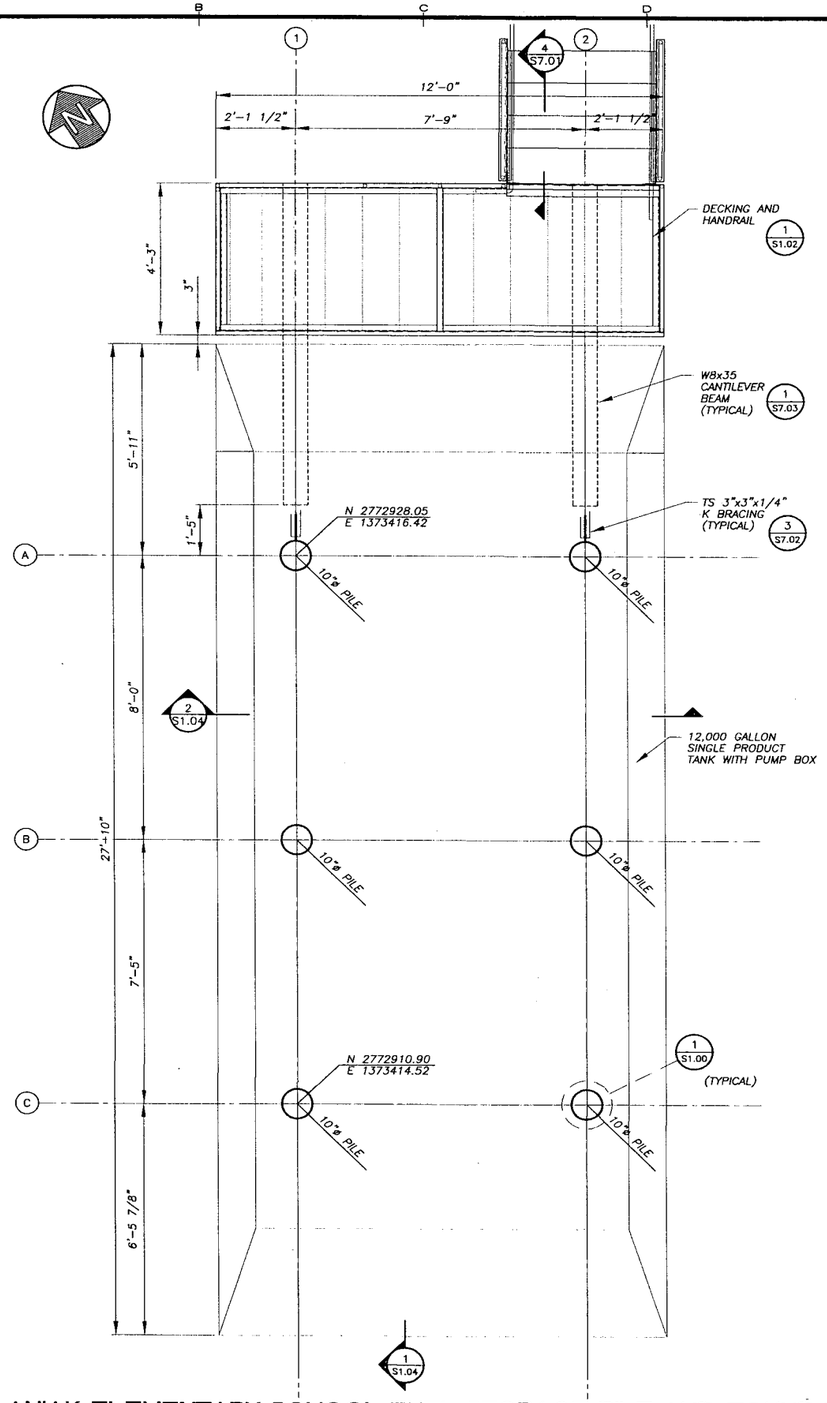
LAYOUT: S1.01
XREF: 03028_00_B001, 03028_00_V100, LMH-STAMP-SIG, SQCT-ENG

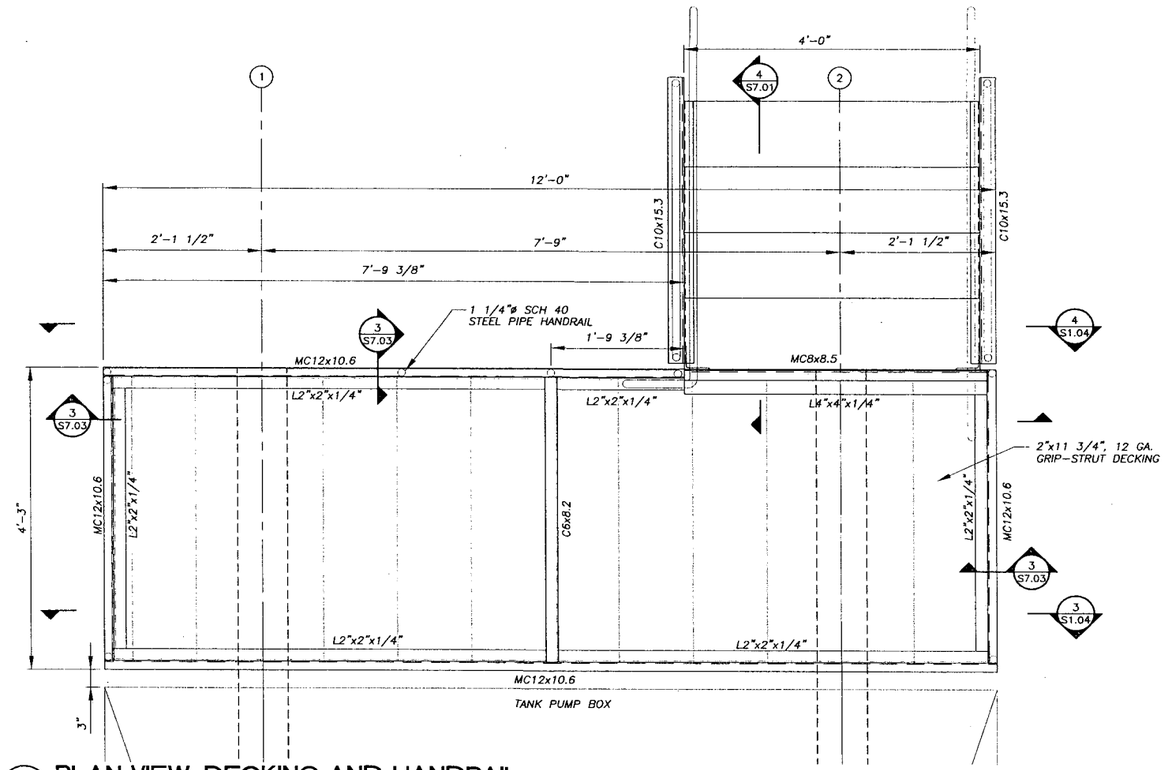


ANIAK ELEMENTARY SCHOOL FUEL STORAGE PILE AND FOUNDATION PLAN

SCALE 1" = 1'-0"

NOTES

1. SEE SHEET S1.00 FOR FOUNDATION NOTES.
2. COORDINATE WORK WITH KUSPUK SCHOOL DISTRICT FACILITIES MANAGER. CONTACT STEVE HILL AT 907-675-4250, EXTENSION 108.
3. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.



1 / S1.02 PLAN VIEW: DECKING AND HANDRAIL

SCALE: 1" = 1'-0"

RECORD DRAWING

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David G. Thompson AUGUST 2007

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SHEET TITLE: ANIAK ELEMENTARY SCHOOL FUEL STORAGE FOUNDATION AND FRAMING PLAN

SHEET: S1.02

DRAWN BY	DESIGNED BY
KK	LMH
DATE	SCALE
6/06/05	AS NOTED

JOB NUMBER: 03-028

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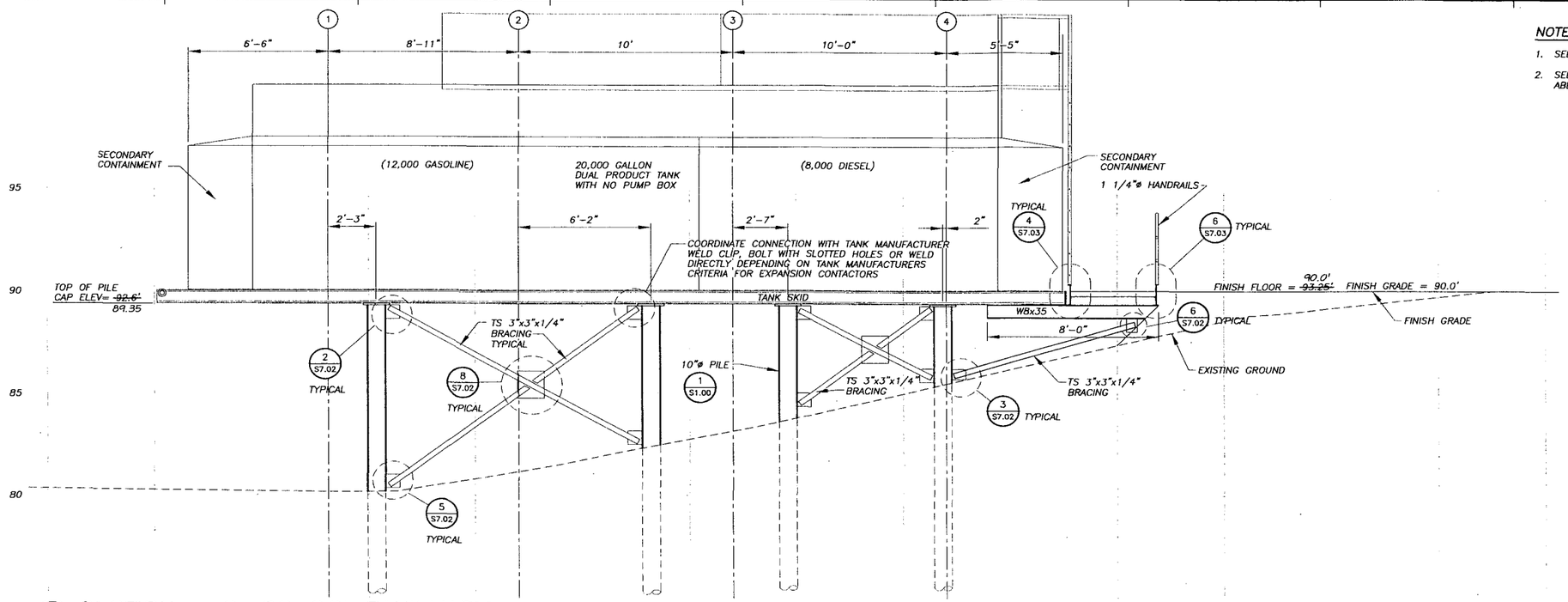
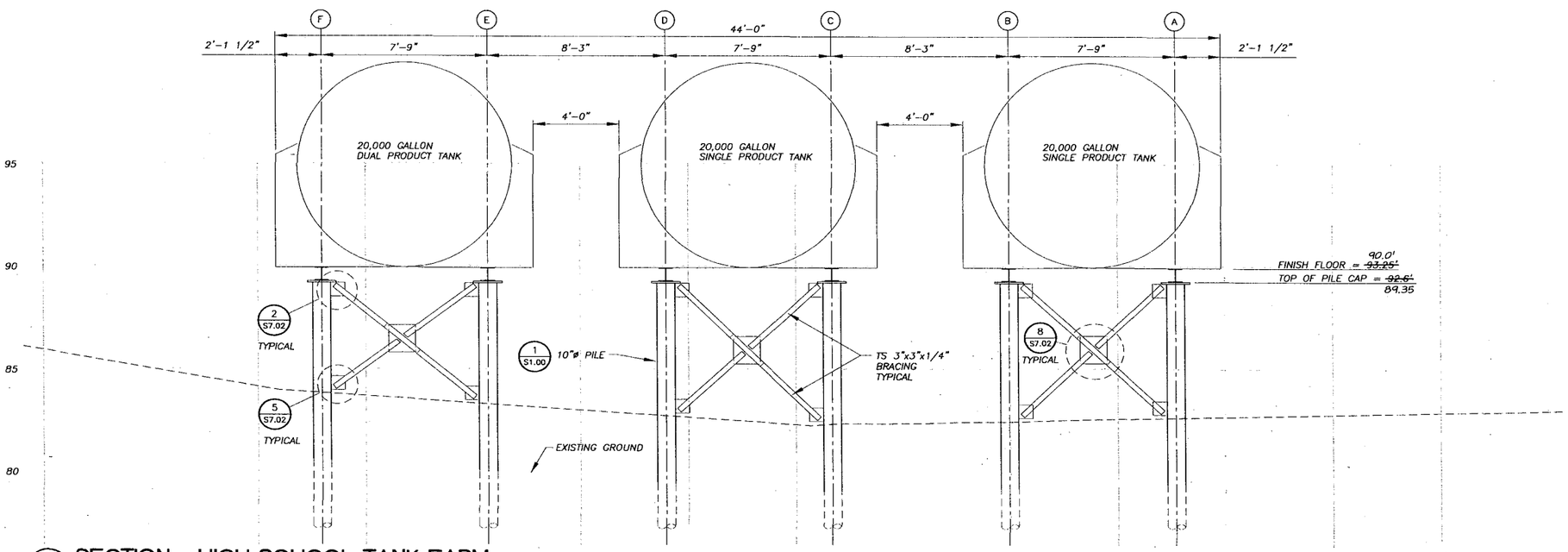
LAYOUT: S1.02
XREF: 03028_00_B001, 03028_00_V100, SDOT-ENG



1 / S1.03 SECTION - HIGH SCHOOL TANK FARM

SCALE: 1" = 3'



2 / S1.03 SECTION - HIGH SCHOOL TANK FARM

SCALE: 1" = 3'

NOTES

1. SEE SHEET S1.00 FOR FOUNDATION NOTES.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.

RECORD DRAWING

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David R. Thayer AUGUST 2007

0 3 6
SCALE IN FEET

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AIDEA/AEA
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL SECTIONS

SHEET: S1.03

DRAWN BY: KK/RFH | CHECKED BY: LMH
DATE: 6/06/05 | SCALE: AS NOTED
JOB NUMBER: 03-028

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LAYOUT: S1.03
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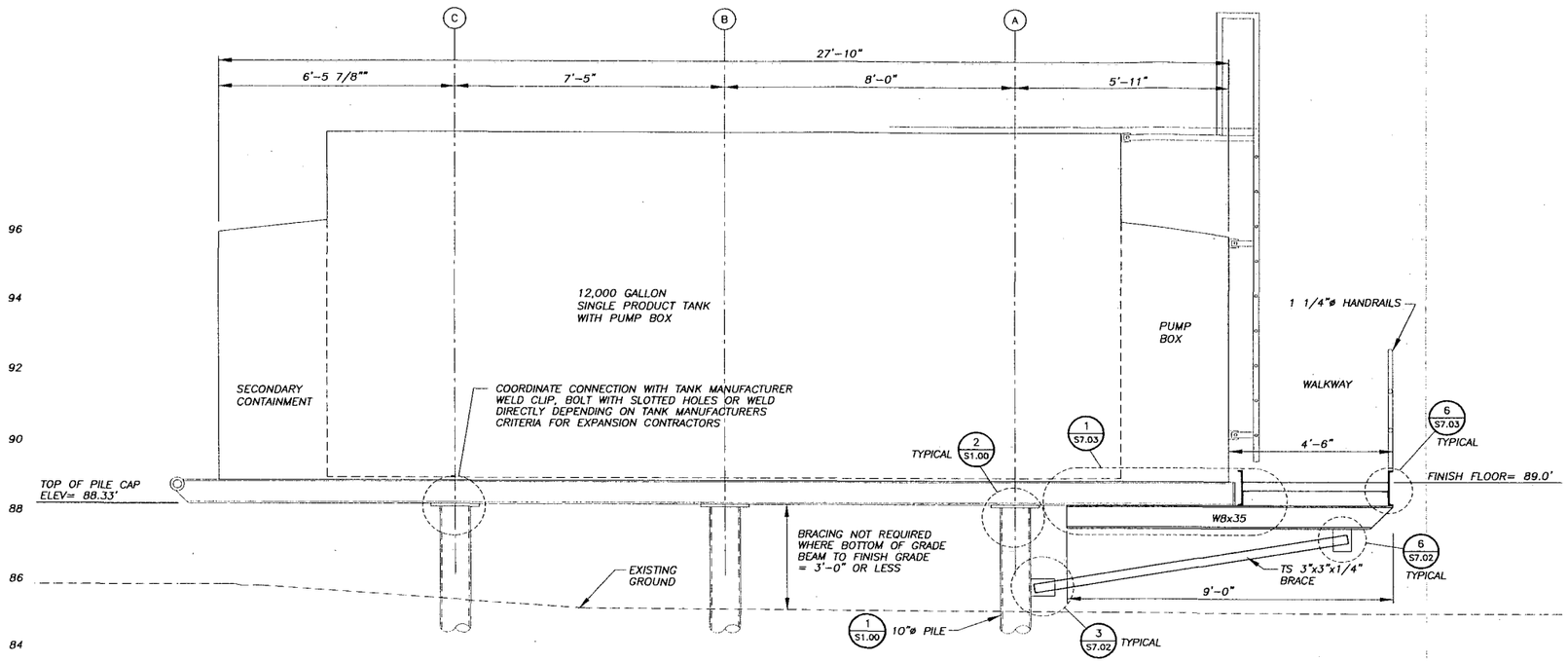
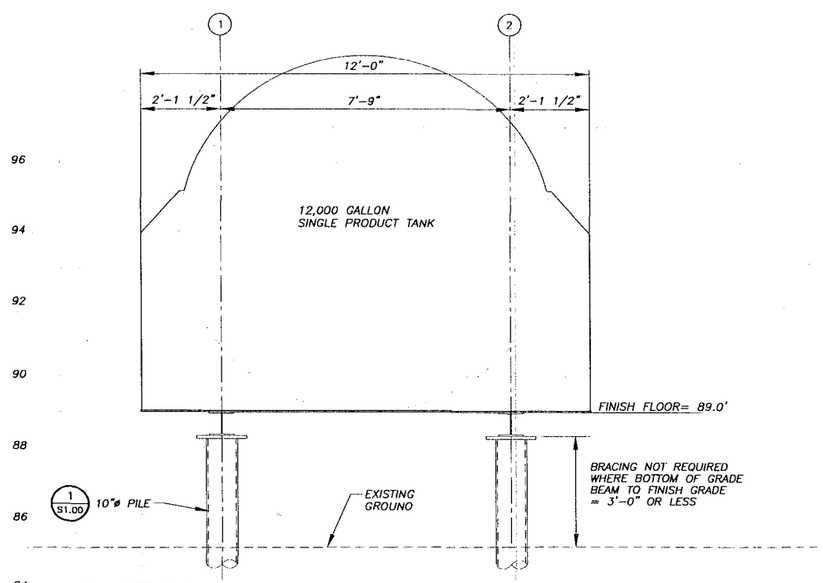
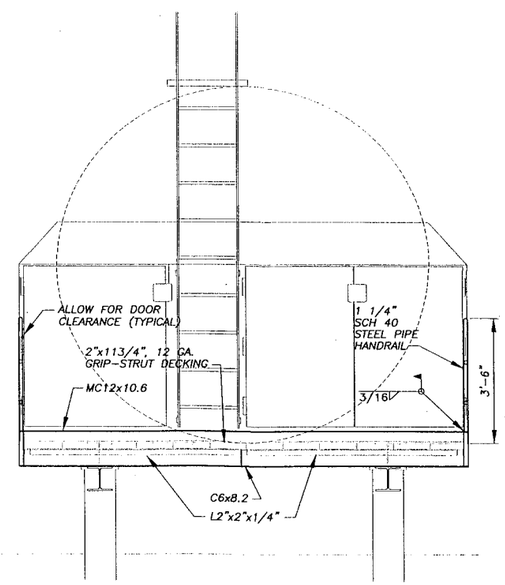


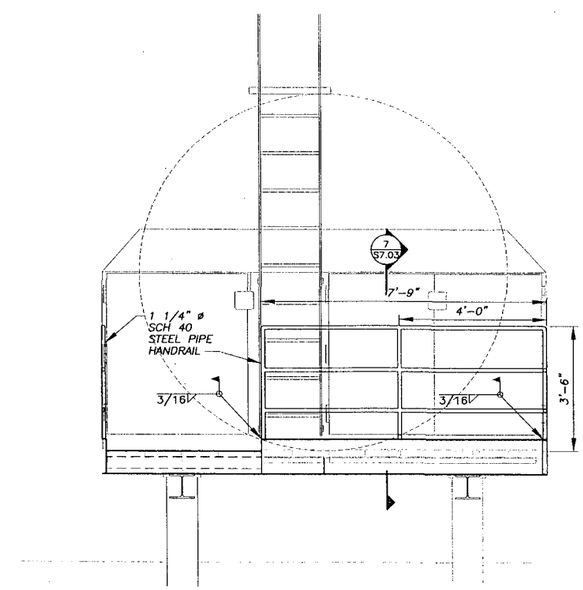
1/S1.04 SECTION - ANIAK ELEMENTARY SCHOOL
SCALE: 1/2" = 1'-0"



2/S1.04 SECTION - ANIAK ELEMENTARY SCHOOL
SCALE: 1/2" = 1'-0"



3/S1.04 SECTION - DECKING AND HANDRAIL
SCALE: 1/2" = 1'-0"



4/S1.04 SECTION - DECKING AND HANDRAIL
SCALE: 1/2" = 1'-0"

NOTES

1. SEE SHEET S1.00 FOR FOUNDATION NOTES.
2. SEE SHEETS G2.01 AND G2.02 FOR GENERAL NOTES, ABBREVIATIONS AND MATERIAL SPECIFICATIONS.

RECORD DRAWING

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MIDDLE KUSKOKWIM RIVER REGION, ALASKA

ADEA/AEA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL SECTIONS

SHEET: S1.04

DRAWN BY	DESIGNED BY
KK	LWH
DATE	SCALE
6/06/05	AS NOTED

JOB NUMBER: 03-028

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LAYOUT: S1.04
XREF: 03028_00_B001, LWH-STAMP-SIG, SDGT-ENG

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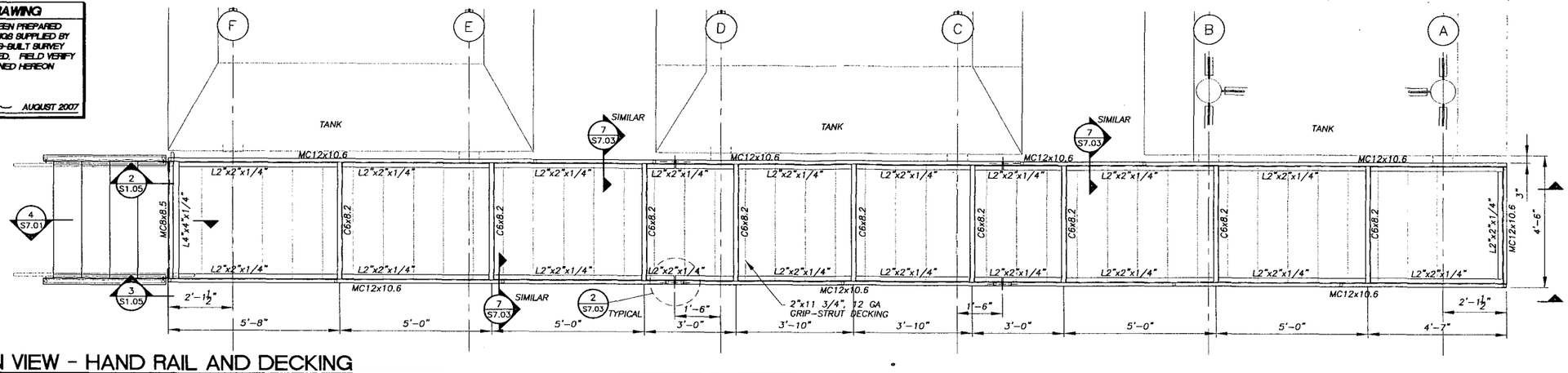
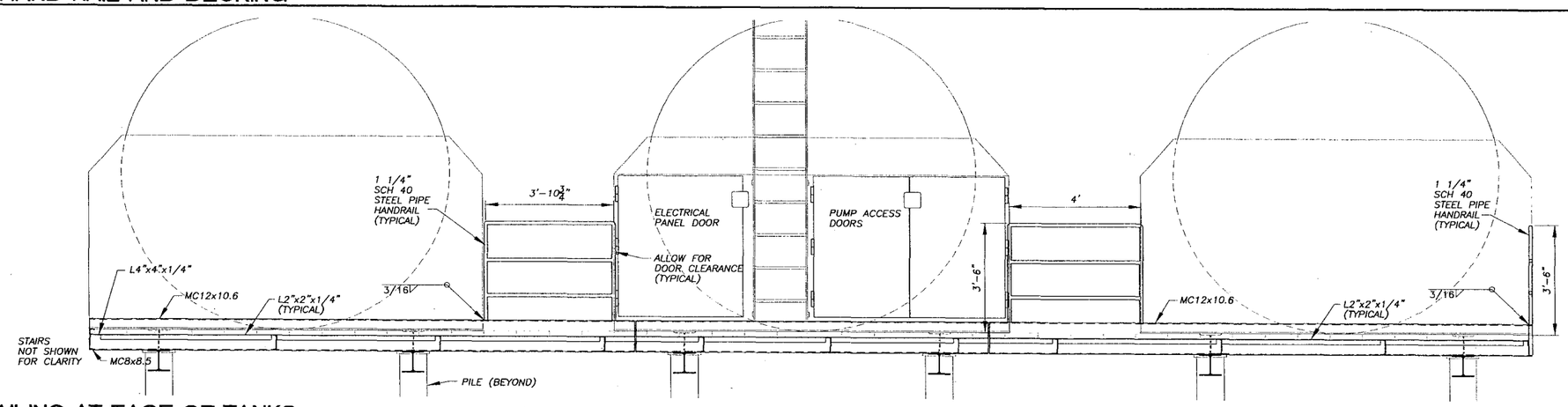


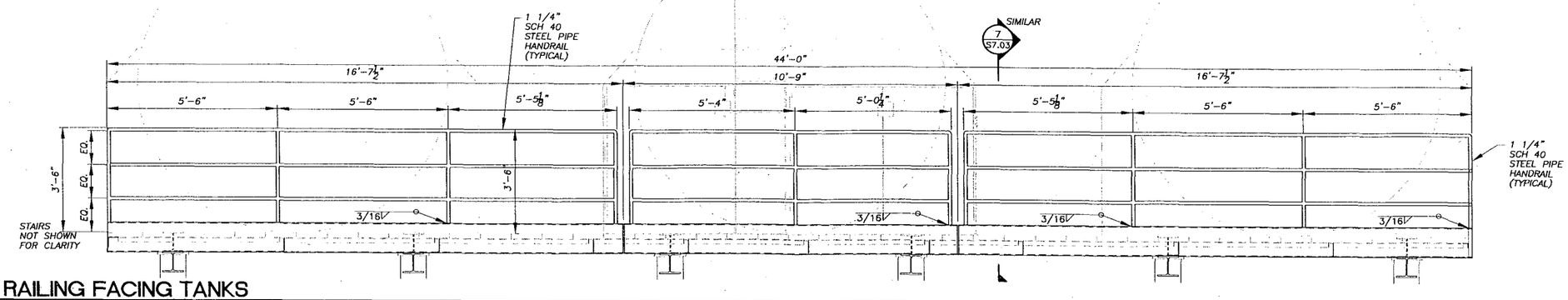
1 S1.05 PLAN VIEW - HAND RAIL AND DECKING

SCALE: 1/2" = 1'-0"



2 S1.05 SECTION - RAILING AT FACE OF TANKS

SCALE: 1/2" = 1'-0"



3 S1.05 SECTION - RAILING FACING TANKS

SCALE: 1/2" = 1'-0"

ONE INCH

REVISIONS		
MARK	DATE	DESCRIPTION
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MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: HIGH SCHOOL TANK FARM HAND RAIL PLAN AND SECTIONS

SHEET: S1.05

DRAWN BY	DESIGNED BY
KK	DGT
DATE 6/06/05	SCALE AS SHOWN

JOB NUMBER 03-028

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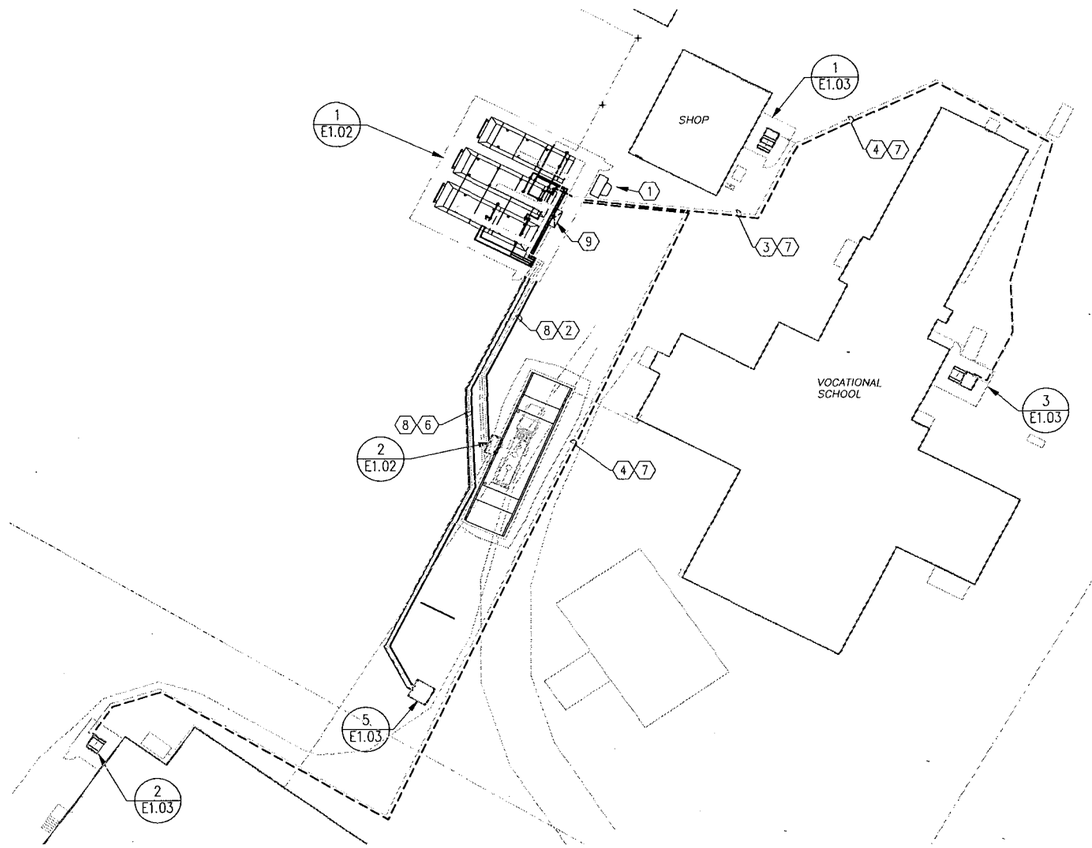
LAYOUT: S1.05
XREF: 03028_00_B001, LMH-STAMP-SIG, SDGT-ENG



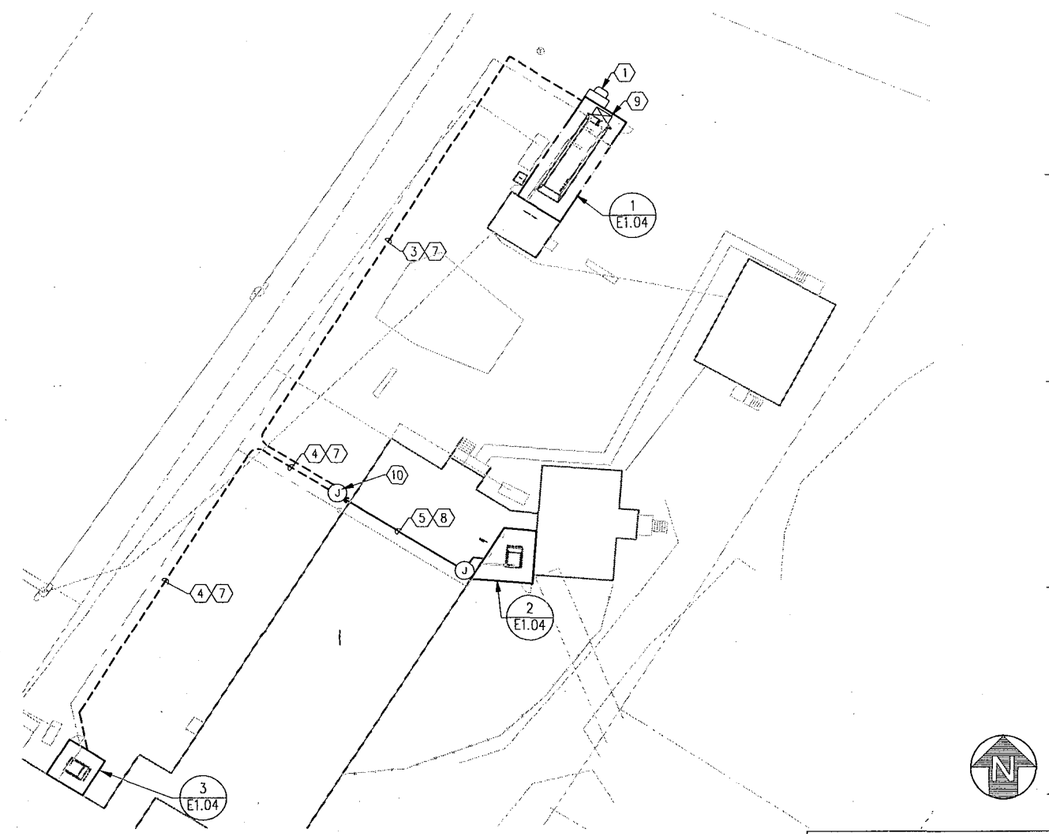
1 ANIAK HIGH SCHOOL ELECTRICAL SITE PLAN

SCALE: 1" = 30'

0 30' 60'

NOTES

1. METER/MAIN COMBINATION
2. TRUCK LOADING CIRCUITS. SEE SHT E1.02, NOTES 10 & 31.
3. 2" HDPE, (2) 6PR#19
4. 2" HDPE, (1) 6PR#19
5. 1"GRC, (1) 6PR#19
6. DISPENSER CIRCUIT. SEE SHT E1.02, NOTE 19.
7. BURY HDPE ALONG FUEL PIPELINE, MAINTAINING A MIN. SEPARATION OF 6". SEE SHEET E0.03 FOR TRENCH CROSS SECTION.
8. ROUTE CONDUIT ALONG FUEL PIPELINE. ATTACH CONDUIT A MIN. OF EVERY 10' ALONG PIPELINE ON PIPE SUPPORTS. PROVIDE ADDITIONAL SUPPORTS AS NECESSARY. ATTACHING TO FUEL PIPING NOT ACCEPTABLE. PROVIDE PULL POINTS FOR CONDUCTORS A MIN. OF EVERY 200'.
9. FUEL SYSTEM CONTROL PANEL.
10. TRANSITION TO ABOVE GRADE. SEE DETAIL ON SHEET E0.03.



2 ANIAK ELEMENTARY SCHOOL ELECTRICAL SITE PLAN

SCALE: 1" = 30'

0 30' 60'

RECORD DRAWING

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8/22/07

RECORD DRAWING

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

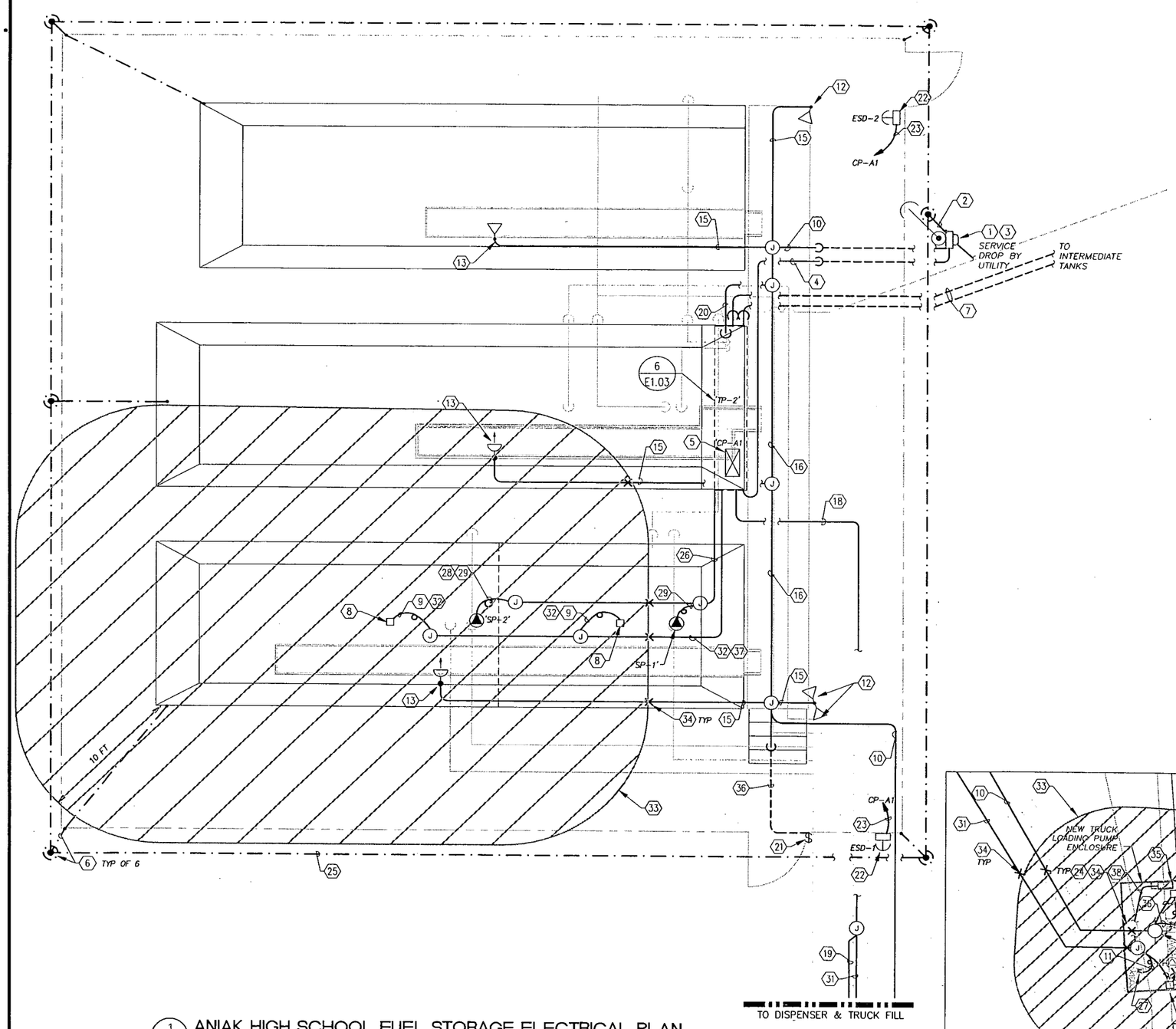
AIDEA/AEA — Alaska Industrial Development and Export Authority / Alaska Energy Authority

MIDDLE KUSKOKWIM RIVER REGION, ALASKA

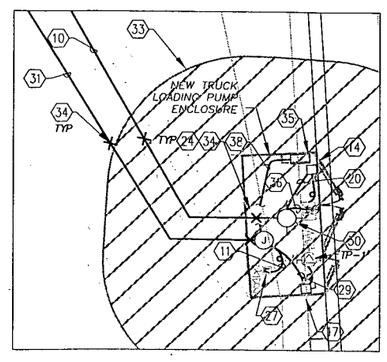
SHEET TITLE: ANIAK HIGH AND ELEMENTARY SCHOOL ELECTRICAL SITE PLANS

SHEET: E1.01

DRAWN BY: R PACE	CHECKED BY: J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED
JOB NUMBER: HDLMKF	



1 ANIAK HIGH SCHOOL FUEL STORAGE ELECTRICAL PLAN
SCALE: 1" = 4'



2 TRUCK FILL ELECTRICAL PLAN
SCALE: 1" = 4'

NOTES

1. 120/240V, 1ø, 100A METER/MAIN COMBINATION. SQUARE D #SC1624M100S OR EQUAL. COORDINATE NEW SERVICE REQUIREMENTS W/LOCAL UTILITY. SEE DETAIL 1 ON SHEET E0.03.
2. #6 BCU. BOND TO METER/MAIN AND TO GROUND RING.
3. SERVICE RISER AND WEATHERHEAD, 2"C, 3#2 (2H,N). LEAVE MINIMUM 18" PIGTAIL FOR CONNECTION BY UTILITY.
4. 1 1/2"C, 2#8 (2H) & 4#10 (H,2N,G)
5. FUEL SYSTEM CONTROL PANEL INSTALLED INSIDE TANK PUMP ENCLOSURE. SEE SHEET E1.05 FOR LAYOUT AND SHEET E1.07 FOR CONTROL SCHEMATIC.
6. 5/8" x 8' COPPER CLAD STEEL GROUND ROD BURIED A MIN OF 12" BELOW GRADE. BOND WHERE SHOWN TO FENCING, FUEL TANK AND METER/MAIN W/#6 BCU USING EXOTHERMIC WELDS.
7. CONTROL CIRCUITS, SEE SHEET E1.01, NOTES 3 & 4.
8. TANK LOW/FULL/CRITICAL HIGH LEVEL SWITCH
9. 1/2"C, 7#14 (6 SIG,G)
10. 3/4"C, 5#10 (2H,2N,G)
11. 3/4"C, 6#10 (H,3 SIG,N,G)
12. FLOOD LIGHT, SEE FIXTURE SCHEDULE SHEET E0.01 AND DETAIL ON SHEET E0.03. INSTALL WITH AN AIMING ANGLE OF 40°.
13. FLOOD LIGHT, SEE FIXTURE SCHEDULE SHEET E0.01 AND DETAIL ON SHEET E0.03. INSTALL WITH AN AIMING ANGLE OF 0°.
14. MOTORIZED HOSE REEL SWITCH, 120V, PROVIDED W/HOSE REEL. MOUNT @48"AFF. WIRE PER MFR INSTRUCTIONS.
15. 1/2"C, 3#10 (SWITCHLEG,N,G)
16. 3/4"C, 6#10 (2H,SWITCHLEG,2N,G)
17. 204V, 30A, 2HP RATED, 2-POLE SWITCH. LEVITON #3032-2I IN FS TYPE CAST BOX W/GASKETED, RAIN-TIGHT COVER. LABEL "PUMP DISCONNECT"
18. 1 1/2"C, 15#10 (2H,2 MOTOR,8 SIG,2N,G)
19. 3/4"C, 5#10 (H,2 SIG,N,G)
20. 1/2"C, 3#10 (H,N,G).
21. SNAP SWITCH WITH A FS TYPE CAST DEVICE BOX AND A GASKETED, RAINTIGHT COVER. CROUSE-HINDS #DS185 OR EQUAL. MOUNT ON FENCE POST ADJACENT TO GATE.
22. ESD. PROVIDE WITH LABEL "EMERGENCY SHUTDOWN".
23. 1/2"C 3#12 (2 SIG,G)
24. LOCATE SEAL-OFF FITTINGS FOR CONDUIT PENETRATIONS 18"AFF INSIDE ENCLOSURE.
25. #2 BCU GROUND RING BURIED A MIN OF 30" BELOW GRADE. EXOTHERMICALLY WELD TO THE GROUND RODS SHOWN.
26. 1/2"C, 5#12 (4 MOTOR,G)
27. 120V, 0.8A MOTORIZED BALL VALVE
28. PROVIDE CLASS 1, DIV. 1 EXPLOSION PROOF FLEXIBLE COUPLING.
29. 1/2"C, 3#10 (2 MOTOR,G)
30. INCANDESCENT FIXTURE. SEE FIXTURE SCHEDULE SHEET E0.01.
31. 1"C, 11#12 (2 MOTOR,6 SIG,H,N,G)
32. LABEL CONDUIT "INTRINSICALLY SAFE" AS PER NEC 504.
33. A CLASS 1, DIV 2 HAZARDOUS LOCATION EXISTS WITHIN 10' IN ANY DIRECTION OF THE GASOLINE DISPENSING TANK, WITHIN 20' OF THE DISPENSER UP TO 18" ABOVE GRADE & WITHIN 10' OF THE GAS TRUCK FILL HEADER CONNECTION POINT UP TO 18" ABOVE GRADE.
34. CLASS 1, DIV 2 SEAL-OFF FITTING, CROUSE HINDS TYPE EYS.
35. NEMA 4X, CONTROL STATION WITH START-STOP PUSH BUTTONS (ALLEN BRADLEY #800H-2HA4R). SEE SHT E1.07 FOR WIRING SCHEMATIC.
36. 1/2"C, 3#10 (H,SWITCHLEG,G)
37. 1"C, 13#14 (12 SIG,G)
38. 1/2"C, 4#10 (3 SIG,G)

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

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E 8288
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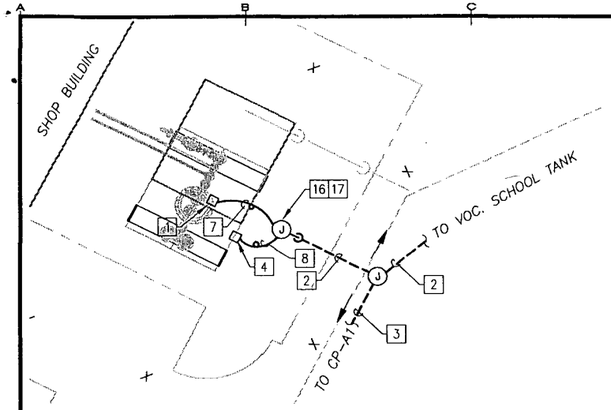
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT
AIDEA
Alaska Industrial Development and Export Authority
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

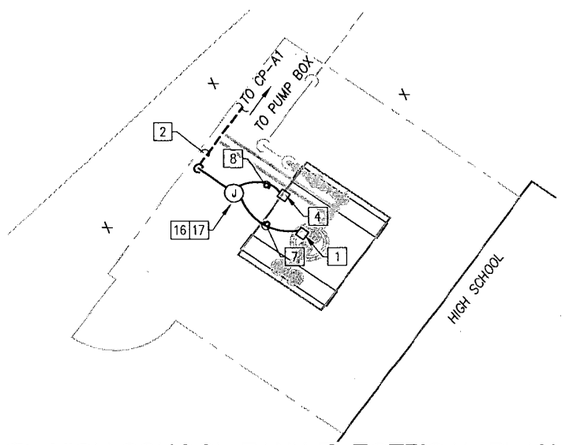
SHEET TITLE: ANIAK HIGH SCHOOL BULK FUEL ELECTRICAL PLAN

SHEET: E1.02

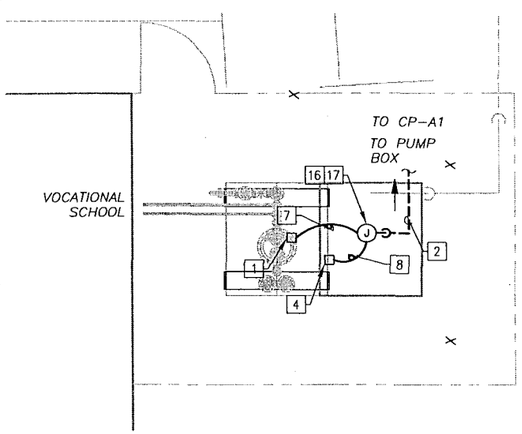
DRAWN BY: R PACE	CHECKED BY: J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED
JOB NUMBER: HDLMKF	



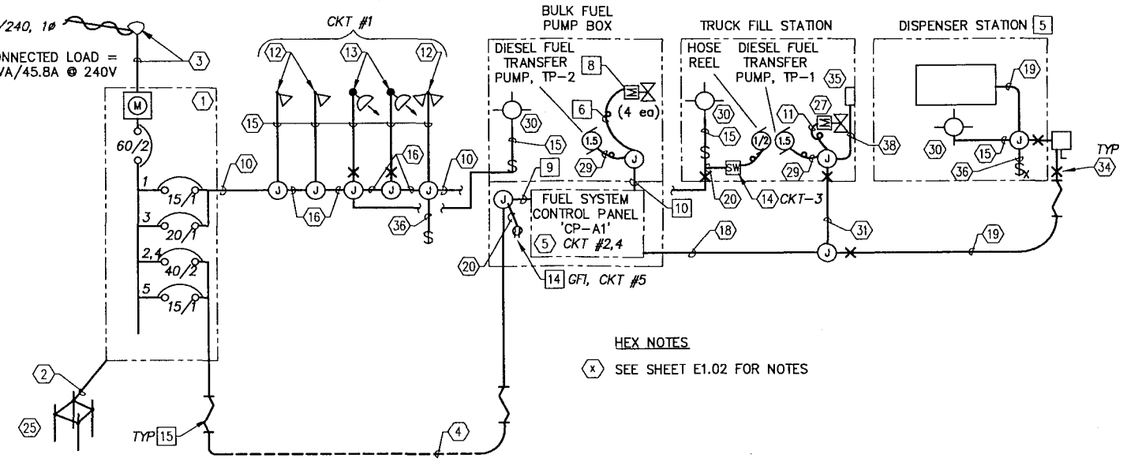
1 E1.01 SHOP TANK ELECTRICAL PLAN
SCALE: 1" = 4'



2 E1.01 HIGH SCHOOL TANK ELECTRICAL PLAN
SCALE: 1" = 4'



3 E1.01 VOCATIONAL SCHOOL TANK ELECTRICAL PLAN
SCALE: 1" = 4'



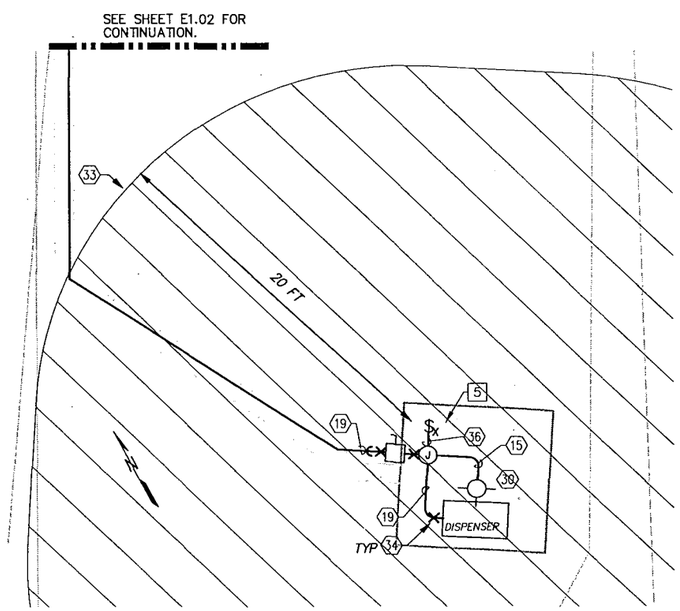
4 — HIGH SCHOOL POWER ONE-LINE
SCALE: NONE

HEX NOTES

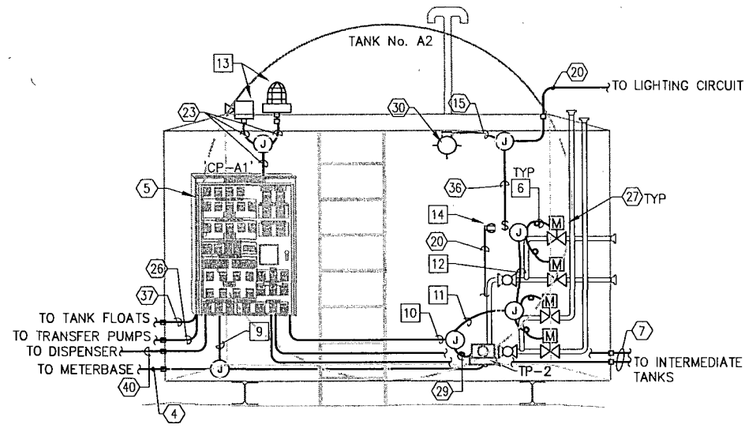
(x) SEE SHEET E1.02 FOR NOTES

BOX NOTES

1. TANK FULL/CRITICAL HIGH LEVEL SWITCH
2. CONTROL CIRCUIT. SEE E1.01, NOTE 4.
3. CONTROL CIRCUIT. SEE E1.01, NOTE 3.
4. VALVE CLOSED LIMIT SWITCH
5. DISPENSER SHED. SEE E0.03, DETAIL #3.
6. 1/2"C, 6#12 (H,3 SIG,N,G)
7. 1/2"C, 5#14 (4 SIG,G)
8. 1/2"C, 3#14 (2 SIG,G)
9. 1"C, 2#8 (2H) & 3#10 (H,N,G)
10. 1 1/2"C, 17#12 (2 MOTOR,12 SIG,H,N,G)
11. 1"C, 15#12 (12 SIG,H,N,G)
12. 1"C, 9#12 (6 SIG,H,N,G)
13. ALARM HORN AND STROBE
14. 120V, 20A RATED GFI RECEPTACLE IN CAST WEATHERPROOF ENCLOSURE.
15. PROVIDE A SECTION OF LTF ABOVE GRADE TO ALLOW FOR MOVEMENT.
16. TRANSITION TO ABOVE GROUND. SEE DETAIL ON SHT E0.03.
17. STOP PUSHBUTTON. SEE COMPONENT SCHEDULE, ITEM #12 ON SHT. E0.02. INSTALL ON FRONT OF JUNCTION BOX. SEE DETAIL ON SHT E0.03.



5 E1.02 DISPENSER ELECTRICAL PLAN
SCALE: 1" = 4'



6 E1.02 PUMP ENCLOSURE DETAIL TYPE C
SCALE: NONE

RECORD DRAWING

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA — Alaska Industrial Development and Export Authority / Alaska Energy Authority

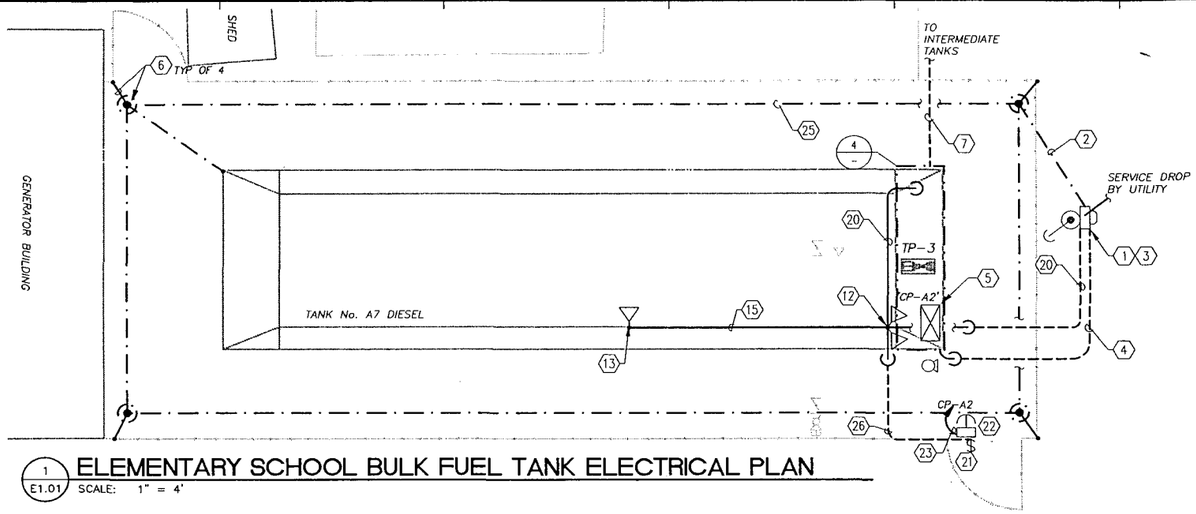
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK VOCATIONAL/ HIGH SCHOOL ELEC SITE PLANS & POWER ONE-LINE

SHEET: E1.03

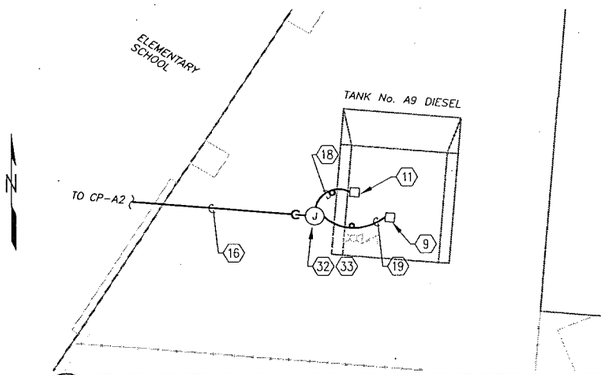
DRAWN BY: R PACE	CHECKED BY: J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED

JOB NUMBER: HDLMKF



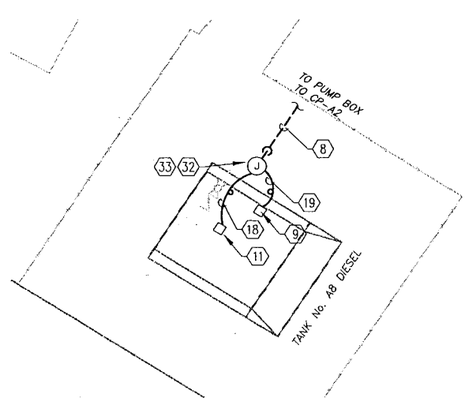
1 / E1.01 ELEMENTARY SCHOOL BULK FUEL TANK ELECTRICAL PLAN

SCALE: 1" = 4'



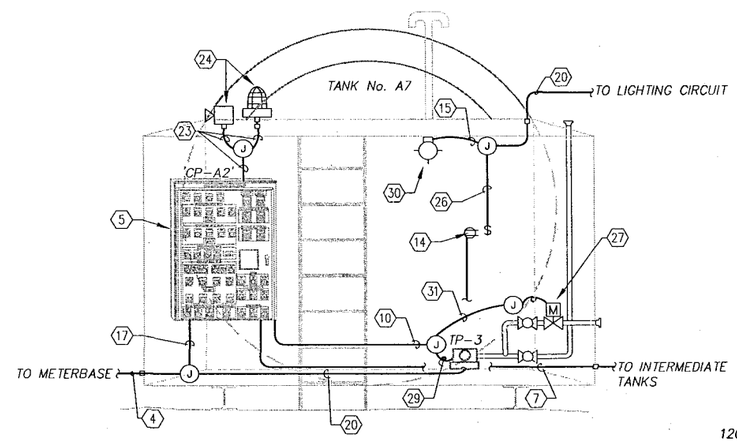
2 / E1.01 ELEMENTARY SCHOOL TANK ELECTRICAL PLAN

SCALE: 1" = 4'



3 / E1.01 ELEMENTARY SCHOOL TANK ELECTRICAL PLAN

SCALE: 1" = 4'

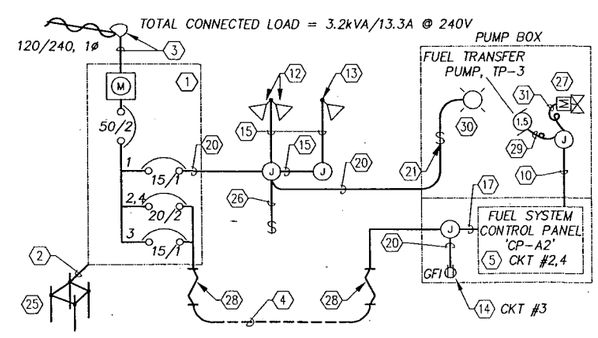


4 / — PUMP BOX DETAIL TYPE A

SCALE: NONE

NOTES

1. 120/240V, 1ø, 100A METER/MAIN COMBINATION. SQUARE D #SC1624M100S OR EQUAL. COORDINATE NEW SERVICE REQUIREMENTS W/LOCAL UTILITY. SEE DETAIL 1 ON SHEET E0.03.
2. #6 BCU. BOND TO METER/MAIN AND TO GROUND RING.
3. SERVICE RISER AND WEATHERHEAD, 2"C, 3#2 (2H,N). LEAVE MINIMUM 18" PIGTAIL FOR CONNECTION BY UTILITY.
4. 1"C, 6#12 (3H,2N,G)
5. FUEL SYSTEM CONTROL PANEL. SEE SHEET E1.06 FOR LAYOUT. SEE SHEET E1.09 FOR CONTROL SCHEMATIC.
6. 5/8" x 8' CU CLAD STEEL GROUND ROD BURIED 12" MIN BELOW GRADE. BOND WHERE SHOWN TO FENCING, FUEL TANK & METER/MAIN W/#6 BCU USING EXOTHERMIC WELDS.
7. CONTROL CIRCUIT, SEE SHEET E1.01, NOTE 3.
8. CONTROL CIRCUIT, SEE SHEET E1.01, NOTE 4.
9. TANK FULL/CRITICAL HIGH LEVEL SWITCH
10. 3/4"C, 8#12 (2 MOTOR,3 SIG,H,N,G).
11. VALVE CLOSED LIMIT SWITCH.
12. FLOOD LIGHT, SEE FIXTURE SCHEDULE SHEET E0.01 AND DETAIL ON SHEET E0.03. INSTALL WITH AN AIMING ANGLE OF 40°.
13. FLOOD LIGHT, SEE FIXTURE SCHEDULE SHEET E0.01 AND DETAIL ON SHEET E0.03. INSTALL WITH AN AIMING ANGLE OF 0°.
14. 120V, 20A RATED GFI RECEPTACLE IN CAST WEATHERPROOF ENCLOSURE.
15. 1/2"C, 3#12 (SWITCHLEG,N,G)
16. CONTROL CIRCUIT. SEE SHEET E1.01, NOTE 5
17. 1/2"C, 4#12 (2H,N,G)
18. 1/2"C, 3#14 (2 SIG,G)
19. 1/2"C, 5#14 (4 SIG,G)
20. 1/2"C, 3#12 (H,N,G).
21. SNAP SWITCH WITH A FS TYPE CAST DEVICE BOX AND A GASKETED, RAINTIGHT COVER. CROUSE-HINDS #DS185 OR EQUAL. MOUNT ON FENCE POST ADJACENT TO GATE.
22. ESD. PROVIDE WITH LABEL "EMERGENCY SHUTDOWN".
23. 1/2"C 3#12 (2 SIG,G)
24. ALARM HORN & STROBE.
25. #2 BCU GROUND RING BURIED A MIN OF 30" BELOW GRADE. EXOTHERMICALLY WELD TO THE GROUND RODS SHOWN.
26. 1/2"C, 3#12 (H,SWITCHLEG,G)
27. 120V, 0.8A MOTORIZED BALL VALVE.
28. PROVIDE A SECTION OF LTF ABOVE GRADE TO ALLOW FOR MOVEMENT.
29. 1/2"C, 3#12 (2 MOTOR,G)
30. INCANDESCENT FIXTURE, SEE FIXTURE SCHEDULE SHEET E0.01.
31. 1/2"C, 6#12 (H,3 SIGNAL,N,G)
32. TRANSITION TO ABOVE GRADE. SEE DETAIL ON SHT E0.03.
33. STOP PUSHBUTTON. SEE COMPONENT SCHEDULE ITEM #12 ON SHT E0.02. INSTALL ON FACE OF JUNCTION BOX. SEE DETAIL ON SHT E0.03.



5 / — POWER ONE-LINE

SCALE: NONE

RECORD DRAWING

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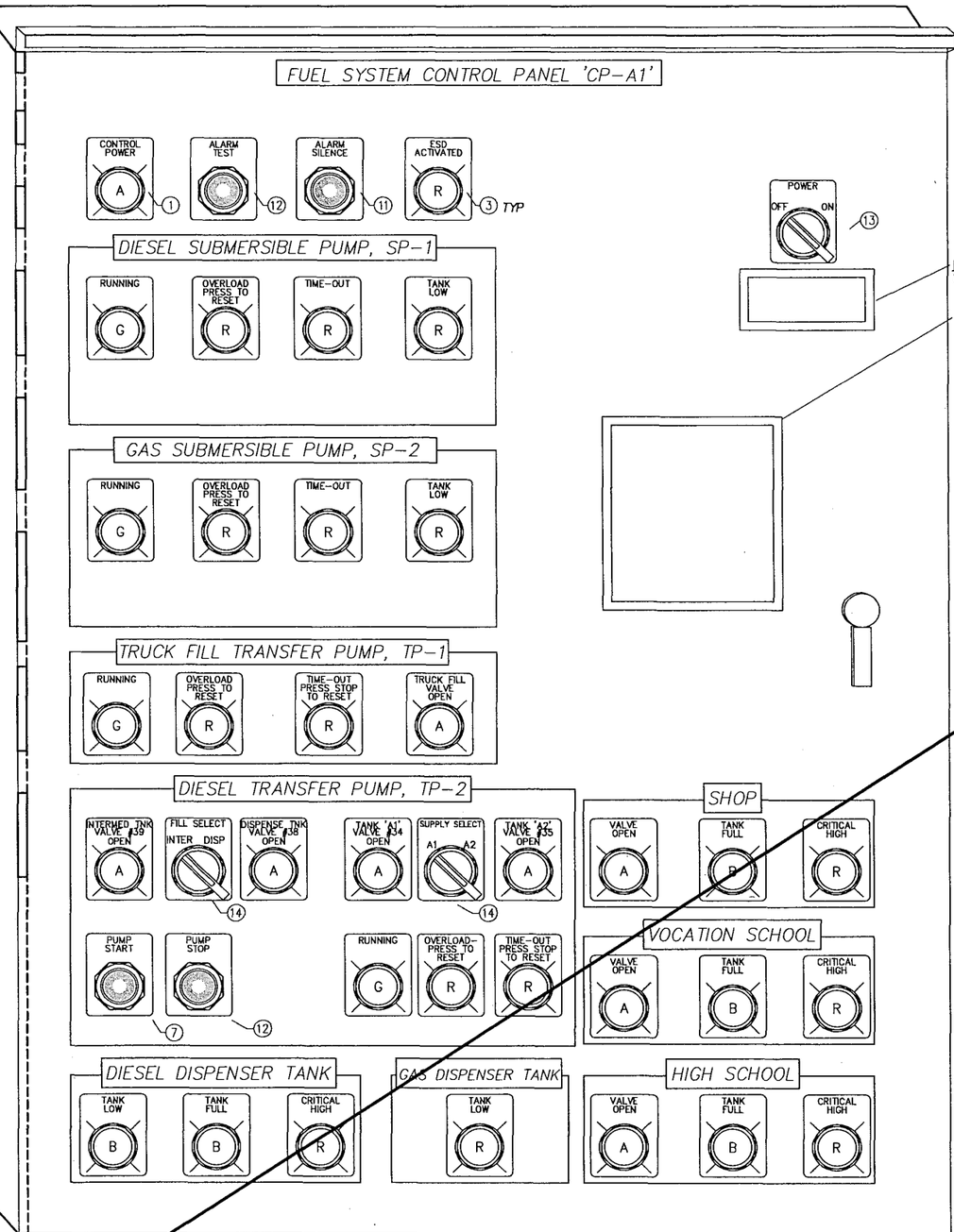
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT
AIDEA/AEA — Alaska Industrial Development and Export Authority / Alaska Energy Authority
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL ELECTRICAL PLANS & POWER ONE-LINE

SHEET: E1.04

DRAWN BY	CHECKED BY
R PACE	J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED

JOB NUMBER: HDLMKF



1 FUEL SYSTEM CONTROL PANEL 'CP-A1' LAYOUT
SCALE: NONE

Warning Placard:
Turn off only to service panel.

Operating Instructions Placard:
Transfer Pump, 'TP-2'
1. To fill an intermediate tank, select 'INTER', and open the manual valve at the tank to be filled.
2. Press START.
3. Press STOP to halt fill operation.

NOTE: Transfer Pump will not start if more than one intermediate tank manual valve is open.

4. To fill the diesel dispensing tank, select 'DISP'.
5. Press START.
6. Press STOP to halt fill operation.

Aniak School Bulk Fuel System Control Panel CP-A1:

The fuel transfer pumps, TP-1 and TP-2, and the submersible pumps SP-1 and SP-2 are controlled by this panel.

TP-1-- supplies diesel fuel to the truck fill station. It is controlled from the START/STOP pushbuttons in the truck fill enclosure. When the 'START' pushbutton is pressed, the motorized valve at the truck fill opens, a maximum run timer begins timing and the transfer pump TP-1 starts. The transfer pump will run until the 'STOP' pushbutton is pressed, the maximum run timer times out or any ESD is pressed, at which point the pump stops and motorized valve closes.

TP-2-- supplies diesel fuel from either of the two bulk storage tanks (A1 or A2) to either the dual product dispensing tank (A3) or to any of intermediate tanks located at the shop, vocational school, and high school. The supply source and destination of the diesel fuel is manually selected at the control panel and controlled by the proper sequencing of four motorized valves in the pump box.

In order to start the pump and fill an intermediate tank, "INTER" must be selected on the control panel and the manual valve at the intermediate tank to be filled must be opened. The 'VALVE OPEN' light for this tank will be illuminated on the control panel. Only one intermediate tank manual valve may be open at a time. If more than one intermediate tank valve is open, the pump cannot be started. Once the appropriate valve is opened, the transfer pump can be started by pressing the 'START' pushbutton. The appropriate motorized ball valve at the bulk fuel site will then open, transfer pump, TP-2 will start, and a maximum run timer will begin timing. The transfer pump will run until the 'TANK FULL' level is reached at the intermediate tank, the 'STOP' pushbutton is pressed, the maximum run timer times out, any ESD is pressed, the intermediate tank valve is closed or another intermediate tank valve is opened, at which point the pump stops and the motorized valve closes.

If the 'TANK FULL' signal fails and the tank keeps filling, the 'CRITICAL HIGH' level in the tank will be reached. If this occurs an external horn and alarm light will energize, a 'CRITICAL HIGH' alarm will be indicated on the panel, the motorized valve at the bulk fuel site will close and the transfer pump will stop. The pump may not be re-started until the condition is cleared. The external horn and alarm light may be de-energized by silencing the alarm, but the indicating light on the panel will not clear until the critical high alarm condition is corrected.

To fill the dispensing tank, "DISP" must be selected at the control panel before pressing the start pushbutton. The appropriate motorized ball valve at the bulk fuel site will then open, a maximum run timer will start timing and the transfer pump, TP-2 will start. The transfer pump will run until the 'TANK FULL' level is reached at the dispensing tank, the 'STOP' pushbutton is pressed, the maximum run timer times out or any ESD is pressed.

If the 'TANK FULL' signal fails and the tank keeps filling, the 'CRITICAL HIGH' level in the tank will be reached. If this occurs an external horn and alarm light will energize, a 'CRITICAL HIGH' alarm will be indicated on the panel, the motorized valve at the bulk fuel site will close and the transfer pump will stop. The pump may not be re-started until the condition is cleared. The external horn and alarm light may be de-energized by silencing the alarm, but the indicating light on the panel will not clear until the critical high alarm condition is corrected.

If an ESD stop occurs, the motorized valves at the bulk fuel site will close and the transfer pump will stop and may not be re-started until the condition is cleared. Also, the indicating light will energize and remain on until the condition is cleared.

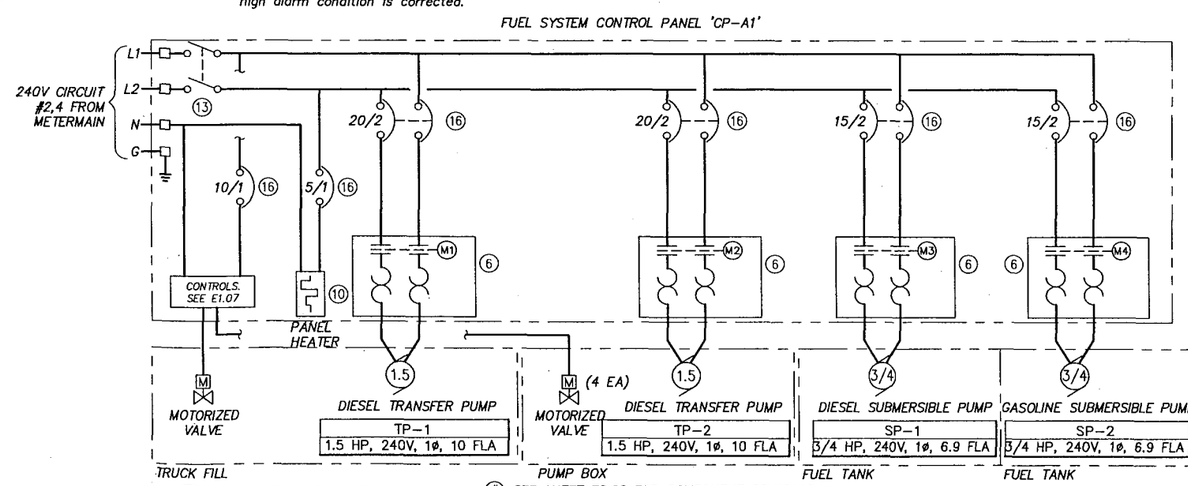
SP-1 – Submersible pump SP-1 supplies diesel fuel to the dispensing station. It is controlled by signals received from the dispenser. When the control panel receives the pump run signal from the dispenser a maximum run timer begins timing and SP-1 starts. The pump will run until the maximum run timer times out, the control panel no longer receives the run signal from the dispenser or a low diesel level signal is received, at which point the pump stops. SP-1 is also disabled whenever transfer pump, TP-2 is supplying fuel to the dispensing tank.

If an ESD at the bulk fuel farm occurs, the submersible pump will stop and may not be re-started until the condition is cleared. All power to the dispensing station will be lost when any ESD is pressed.

SP-2 – Submersible pump, SP-2 supplies gasoline to the dispensing station. Its operation is identical to submersible pump, SP-1 except it is not disabled when transfer pump, TP-2 is running.

Emergency Shutdowns – Operation of an ESD stop at the bulk fuel form will cause an 'ESD ACTIVATED' alarm to be indicated on the panel, all motorized valves to close and all pumps to stop. The pumps may not be re-started until the condition is cleared.

SUPERCEDED BY TOTAL CONTROL SHOP DRAWINGS, "CP-A1", PNL 100, PNL 200 & E000



2 POWER SCHEMATIC
SCALE: NONE

(#) SEE SHEET E0.02 FOR COMPONENT SCHEDULE

RECORD DRAWING

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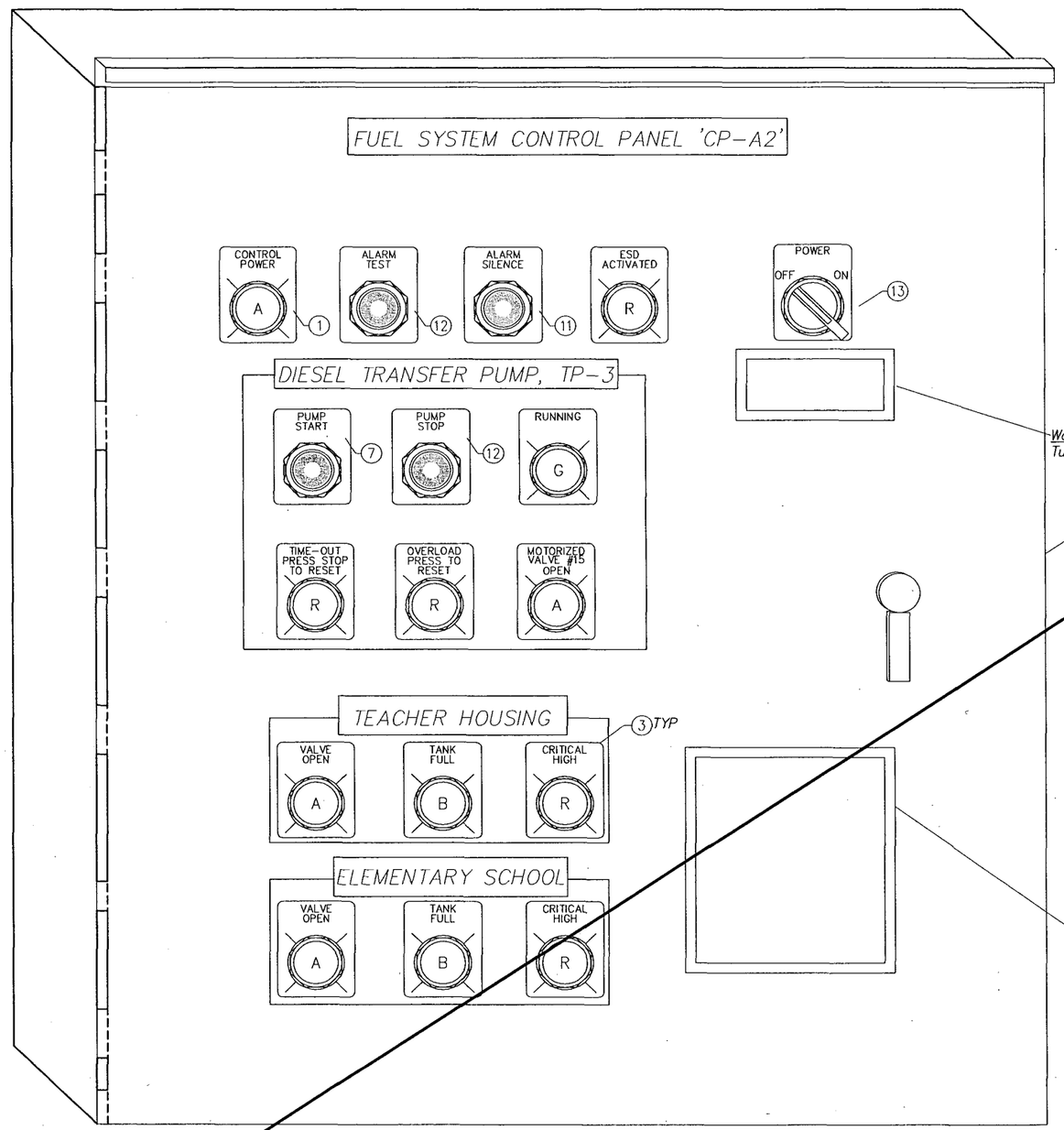
AIDEA/AEA
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL CONTROL PANEL 'CP-A1' LAYOUT

SHEET: E1.05

DRAWN BY: R PACE — CHECKED BY: J FASCHAN
DATE: 8/22/07 — SCALE: AS NOTED
JOB NUMBER: HDLMKF



1 FUEL SYSTEM CONTROL PANEL 'CP-A2' LAYOUT
SCALE:

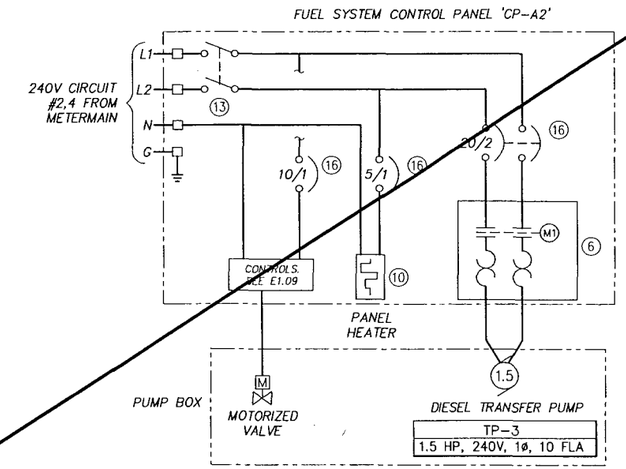
Warning Placard:
Turn off only to service panel.

Operating Instructions Placard:

1. To fill an intermediate tank, open the manual valve at the tank to be filled.
2. Press START.
3. Press STOP to halt fill operation.

NOTE: Transfer Pump will not start if more than one intermediate tank manual valve is open.

SUPERCEDED BY TOTAL CONTROL SHOP DRAWINGS, "CP-A2", PNL 100, PNL 200 & E000



2 POWER SCHEMATIC
SCALE: NONE

(#) SEE SHEET E0.02 FOR COMPONENT SCHEDULE

FUNCTIONAL NARRATIVE

Aniak Elementary School Bulk Fuel System Control Panel CP-A2:

The fuel transfer pump, TP-3 is controlled by this panel. It supplies diesel fuel to the intermediate tanks at the teacher housing, and the elementary school.

The transfer pump is controlled from the START/STOP pushbuttons on the control panel. In order to start the pump and fill an intermediate tank, the manual valve at the intermediate tank to be filled must be opened. The 'VALVE OPEN' light for this tank will be illuminated on the control panel. Only one intermediate tank manual valve may be open at a time. If more than one intermediate tank valve is open, the pump cannot be started. Once the appropriate valve is opened, the transfer pump can be started by pressing the 'START' pushbutton. The motorized ball valve at the bulk fuel site will then open, transfer pump, TP-3 will start, and a maximum run timer will begin timing. The transfer pump will run until the 'TANK FULL' level is reached at the intermediate tank, the 'STOP' pushbutton is pressed, the maximum run timer times out, the ESD is pressed or another intermediate tank valve is opened, at which point the pump stops and motorized valve closes.

If the 'TANK FULL' signal fails and the tank keeps filling, the 'CRITICAL HIGH' level in the tank will be reached. If this occurs, the motorized valve at the bulk fuel site will close and the transfer pump will stop and may not be re-started until the condition is cleared. Also, the alarm horn, alarm strobe and indicating light will energize. The horn and alarm light may be de-energized by acknowledging the alarm, but the indicating light will not clear until the critical high alarm condition is corrected.

If an ESD stop occurs, the motorized valve at the bulk fuel site will close and the transfer pump will stop and may not be re-started until the condition is cleared. Also, the indicating light will energize and remain on until the condition is cleared.

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

8/22/07

RECORD DRAWING

REVISIONS		
REV.	DATE	DESCRIPTION
1		
2		
3		
4		
5		

STATE OF ALASKA 49th — JOHN A. FASCHAN — CE 6285 — REGISTERED PROFESSIONAL ENGINEER

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

AIDEA/AEA
Alaska Industrial Development and Export Authority
A Total Energy Network

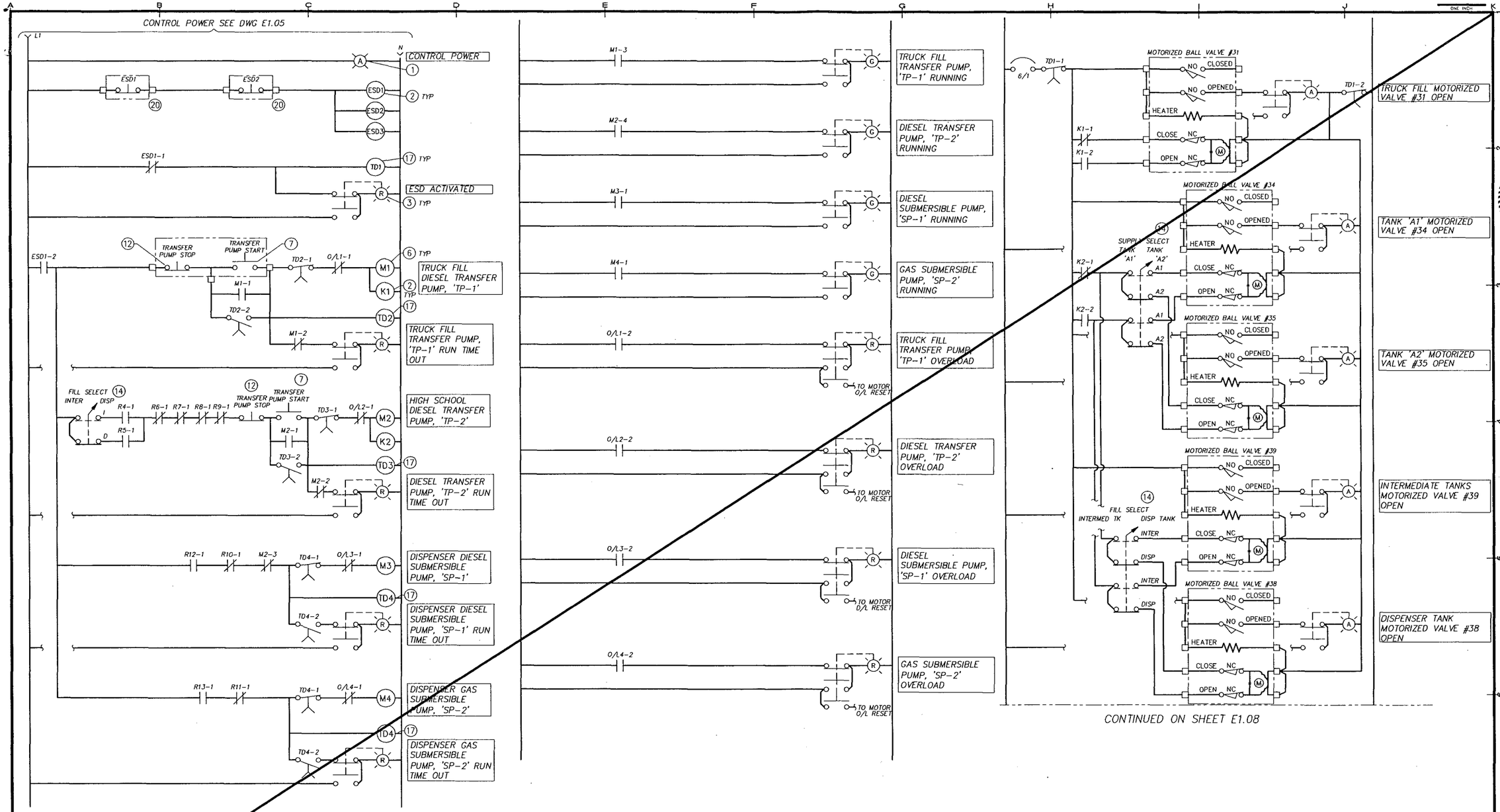
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL CONTROL PANEL 'CP-A2' LAYOUT

SHEET: E1.06

DRAWN BY:	CHECKED BY:
R PACE	J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED

JOB NUMBER: HDLMKF



CONTINUED ON SHEET E1.08

1. FUEL SYSTEM CONTROL PANEL 'CP-A1' SCHEMATIC
SCALE: NONE

SUPERCEDED BY TOTAL CONTROL SHOP DRAWINGS, "CP-A1", E100-E600.

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

8/22/07

RECORD DRAWING

REVISIONS

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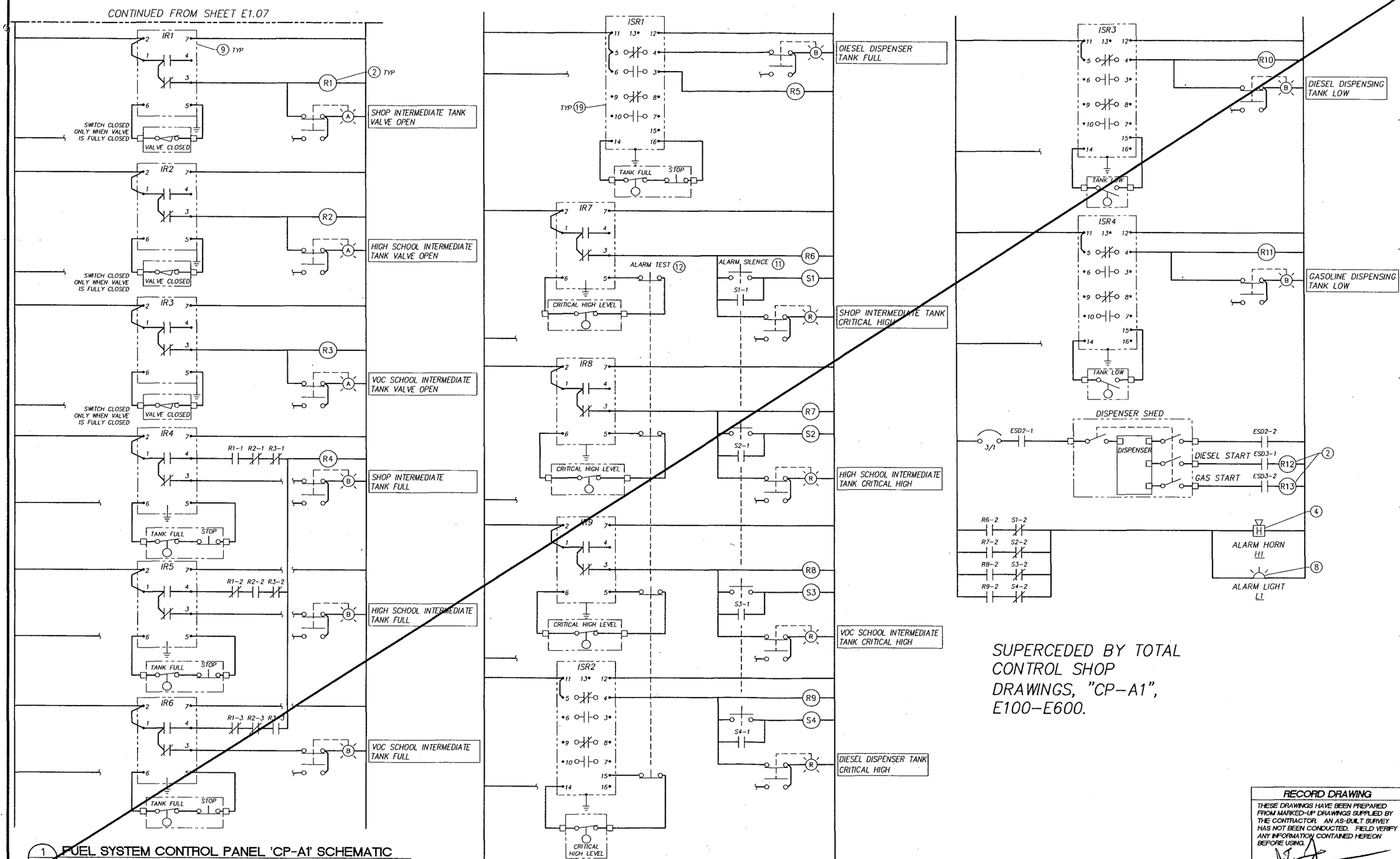
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT
AIDEA/AEA
Alaska Industrial Development and Export Authority
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL CONTROL PANEL 'CP-A1' SCHEMATIC – PART 1

SHEET: E1.07

DRAWN BY:	CHECKED BY:
R PACE	J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED

JOB NUMBER: HDLMKF



SUPERCEDED BY TOTAL CONTROL SHOP DRAWINGS, "CP-A1", E100-E600.

1 FUEL SYSTEM CONTROL PANEL 'CP-A1' SCHEMATIC

SCALE: NONE

RECORD DRAWING

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8/22/07

RECORD DRAWING

REVISIONS		
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STATE OF ALASKA — 49TH — REGISTERED PROFESSIONAL ENGINEER — John H. Faschan — CE 9286

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

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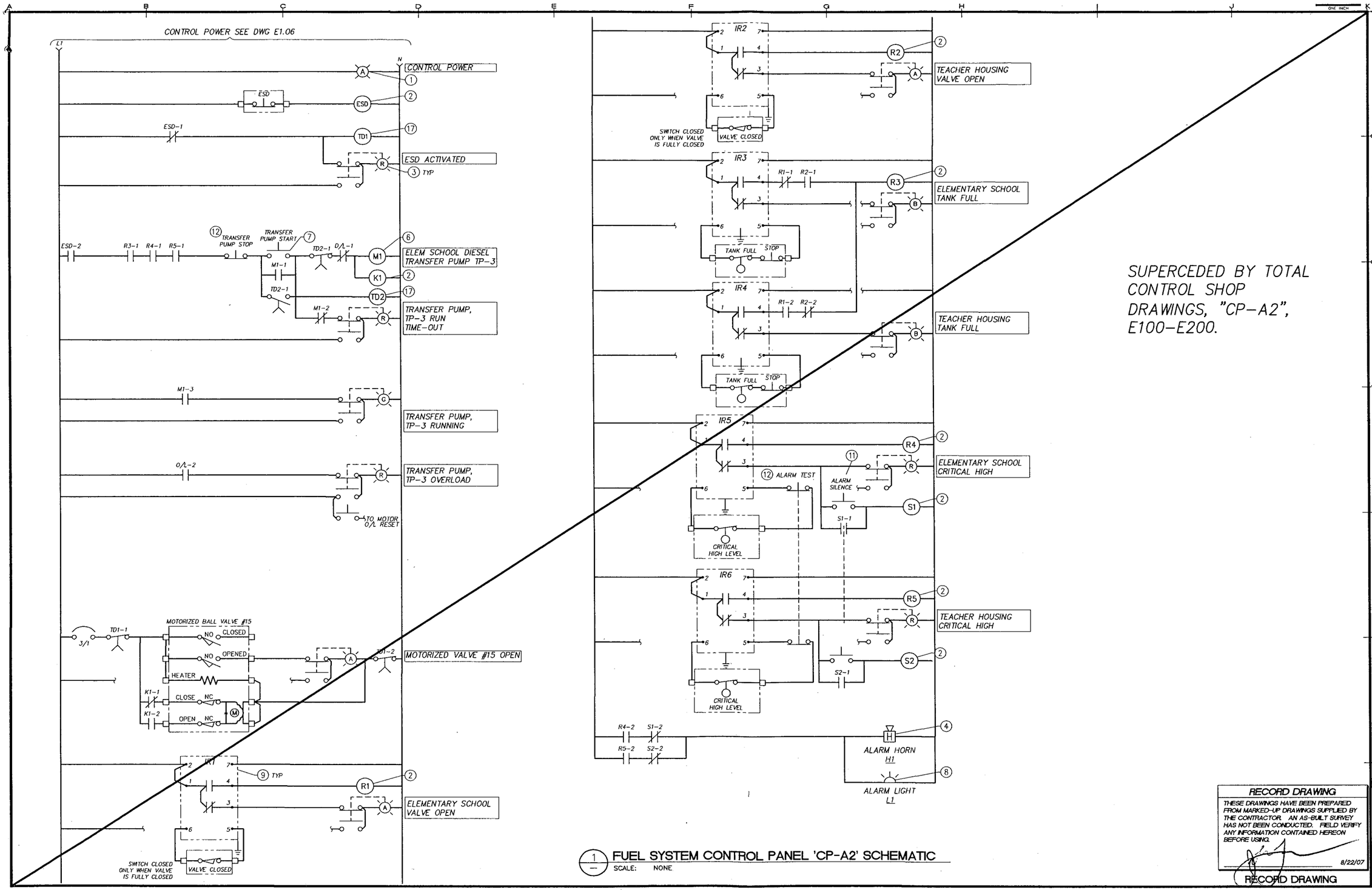
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK HIGH SCHOOL CONTROL PANEL 'CP-A1' SCHEMATIC – PART 2

SHEET: E1.08

DRAWN BY: R PACE	CHECKED BY: J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED
JOB NUMBER: HDLMKF	



SUPERCEDED BY TOTAL CONTROL SHOP DRAWINGS, "CP-A2", E100-E200.

1 FUEL SYSTEM CONTROL PANEL 'CP-A2' SCHEMATIC
SCALE: NONE

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

8/22/07

RECORD DRAWING

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REV	DATE	DESCRIPTION
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STATE OF ALASKA 49TH JOHN H. FASCHAN JR. 8286 REGISTERED PROFESSIONAL ENGINEER

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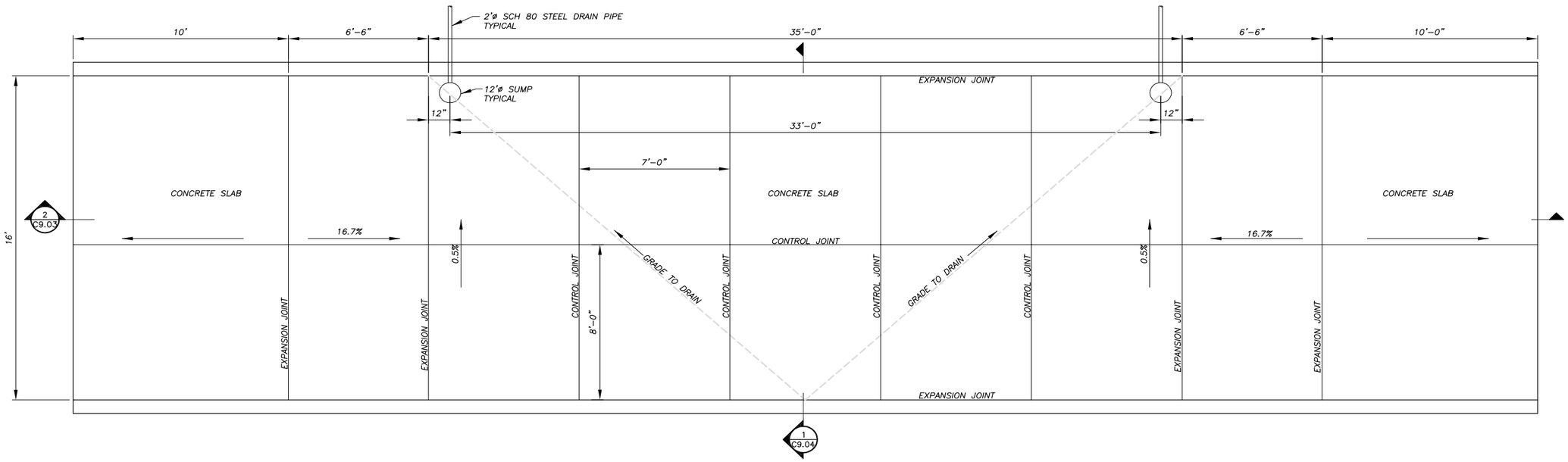
MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: ANIAK ELEMENTARY SCHOOL CONTROL PANEL 'CP-A2' SCHEMATIC

SHEET: E1.09

DRAWN BY: R PAGE	CHECKED BY: J FASCHAN
DATE: 8/22/07	SCALE: AS NOTED
JOB NUMBER: HDLMKF	



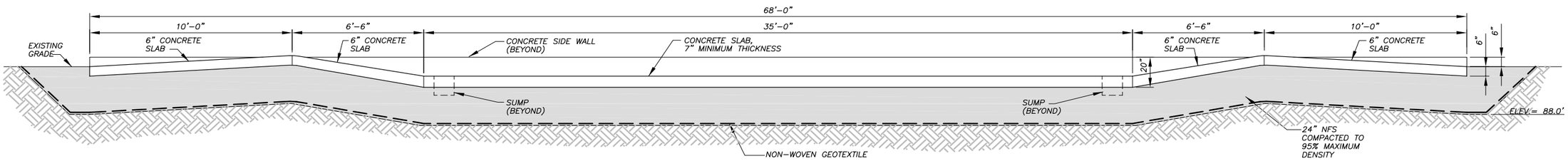
1 C9.03 SECONDARY CONTAINMENT - PLAN VIEW

SCALE: 3/8" = 1'-0"

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

Laurie M Hulse AUGUST 2007



2 C9.03 SECTION A

SCALE: 3/8" = 1'-0"

REVISIONS

MARK	DATE	DESCRIPTION
1		

STATE OF ALASKA 49th LAURE M. HULSE No. CE-10884 REGISTERED PROFESSIONAL ENGINEER

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

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MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: TRUCK FILL SECONDARY CONTAINMENT

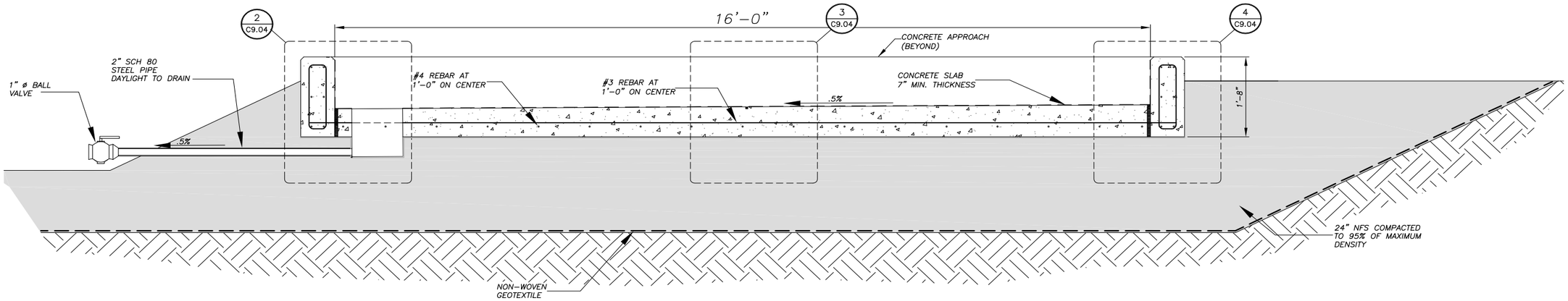
SHEET: C9.03

DRAWN BY: KK | CHECKED BY: LMH

DATE: 6/06/05 | SCALE: AS NOTED

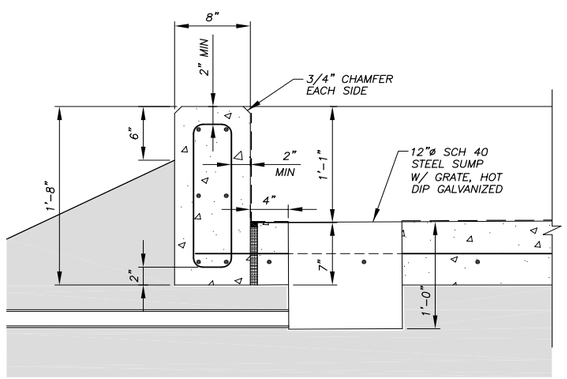
JOB NUMBER: 03-028

H:\jobs\03-028 Middle Kuskokwim Energy Project\cad\drawings\03028_00_C0903-C0904, 1=32, 08/22/07 at 11:27 by mmhn
LAYOUT: C9.03
XREF: 03028_00_B001, SDGT-ENG



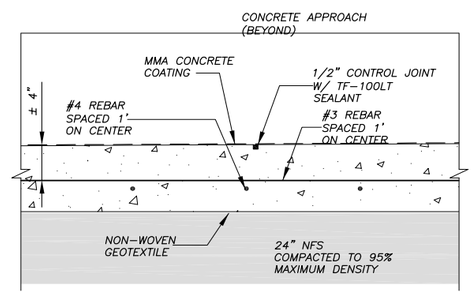
1 C9.03 SECTION B

SCALE: 1" = 1'-0"



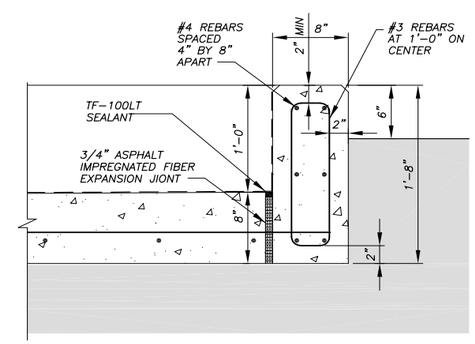
2 C9.03 DETAIL

SCALE: 1 1/2" = 1'-0"



3 C9.03 DETAIL

SCALE: 1 1/2" = 1'-0"



4 C9.03 DETAIL

SCALE: 1 1/2" = 1'-0"

RECORD DRAWING

THESE DRAWINGS HAVE BEEN PREPARED FROM MARKED-UP DRAWINGS SUPPLIED BY THE CONTRACTOR. AN AS-BUILT SURVEY HAS NOT BEEN CONDUCTED. FIELD VERIFY ANY INFORMATION CONTAINED HEREON BEFORE USING.

Laurie M Hulse AUGUST 2007

REVISIONS

MARK	DATE	DESCRIPTION
1		

STATE OF ALASKA 49th LAURE M. HULSE No. CE-10584 REGISTERED PROFESSIONAL ENGINEER

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MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

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MIDDLE KUSKOKWIM RIVER REGION, ALASKA

SHEET TITLE: TRUCK FILL SECONDARY CONTAINMENT

SHEET: C9.04

DRAWN BY: KK	CHECKED BY: LMH
DATE: 6/06/05	SCALE: AS NOTED
JOB NUMBER: 03-028	

H:\jobs\03-028 Middle Kuskokwim Energy Project\cad\drawings\03028_00_C0903-C0904, 1=32, 08/22/07 at 11:27 by mmhn
LAYOUT: C9.04
XREF: 03028_00_B001, SDGT-ENG

COMPONENT SCHEDULE, A1, & T1

ITEM No.	DESIGNATION	DESCRIPTION	MANUFACTURE	CATALOG No.
1	100ENC	ENCLOSURE, FIBERGLASS, NEMA 4X	HOFFMAN MFG.	A48H3612GQRLP
2	100PNL	SUB-PANEL FOR ENCLOSURE	HOFFMAN MFG.	A48P36
3	137HTR	ENCLOSURE HEATER WITH INTEGRAL FAN, 120 VAC, 800 WATT	HOFFMAN MFG.	DAH8001B
4	106CB, 112CB, 118CB	CIRCUIT BREAKER, 2-POLE, (20 AMP), UL 489	SQUARE D	CLASS 860 60147
5	126CB, 132CB	CIRCUIT BREAKER, 2-POLE, (15 AMP), UL 489	SQUARE D	CLASS 860 60146
6	137CB	CIRCUIT BREAKER, 1-POLE, (8 AMP), UL 489	SQUARE D	CLASS 860 60109
7	139CB	CIRCUIT BREAKER, 1-POLE, (10 AMP), UL 489	SQUARE D	CLASS 860 60110
8	341CB	CIRCUIT BREAKER, 1-POLE, (5 AMP), UL489	SQUARE D	CLASS 860 60106
9	601CB	CIRCUIT BREAKER, 1-POLE, (3 AMP), UL489	SQUARE D	CLASS 860 60104
10	ALL TIME DELAY RELAYS	TIME DELAY RELAY, ADJUSTABLE (1.2-120 MINUTES), 120 VAC COIL	SQUARE D	CLASS 9050 JCK19V20
11	ALL DPDT RELAY SOCKETS	RELAY SOCKET, DPDT, TUBULAR TYPE, DIN RAIL MOUNTING	SQUARE D	CLASS 8501 NR52
12	ALL 3PDT RELAY SOCKETS	RELAY SOCKET, 3PDT, TUBULAR TYPE, DIN RAIL MOUNTING	SQUARE D	CLASS 8501 NR62
13	100DISC	DISCONNECT SWITCH KIT, (30 AMP), NFPA 79 COMPLIANT, UL98	ALLEN-BRADLEY	194RF-NN060R24E
14	103DB	POWER DISTRIBUTION BLOCK, 3-POLE,), 4-LOAD TERMINALS / POLE	ALLEN-BRADLEY	1492-PD3163
15	204CON, 217CON, 228CON, 235CON	CONTACTOR, IEC TYPE, AC-3 RATED @ (23 AMP), 120 VAC COIL	ALLEN-BRADLEY	100-C23D10
16	204AUX, 217AUX, 228AUX, 235AUX	AUXILIARY CONTACTS FOR CONTACTOR, TOP MOUNTED, 2-N.O. & 2-N.C.	ALLEN-BRADLEY	100-FA22
17	106OLR, 112OLR, 118OLR, 126OLR	THERMAL OVERLOAD RELAY, CLASS 10, SINGLE PHASE, ADJ. (5-15 AMP)	ALLEN-BRADLEY	193-ES1BB
18	314RRS, 319RRS, 329RRS, 334RRS	REMOTE RESET SOLENOID, 120 VAC COIL	ALLEN-BRADLEY	193-ER1D
19	ALL CONTROL RELAYS	RELAY 3PDT, TUBE BASE, 120 VAC COIL, (10 AMP) CONTACT RATING	ALLEN-BRADLEY	700-HA33A1
20	ALL RED PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, RED, WITH 1-N.C. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR6D2
21	ALL GREEN PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, GREEN, WITH 1-N.O. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR1D1
22	ALL YELLOW PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, YELLOW, WITH 1-N.C. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR9D2
23	ALL BLACK PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, BLACK, WITH 1-N.O. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR2D1
24	142LT	PILOT LIGHT, NEMA 4X, 30MM, AMBER, 120 VAC	ALLEN-BRADLEY	800H-QRH10A
25	ALL AMBER LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, AMBER, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10A
26	ALL BLUE LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, BLUE, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10B
27	ALL GREEN LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, GREEN, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10G
28	ALL RED LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, RED, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10R
29	ALL 2-POS. SELECTOR SWITCHES	SELECTOR SWITCH, 2-POSITION MAINTAINED, NEMA 4X, 30MM	ALLEN-BRADLEY	800H-HR2A
30	ALL 3-POS. SELECTOR SWITCHES	SELECTOR SWITCH, 3-POSITION MAINTAINED, NEMA 4X, 30MM	ALLEN-BRADLEY	800H-JR2A
31	ALL OPERATOR LEGEND PLATES	LEGEND PLATE, BLANK, 30MM, (WHITE WITH BLACK LETTERS)	ALLEN-BRADLEY	800H-W500A
32	ALL AUXILARY CONTACT BLOCKS N.O., FOR OPERATORS	AUXILIARY CONTACT BLOCK, N.O.	ALLEN-BRADLEY	800T-XD1
33	ALL AUXILARY CONTACT BLOCKS N.C., FOR OPERATORS	AUXILIARY CONTACT BLOCK, N.C.	ALLEN-BRADLEY	800T-XD2
34	ALL AUXILARY CONTACT BLOCKS 1-N.O. & 1-N.C., OPERATORS	AUXILIARY CONTACT BLOCK, 1-N.O. & 1-N.C.	ALLEN-BRADLEY	800T-XA
35	ALL RELAY SOCKETS FOR LIQUID LEVEL CONTROL RELAYS	RELAY SOCKET, DPDT	ALLEN-BRADLEY	700-HN125
36	144ESR, 145ESR	INDUSTRIAL CONTROL RELAY, 4 POLE, (120 VAC COIL)	ALLEN-BRADLEY	700-CF400D
37	MOTOR TERMINAL BLOCKS	TERMINAL BLOCK, BLACK, (50 AMP), 600 VOLT	ALLEN-BRADLEY	1492-W10-BL
38	MOTOR GROUND TERMINAL BLOCKS	TERMINAL BLOCK, GREEN/YELLOW, METAL BASE	ALLEN-BRADLEY	1492-WG6
39	CONTROL TERMINAL BLOCKS	TERMINAL BLOCK, RED, (50 AMP), 600 VOLT	ALLEN-BRADLEY	1492-W10-RE
40	NEUTRAL TERMINAL BLOCKS	TERMINAL BLOCK, WHITE, (50 AMP), 600 VOLT	ALLEN-BRADLEY	1492-W10-W
41	CHASSIS GROUNDING TERMINAL BLOCK	TERMINAL BLOCK, GREEN/YELLOW, METAL BASE	ALLEN-BRADLEY	1492-WG10
42	TERMINAL BLOCK DIN RAIL	HIGH RISE DIN RAIL, (ALUMINUM)	ALLEN-BRADLEY	1492-DR6
43	DEVICE DIN RAIL	DIN RAIL, (ALUMINUM)	IDEC	BNDN-1000
44	ALL WIRE MARKERS	PERMASLEEVE WIRE MARKER, (HEATSHRINK TYPE)	BRADY	PSPT-187-1W
45	140DB, 140DB	DISTRIBUTION BLOCK, 1-POLE, 4-LOAD TERMINALS	BUSSMAN	16220-1
46	ALL WIRE DUCT	PVC WIRE DUCT, WHITE, (1-1/2" WIDE X 3" HIGH)	PANDUIT	G1.5X3WH6
47	ALL LIQUID LEVEL RELAYS	LIQUID LEVEL CONTROL CONTROL RELAY, (120 VAC COIL)	B/W CONTROLS	5400-A-L1
48	ALL INTRINSICALLY SAFE RELAYS	INTRINSICALLY SAFE RELAY, (120 VAC POWER)	PEPPERL+FUCHS	KFA5-SR2-EX1.W.LB

COMPONENT SCHEDULE, A1, & T1

ITEM No.	DESIGNATION	DESCRIPTION	MANUFACTURE	CATALOG No.
49	REMOTE ALARM HORN	ALARM HORN	FEDERAL SIGNAL	350WB-120
50	REMOTE ALARM LIGHT	ALARM LIGHT, FLASHING, (RED)	FEDERAL SIGNAL	141-120R
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CONTRACTOR: **STG. INCORPORATED**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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TOTAL CONTROL
CONTROL SYSTEMS DISTRIBUTOR
a division of RSD
26021 Atlantic Ocean Drive
Lake Forest, CA 92630
949-380-7878 949-380-0755 Fax

Job No.: **7062**

Sheet Title: **COMPONENTS** Sheet: **1 of 1**

Revisions

Rev	Date	Revision
0	11/04	Issued for Construction

Project No.: **7062**
Designed By: RSC
Drawing By: RSC
Approved By:
Date: 03-18-05
Sheet No. CS100

COMPONENT SCHEDULE, A2, CH1, & ST1

ITEM No.	DESIGNATION	DESCRIPTION	MANUFACTURE	CATALOG No.
1	100ENC	ENCLOSURE, FIBERGLASS, NEMA 4X	HOFFMAN MFG.	UU756030
2	100PNL	SUB-PANEL FOR ENCLOSURE	HOFFMAN MFG.	A30P24
3	111HTR	ENCLOSURE HEATER WITH INTEGRAL FAN, 120 VAC, 400 WATT	HOFFMAN MFG.	DAH4001B
4	106CB	CIRCUIT BREAKER, 2-POLE, (20 AMP), UL 489	SQUARE D	CLASS 860 60147
5	111CB	CIRCUIT BREAKER, 1-POLE, (5 AMP), UL 489	SQUARE D	CLASS 860 60106
6	113CB	CIRCUIT BREAKER, 1-POLE, (10 AMP), UL 489	SQUARE D	CLASS 860 60110
7	201CB	CIRCUIT BREAKER, 1-POLE, (3 AMP), UL489	SQUARE D	CLASS 860 60104
8	ALL TIME DELAY RELAYS	TIME DELAY RELAY, ADJUSTABLE (1.2-120 MINUTES), 120 VAC COIL	SQUARE D	CLASS 9050 JCK19V20
9	ALL DPDT RELAY SOCKETS	RELAY SOCKET, DPDT, TUBULAR TYPE, DIN RAIL MOUNTING	SQUARE D	CLASS 8501 NR52
10	ALL 3PDT RELAY SOCKETS	RELAY SOCKET, 3PDT, TUBULAR TYPE, DIN RAIL MOUNTING	SQUARE D	CLASS 8501 NR62
11	100DISC	DISCONNECT SWITCH KIT, (30 AMP), NFPA 79 COMPLIANT, UL98	ALLEN-BRADLEY	194RF-NN030R24E
12	103DB	POWER DISTRIBUTION BLOCK, 3-POLE,), 4-LOAD TERMINALS / POLE	ALLEN-BRADLEY	1492-PD3141
13	129CON	CONTACTOR, IEC TYPE, AC-3 RATED @ (23 AMP), 120 VAC COIL	ALLEN-BRADLEY	100-C23D10
14	129AUX	AUXILIARY CONTACTS FOR CONTACTOR, TOP MOUNTED, 2-N.O. & 2-N.C.	ALLEN-BRADLEY	100-FA22
15	106OLR	THERMAL OVERLOAD RELAY, CLASS 10, SINGLE PHASE, ADJ. (5-15 AMP)	ALLEN-BRADLEY	193-ES1BB
16	141RRS	REMOTE RESET SOLENOID, 120 VAC COIL	ALLEN-BRADLEY	193-ER1D
17	ALL CONTROL RELAYS	RELAY 3PDT, TUBE BASE, 120 VAC COIL, (10 AMP) CONTACT RATING	ALLEN-BRADLEY	700-HA33A1
18	ALL RED PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, RED, WITH 1-N.C. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR6D2
19	ALL GREEN PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, GREEN, WITH 1-N.O. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR1D1
20	ALL YELLOW PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, YELLOW, WITH 1-N.C. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR9D2
21	ALL BLACK PUSH BUTTONS	PUSH BUTTON, NEMA 4X, 30MM, BLACK, WITH 1-N.O. CONTACT BLOCK	ALLEN-BRADLEY	800H-AR2D1
22	116LT	PILOT LIGHT, NEMA 4X, 30MM, AMBER, 120 VAC	ALLEN-BRADLEY	800H-QRH10A
23	ALL AMBER LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, AMBER, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10A
24	ALL BLUE LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, BLUE, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10B
25	ALL GREEN LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, GREEN, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10G
26	ALL RED LIGHTS, PTT	PILOT LIGHT, NEMA 4X, 30MM, RED, PUSH-TO-TEST, 120 VAC	ALLEN-BRADLEY	800H-QRTH10R
27	ALL 2-POS. SELECTOR SWITCHES	SELECTOR SWITCH, 2-POSITION MAINTAINED, NEMA 4X, 30MM	ALLEN-BRADLEY	800H-HR2A
28	ALL 3-POS. SELECTOR SWITCHES	SELECTOR SWITCH, 3-POSITION MAINTAINED, NEMA 4X, 30MM	ALLEN-BRADLEY	800H-JR2A
29	ALL OPERATOR LEGEND PLATES	LEGEND PLATE, BLANK, 30MM, (WHITE WITH BLACK LETTERS)	ALLEN-BRADLEY	800H-W500A
30	ALL AUXILARY CONTACT BLOCKS N.O., FOR OPERATORS	AUXILIARY CONTACT BLOCK, N.O.	ALLEN-BRADLEY	800T-XD1
31	ALL AUXILARY CONTACT BLOCKS N.C., FOR OPERATORS	AUXILIARY CONTACT BLOCK, N.C.	ALLEN-BRADLEY	800T-XD2
32	ALL AUXILARY CONTACT BLOCKS 1-N.O. & 1-N.C., OPERATORS	AUXILIARY CONTACT BLOCK, 1-N.O. & 1-N.C.	ALLEN-BRADLEY	800T-XA
33	ALL RELAY SOCKETS FOR LIQUID LEVEL CONTROL RELAYS	RELAY SOCKET, DPDT	ALLEN-BRADLEY	700-HN125
34	MOTOR TERMINAL BLOCKS	TERMINAL BLOCK, BLACK, (50 AMP), 600 VOLT	ALLEN-BRADLEY	1492-W10-BL
35	MOTOR GROUND TERMINAL BLOCKS	TERMINAL BLOCK, GREEN/YELLOW, METAL BASE	ALLEN-BRADLEY	1492-WG6
36	CONTROL TERMINAL BLOCKS	TERMINAL BLOCK, RED, (50 AMP), 600 VOLT	ALLEN-BRADLEY	1492-W10-RE
37	NEUTRAL TERMINAL BLOCKS	TERMINAL BLOCK, WHITE, (50 AMP), 600 VOLT	ALLEN-BRADLEY	1492-W10-W
38	CHASSIS GROUNDING TERMINAL BLOCK	TERMINAL BLOCK, GREEN/YELLOW, METAL BASE	ALLEN-BRADLEY	1492-WG10
39	TERMINAL BLOCK DIN RAIL	HIGH RISE DIN RAIL, (ALUMINUM)	ALLEN-BRADLEY	1492-DR6
40	DEVICE DIN RAIL	DIN RAIL, (ALUMINUM)	IDEC	BNDN-1000
41	ALL WIRE MARKERS	PERMASLEEVE WIRE MARKER, (HEATSHRINK TYPE)	BRADY	PSPT-187-1W
42	114DB	DISTRIBUTION BLOCK, 1-POLE, 4-LOAD TERMINALS	BUSSMAN	16220-1
43	ALL WIRE DUCT	PVC WIRE DUCT, WHITE, (1" WIDE X 3" HIGH)	PANDUIT	G1X3WH6
44	ALL LIQUID LEVEL RELAYS	LIQUID LEVEL CONTROL CONTROL RELAY, (120 VAC COIL)	B/W CONTROLS	5400-A-L1
45	REMOTE ALARM HORN	ALARM HORN	FEDERAL SIGNAL	350WB-120
46	REMOTE ALARM LIGHT	ALARM LIGHT, FLASHING, (RED)	FEDERAL SIGNAL	141-120R
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COMPONENT SCHEDULE, A2, CH1, & ST1

ITEM No.	DESIGNATION	DESCRIPTION	MANUFACTURE	CATALOG No.
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CONTRACTOR: **STG. INCORPORATED**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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Job No. : **7062**

Sheet: **1 of 1**

Sheet Title: **COMPONENTS**

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Project No. : **7062**
Designed By: RSC
Drawing By: RSC
Approved By:
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Sheet No. CS100

SEQUENCE OF OPERATIONS

Aniak School Bulk Fuel System Control Panel CP-A1:

The fuel transfer pumps, TP-1 and TP-2, and the submersible pumps SP-1 and SP-2 are controlled by this panel.

TP-1- supplies diesel fuel to the truck fill station. It is controlled from the START/STOP pushbuttons in the truck fill enclosure. When the 'START' pushbutton is pressed, the motorized valve at the truck fill opens, a maximum run timer begins timing and the transfer pump TP-1 starts. The transfer pump will run until the 'STOP' pushbutton is pressed, the maximum run timer times out or any ESD is pressed, at which point the pump stops and motorized valve closes.

TP-2- supplies diesel fuel from either of the two bulk storage tanks (A1 or A2) to either the dual product dispensing tank (A3) or to any of intermediate tanks located at the shop, vocational school, and high school. The supply source and destination of the diesel fuel is manually selected at the control panel and controlled by the proper sequencing of four motorized valves in the pump box.

In order to start the pump and fill an intermediate tank, "INTER" must be selected on the control panel and the manual valve at the intermediate tank to be filled must be opened. The 'VALVE OPEN' light for this tank will be illuminated on the control panel. Only one intermediate tank manual valve may be open at a time. If more than one intermediate tank valve is open, the pump cannot be started. Once the appropriate valve is opened, the transfer pump can be started by pressing the 'START' pushbutton. The appropriate motorized ball valve at the bulk fuel site will then open, transfer pump, TP-2 will start, and a maximum run timer will begin timing. The transfer pump will run until the 'TANK FULL' level is reached at the intermediate tank, the 'STOP' pushbutton is pressed, the maximum run timer times out, any ESD is pressed, the intermediate tank valve is closed or another intermediate tank valve is opened, at which point the pump stops and the motorized valve closes.

If the 'TANK FULL' signal fails and the tank keeps filling, the 'CRITICAL HIGH' level in the tank will be reached. If this occurs an external horn and alarm light will energize, a 'CRITICAL HIGH' alarm will be indicated on the panel, the motorized valve at the bulk fuel site will close and the transfer pump will stop. The pump may not be re-started until the condition is cleared. The external horn and alarm light may be de-energized by silencing the alarm, but the indicating light on the panel will not clear until the critical high alarm condition is corrected.

To fill the dispensing tank, "DISP" must be selected at the control panel before pressing the start pushbutton. The appropriate motorized ball valve at the bulk fuel site will then open, a maximum run timer will start timing and the transfer pump, TP-2 will start. The transfer pump will run until the 'TANK FULL' level is reached at the dispensing tank, the 'STOP' pushbutton is pressed, the maximum run timer times out or any ESD is pressed.

If the 'TANK FULL' signal fails and the tank keeps filling, the 'CRITICAL HIGH' level in the tank will be reached. If this occurs an external horn and alarm light will energize, a 'CRITICAL HIGH' alarm will be indicated on the panel, the motorized valve at the bulk fuel site will close and the transfer pump will stop. The pump may not be re-started until the condition is cleared. The external horn and alarm light may be de-energized by silencing the alarm, but the indicating light on the panel will not clear until the critical high alarm condition is corrected.

If an ESD stop occurs, the motorized valves at the bulk fuel site will close and the transfer pump will stop and may not be re-started until the condition is cleared. Also, the indicating light will energize and remain on until the condition is cleared.

SP-1 - Submersible pump SP-1 supplies diesel fuel to the dispensing station. It is controlled by signals received from the dispenser. When the control panel receives the pump run signal from the dispenser a maximum run timer begins timing and SP-1 starts. The pump will run until the maximum run timer times out, the control panel no longer receives the run signal from the dispenser or a low diesel level signal is received, at which point the pump stops. SP-1 is also disabled whenever transfer pump, TP-2 is supplying fuel to the dispensing tank.

If an ESD at the bulk fuel farm occurs, the submersible pump will stop and may not be re-started until the condition is cleared. All power to the dispensing station will be lost when any ESD is pressed.

SP-2 - Submersible pump, SP-2 supplies gasoline to the dispensing station. Its operation is identical to submersible pump, SP-1 except it is not disabled when transfer pump, TP-2 is running.

Emergency Shutdowns - Operation of an ESD stop at the bulk fuel farm will cause an 'ESD ACTIVATED' alarm to be indicated on the panel, all motorized valves to close and all pumps to stop. The pumps may not be re-started until the condition is cleared.

DESCRIPTION: ANIAK HIGH SCHOOL CONTROL PANEL CP-A1

PROJECT: MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

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Job No.: 7062

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Sheet: 1 of 1

Revisions

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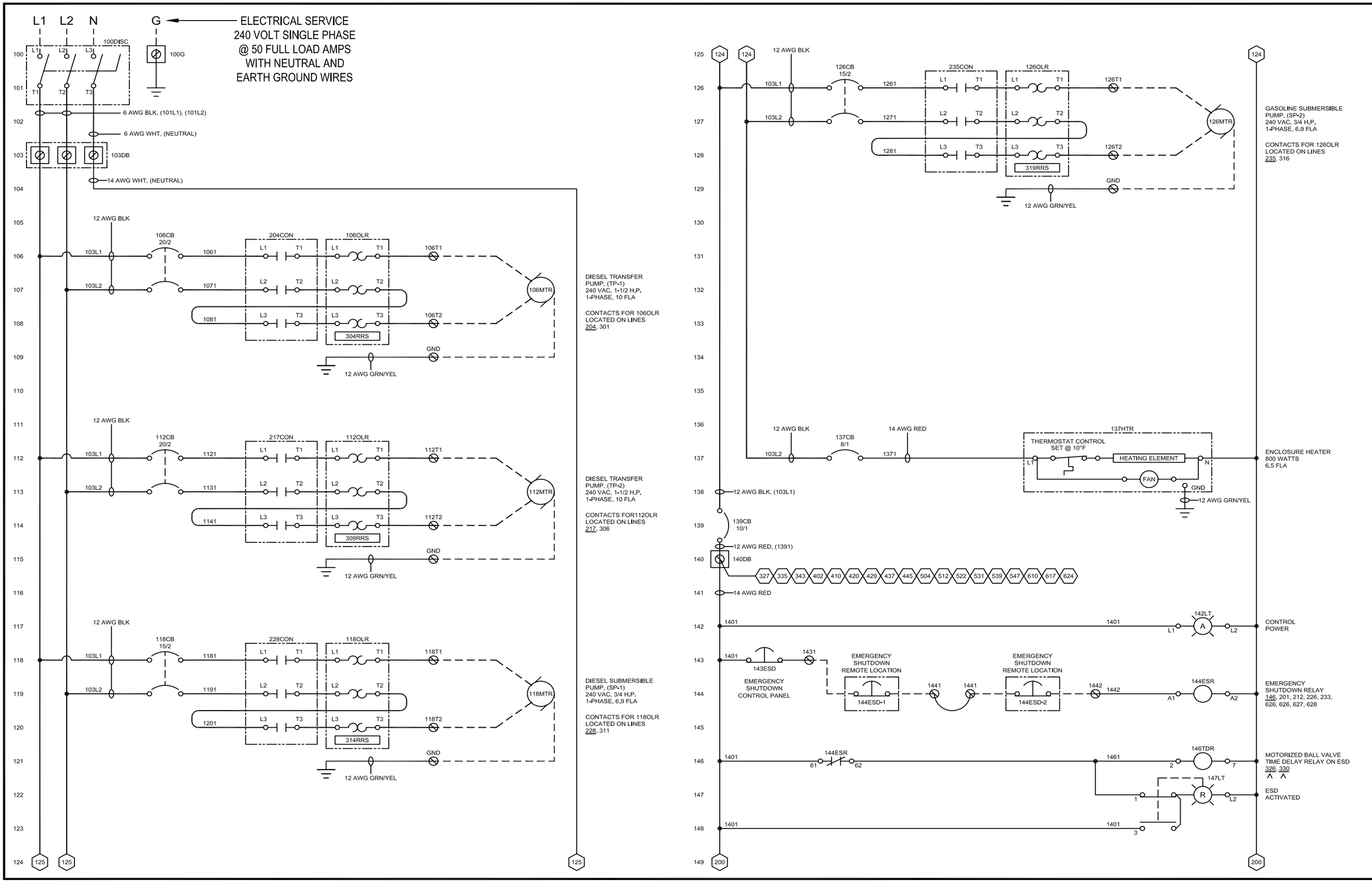

DESCRIPTION: **ANIAK HIGH SCHOOL CONTROL PANEL CP-A1**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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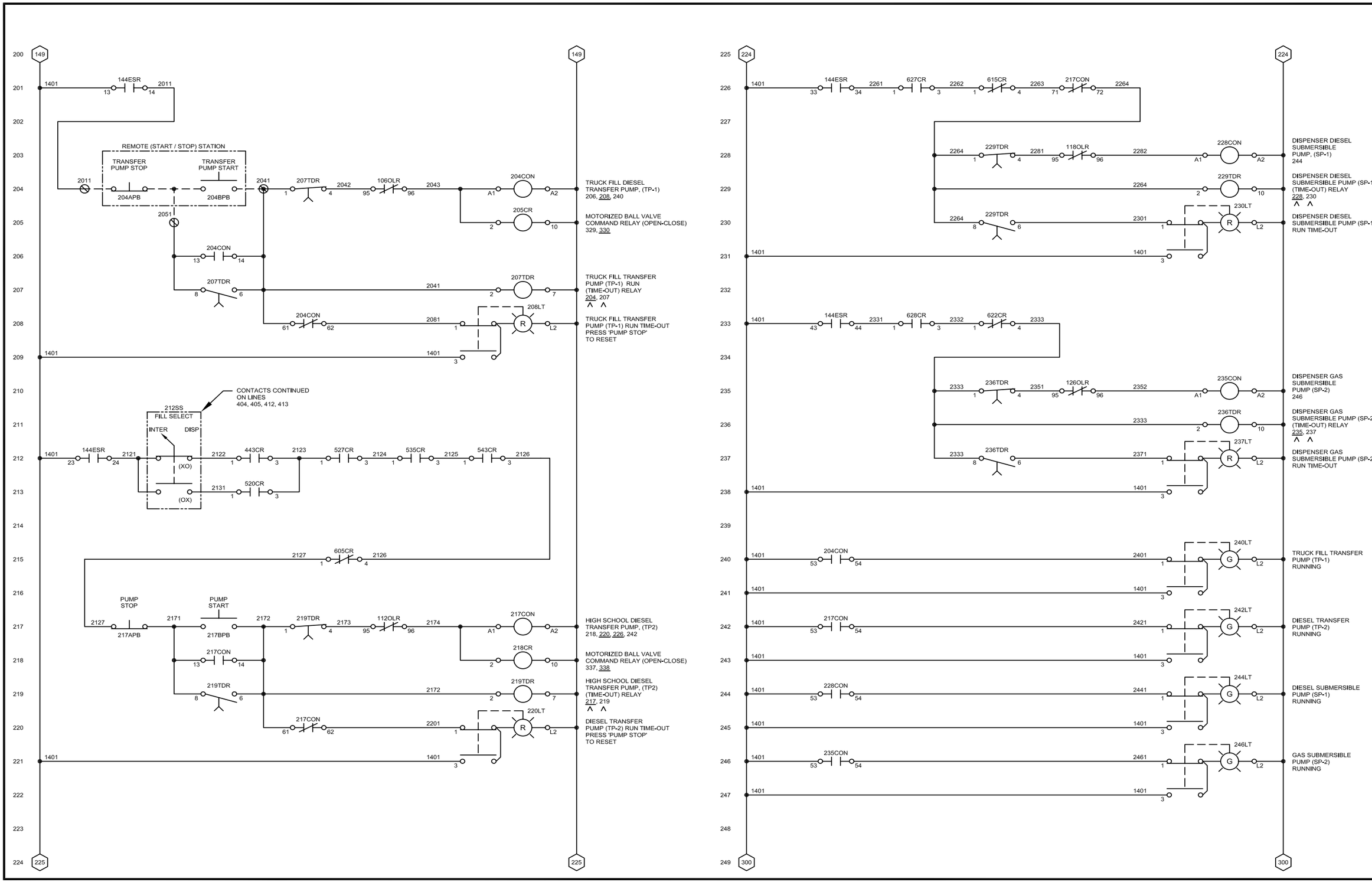

DESCRIPTION: **ANIAK HIGH SCHOOL CONTROL PANEL CP-A1**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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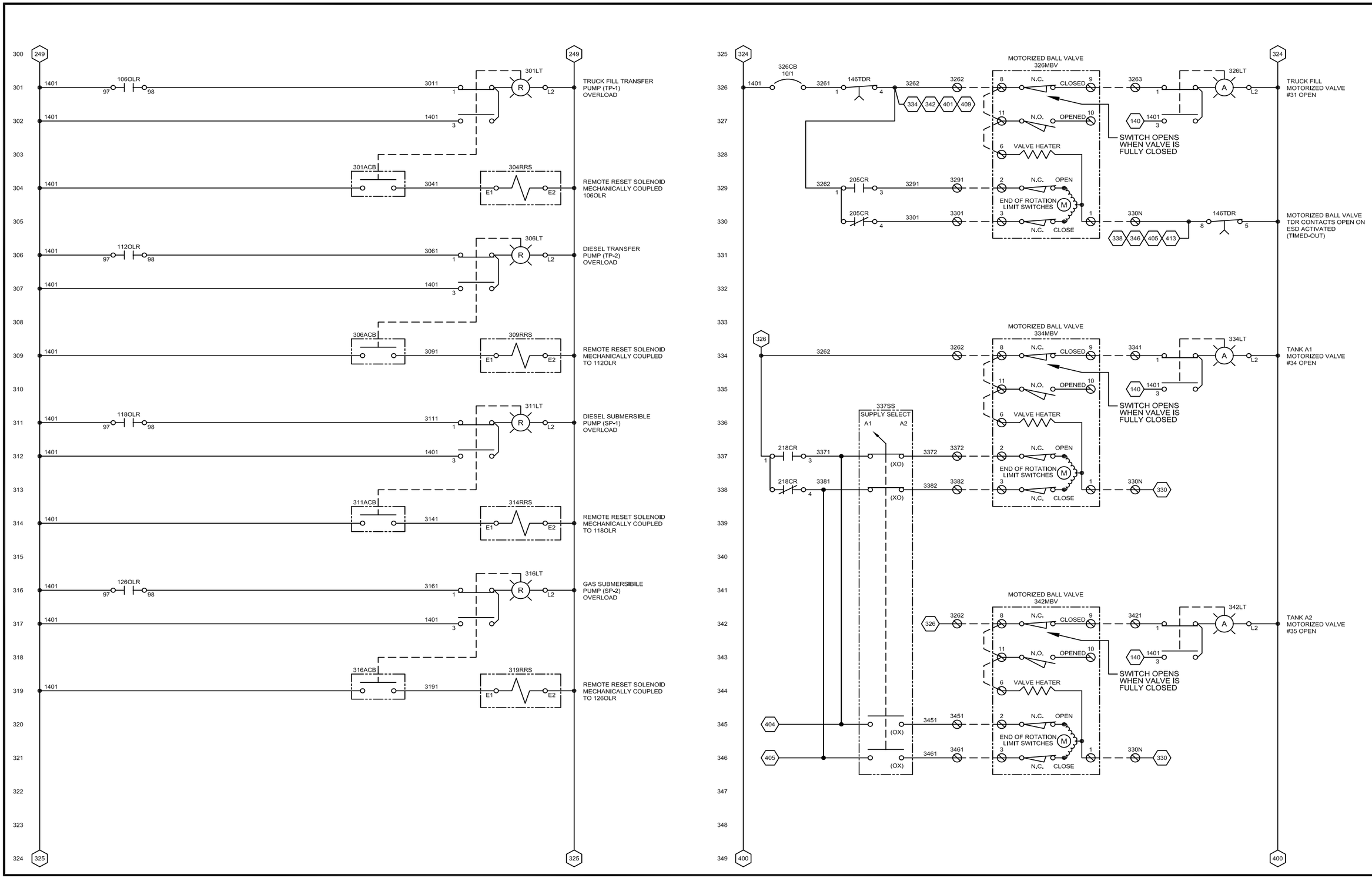

DESCRIPTION: **ANIAK HIGH SCHOOL CONTROL PANEL CP-A1**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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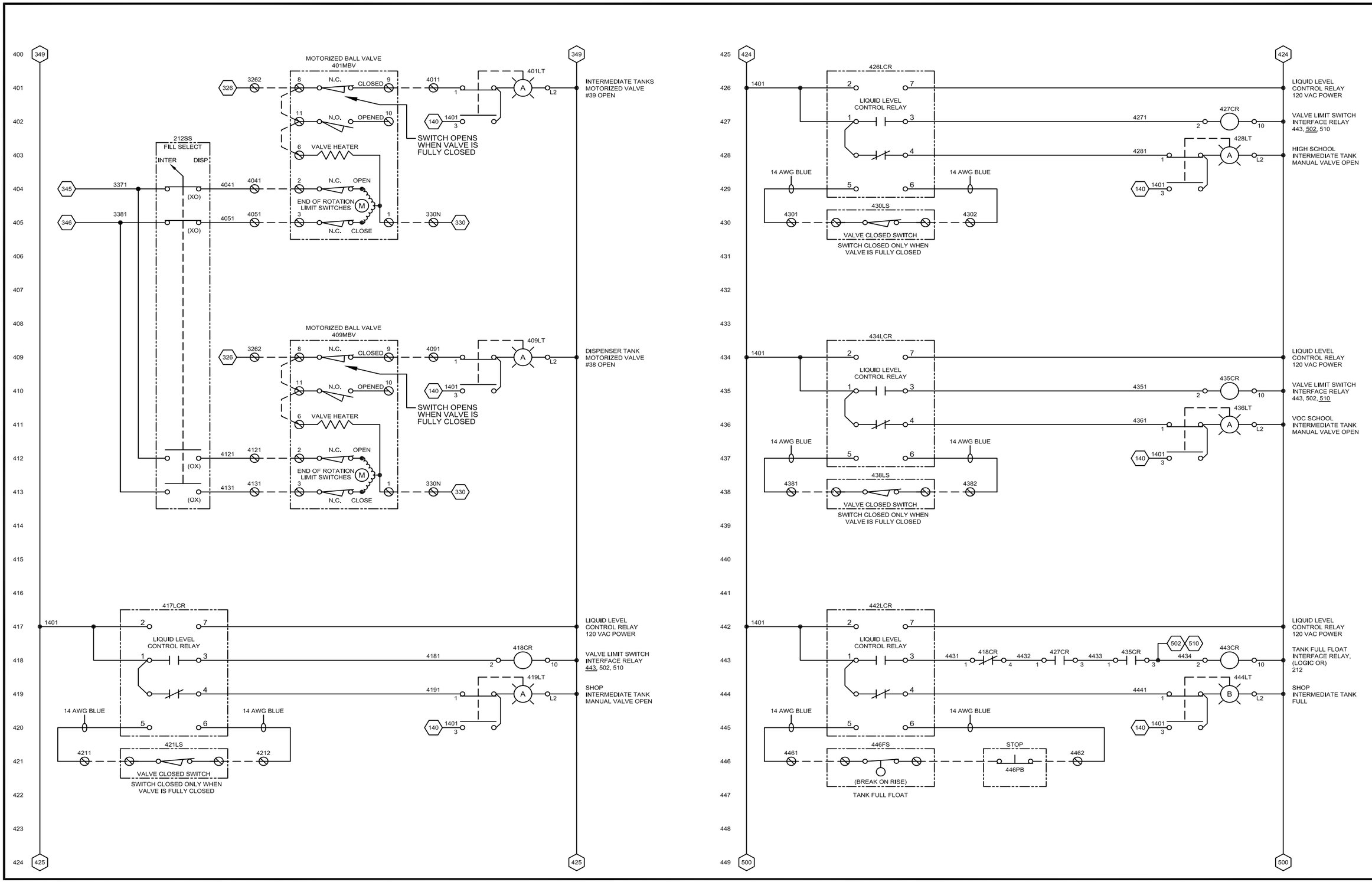

DESCRIPTION: **ANIAK HIGH SCHOOL CONTROL PANEL CP-A1**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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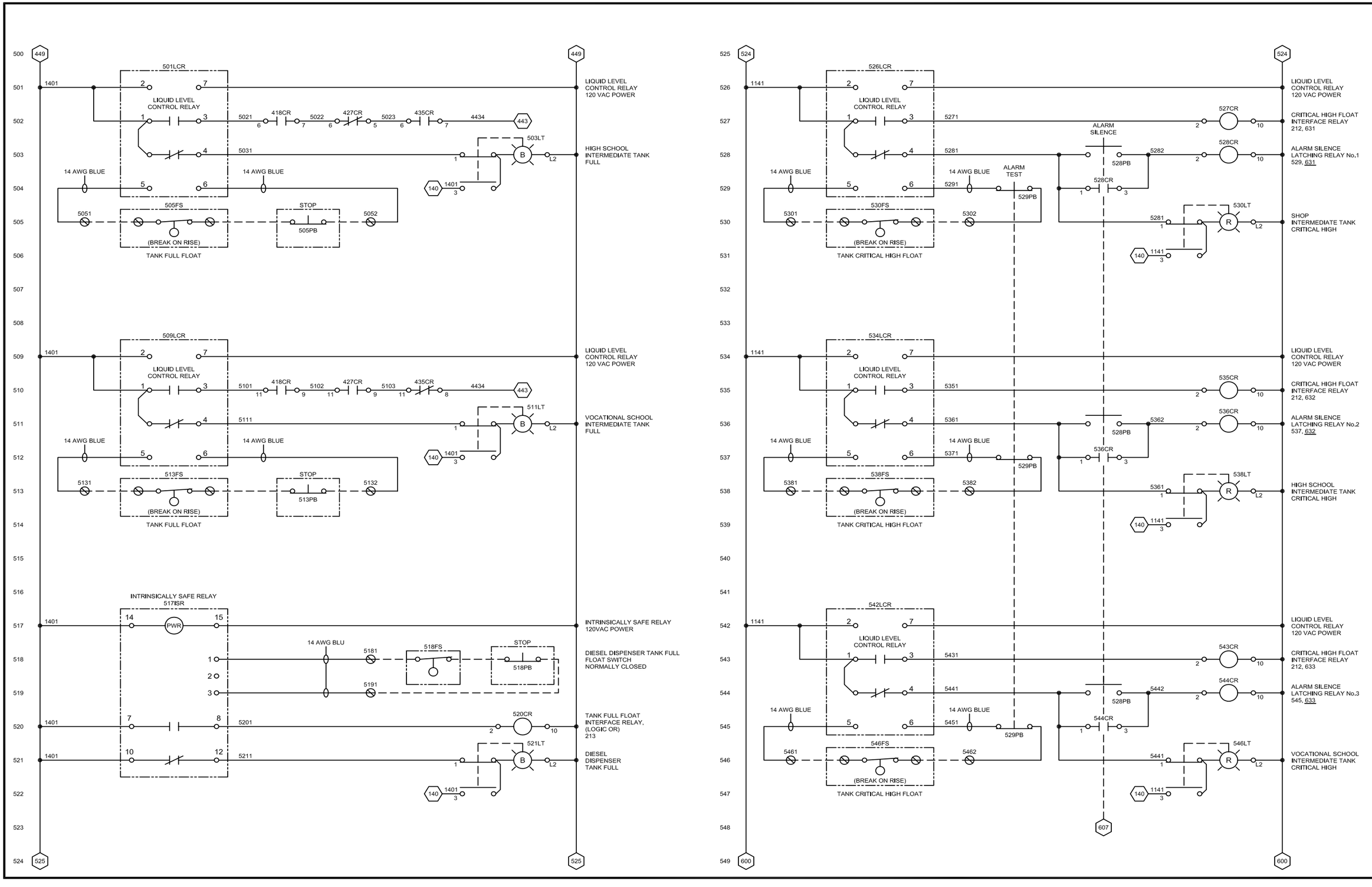

DESCRIPTION: **ANIAK HIGH SCHOOL CONTROL PANEL CP-A1**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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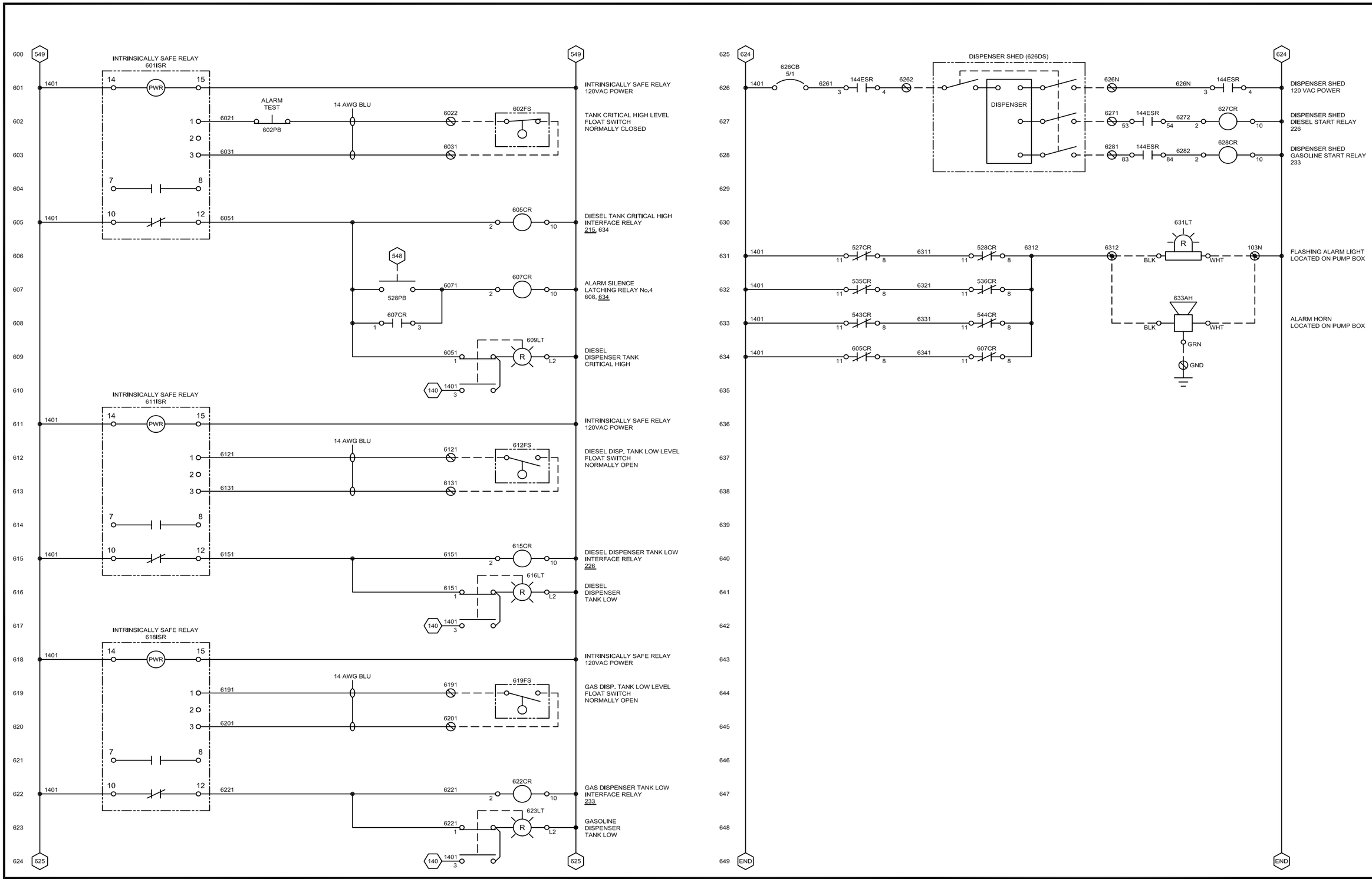

DESCRIPTION: **ANIAK HIGH SCHOOL CONTROL PANEL CP-A1**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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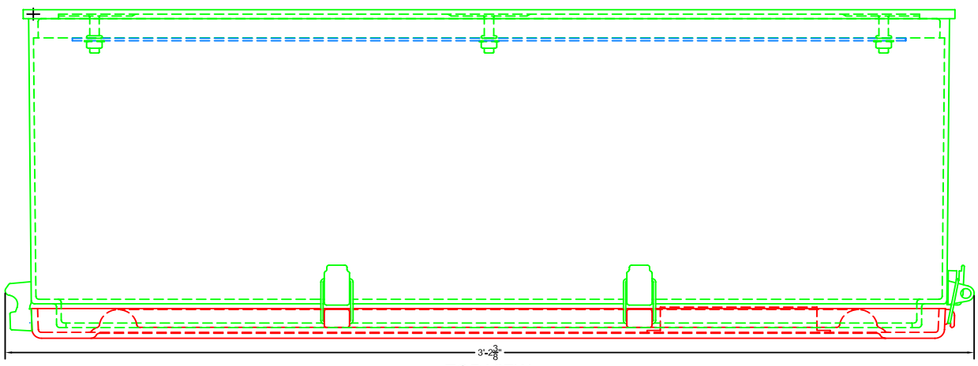
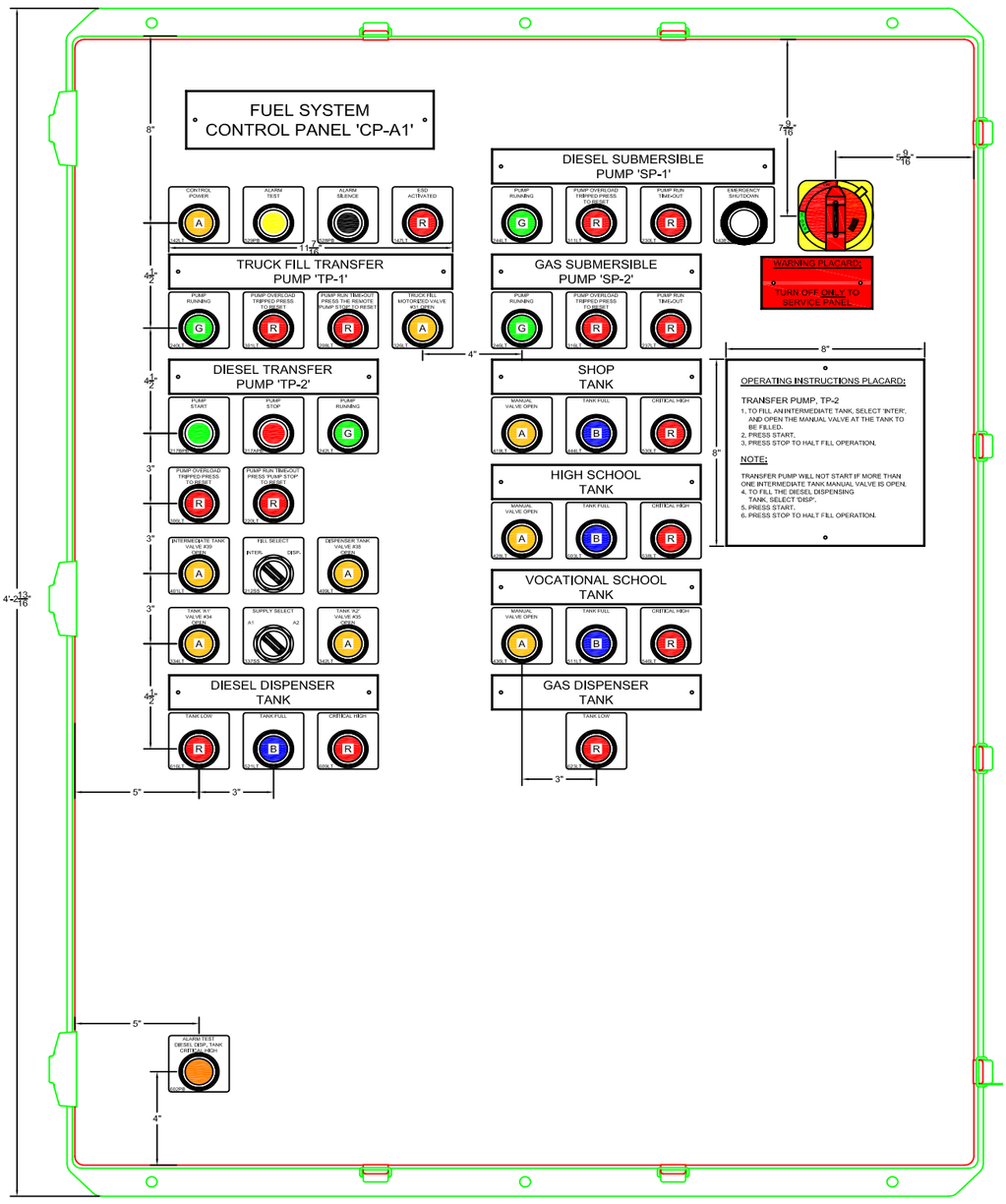
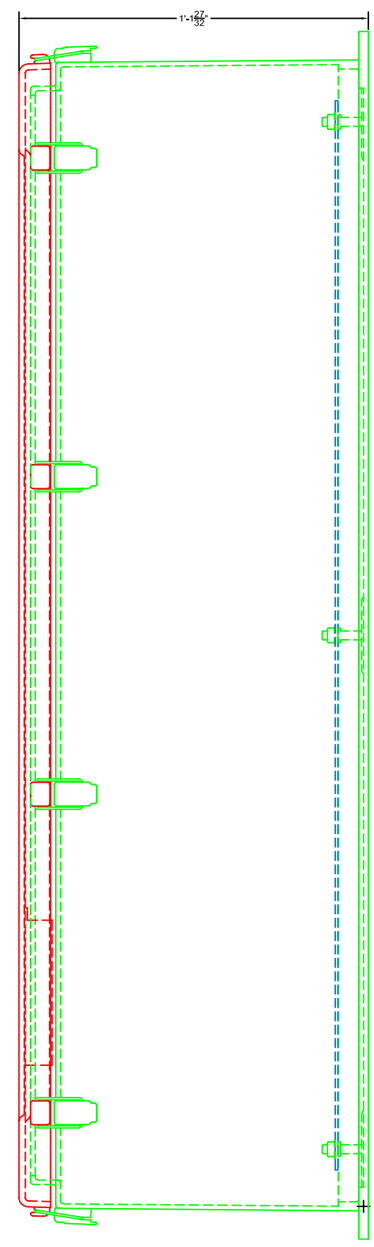


TOP VIEW



FRONT PANEL VIEW



SIDE VIEW

Revisions		
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Sheet Title: DOOR LAYOUT | Sheet: 1 of 2 | Job No.: 7062

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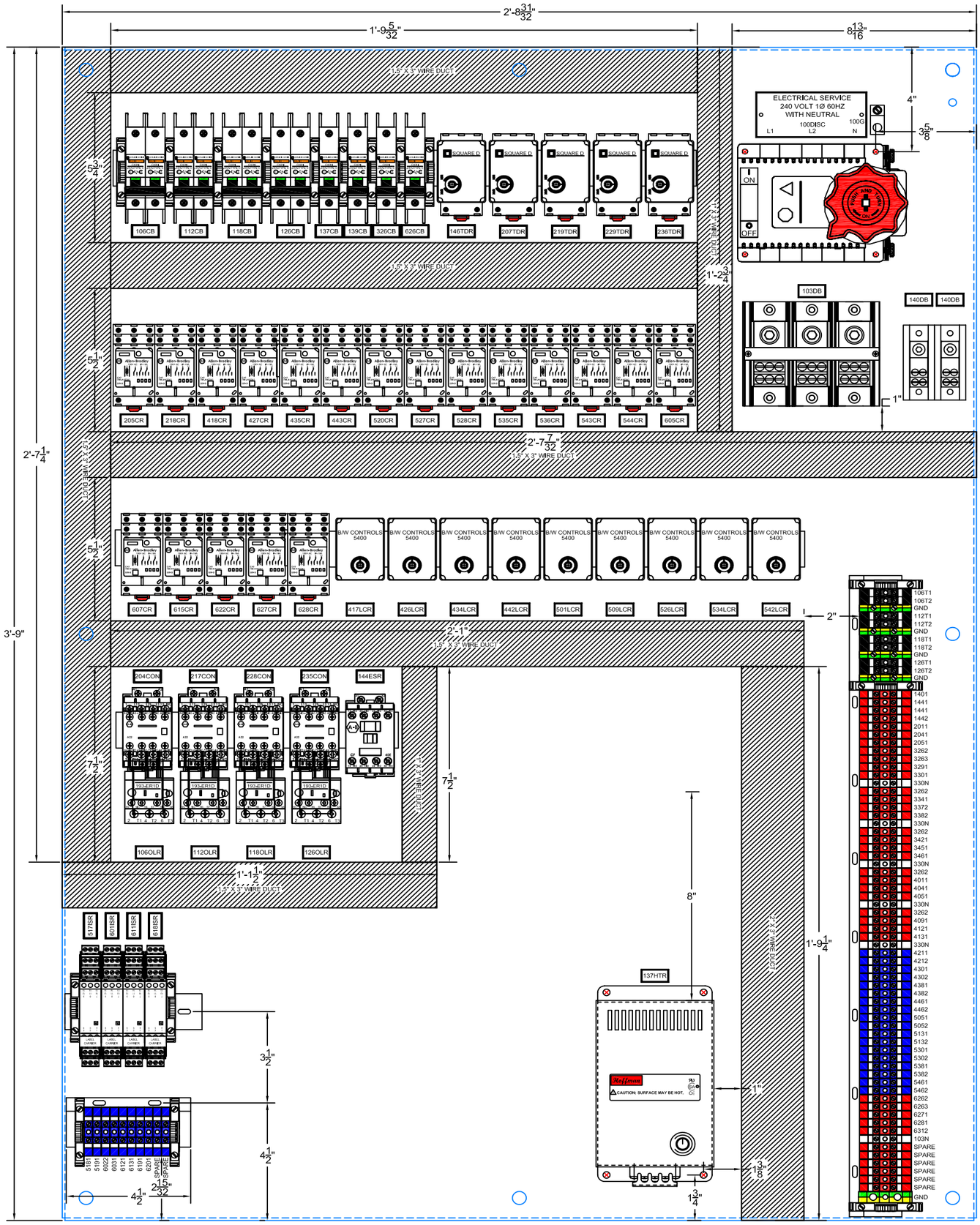
PROJECT:
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

DESCRIPTION:
ANIAK HIGH SCHOOL CONTROL PANEL CP-A1



SUB-PANEL LAYOUT
CP-A1
A48P30

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Sheet Title: PANEL LAYOUT | Sheet: 2 of 2 | Job No.: 7062

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PROJECT:
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

DESCRIPTION:
ANIAK HIGH SCHOOL CONTROL PANEL CP-A1

SEQUENCE OF OPERATIONS

Aniak Elementary School Bulk Fuel System Control Panel CP-A2:

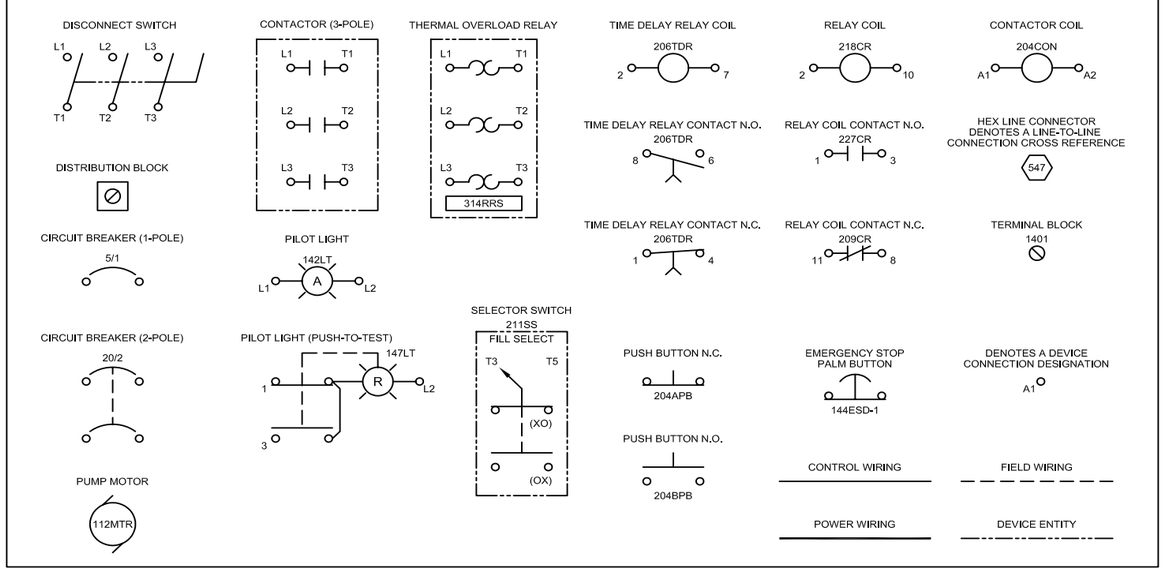
The fuel transfer pump, TP-3 is controlled by this panel. It supplies diesel fuel to the intermediate tanks at the teacher housing, and the elementary school.

The transfer pump is controlled from the START/STOP pushbuttons on the control panel. In order to start the pump and fill an intermediate tank, the manual valve at the intermediate tank to be filled must be opened. The 'VALVE OPEN' light for this tank will be illuminated on the control panel. Only one intermediate tank manual valve may be open at a time. If more than one intermediate tank valve is open, the pump cannot be started. Once the appropriate valve is opened, the transfer pump can be started by pressing the 'START' pushbutton. The motorized ball valve at the bulk fuel site will then open, transfer pump, TP-3 will start, and a maximum run timer will begin timing. The transfer pump will run until the 'TANK FULL' level is reached at the intermediate tank, the 'STOP' pushbutton is pressed, the maximum run timer times out, the ESD is pressed or another intermediate tank valve is opened, at which point the pump stops and motorized valve closes.

If the 'TANK FULL' signal fails and the tank keeps filling, the 'CRITICAL HIGH' level in the tank will be reached. If this occurs, the motorized valve at the bulk fuel site will close and the transfer pump will stop and may not be re-started until the condition is cleared. Also, the alarm horn, alarm strobe and indicating light will energize. The horn and alarm light may be de-energized by acknowledging the alarm, but the indicating light will not clear until the critical high alarm condition is corrected.

If an ESD stop occurs, the motorized valve at the bulk fuel site will close and the transfer pump will stop and may not be re-started until the condition is cleared. Also, the indicating light will energize and remain on until the condition is cleared.

ELECTRICAL SYMBOL LEGEND



DESCRIPTION: ANIAK ELEMENTARY SCHOOL CONTROL PANEL CP-A2

PROJECT: MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

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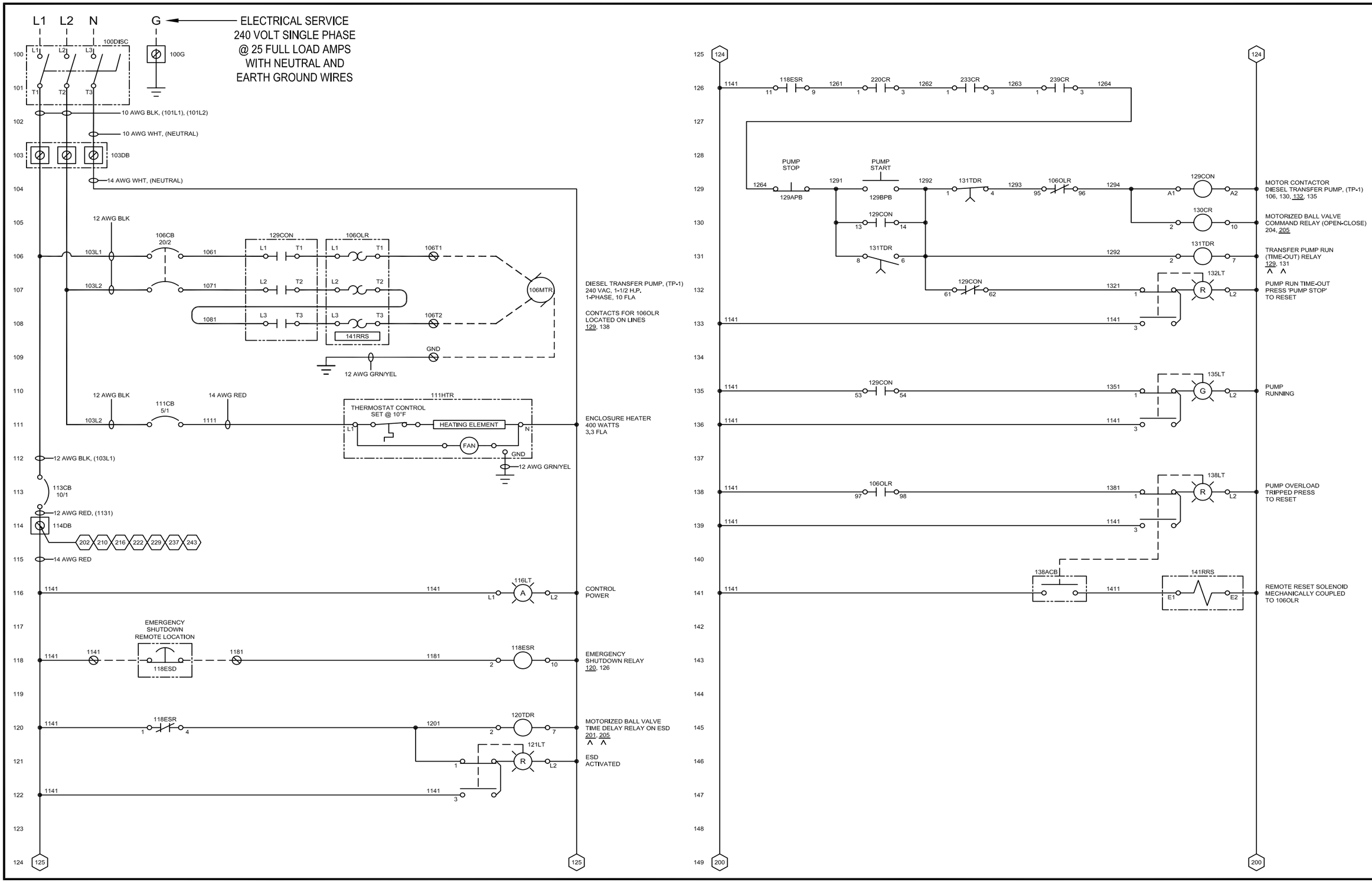

DESCRIPTION: **ANIAK ELEMENTARY SCHOOL CONTROL PANEL CP-A2**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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Project No.: **7062**

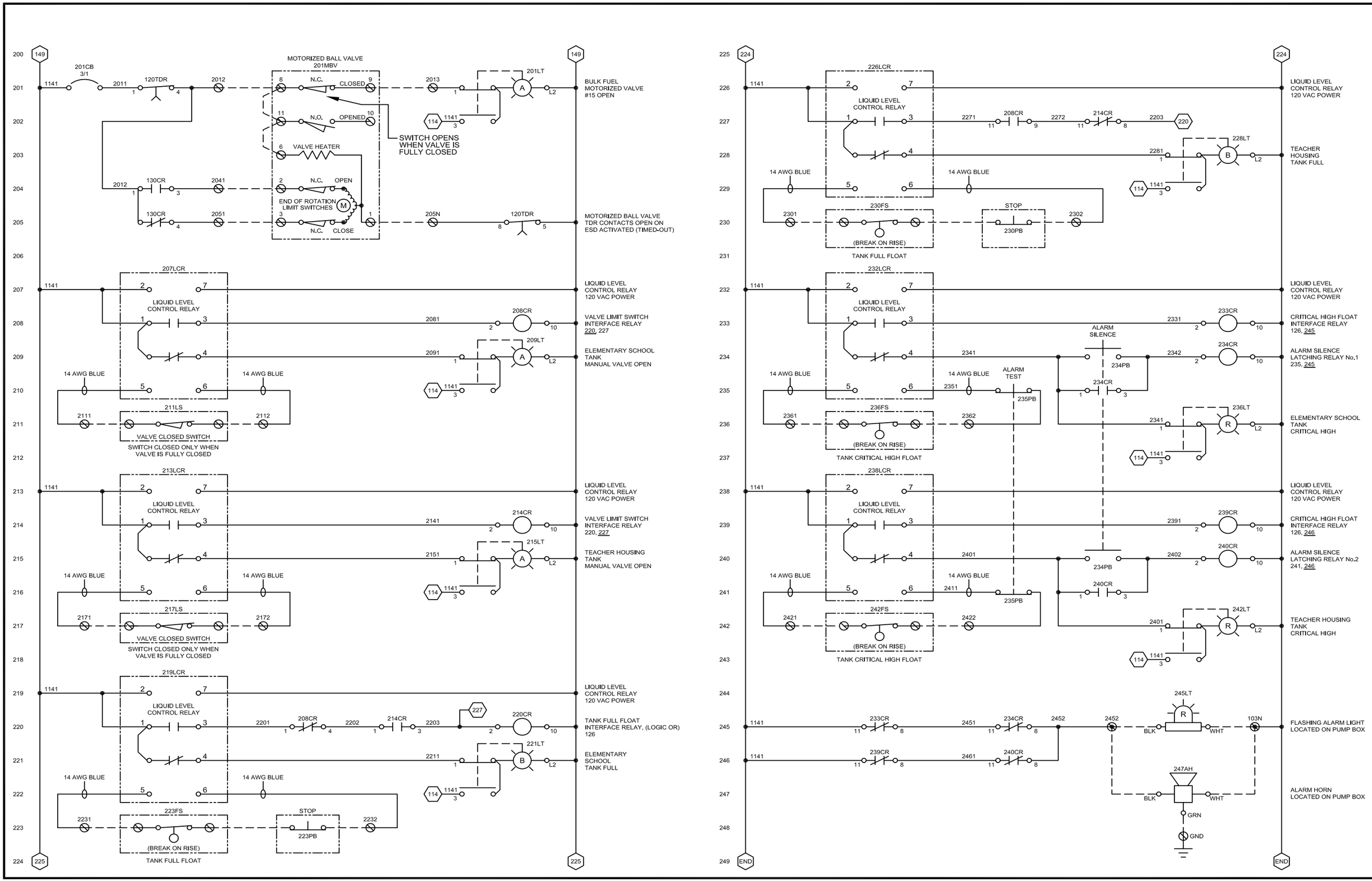
Designed By: RSC

Drawing By: RSC

Approved By:

Date: 03-11-05

Sheet No. E100



DESCRIPTION: **ANIAK ELEMENTARY SCHOOL CONTROL PANEL CP-A2**

PROJECT: **MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT**

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CONTROL SYSTEMS DISTRIBUTOR
a division of RSD
26021 Atlantic Ocean Drive
Lake Forest, CA. 92630
949-380-7878 • 949-380-0755 Fax

Job No.: **7062**

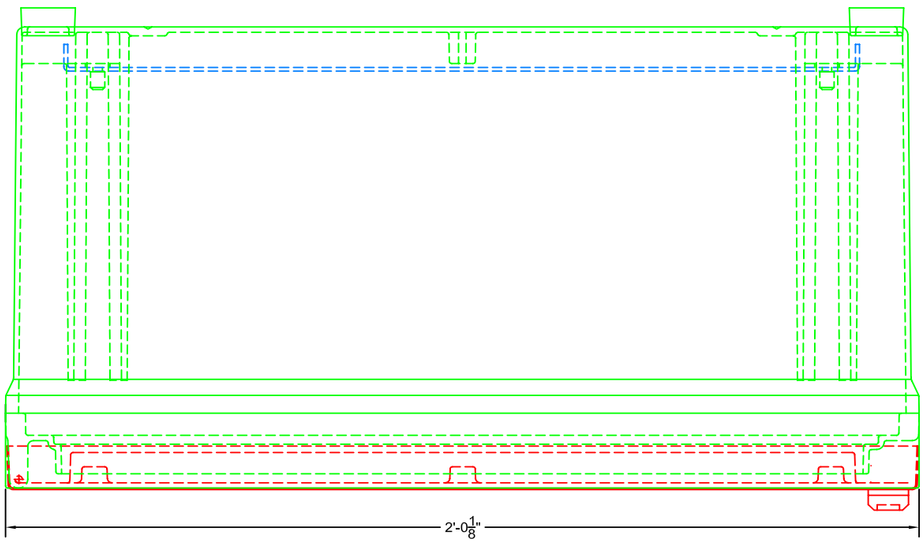
Sheet: **2 of 2**

Sheet Title: **ELECTRICAL**

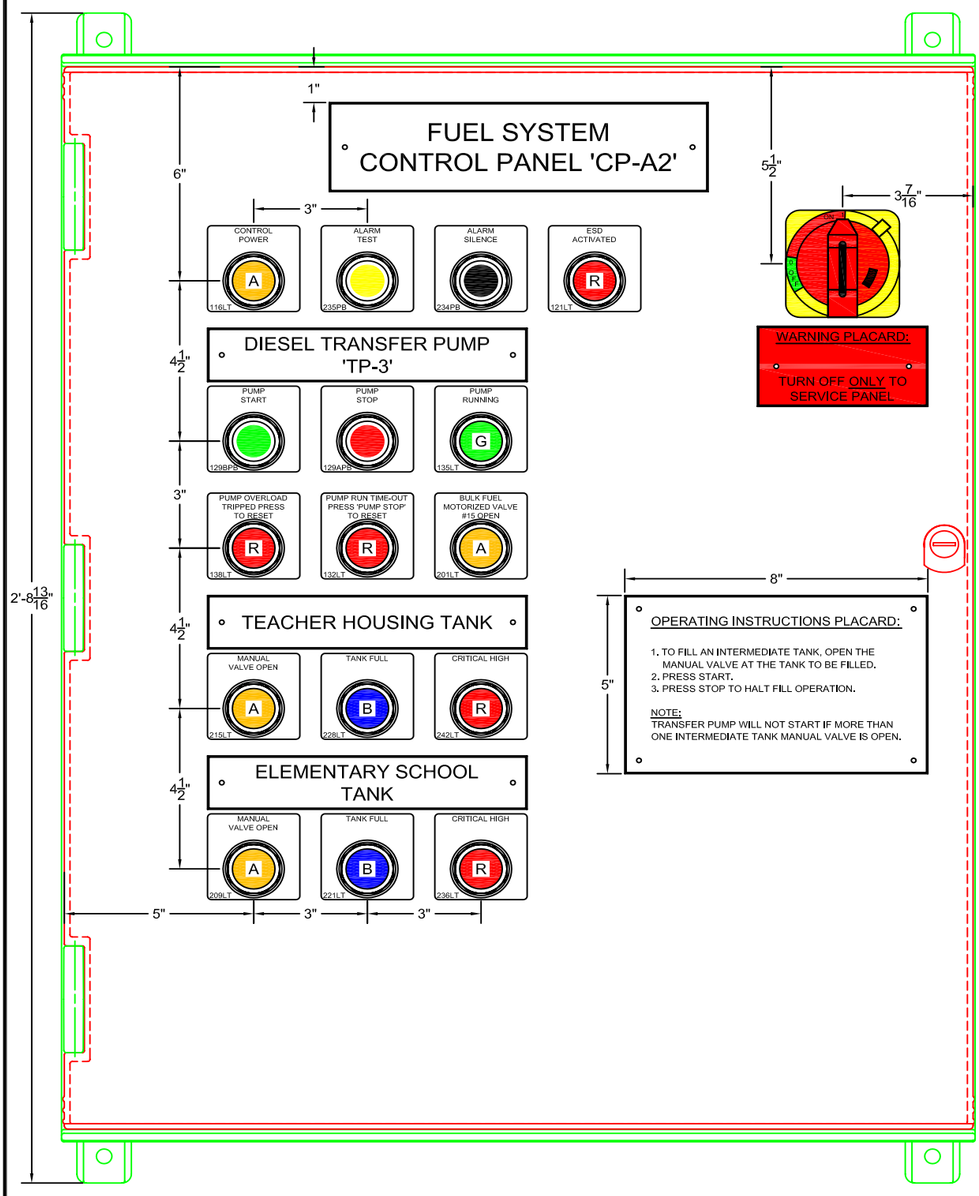
Revisions

Rev	Date	Revision
0	04/05	Issued for Construction

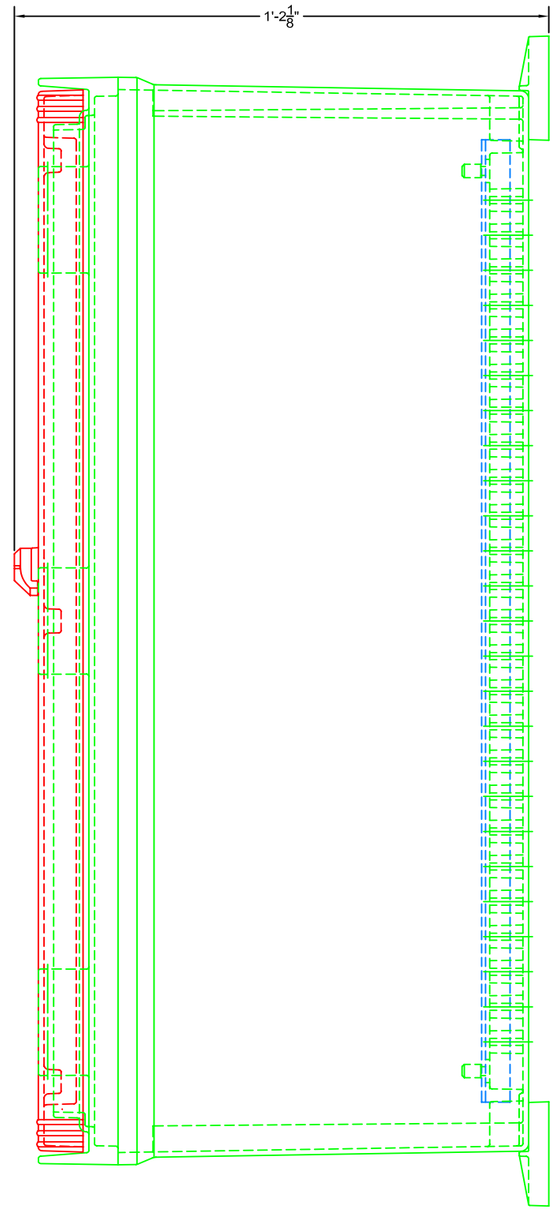
Project No.: **7062**
Designed By: RSC
Drawing By: RSC
Approved By:
Date: 03-11-05
Sheet No. E200



TOP VIEW



FRONT PANEL VIEW



SIDE VIEW

Revisions		
Rev	Date	Revision
0	04/01	Issued for Construction

Project No.: 7062
Designed By: RSC
Drawing By: RSC
Approved By:
Date: 03-18-05
Sheet No. PNL100

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Sheet Title: DOOR LAYOUT | Sheet: 1 of 2 | Job No.: 7062

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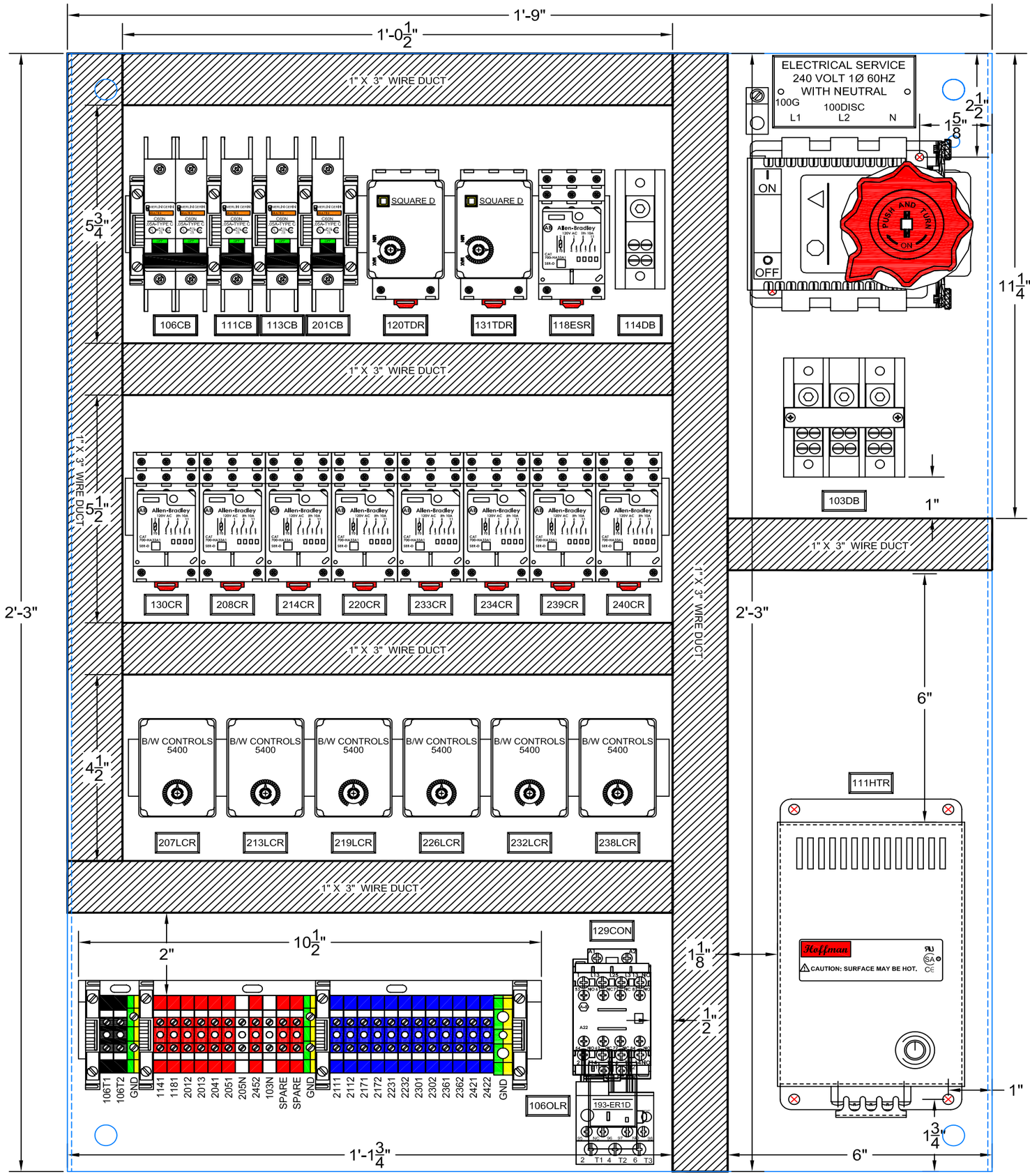
PROJECT:
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

DESCRIPTION:
ANIAK ELEMENTARY SCHOOL CONTROL PANEL CP-A2



SUB-PANEL LAYOUT
CP-A2
A30P24

Revisions		
Rev	Date	Revision
0	04/01	Issued for Construction

Project No.: 7062
Designed By: RSC
Drawing By: RSC
Approved By:
Date: 03-18-05
Sheet No. PNL200

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26021 Atlantic Ocean Drive
Lake Forest, CA. 92630
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Sheet Title: PANEL LAYOUT | Sheet: 2 of 2 | Job No.: 7062

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PROJECT:
MIDDLE KUSKOKWIM REGIONAL ENERGY PROJECT

DESCRIPTION:
ANIAK ELEMENTARY SCHOOL CONTROL PANEL CP-A2

APPENDIX I

National Geodetic Survey Data Sheets

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.5
1         National Geodetic Survey,   Retrieval Date = DECEMBER  8, 2014
 UV8494 ***********************************************************************
 UV8494  DESIGNATION -  ANIAK AIRWAY BEACON
 UV8494  PID         -  UV8494
 UV8494  STATE/COUNTY-  AK/BETHEL CENSUS
 UV8494  COUNTRY     -  US
 UV8494  USGS QUAD   -  RUSSIAN MISSION C-2
 UV8494
 UV8494                         *CURRENT SURVEY CONTROL
 UV8494  ______________________________________________________________________
 UV8494* NAD 83(1986) POSITION- 61 34 41.46561(N) 159 32 19.12756(W)   ADJUSTED
 UV8494* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 UV8494  ______________________________________________________________________
 UV8494  LAPLACE CORR    -         10.54  (seconds)                    DEFLEC12A
 UV8494  GEOID HEIGHT    -         10.51  (meters)                     GEOID12A
 UV8494  HORZ ORDER      -  THIRD
 UV8494
 UV8494.The horizontal coordinates were established by classical geodetic methods
 UV8494.and adjusted by the National Geodetic Survey in July 1986.
 UV8494.
 UV8494.The Laplace correction was computed from DEFLEC12A derived deflections.
 UV8494
 UV8494. The following values were computed from the NAD 83(1986) position.
 UV8494
 UV8494;                     North         East     Units Scale Factor Converg.
 UV8494;SPC AK 6     -   844,887.632   418,278.747   MT  0.99998179   -1 21 11.7
 UV8494;UTM  04      - 6,827,309.218   471,398.109   MT  0.99961002   -0 28 25.4
 UV8494
 UV8494                           SUPERSEDED SURVEY CONTROL
 UV8494
 UV8494  NAD 27      -  61 34 44.05672(N)    159 32 10.66192(W) AD(       ) 3
 UV8494
 UV8494.Superseded values are not recommended for survey control.
 UV8494
 UV8494.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 UV8494.See file dsdata.txt to determine how the superseded data were derived.
 UV8494
 UV8494_U.S. NATIONAL GRID SPATIAL ADDRESS: 4VDP7139827309(NAD 83)
 UV8494
 UV8494_MARKER: 22 = AIRWAY BEACON
 UV8494
 UV8494  HISTORY     - Date     Condition        Report By
 UV8494  HISTORY     - 1949     FIRST OBSERVED   CGS
 UV8494  HISTORY     - 1951     GOOD             CGS
 UV8494  HISTORY     - 1971     GOOD             NGS
 UV8494
 UV8494                           STATION DESCRIPTION
 UV8494
 UV8494'DESCRIBED BY COAST AND GEODETIC SURVEY 1949 (CLF)
 UV8494'AIRWAY BEACON, 3 SECOND REVOLVING LIGHT ON TOP OF 60 FOOT RED AND
 UV8494'WHITE MAST ON THE SOUTH SIDE AND ABOUT MIDWAY OF THE CAA RUNWAY,
 UV8494'NEAR THE CAA CONTROL BUILDING.
 UV8494
 UV8494                           STATION RECOVERY (1951)
 UV8494
 UV8494'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1951 (EBL)
 UV8494'THE OLD DESCRIPTION IS CORRECT AND ADEQUATE.
 UV8494
 UV8494                           STATION RECOVERY (1971)
 UV8494
 UV8494'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1971 (PDC)
 UV8494'THE STATION WAS RECOVERED AS DESCRIBED.

 *** retrieval complete.
 Elapsed Time = 00:00:03
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.5
1         National Geodetic Survey,   Retrieval Date = DECEMBER  8, 2014
 UV8492 ***********************************************************************
 UV8492  DESIGNATION -  ANIAK NE BASE
 UV8492  PID         -  UV8492
 UV8492  STATE/COUNTY-  AK/BETHEL CENSUS
 UV8492  COUNTRY     -  US
 UV8492  USGS QUAD   -  RUSSIAN MISSION C-2
 UV8492
 UV8492                         *CURRENT SURVEY CONTROL
 UV8492  ___________________________________________________________________
 UV8492* NAD 83(1986) POSITION- 61 34 38.59951(N) 159 31 27.66374(W)   ADJUSTED
 UV8492* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 UV8492  ___________________________________________________________________
 UV8492  LAPLACE CORR    -         11.21  (seconds)                    DEFLEC12A
 UV8492  GEOID HEIGHT    -         10.50  (meters)                     GEOID12A
 UV8492  HORZ ORDER      -  FIRST
 UV8492  VERT ORDER      -  THIRD ? (See Below)
 UV8492
 UV8492.The horizontal coordinates were established by classical geodetic methods
 UV8492.and adjusted by the National Geodetic Survey in July 1986.
 UV8492.
 UV8492.The vertical order pertains to the first NAVD 88 superseded value.
 UV8492
 UV8492.The Laplace correction was computed from DEFLEC12A derived deflections.
 UV8492
 UV8492. The following values were computed from the NAD 83(1986) position.
 UV8492
 UV8492;                    North         East     Units Scale Factor Converg.
 UV8492;SPC AK 6     -   844,781.087   419,035.842   MT  0.99998028   -1 20 26.4
 UV8492;UTM  04      - 6,827,214.342   472,156.468   MT  0.99960950   -0 27 40.1
 UV8492
 UV8492:                Primary Azimuth Mark                     Grid Az
 UV8492:SPC AK 6     -  ANIAK AIRWAY BEACON                      278 00 38.0
 UV8492:UTM  04      -  ANIAK AIRWAY BEACON                      277 07 51.7
 UV8492
 UV8492|-------------------------------------------------------------------|
 UV8492| PID    Reference Object                     Distance      Geod. Az  |
 UV8492|                                                           dddmmss.s |
 UV8492| CU2242 ANIAK NE BASE RM 1                   41.980 METERS 20301     |
 UV8492| UV8499 AP 1971 STA A ANI                    40.413 METERS 21523     |
 UV8492| UV8494 ANIAK AIRWAY BEACON                 APPROX. 0.8 KM 2764011.6 |
 UV8492| UV8495 ANIAK SOUTH RADIO MAST              APPROX. 3.6 KM 2781902.9 |
 UV8492| UV8496 ANIAK NORTH RADIO MAST              APPROX. 3.7 KM 2800305.7 |
 UV8492| UV8493 S 2638 C1 S 2226 C2 GLO 1949        206.120 METERS 29859     |
 UV8492| CU2243 ANIAK NE BASE RM 2                   55.134 METERS 35906     |
 UV8492|-------------------------------------------------------------------|
 UV8492
 UV8492                          SUPERSEDED SURVEY CONTROL
 UV8492
 UV8492  NAD 27      -  61 34 41.19052(N)    159 31 19.19861(W) AD(       ) 1
 UV8492  NGVD 29 (07/19/86)   25.60   (m)           84.0    (f) LEVELING    3
 UV8492
 UV8492.Superseded values are not recommended for survey control.
 UV8492
 UV8492.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 UV8492.See file dsdata.txt to determine how the superseded data were derived.
 UV8492
 UV8492_U.S. NATIONAL GRID SPATIAL ADDRESS: 4VDP7215627214(NAD 83)
 UV8492
 UV8492_MARKER: DS = TRIANGULATION STATION DISK
 UV8492_SETTING: 17 = SET INTO TOP OF METAL PIPE DRIVEN INTO GROUND
 UV8492_SP_SET: METAL PIPE IMBEDDED IN GROUND
 UV8492_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
 UV8492_SATELLITE: THE SITE LOCATION WAS REPORTED AS NOT SUITABLE FOR
 UV8492+SATELLITE: SATELLITE OBSERVATIONS - March 28, 2007
 UV8492
 UV8492  HISTORY     - Date     Condition        Report By
 UV8492  HISTORY     - 1949     MONUMENTED       CGS
 UV8492  HISTORY     - 1951     GOOD             CGS
```

```
UV8492  HISTORY     - 1953     GOOD             USE
UV8492  HISTORY     - 1971     GOOD             NGS
UV8492  HISTORY     - 1976     GOOD             NGS
UV8492  HISTORY     - 20070328 GOOD             TSLLC
UV8492
UV8492                          STATION DESCRIPTION
UV8492
UV8492'DESCRIBED BY COAST AND GEODETIC SURVEY 1949 (CLF)
UV8492'THE STATION IS LOCATED AT THE VILLAGE OF ANIAK, 138 FEET NORTH OF THE
UV8492'NORTHEAST CORNER OF THE AIRWAY STRIP AND 180 FEET SOUTH OF A CABIN.
UV8492'IT IS WITNESSED BY A 1-FOOT BENCH THAT IS ERECTED OVER THE MARK.
UV8492'
UV8492'THE STATION IS MARKED WITH A STANDARD DISK, STAMPED ANIAK N E BASE
UV8492'1949, THAT IS BRAZED TO THE TOP OF A 2-INCH IRON PIPE WHICH PROJECTS
UV8492'4 INCHES.
UV8492'
UV8492'REFERENCE MARK NO. 1 IS LOCATED AT THE NORTHEAST CORNER OF THE
UV8492'AIR-STRIP.  IT IS A STANDARD DISK, STAMPED ANIAK N E BASE NO 1 1949,
UV8492'THAT IS BRAZED TO THE TOP OF A 1-INCH IRON PIPE WHICH PROJECTS 10
UV8492'INCHES.
UV8492'
UV8492'REFERENCE MARK NO. 2 IS LOCATED AT THE SOUTHWEST CORNER OF THE CABIN.
UV8492'IT IS A STANDARD DISK, STAMPED ANIAK N E BASE NO 2 1949, THAT IS
UV8492'BRAZED TO THE TOP OF A 1-INCH IRON PIPE WHICH PROJECTS 8 INCHES.
UV8492'
UV8492'A G.L.O. MARK, STAMPED S 2638 C1 S2226 C2, IS LOCATED 114 FEET NORTH
UV8492'OF THE NORTH EDGE OF THE AIR-STRIP AND IS SET 6 INCHES BELOW THE
UV8492'SURFACE OF THE GROUND. IT IS WITNESSED BY A 2 BY 4 WOODEN STAKE.
UV8492'
UV8492'ANOTHER MARK, ASSUMED TO BE A GLO MARK, WAS LOCATED 30 FEET WEST OF
UV8492'THE CENTER OF A T ROAD INTERSECTION. THE FOOT OF THE T LEADS
UV8492'EASTERLY TO THE RIVER. IT IS ABOUT 0.1 MILE NORTH-NORTHWEST FROM THE
UV8492'STATION.  IT IS A 1-1/4 INCH IRON PIPE WITH A WOODEN PLUG IN THE TOP
UV8492'(CENTERED WITH A NAIL).  THE PIPE PROJECTS 12 INCHES AND IS
UV8492'WITNESSED BY A 2 BY 4 WOODEN STAKE.  NO 22 IS STAMPED ON THE SIDE OF
UV8492'THE PIPE.
UV8492'
UV8492'THE SUBSTITUTE CONTROL POINT IS THE SOUTH GABLE OF THE CABIN,
UV8492'ADJACENT TO THE STATION. THE GROUND AT BASE OF CABIN IS 1 FOOT HIGHER
UV8492'THAN THE STATION MARK.
UV8492
UV8492                          STATION RECOVERY (1951)
UV8492
UV8492'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1951 (EBL)
UV8492'STATION WAS RECOVERED AS DESCRIBED AND ALL MARKS WERE FOUND IN GOOD
UV8492'CONDITION.
UV8492
UV8492                          STATION RECOVERY (1953)
UV8492
UV8492'RECOVERY NOTE BY US ENGINEERS 1953
UV8492'DESCRIPTION ADEQUATE.  RM 1 IN GOOD CONDITION. RM 2 NOT
UV8492'FOUND.  LINE OF SIGHT CLEAR IN ALL DIRECTIONS EXCEPT NE WHEN
UV8492'OCCUPIED BY A T-2 TRIPOD.  TOP OF MARK IS 6 INCHES ABOVE SURFACE OF
UV8492'GROUND.
UV8492
UV8492                          STATION RECOVERY (1971)
UV8492
UV8492'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1971 (PDC)
UV8492'THE STATION WAS RECOVERED IN GOOD CONDITION NEW DESCRIPTION FOLLOWS--
UV8492'THE STATION IS LOCATED IN THE VILLAGE OF ANIAK.  203.7 FEET NORTH OF
UV8492'THE MOST NORTHERLY THRESHOLD LIGHT ON RUNWAY END 28. 180 FEET SOUTH
UV8492'OF THE SOUTHWEST CORNER OF BUILDING. 138 FEET NORTH OF THE NORTHEAST
UV8492'CORNER OF BLADED SHOULDER ALONG RUNWAY. 63 FEET WEST OF THE TOP
UV8492'OF DIKE AND 15.5 FEET EAST OF THE CENTER OF DIRT ROAD. RM 1 HAS
UV8492'BEEN DESTROYED AND RM 2 AND GLO MARK S2638 C1 S2226 C2 WERE
UV8492'SEARCHED FOR BUT NOT FOUND.
UV8492
UV8492                          STATION RECOVERY (1976)
UV8492
UV8492'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1976 (ARB)
UV8492'RECOVERED AS DESCRIBED.  THERE IS NOW A 4 X 6 WITNESS POST 2 FEET
UV8492'WEST OF THE STATION.
UV8492
UV8492                          STATION RECOVERY (2007)
UV8492
UV8492'RECOVERY NOTE BY TERRA SURVEYS LLC 2007 (JGM)
UV8492'STATION MARK RECOVERED AS DESCRIBED IN GOOD CONDITION.  TOP OF MARK IS
UV8492'NOW 6 INCHES BELOW GROUND LEVEL.  THE STUMP OF A POST IS LOCATED 2
UV8492'FEET TO THE NORTHEAST.  THE STATION MARK IS LOCATED ON THE WEST EDGE
UV8492'OF A GROUP OF TREES THAT LIES BETWEEN THE DIRT ROAD AND THE DIKE THAT
UV8492'FORMS THE WEST BANK OF THE ANIAK RIVER.  TREE COVER TO THE EAST
```

```
UV8492'PARTIALLY OBSCURES THE STATION MARK MAKING GPS OBSERVATIONS MARGINAL
UV8492'AT BEST.

*** retrieval complete.
Elapsed Time = 00:00:03
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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.5
1         National Geodetic Survey,   Retrieval Date = DECEMBER  8, 2014
 UV8499 ***********************************************************************
 UV8499  DESIGNATION -  AP 1971 STA A ANI
 UV8499  PID         -  UV8499
 UV8499  STATE/COUNTY-  AK/BETHEL CENSUS
 UV8499  COUNTRY     -  US
 UV8499  USGS QUAD   -  RUSSIAN MISSION C-2
 UV8499
 UV8499                         *CURRENT SURVEY CONTROL
 UV8499  ______________________________________________________________________
 UV8499* NAD 83(1986) POSITION- 61 34 37.53504(N) 159 31 29.24932(W)   NO CHECK
 UV8499* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 UV8499  ______________________________________________________________________
 UV8499  LAPLACE CORR    -         11.09  (seconds)                     DEFLEC12A
 UV8499  GEOID HEIGHT    -         10.50  (meters)                      GEOID12A
 UV8499  HORZ ORDER      -  THIRD
 UV8499  VERT ORDER      -  THIRD ? (See Below)
 UV8499
 UV8499.The horizontal coordinates were established by classical geodetic methods
 UV8499.and adjusted by the National Geodetic Survey in July 1986.
 UV8499.
 UV8499.No horizontal observational check was made to the station.
 UV8499.
 UV8499.The vertical order pertains to the first NAVD 88 superseded value.
 UV8499
 UV8499.The Laplace correction was computed from DEFLEC12A derived deflections.
 UV8499
 UV8499. The following values were computed from the NAD 83(1986) position.
 UV8499
 UV8499;                    North         East     Units Scale Factor Converg.
 UV8499;SPC AK 6     -   844,748.693   419,011.680   MT  0.99998033   -1 20 27.8
 UV8499;UTM  04      - 6,827,181.594   472,132.816   MT  0.99960951   -0 27 41.5
 UV8499
 UV8499:                Primary Azimuth Mark                     Grid Az
 UV8499:SPC AK 6     -  OWHUT                                    037 26 25.3
 UV8499:UTM  04      -  OWHUT                                    036 33 39.0
 UV8499
 UV8499|---------------------------------------------------------------------|
 UV8499| PID    Reference Object                     Distance      Geod. Az  |
 UV8499|                                                           dddmmss.s |
 UV8499| UV8492 ANIAK NE BASE                        40.413 METERS 03523     |
 UV8499| UV8466 OWHUT                               APPROX. 5.3 KM 0360557.5 |
 UV8499| UV8494 ANIAK AIRWAY BEACON                 APPROX. 0.7 KM 2792334.4 |
 UV8499|---------------------------------------------------------------------|
 UV8499
 UV8499                          SUPERSEDED SURVEY CONTROL
 UV8499
 UV8499  NAD 27      -  61 34 40.12588(N)    159 31 20.78456(W) AD(       ) 3
 UV8499  NGVD 29 (07/19/86)   26.12   (m)           85.7    (f) LEVELING    3
 UV8499
 UV8499.Superseded values are not recommended for survey control.
 UV8499
 UV8499.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 UV8499.See file dsdata.txt to determine how the superseded data were derived.
 UV8499
 UV8499_U.S. NATIONAL GRID SPATIAL ADDRESS: 4VDP7213227181(NAD 83)
 UV8499
 UV8499_MARKER: DT = TOPOGRAPHIC STATION DISK
 UV8499_SETTING: 0 = UNSPECIFIED SETTING
 UV8499_STAMPING: AP 1971 STA A ANI
 UV8499_MARK LOGO: CGS
 UV8499_MAGNETIC: O = OTHER; SEE DESCRIPTION
 UV8499_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
 UV8499
 UV8499  HISTORY     - Date     Condition        Report By
 UV8499  HISTORY     - 1971     MONUMENTED       NGS
 UV8499  HISTORY     - 19910615 GOOD             NGS
 UV8499
 UV8499                          STATION DESCRIPTION
```

```
UV8499
UV8499'DESCRIBED BY NATIONAL GEODETIC SURVEY 1971 (PDC)
UV8499'THE STATION IS LOCATED SOUTHEAST OF RUNWAY END 28 ON THE NORTH SIDE
UV8499'OF THE RUNWAY NEAR THE END OF THE OVERRUN.  THE STATION IS 622.74
UV8499'FEET EASTSOUTHEAST OF THE CL END OF RUNWAY 28, 243.22 FEET
UV8499'NORTHEAST OF THE CENTER OF THE ILS-LO PLATFORM.  67.7 FEET
UV8499'WESTSOUTHWEST OF THE POINT OF INTERSECTION OF TWO GRAVEL ROADS.
UV8499'49.9 FEET NORTHWEST OF THE DML POLE AT THE IBS-LO BLDG.  44 FEET
UV8499'NORTHWEST OF THE CL OF GRAVEL ROAD.  AND 2.3 FEET NORTHWEST OF
UV8499'A 4X4 WITNESS POST.
UV8499'
UV8499'THE STATION IS A STANDARD TOPOGRAPHIC DISK STAMPED AP 1971 STA A ANI
UV8499'AND IS WELDED TO THE TOP OF A 2-INCH STEEL PIPE WHICH PROJECTS 2
UV8499'INCHES ABOVE THE GROUND.
UV8499
UV8499                          STATION RECOVERY (1991)
UV8499
UV8499'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991
UV8499'THE STATION IS LOCATED SOUTHEAST OF RUNWAY END 28 ON THE NORTH SIDE OF
UV8499'THE RUNWAY NEAR THE END OF THE OVERRUN.  THE STATION IS 622.74 FT
UV8499'(189.81 M) EAST-SOUTHEAST OF THE CL END OF RUNWAY 28, 243.22 FT (74.13
UV8499'M) NORTHEAST OF THE CENTER OF THE ILS-LO PLATFORM, 67.7 FT (20.6 M)
UV8499'WEST-SOUTHWEST OF THE POINT OF INTERSECTION OF TWO GRAVEL ROADS, 49.9
UV8499'FT (15.2 M) NORTHWEST OF THE DME POLE AT THE ILS-LO BUILDING, 44 FT
UV8499'(13.4 M) NORTHWEST OF THE CL OF GRAVEL ROAD, AND 2.3 FT (0.7 M)
UV8499'NORTHWEST OF A 4X4 FT WITNESS POST.  THE STATION IS A STANDARD
UV8499'TOPOGRAPHIC DISK STAMPED AP 1971 STA A ANI AND IS WELDED TO THE TOP OF
UV8499'A 2 INCH STEEL PIPE WHICH PROJECTS 2 INCHES ABOVE THE GROUND.

*** retrieval complete.
Elapsed Time = 00:00:02
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.5
1         National Geodetic Survey,   Retrieval Date = DECEMBER  8, 2014
 UV8501 ***********************************************************************
 UV8501  DESIGNATION -  AP 1971 STA B ANI
 UV8501  PID         -  UV8501
 UV8501  STATE/COUNTY-  AK/BETHEL CENSUS
 UV8501  COUNTRY     -  US
 UV8501  USGS QUAD   -  RUSSIAN MISSION C-2
 UV8501
 UV8501                          *CURRENT SURVEY CONTROL
 UV8501  ______________________________________________________________________
 UV8501* NAD 83(1986) POSITION- 61 35 00.39875(N) 159 32 51.76953(W)   NO CHECK
 UV8501* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 UV8501  ______________________________________________________________________
 UV8501  LAPLACE CORR    -         10.17  (seconds)                    DEFLEC12A
 UV8501  GEOID HEIGHT    -         10.51  (meters)                     GEOID12A
 UV8501  HORZ ORDER      -  THIRD
 UV8501  VERT ORDER      -  THIRD ? (See Below)
 UV8501
 UV8501.The horizontal coordinates were established by classical geodetic methods
 UV8501.and adjusted by the National Geodetic Survey in July 1986.
 UV8501.
 UV8501.No horizontal observational check was made to the station.
 UV8501.
 UV8501.The vertical order pertains to the first NAVD 88 superseded value.
 UV8501
 UV8501.The Laplace correction was computed from DEFLEC12A derived deflections.
 UV8501
 UV8501. The following values were computed from the NAD 83(1986) position.
 UV8501
 UV8501;                    North         East     Units Scale Factor Converg.
 UV8501;SPC AK 6     -   845,484.944   417,811.152   MT  0.99998273   -1 21 40.7
 UV8501;UTM  04      - 6,827,899.063   470,921.577   MT  0.99961036   -0 28 54.2
 UV8501
 UV8501:                Primary Azimuth Mark                      Grid Az
 UV8501:SPC AK 6     -  ARP 1971 ANI                              121 36 56.5
 UV8501:UTM  04      -  ARP 1971 ANI                              120 44 10.0
 UV8501
 UV8501|---------------------------------------------------------------------|
 UV8501| PID    Reference Object                     Distance      Geod. Az  |
 UV8501|                                                           dddmmss.s |
 UV8501| UV8500 ARP 1971 ANI                        APPROX. 0.7 KM 1201515.8 |
 UV8501| UV8494 ANIAK AIRWAY BEACON                 APPROX. 0.8 KM 1403501.5 |
 UV8501|---------------------------------------------------------------------|
 UV8501
 UV8501                          SUPERSEDED SURVEY CONTROL
 UV8501
 UV8501  NAD 27      -  61 35 02.99022(N)    159 32 43.30286(W) AD(       ) 3
 UV8501  NGVD 29 (07/19/86)   25.14   (m)           82.5    (f) LEVELING    3
 UV8501
 UV8501.Superseded values are not recommended for survey control.
 UV8501
 UV8501.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 UV8501.See file dsdata.txt to determine how the superseded data were derived.
 UV8501
 UV8501_U.S. NATIONAL GRID SPATIAL ADDRESS: 4VDP7092127899(NAD 83)
 UV8501
 UV8501_MARKER: DT = TOPOGRAPHIC STATION DISK
 UV8501_SETTING: 0 = UNSPECIFIED SETTING
 UV8501_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
 UV8501
 UV8501  HISTORY     - Date     Condition        Report By
 UV8501  HISTORY     - 1971     MONUMENTED       NGS
 UV8501
 UV8501                           STATION DESCRIPTION
 UV8501
 UV8501'DESCRIBED BY NATIONAL GEODETIC SURVEY 1971 (PDC)
 UV8501'THE STATION IS LOCATED APPROXIMATELY 2,000 FEET SOUTHEAST OF RUNWAY
 UV8501'END 10 ON THE NORTH SIDE OF THE RUNWAY.  THE STATION IS 171.0 FEET
 UV8501'EAST OF THE NINTH RUNWAY LIGHT FROM RUNWAY END 10.  85.8 FEET
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UV8501'NORTHWEST OF THE TENTH RUNWAY LIGHT FROM RUNWAY END 10.  72.5 FEET
UV8501'NORTHEAST OF THE LINE PROJECTING BETWEEN THE RUNWAY LIGHTS.  169
UV8501'FEET SOUTHEAST OF A FOOT PATH.  AND 2 FEET SOUTHEAST OF A 4X6
UV8501'WITNESS POST.
UV8501'
UV8501'THE STATION IS A STANDARD TOPOGRAPHIC DISK STAMPED AP 1971 STA B ANI
UV8501'AND WELDED TO A 2-INCH STEEL PIPE.  THE MARK HAS BEEN COVERED WITH
UV8501'GRAVEL AND IS APPROXIMATELY 2.5 FEET BELOW THE SURFACE OF THE
UV8501'BLADED GRAVEL SHOULDER.

*** retrieval complete.
Elapsed Time = 00:00:03
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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.5
1         National Geodetic Survey,   Retrieval Date = DECEMBER  8, 2014
 UV8500 ***********************************************************************
 UV8500  DESIGNATION -  ARP 1971 ANI
 UV8500  PID         -  UV8500
 UV8500  STATE/COUNTY-  AK/BETHEL CENSUS
 UV8500  COUNTRY     -  US
 UV8500  USGS QUAD   -  RUSSIAN MISSION C-2
 UV8500
 UV8500                         *CURRENT SURVEY CONTROL
 UV8500  ______________________________________________________________________
 UV8500* NAD 83(1986) POSITION- 61 34 49.75702(N) 159 32 13.49846(W)   NO CHECK
 UV8500* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 UV8500  ______________________________________________________________________
 UV8500  LAPLACE CORR    -         11.03  (seconds)                     DEFLEC12A
 UV8500  GEOID HEIGHT    -         10.51  (meters)                      GEOID12A
 UV8500  HORZ ORDER      -  THIRD
 UV8500  VERT ORDER      -  THIRD ? (See Below)
 UV8500
 UV8500.The horizontal coordinates were established by classical geodetic methods
 UV8500.and adjusted by the National Geodetic Survey in July 1986.
 UV8500.
 UV8500.No horizontal observational check was made to the station.
 UV8500.
 UV8500.The vertical order pertains to the first NAVD 88 superseded value.
 UV8500
 UV8500.The Laplace correction was computed from DEFLEC12A derived deflections.
 UV8500
 UV8500. The following values were computed from the NAD 83(1986) position.
 UV8500
 UV8500;                     North         East     Units Scale Factor Converg.
 UV8500;SPC AK 6     -   845,142.257   418,367.840   MT  0.99998161   -1 21 06.9
 UV8500;UTM  04      - 6,827,565.086   471,483.251   MT  0.99960996   -0 28 20.5
 UV8500
 UV8500:                Primary Azimuth Mark                     Grid Az
 UV8500:SPC AK 6     -  AP 1971 STA B ANI                        301 36 56.4
 UV8500:UTM  04      -  AP 1971 STA B ANI                        300 44 10.0
 UV8500
 UV8500|---------------------------------------------------------------------|
 UV8500| PID    Reference Object                     Distance      Geod. Az  |
 UV8500|                                                           dddmmss.s |
 UV8500| UV8494 ANIAK AIRWAY BEACON                 269.767 METERS 19756     |
 UV8500| UV8501 AP 1971 STA B ANI                   APPROX. 0.7 KM 3001549.5 |
 UV8500|---------------------------------------------------------------------|
 UV8500
 UV8500                           SUPERSEDED SURVEY CONTROL
 UV8500
 UV8500  NAD 27      -  61 34 52.34802(N)    159 32 05.03203(W) AD(       ) 3
 UV8500  NGVD 29 (07/19/86)   25.23   (m)           82.8    (f) LEVELING    3
 UV8500
 UV8500.Superseded values are not recommended for survey control.
 UV8500
 UV8500.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 UV8500.See file dsdata.txt to determine how the superseded data were derived.
 UV8500
 UV8500_U.S. NATIONAL GRID SPATIAL ADDRESS: 4VDP7148327565(NAD 83)
 UV8500
 UV8500_MARKER: DT = TOPOGRAPHIC STATION DISK
 UV8500_SETTING: 0 = UNSPECIFIED SETTING
 UV8500_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
 UV8500
 UV8500  HISTORY     - Date     Condition        Report By
 UV8500  HISTORY     - 1971     MONUMENTED       NGS
 UV8500
 UV8500                           STATION DESCRIPTION
 UV8500
 UV8500'DESCRIBED BY NATIONAL GEODETIC SURVEY 1971 (PDC)
 UV8500'THE STATION IS LOCATED NEAR THE CENTER OF THE ANIAK AIRPORT ON THE
 UV8500'NORTH SIDE OF THE GRAVEL RUNWAY 10-28.  THE STATION IS
 UV8500'250.1 FEET NORTHWEST OF THE CENTER OF THE SOUTH END OF A WOODEN
```

```
UV8500'BRIDGE.  146.0 FEET EAST OF THE NINETEENTH RUNWAY LIGHT FROM
UV8500'RUNWAY END 10.  148.3 FEET NORTH OF THE TWENTIETH RUNWAY LIGHT
UV8500'FROM RUNWAY END 10.  107.3 FEET NORTHEAST OF THE LINE PROJECTING
UV8500'BETWEEN THE RUNWAY LIGHTS.  AND 2 FEET NORTHWEST OF A 4X4
UV8500'WITNESS POST.  THERE ARE 28 RUNWAY LIGHTS ON EACH SIDE OF THE
UV8500'RUNWAY.
UV8500'
UV8500'THE STATION IS A STANDARD TOPOGRAPHIC DISK STAMPED ARP 1971 ANI
UV8500'AND WELDED TO A 2-INCH STEEL PIPE THAT PROJECTS 2 INCHES ABOVE THE
UV8500'GROUND.

*** retrieval complete.
Elapsed Time = 00:00:02
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The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.5
1         National Geodetic Survey,   Retrieval Date = DECEMBER  8, 2014
 UV8493 ***********************************************************************
 UV8493  DESIGNATION -  S 2638 C1 S 2226 C2 GLO 1949
 UV8493  PID         -  UV8493
 UV8493  STATE/COUNTY-  AK/BETHEL CENSUS
 UV8493  COUNTRY     -  US
 UV8493  USGS QUAD   -  RUSSIAN MISSION C-2
 UV8493
 UV8493                        *CURRENT SURVEY CONTROL
 UV8493  ______________________________________________________________________
 UV8493* NAD 83(1986) POSITION- 61 34 41.82553(N) 159 31 39.88337(W)   ADJUSTED
 UV8493* NAVD 88 ORTHO HEIGHT -          **(meters)           **(feet)
 UV8493  ______________________________________________________________________
 UV8493  LAPLACE CORR    -         11.30  (seconds)                     DEFLEC12A
 UV8493  GEOID HEIGHT    -         10.50  (meters)                      GEOID12A
 UV8493  HORZ ORDER      -  THIRD
 UV8493
 UV8493.The horizontal coordinates were established by classical geodetic methods
 UV8493.and adjusted by the National Geodetic Survey in July 1986.
 UV8493.
 UV8493.The Laplace correction was computed from DEFLEC12A derived deflections.
 UV8493
 UV8493. The following values were computed from the NAD 83(1986) position.
 UV8493
 UV8493;                     North         East     Units Scale Factor Converg.
 UV8493;SPC AK 6     -   844,885.143   418,857.920   MT  0.99998064   -1 20 37.2
 UV8493;UTM  04      - 6,827,315.618   471,977.037   MT  0.99960962   -0 27 50.9
 UV8493
 UV8493                           SUPERSEDED SURVEY CONTROL
 UV8493
 UV8493  NAD 27      -  61 34 44.41652(N)    159 31 31.41761(W) AD(       ) 3
 UV8493
 UV8493.Superseded values are not recommended for survey control.
 UV8493
 UV8493.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 UV8493.See file dsdata.txt to determine how the superseded data were derived.
 UV8493
 UV8493_U.S. NATIONAL GRID SPATIAL ADDRESS: 4VDP7197727315(NAD 83)
 UV8493
 UV8493_MARKER: DD = SURVEY DISK
 UV8493_SETTING: 4 = OBJECT SURROUNDED BY MASS OF CONCRETE
 UV8493_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
 UV8493
 UV8493  HISTORY     - Date     Condition        Report By
 UV8493  HISTORY     - 1949     MONUMENTED       USGLO
 UV8493  HISTORY     - 1971     MARK NOT FOUND   NGS
 UV8493
 UV8493                           STATION DESCRIPTION
 UV8493
 UV8493'DESCRIBED BY US GENERAL LAND OFFICE 1949 (CLF)
 UV8493'GENERAL LANDOFFICE MARK, LOCATED AT ANIAK ALASKA, ABOUT 300 FEET EAST
 UV8493'OF THE SMALL ROAD HOUSE AND 114 FEET NORTH OF EDGE OF RUNWAY.
 UV8493'
 UV8493'BRONZE DISK MARKED THUS-- S2638 OVER C 1 ALSO C 2 OVER S2226 SET IN
 UV8493'CONCRETE 6 INCHES BELOW SURFACE.
 UV8493'
 UV8493'DISTANCE FROM ANIAK NE BASE STATION 206.12 MTRS 676.25 FEET.
 UV8493'WITNESSED BY A 2X4 STAKE. WHEN RECOVERING STATION CONTACT STORE
 UV8493'KEEPER OF THE NORTHERN COMMERCIAL STORE.
 UV8493
 UV8493                           STATION RECOVERY (1971)
 UV8493
 UV8493'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1971 (PDC)
 UV8493'THE STATION WAS SEARCHED FOR BUT NOT FOUND.

 *** retrieval complete.
 Elapsed Time = 00:00:03
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TRANSPORTATION & PUBLIC FACILITIES

STATE OF ALASKA

GREEN STAR