

SECTION 01340

SUBMITTALS

1. DESCRIPTION OF REQUIREMENTS

1.1 This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: (1) Contractor's Quality Control Plan, (2) Safety, Health and Emergency Response Plan (SHERP), (3) Construction Schedule, (4) Shop Drawings, Product Data, and Samples, (5) Contractor Quality Control Daily Report/Contractor Quality Control Project Summary Report. Detailed submittal requirements will be specified in the technical specifications sections.

1.2 Contractor's (CQCP) Quality Control Plan shall be in accordance with the requirements contained in Section 01100 Special Clauses. Plan shall be submitted to the Contracting Officer, for approval, within 15 days after Notice to Proceed.

1.3 The Contractor shall develop and submit to the Contracting Officer within 21 days following award of contract, his proposed SHERP regarding on-site health, safety, and emergency response procedures. The SHERP shall contain, as a minimum, all items specified and discussed in Section 01400, Special Safety Requirements.

1.4 Construction Schedule The Construction/Project Schedule and updates shall be submitted in accordance with SECTION: PROJECT SCHEDULES.

1.5 SUBMITTAL REGISTER (ENG FORM 4288). One (1) set of ENG Forms 4288 are enclosed with each technical specification which list each item of equipment and material of each type for which fabricators drawings, and/or related descriptive data, test reports, samples, or other types of submittals are required by the specifications. Columns 3, 4, 5, 6, 12, and 13 of ENG Form 4288 will be completed by the Government. The Contractor shall complete columns 7, 8, and 9 within twenty (20) calendar days after the preconstruction conference and return six (6) completed copies to the Contracting Officer's Representative for approval. Dates entered in columns 7 and 8 shall not include mail or delivery time. The ENG Forms 4288 will become a part of the contract after approval. Column 2 shall be left blank for use later to record the respective transmittal and item number indicated for the submittal item(s) listed on the transmittal form entitled: "TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE" (ENG Form 4025).

1.5.1 Scheduling. Drawings on component items forming a system or that are interrelated shall be scheduled to be correlated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 20 calendar days exclusive of mailing time) will be allowed on the register for review and approval and possible re-submittal of any items subject to approval. No delay damages or time extensions will be allowed for time lost in late submittals or re-submittals for such items.

1.5.2 Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work

sections of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

1.5.3 Application to Contract. The approved submittal register will become a part of the contract and Contractor will be subject to requirements thereof. This register and the progress schedules shall be coordinated.

1.6 CONTRACTOR QUALITY CONTROL DAILY REPORT/CONTRACTOR QUALITY CONTROL PROJECT SUMMARY REPORT

1.6.1 The Contractor Quality Control (CQC) Daily Report shall include at a minimum the following:

1. Location of work
2. Weather condition information
3. Work performed
4. Specific inspections performed and results
5. Problems identified
6. Corrective actions taken, if any
7. Instrument calibrations, frequency and results
8. Verbal instructions from government personnel for retesting
9. Type of test performed, samples collected, personnel involved and results of tests including quality control results
10. Results of QC checks, duplicate analysis etc.
11. General remarks
12. Contractor's certification

1.6.2 Special QC reports from the Contractor shall be submitted within 48 hours when significant problems with sampling, analyses, instrumentation or other QA problems are encountered.

1.6.3 At the end of the work, the Contractor shall prepare a Contractor Quality Control Project Summary Report for the Contracting Officer. The report is a compilation and summarization of Quality Control Daily Reports. The intended purpose of this report is to state the overall quality of data produced during the project and the acceptability of data based on QA/QC efforts. An appendix to this report will include copies of all documentation concerning data collection, analysis, and reporting. The appendix will contain the following:

1. Chain-of-custody documents
2. All laboratory analytical results
3. Meteorological records
4. Daily inspection records for staging and storage area

2. SUBMITTAL PROCESS. The Contractor shall submit all items listed on the contract drawings and listed or specified in the other sections of these specifications. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective

addresses set forth below. Each submittal shall be complete and in sufficient detail for ready determination of compliance with the contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) Engineer and each respective transmittal form (ENG Form 4025) shall be stamped, initialed, and dated by the CQC Engineer certifying that the accompanying submittal complies with the contract requirements. Submittals shall include such items as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operation charts or curves; test reports; test cylinders; samples, O&M manuals including parts lists; certifications; warranties and other such required submittals. Submittals pertinent to materials and equipment which are subject to advance approval shall be scheduled and made prior to the acquisition or the delivery thereof. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, and units of work to be used by the Contracting Officer for independent inspection and testing, as applicable to the work. Product data shall include, if requested by the Contracting Officer, items of disposable clothing, safety equipment, breathing apparatus, communication devices, items of equipment to be used on the site, and any other items which are required for the safety and health of all personnel on the site.

2.1 All shop drawings submitted by Subcontractors for approval shall be sent directly to the Contractor for preliminary checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

2.2 The Contractor shall check all his Subcontractor's shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Drawings found to be inaccurate or otherwise in error shall be returned to the Contractor's Subcontractor for correction prior to being submitted to the Contracting Officer.

2.3 Categories of Submittals. The categories of items specified to be submitted shall be submitted as follows:

2.3.1 Category I. All items listed as Category I submittals in the various sections shall be mailed directly to the Architect-Engineer to be defined by the Resident Engineer. For each submittal, a completed information copy of the attached transmittal form shall also be mailed to the Resident Engineer and to the Construction Division of the Omaha District. Each required submittal which is in the form of a drawing shall be submitted as one (1) reproducible and one (1) print of the drawing. Drawing print shall be either blue or black line permanent-type prints on a white back-ground or blueprint. Reproducibles shall be browline diazo or sepia and shall be of such quality that prints made therefrom are sufficiently clear for microfilm copying. All catalog and descriptive data shall be submitted in eight (8) copies. Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment which is proposed for approval. Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to

demonstrate that the items have been properly coordinated and will function as a unit.

2.3.2 Category II. Except as noted below, data for all items listed as Category II Submittals in the various sections shall be submitted in five (5) copies to the Resident Engineer using the transmittal form. Items not to be submitted in quintuplicate, such as samples and test cylinders, shall be submitted to the Resident Engineer accompanied by five (5) copies of the transmittal form.

2.4 Control of Submittals. The contractor shall carefully control his procurement operations to assure that each individual submittal is made on or before the corresponding date scheduled on his approved "SUBMITTAL REGISTER."

2.5 Transmittal Form (ENG Form 4025). The sample transmittal form attached to this section shall be used for submitting both the Category I and Category II submittals, in strict accordance with the instructions on the reverse side thereof. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care should be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item. A separate transmittal form shall be attached to each copy of the data being submitted.

2.6 Approval Action.

2.6.1 Category I. All Category I submittals are subject to advance approval. Upon completion of review of Category I submittals, the drawing reproducible and print and other pertinent data will be identified as having received approval by being so stamped and dated. The drawing print and six (6) sets of all catalog data and descriptive literature will be retained by the Contracting Officer and the drawing reproducible and two (2) sets of catalog data and descriptive literature will be returned to the Contractor.

2.6.2 Category II. Submittals may be required for "Approval" or for "Information Only." Within the terms of the CONTRACT CLAUSES clause entitled "Specifications and Drawings for construction," Category II submittals "for approval" are considered to be "shop drawings" and Category II submittals "for information only" are not considered to be "shop drawings." Two (2) copies of Category II submittals for approval will be returned to the Contractor except for samples, test cylinders, and O&M manuals for which two (2) copies of the transmittal form only will be returned to the Contractor. Submittals for "Information Only" will not be returned to the Contractor. No Corps of Engineers' approval action will be required prior to incorporating these "Information Only" items into the work. These Contractor approved "Information Only" submittals will be used to verify that material received and used in the job is the same as that described in the plans and specifications and will be used as record copies. Delegation of this approval authority to the CQC Engineer does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the Contracting Officer from requiring removal and replacement if nonconforming material is incorporated in the work. This obligation does not relieve the Contractor from the requirement to furnish samples for testing by the Government laboratory or check testing by the Government in those instances where the technical specifications so prescribe.

2.6.3 Meaning of Approvals. The approval of the submittals by the Contracting Officer or his authorized representative shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist as the Contractor, under the CQC requirements of this contract, is responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work. After submittals have been approved by the contracting Officer or his authorized representative, no re-submittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by an acceptable explanation as to why a substitution is necessary.

2.6.4 When Not Approved. The Contractor shall make all corrections required by the Contracting Officer or his authorized representative and promptly furnish a corrected submittal in the form and number of copies as specified for initial submittals. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, notice as required under the CONTRACT CLAUSES clause entitled "Changes" should promptly be given to the Contracting Officer.

2.6.5 Withholding of Payment. Payment for materials incorporated into the work will not be made if required approvals have not been obtained.

3. CONTRACTOR RESPONSIBILITIES

3.1 The Contractor shall review shop drawings, product data and samples prior to submission to determine and verify the following:

1. Field measurements
2. Field construction criteria
3. Catalog numbers and similar data
4. Conformance with the Specifications, Protocol and Contingency Plans

3.2 Each shop drawing, working drawing, sample and catalog data submitted by the Contractor shall have affixed to it the following Certification Statement, signed by the Contractor: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Subcontract requirements.

3.3 Notify the Contracting Officer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Subcontract Documents.

3.4 The review and approval of shop drawings, samples or catalog data by the Contracting Officer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Contracting Officer will have no responsibility therefor.

3.5 No portion of the work requiring a shop drawing, working drawing, sample, or catalog data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall

be at the Contractor's risk. The COE will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

3.6 Project work, materials, fabrication, and installation shall conform with approved shop drawings, working drawings, applicable samples, and catalog data.

4. CONSTRUCTION PHOTOGRAPHS

4.1 Before Work Begins. The Contractor shall use a wide angle lens to take ten (10) views of the general site showing the location of each facility, entrance/exit road, etc. These photographs shall be 8-in x 10-in color prints.

4.2 Progress Photographs. After construction operations have been started at the site, the Contractor shall photographically record the capping of the waste site.

4.2.1 The progress photographs can be 3-in x 5-in and shall include, as a minimum, coverage of:

1. Landfill soil excavation, handling, and placement in fill area.
2. Unanticipated events such as spillage of soil in uncontaminated zones or related accidents.
3. Truck loading and decontamination.
4. Borrow pit area.
5. Personnel decontamination.
6. Site or task-specific employee respiratory and personnel protection.
7. Fill placement, compaction, density tests, and grading.
8. Membrane placement, seam welds.
9. Seeding and cover establishment.
10. Rock placement.
11. Pond pumping and fill placement in this area.
12. Any unforeseen condition.

4.3 Post Construction Photographs

4.3.1 After completion of work the Contractor shall take ten (10) views of the completed site using a wide angle lens (minimum 10 photographs, 8-in x 10-in).

4.3.2 The actual number and location of views to be taken shall be as directed by the Contracting Officer.

4.4 All photographic work shall be done by a qualified, established commercial photographer acceptable to the Contracting Officer. Three (3-in x 5-in) prints of each photograph along with the negatives shall be furnished within ten (10) calendar days to the Contracting Officer, and each print shall have a glossy finish and be mounted on a substantial backing. The overall dimensions of each mounted print shall be 8 x 10-in with 1-1/4-in flexible binding margin on the short left hand side.

4.5 All photographs are U.S. Government property and shall not be released by the Contractor to the public or news media. The photographs shall be mounted and enclosed back-to-back in a double-face plastic sleeve punched to fit standard three-ring binders.

4.6 Prints shall be color prints, be of standard commercial quality, be sized as previously described, be of single weight glossy paper; and each print shall show an information box, 1-1/2-in x 3-1/2-in in the lower right hand center. The information box for the 3-in x 5-in photographs shall be

scaled down accordingly, or taped to the bottom of the photo. The box shall be type written and arranged as follows:

1. Project No. and Contract No.
2. Contractor's name
3. Short description of view
4. Photo no. and date taken
5. Photographer's firm name
6. Direction of view

5. CERTIFICATES OF COMPLIANCE. Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in three copies. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

6. PURCHASE ORDERS. Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be incorporated into the Project shall (1) be clearly identified with the applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating. Copies of purchase orders shall be furnished to the Contracting Officer when the Contractor requests assistance for expediting deliveries of equipment or materials, or when requested by the Contracting Officer for the purpose of quality assurance review.

END

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Section 1400

Safety, Health, and Emergency Response

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1.0 General Requirements.

1.1 General. This section describes the minimum safety, health and emergency response requirements for remedial activities at the Heleva Landfill Site. The references listed in paragraph 1.2 and the judgement of qualified health and safety personnel shall form the basis for the safety program on this project. The contractor is responsible for the development, implementation, and enforcement of a Safety, Health, and Emergency Response Plan (SHERP) which shall apply to all site activities. The contractor shall take all necessary precautions to prevent damage, injury, or loss to all employees on site and off site persons affected by the work; the remedial activities, materials, and equipment whether on or off the site; and other property at or adjacent to the site. The contractor shall list his/her staff organization with assigned authority and specify the actions to be taken and persons to be consulted in the event that unanticipated hazards are encountered.

1.2 Applicable Publications and Regulatory Requirements

- 1.2.1 USACOE Safety And Health Requirements Manual. EM 385-1-1
- 1.2.2 USEPA Standard Operating Safety Guides. November 1984
- 1.2.3 OSHA Occupational Health and Safety Standards, 29 CFR 1910 and 1926, and in particular, Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120

1.2.4 Occupational Safety And Health Guidance Manual For Hazardous Waste Sites Activities. NIOSH Publication No. 85-115

1.2.5 TLV Booklet 1987-1988, American Conference of Governmental Industrial Hygienists

1.2.6 Documentation of TLVs and BEIs, Ibid

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1.3 Qualified Health and Safety Personnel Required. The contractor shall utilize the following professionals as specified below. Each professional shall be identified and the qualifications of each shall be submitted with the SHERP. For any category, a person of higher qualification may be substituted.

1.3.1 Certified Industrial Hygienist (CIH). The Contractor shall obtain the services of a CIH to develop the SHERP, conduct initial hazard and personal protective equipment training of employees, and provide on site support. The CIH shall be available to the site for supervision of the air monitoring program and other health and safety professionals, and for consultations with site management personnel.

The CIH shall have a minimum of three (3) years working experience in the chemical or chemical waste disposal industry, and a sound working knowledge of state and federal occupational health and safety regulations.

A list of persons certified as Industrial Hygienists may be obtained from:

The American Board of Industrial Hygiene
4600 W. Saginaw, Suite 101
Lansing Michigan, 48917
(517) 321-2638

1.3.2 Safety and Health Specialist (SHS). The contractor shall have a person on site during all remedial activities who meets the minimum requirements for the SHS. This person shall work under the supervision of the CIH to perform health and safety surveillance to assist management in the implementation of the SHERP.

The SHS shall have a minimum of two (2) years experience in the chemical or chemical waste disposal industry, a working knowledge of state and federal health and safety regulations, and formal training in health and safety. This person shall be certified in CPR and first aid, and have experience in the application of personal protective equipment (PPE) and air monitoring instrumentation.

1.3.3 Safety and Health Technician (SHT). Each separate work crew with the potential for overexposure to landfill materials shall have a minimum of an SHT assigned to it. This person shall work under the supervision of the SHS to perform air monitoring and audit the implementation of the SHERP. The SHT shall have one (1) year of related experience, knowledge of safety and health regulations, training on PPE and air monitoring instrumentation, and certification in CPR and first aid.

1.3.4 Medical Consultant. The contractor shall retain a physician who is board certified or certifiable in occupational medicine. Information on certification can be obtained from The American Board of Preventative Medicine, Wright State University. The physician shall be familiar with the remedial action plan and site hazards. The employee medical surveillance program shall be developed under the supervision of this medical consultant.

2.0 Hazard and Risk Assessments. The contractor shall include a description of the site and a characterization of the chemical hazards anticipated during the remedial action using data supplied in paragraph 14 of these specifications. This characterization shall include published acceptable exposure limits, and physical, chemical, and toxicological properties needed to satisfy employees right to know. This information shall be used to perform a risk assessment for each operation in the remedial action plan. This risk assessment will be the basis for selection of PPE, air monitoring, specific procedures, and special security measures.

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3.0 Site Control Measures. A site layout showing the work zones, site access, security barriers, decontamination facilities, and communications facilities shall be included in the SHERP.

3.1 Contamination Control. Control of access to and egress from contaminated areas shall be established to limit exposure to trained, equipped employees and to minimize the spread of contaminants. As a minimum, an exclusion zone (EZ) shall be established at the perimeter of the landfill until fresh fill is placed over the existing soil. The EZ may progress with the cover operation provided appropriate controls are established to limit employee exposure and the spread of contamination.

3.2 Communication. Procedures and facilities shall be established for communications between employees for routine and emergency operations, and for contacting off site emergency response units.

3.3 Barriers and Signs. Barriers such as, saw horses or barricade tape strung between supports, shall be specified to show the perimeter of any areas which may pose a hazard to curious or uninformed persons walk through the area. Signs shall be posted along this perimeter to warn individuals to keep out and that this is a hazardous waste site.

4.0 Personal Protective Equipment. PPE shall be specified for each operation anticipated during the remedial action. The minimum PPE for use within the EZ shall also be specified. Changes in the level of protection based upon site observations or sampling shall be delineated. The contractor shall maintain an adequate supply of specified PPE on site for operations including three extra sets for COE personnel and three sets for other government visitors. The following categories of PPE shall be addressed:

4.1 Respiratory protection shall be required any time air monitoring results exceed the acceptable exposure limit. Respirators shall be selected to provide adequate protection and shall be used in accordance with the OSHA Standard on Respirators, 29 CFR 1910.134.

4.2 Disposable coveralls and rubber boots shall be the minimum protective clothing for entry into the exclusion zone. More stringent protective clothing shall be required anytime the risk assessment results indicate a significant hazard from potential skin contact with site materials.

4.3 Rubber gloves shall be worn upon entry into the EZ. Chemical resistant or multiple layers of gloves shall be specified when the hazard warrants.

4.4 Safety glasses or equivalent shall be required any time an employee enters the exclusion zone and any time outside the EZ that an impact hazard to the eye exists. Protection from other eye hazards shall be required for exposure to the specific hazard.

4.5 Hard hats will be required any time there is the potential for a significant blow to the head from work activity.

5.0 Air Monitoring. Monitoring for gases and vapors will be necessary any time the existing soil is disturbed in the exclusion zone. The frequency of monitoring and employee responses to various levels of results shall be included in the SHERP.

5.1 Monitoring for flammable gases and vapors shall be conducted periodically during initial grading and trenching operations to limit work to acceptable concentrations. Properly calibrated combustible gas and oxygen analyzers shall be utilized by trained persons to perform this monitoring.

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5.2 Organic vapor monitoring shall be conducted using a direct reading detector that differentiates between methane and the organics identified in section 14. This detector shall be properly calibrated and operated by a person skilled in its operation.

5.3 Perimeter monitoring will be required anytime there is a release of vapors that reaches ten (10) times the acceptable exposure limit, approaches or exceeds the lower explosive limit, or the SHS feels it is necessary to protect off site personnel.

6.0 Heat and Cold Stress. Climatic conditions at this site range from -30 F to 100 F with 10% to 100% relative humidity and varying degrees of radiant heat from the sun.

6.1 Monitoring for heat stress or strain using accepted methods shall be specified for conditions which may result in harm to site workers. Appropriate work-rest schedules for anticipated conditions shall be listed and shall account for the use of protective clothing.

6.2 Conditions for requiring monitoring for cold stress or strain and the monitoring methods shall be addressed. Responses to levels of cold stress shall be delineated.

7.0 Accident Prevention. Accident prevention procedures and responsibilities will be developed and listed to address hazards revealed during the risk assessment. As a minimum, the following items must be addressed.

7.1 Fire and explosion potential and prevention.

7.2 Excavation hazards and control measures.

7.3 Heavy equipment hazards and control.

7.4 Areas where employee personal activities such as smoking, drinking, eating, and gum or tobacco chewing, are allowed and prohibited.

8.0 Decontamination and Personnel Facilities. Equipment and personnel leaving the EZ shall be decontaminated to prevent the spread of contamination at this site. Means of drainage, collection, and disposal for the decontamination fluids shall be delineated. This contaminated water may be returned to the landfill prior to capping. Eating, shower, and toilet facilities for site workers shall be available outside of the EZ. These facilities shall be provided and maintained by the Contractor. The Contractor shall submit a drawing showing the proposed layout of these facilities for approval by the CO.

8.1 Procedures and equipment shall be established for employee decontamination at the limits of the EZ. These facilities shall have smooth water tight floors graded to drain to facilitate daily cleaning. Provisions shall be made for clothes changing, showers with hot and cold water, storage for clean and contaminated clothing, soap and shampoo, benches for changing clothes, towels, and laundry equipment for washing undergarments and towels, all in amounts sufficient for the site personnel to use without undue delay.

8.2 Toilet facilities shall be clean, sanitary, and adequate for the maximum number of persons expected on site, including COE and EPA personnel.

8.3 Facilities for eating shall be maintained in a clean, sanitary condition and be free of hydrocarbon contaminants.

8.4 A location shall be designated for the steam cleaning of heavy equipment.

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9.0 Medical Surveillance. The content and frequency of medical examinations for persons who may enter the EZ shall be detailed. Other medical exams or requirements should be included in this part. All personnel who may be exposed to the materials in the EZ must have had a medical exam within the previous twelve months and be certified by the Contractor's medical consultant for work on this project. The minimum content of the medical exam shall be a medical and work history, a check of vital signs and major organ systems, audiometric and visual screening, blood count, chest X-ray every fourth year, lung function test which includes FEV-1 and FVC, and urinalysis .

10.0 Emergency Response Plan. Equipment and procedures that address foreseeable emergencies shall be established. These procedures shall include a listing of off site emergency response units and how they can be contacted, which shall be posted in the decontamination facilities where it will be readily visible to all persons entering the EZ. Representatives of these emergency response units shall be invited to a meeting to discuss the site remedial action work and the emergency response plans prior to the initiation of site work.

10.1 First aid and emergency decontamination equipment and procedures shall be specified for operations on site. At a minimum, these shall include a first aid kit and eye wash facilities. The shower facilities in section 3.0 shall be considered adequate for removing chemical contamination. A fire blanket shall be available during initial site grading and trenching operations.

10.2 Procedures for dealing with fire, explosion, and medical emergencies shall be delineated. The number, type, and size of fire extinguishers to be available on equipment and in support operations shall be specified.

10.3 A physician shall be retained near the site to be available for treating site personnel during medical emergencies. This physician shall be given a copy of the chemical information required in section 2.0, Hazard Assessment.

11.0 Training.

11.1 Initial Training for site personnel including government representatives shall be conducted by the CIH. The length and content shall be consistent with the requirements of the OSHA Standard " Hazardous Waste Operations and Emergency Response," 29 CFR 1910.120. As a minimum this training shall include:

11.1.1 Site hazards including the acute and chronic effects of chemical and physical agents which may be encountered.

11.1.2 PPE requirements for various work zones and activities, and the capabilities and limitations of the PPE.

11.1.3 Respirator fit testing

11.1.4 Accepted and prohibited employee practices in the various work zones.

11.1.5 Communication system.

11.1.6 Medical examinations.

11.1.7 Site control procedures.

11.1.8 Monitoring program for chemical and physical agents.

11.1.9 The health and safety hierarchy

11.1.10 Emergency procedures

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11.2 Additional training shall be provided weekly by the SHS to focus on areas of special concern during current or near future work. Each new type of work will require training on the hazards, PPE, and specific procedures involved in that work. This training may be presented by the CIH or SHS in conjunction with operations management.

11.3 Each person must pass an examination after the initial training to demonstrate knowledge about site hazards, procedures and PPE. This exam shall be designed by the CIH and submitted with the SHERP.

11.4 Visitor training shall be conducted by the Contractor's SHS to inform them of site hazards, emergency procedures, prohibited activities, and instruct them in the use of required PPE.

11.5 Records of the content, attendance, and test results of training shall be maintained on site.

12.0 Logs, and Reports. The Contractor shall establish logs and reports covering the implementation of the SHERP. The format of these logs and reports is up to the Contractor and shall include trainings logs, daily logs, weekly reports, incident reports, and a phase-out report. All logs shall be maintained on site for inspection by the Contract Officer (CO) and shall be submitted upon request of the CO.

12.1 Training logs shall contain the topic covered including a description of any demonstrations, the names of employees attending, the date, and the signature of the trainer.

12.2 Daily logs shall include the date; work area or activity; PPE variations from that required in written procedures; monitoring results for flammables, vapors, and heat; unusual activities; and the signature of the SHS.

12.3 Weekly reports shall be submitted to the CO on the third workday of the week. These reports shall summarize the safety and health activities for the previous week to include: work activities covered, misuse or nonuse of required PPE, significant variances from procedures, air monitoring results in excess of established limits, and a summary of training activity.

12.4 Incident reports shall describe in detail all injuries including symptomatic overexposure to chemicals or heat, releases which propagated off-site in significant amounts, equipment damage in excess of \$1000, and any near miss incidents. These reports shall include an analysis of the incident and steps taken to prevent a recurrence.

12.5 The phase-out report shall be submitted at the end of the work to describe how the heavy equipment, and toilet and shower facilities, were decontaminated and how the disposal of decontamination fluid was accomplished.

13.0 Blasting. Rock blasting is not anticipated on this job. However, should blasting be necessary, the Contractor shall develop a Rock Blasting Plan which includes the needed safety measures to complete that work. This plan shall be submitted and approved by the CO prior to any blasting.

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14.0 Background. This site was used largely for the disposal of a large amount of organic debris, such as, leaves, tree branches, waste paper, and household garbage. In the absence of oxygen, bacteria have degraded these materials to form methane and related compounds. Flammable concentrations of these materials have been measured at the top of soil bore holes in the landfill area.

Chlorinated solvents, largely trichloroethylene, were dumped in one area of the landfill. These materials appear to be concentrated around the fenced "spill area." Analyses of soil and water samples and their locations are shown in table 1 and figure 1.

AR301749

SECTION 01510

TEMPORARY SITE UTILITIES

1. SITE REQUIREMENTS

1.1 As presented below and for the purposes of performing the work, utilities are defined as telephone, water supply and electrical power services. The costs for obtaining and supplying these services to the site shall be assumed by the Contractor.

2. RELATED WORK NOT INCLUDED

2.1 Temporary facilities are included in Section 01590.

3. REGULATORY REQUIREMENTS

3.1 The Contractor shall obtain all necessary permits and approvals for the use of the provided utilities.

4. GENERAL. Relative to this Contract, existing telephone and electrical utility services at the Site may not be adequate. These services shall be provided as required to complete the work by the Contractor, as presented below.

4.1 The Contractor shall be responsible for providing all telephone, electrical and water service to the site necessary to complete the work.

4.2 The Contractor shall be responsible for the operation of all systems, including maintenance, to assure that necessary services are provided.

4.3 The Contractor shall be responsible for all telephone costs including installation, service charges (except Contracting Officer toll charges) and discontinuance.

5. WATER SUPPLY

5.1 The Contractor shall provide all necessary water supply of sufficient volume and pressure to meet the requirements of the Work.

5.2 The Contractor shall provide a portable wash unit and collection system for the Equipment Washdown Station as shown on the Site Layout Plan.

5.2.1 The portable wash unit shall be high pressure steam generating with a self contained water storage tank and pressurizing system. The system shall be suitably sized to provide a minimum of 500 psi with a 0.5 to 5 GPM flow range and a nominal temperature of 200 deg. F. A storage tank of minimum size of 200 gallons shall be provided for water supply to the high pressure wash equipment. The wash equipment hose shall be a minimum of 50 ft in length. Removal of gross contamination of equipment with soil will take place prior to cleaning on the washdown station.

5.2.2 All wash water shall drain to the sump in the middle of the washdown station and be pumped by a sump pump to the washwater collection tank and disposed of as liquid waste. The Contractor shall be responsible for testing this liquid wastewater and determining the appropriate disposal techniques.

5.3 The Contractor shall provide a potable water supply with appropriate backflow prevention to supply the requirements specified for the personnel hygiene facility and the sanitary facilities in each trailer. The Contractor shall insure that the water supply is compatible with the requirements of these facilities in terms of flow rate, pressure and any other specific requirements of these Contractor supplied facilities. The Contractor shall perform the required hook-ups.

5.4 The water systems shall be maintained and protected from weather until completion of the Work and removed and disposed of as approved by the Contracting Officer.

6. SANITARY WASTE SYSTEM

6.1 Wastewater from sanitary facilities shall be collected in holding tanks for subsequent transfer to an off-site septage disposal facility by the Contractor. Holding tanks may be stationary tanks or tank trucks of suitable size.

6.2 A flush type toilet shall be provided in the Contracting Officer's field office.

6.3 Unless otherwise specified, temporary toilet facilities shall be the chemical type, insofar as possible, in order to minimize water usage requirements. No toilet facilities shall be provided in the Exclusion Zone. Chemical toilets shall be serviced no less than once per week.

7. TELEPHONE SERVICE

7.1 The Contractor shall make the necessary arrangements with the local Telephone Company to install telephone equipment and services to meet site requirements and shall be responsible for all related installation, service and shut-off costs.

8. ELECTRICAL POWER

8.1 The Contractor shall be responsible for providing electrical service to the Support, Contamination Reduction and Exclusion Zones as necessary to conduct the work.

8.2 The Contractor shall make the necessary arrangements with appropriate power authority for service and shall be responsible for installation, maintenance and shut-off costs or on-site power connections.

END

01510-2

AR301751

SECTION 01550

SPILL CONTROL1. SCOPE OF WORK

1.1 The Contractor shall develop, implement, maintain, supervise, and be responsible for a comprehensive Spill and Discharge Control Plan. This plan shall provide contingency measures for potential spills and discharges from trucks handling off-site transportation and any other potentially hazardous materials on-site.

1.2 Provide methods, means, and facilities required to prevent contamination of soil, water, atmosphere, uncontaminated structures, equipment, or material by the discharge of wastes from spills due to Contractor's operations.

1.3 Provide equipment and personnel to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material shall be properly disposed of at the Contractor's expense.

1.4 Provide equipment and personnel to perform decontamination measures that may be required to remove spillage from previously uncontaminated structures, equipment, or material. Decontamination residues must be properly disposed of at the Contractor's expense.

2. EQUIPMENT

2.1 The Contractor shall provide, for any unexpected spills or discharge, the following minimum equipment to be kept on site at all times during site work activities:

2.1.1 Sand, clean fill, or other noncombustible absorbent.

2.1.2 Front-end loader.

2.1.3 Drums (55 gallon, U.S. DOT 17-E or 17-H).

2.1.4 Shovels.

2.1.5 Solvent for decontamination of tools and equipment.

3. SPILL AND DISCHARGE CONTROL PLAN

3.1 If a spill occurs, the following actions shall be taken by the Contractor:

3.1.1 Notify the Contracting Officer immediately.

3.1.2 Take immediate measures to control and contain the spill within the site boundaries. This shall include the following actions:

a. Keep unnecessary people away, isolate hazardous areas, and deny entry.

b. Do not allow anyone to touch spilled material.

c. Stay upwind; keep out of low areas.

d. Keep combustibles away from the spilled material.

e. Use water spray to reduce vapors and dust, as needed.

- f. Take samples for analysis to determine that cleanup is adequate.
- g. Other actions, as needed.

3.1.3 General spill control actions the Contractor will implement are as follows:

- a. Solid Spills. Remove and place contaminated materials into dry containers and cover; label the container as to contents; dispose of the container properly as soon as possible.
- b. Liquid spills. Absorb with sand, clean fill, or noncombustible absorbent material. Remove and place contaminated materials into dry containers and cover; label the container as to contents; dispose of the container properly as soon as possible.

3.2 If a discharge of material stored in tanks or drums occurs, the following actions shall be taken by the Contractor to reduce potential migration to adjacent properties:

3.2.1 Notify the Contracting Officer immediately.

3.2.2 Take immediate measures to control the discharge within the site boundaries or beyond the site boundaries, if necessary. This shall include the following actions:

- a. Contain and eliminate the discharge, if possible.
- b. Remove or retrieve any discharged liquids or sludges, if possible.
- c. Keep unnecessary people away; isolate the hazardous area and deny entry.
- d. Do not allow anyone to touch the discharge materials.
- e. Other actions, as needed.

3.2.3 If the spill involves liquid discharges to the soil, immediately identify the point of discharge, and take measures to eliminate further spills. Absorb discharged material with sand, clean fill, or noncombustible absorbent material. Place the absorbent/ discharge mixture into dry containers and cover; label the container as to contents, dispose of the container properly as soon as possible.

3.3 If the spill or discharge is reportable, and/or humans or the environment are threatened, the Contractor shall immediately implement the Spill and Discharge Control Plan as outlined in these Specifications.

3.4 Decontamination procedures may be required after cleanup to eliminate traces of the substance spilled or reduce it to an acceptable level as determined by the Contracting Officer. Complete cleanup may require removal of contaminated soils. Personnel decontamination should include showers and cleansing or disposing of clothing and equipment. All contaminated materials including solvents, cloth, soil, and wood that cannot be decontaminated must be properly containerized, labeled, and properly disposed of as soon as possible.

END

01550-2

AR301753

SECTION 01590

TEMPORARY SUPPORT ZONE FACILITIES1. SCOPE OF WORK

1.1 The Contractor shall furnish temporary facilities at the locations shown and of the size and performance requirement specified herein.

1.2 Facilities shall consist of the following:

- 1.2.1 Contracting Officer office
- 1.2.2 Security/Communications
- 1.2.3 Emergency Medical Provisions
- 1.2.4 Equipment Storage
- 1.2.5 Personnel Hygiene Facility
- 1.2.6 Parking Area

2. RELATED WORK NOT INCLUDED

- 2.1 Crushed stone surfacing is included in Section 02241.
- 2.2 Equipment washdown station is included in Section 02100.

3. SUBMITTALS

3.1 Floor plans, proposed fixtures, materials of construction and proposed siting locations shall be submitted in accordance with SECTION 01340 SUBMITTALS as Category II submittals for approval.

4. LOCATION

4.1 All facilities specified in Paragraph 1.2 shall be located on site within the Support Zone with the exception of the personnel hygiene facility which shall be located within the Contamination Reduction Zone, at the boundary between the Support and Exclusion Zones.

4.2 The security, communications, emergency medical provisions and equipment storage areas may be contained within the same, or separate structures, at the Contractor's option.

5. PERFORMANCE REQUIREMENTS5.1 General

5.1.1 All structures installed under this Section shall be provided with, as a minimum, the following services:

- a. Lighting. Electric light, non-glare type luminaries to provide a minimum illumination level of 100-ft candles at desk height level
- b. Heating and Cooling. Adequate equipment to maintain an ambient air temperature of 70 deg. F +3 deg.
- c. Potable water
- d. Fire Extinguisher. Non-toxic, dry chemical, fire extinguisher meeting Underwriters Laboratories, Inc.,

approval for Class A, Class B, and Class C fires with a minimum rating of 2A-10 B:C

- e. Janitorial services on a daily basis
- f. Sufficient supply of electrical outlets

5.2 Contracting Officer's Offices

5.2.1 The Contractor shall supply and maintain an office for the use of the Contracting Officer, meeting the following requirements:

- a. One partitioned office, having a minimum of 96 square feet of floor area. The office shall contain at least two operable windows and shall be supplied with the following equipment:
 - (1) Office desk with lockable drawers, and chair
 - (2) Telephone - a separate telephone line with extension to the secretarial station
 - (3) Fire resistant, 4 drawer, lockable filing cabinet
- b. One partitioned meeting area having a minimum of 140 square feet of floor area. The meeting area will contain the following equipment:
 - (1) One office table, 2-1/2 ft by 10 ft; and
 - (2) Eight office chairs.
- c. An open secretarial area having a minimum of 50 square feet of floor area. This area shall contain, as a minimum, the following equipment:
 - (1) One secretarial desk and chair;
 - (2) One typewriter, IBM electric or equivalent
 - (3) One telephone with extension to the office area described in Paragraph 5.2.1a preceding.
 - (4) One office table, 3 ft by 8 ft;
- d. One flush toilet located inside the office structure.

5.3 Security and Communications

5.3.1 A partitioned area shall be provided for security and communications personnel, having a minimum floor space of 80 sq. ft. This area shall contain, as a minimum, the following equipment:

- a. One office desk with lockable drawers, and three office chairs
- b. One telephone having a circuit separate from all others on site
- c. One office table measuring 3 ft by 8 ft;
- d. A minimum of two windows providing visibility of the site;
- e. One base and three portable two-way radios. All sets shall be intrinsically safe, capable of transmitting to and receiving from any other set, at any point within the property boundaries of the site. All portable units shall be rechargeable, and shall be capable of operating continuously without recharge for three hours
- f. One pair of binoculars, minimum power of 7.

5.4 Emergency Medical Provisions

5.4.1 On-site medical provisions shall include, as a minimum, the following equipment and supplies:

- a. Two stretchers
- b. One set of crutches
- c. Two self-contained air respiratory devices
- d. 3 blankets
- e. First aid medications appropriate for the initial treatment of burns, abrasions, fractures, and ingestion or dermal contact with on-site hazardous waste.

5.5 Personnel Hygiene Facility

5.5.1 The Contractor shall provide the equipment and fixtures specified below in order to provide for the proper hygiene of all on-site personnel.

- a. Shower facilities with at least one shower for every six on-site personnel
- b. Locker room with two lockers for each on-site personnel
- c. A room where all personnel safety equipment and protective clothing can be stored
- d. Boot rack for washed boots to drain
- e. Toilet facilities with at least one toilet and hand basin for every six on-site Personnel. Type of toilet facility is specified in Section 01510
- f. Sanitary waste holding tank and piping from Personnel Hygiene Facility and Site Offices including excavation and backfill.
- g. The Contractor shall provide a separate lunch area of sufficient size for his personnel.

5.5.2 All equipment and fixtures shall be properly supplied and maintained in clean condition. Drain water from all washing facilities shall be conveyed to an on-site holding tank for subsequent disposal at an approved septage receiving facility.

5.6 On-Site Contaminated Equipment Area

5.6.1 The Contractor shall provide an on-site contaminated equipment storage area at the entrance point to the Contamination Reduction Zone from the Exclusion Zone (underlined with polyethylene).

5.6.2 The contaminated equipment storage area shall include but not necessarily be limited to the following:

- a. Boot rack for washing and storage
- b. Drums for the disposal of protective clothing
- c. A 10 ft by 10 ft temporary structure for the storage of contaminated materials and equipment used daily
- d. Emergency eyewash/shower and fire extinguisher

5.7 Parking

5.7.1 The Contractor shall provide parking in the area shown on the Drawings.

5.7.2 The Contractor shall maintain these areas.

6. OPERATIONS

6.1 Traffic Control

6.1.1 The Contractor shall be responsible for controlling vehicular traffic on the site in order to assure safe and efficient operations.

6.1.2 Parking areas shall be regulated to insure free entry and egress to and from the site.

6.2 Dust Control

6.2.1 The Contractor shall at all times minimize generation of airborne particulate matter in the work areas by application of clean water, calcium chloride or approved chemical dust suppressants.

6.2.2 Any borrow material spilled shall be cleaned from the pavement and removed to the site on a daily basis.

END

01590-4

AR301757

SECTION 01700

CONTRACT CLOSEOUT

1. SCOPE OF WORK

1.1 Work activities will include the following:

1.1.1 Decontamination of all Contractor equipment, and materials within the Exclusion Zone and removal from site of same.

1.1.2 Collection and disposal of all Contractor generated contaminated materials and equipment for which decontamination is inappropriate.

1.1.3 Repair of site fences damaged during the performance of the work and providing new locks for all gates.

1.1.4 Wash down of equipment washdown station including collection and disposal of sediments and liquids from troughs and sumps. Removal of tank and placement of compacted backfill in sump.

1.1.5 Grading the laydown turnaround area, washdown area and site road prior to placement of a minimum 6-inch layer of topsoil over laydown turnaround area, removed washdown area and site roads as shown on the drawings. Followed by seeding of this area.

1.2 The following items furnished by the Contractor shall remain on site and become the property of the Contracting Officer.

1.2.1 Perimeter and security fencing including all gates.

1.2.2 All granular roadways and parking area placed at the site that are shown to remain on the plans.

1.2.3 Drainage ditches and associated construction.

2. DECONTAMINATION

2.1 Without exception, all equipment and materials shall be decontaminated prior to final removal. Decontamination shall take place on the equipment washdown station and shall consist of degreasing (if required) followed by high pressure water and/or steam cleaning supplemented by detergents or solvents as appropriate. Special attention shall be paid to removal of material on and within the tracks and sprockets of crawler equipment, and the tires and axles of trucks and rubber mounted equipment.

3. DISPOSAL OF TOOLS AND MATERIAL

3.1 In general, all small tools and materials for which decontamination is difficult or uncertain, shall be packaged and disposed of by the Contractor at an approved secure landfill. Examples of such equipment or materials are wire, rope, lumber, personnel protective equipment and apparel, etc.

4. FINAL APPROVAL

4.1 Prior to removal from site, all decontaminated equipment and materials shall be inspected and approved by the CIH and/or the SSHO and the CO.

4.2 Certification of decontamination shall be attested to by the CIH and/or the SSHO.

4.3 A copy of each decontamination certificate shall be provided to the Contractor and the CIH. The original of the certificate shall be maintained at the Contracting Officer's Office.

5. UTILITIES: Telephone shall be disconnected at the source. Service lines shall remain on site.

6. EQUIPMENT DECONTAMINATION PAD

6.1 Upon completion of equipment decontamination, the equipment decontamination pad shall be thoroughly washed down and sediments and liquids removed from the collection trough and sump.

6.2 The sump shall be flushed clean, and filled with compacted backfill.

7. WASH UNITS: Wash units shall be the final equipment removed from the Contamination Reduction Zone.

8. SECURITY: Upon completion of equipment, materials, and personnel decontamination and removal of same from site, the Contractor shall inspect the perimeter and security fences and repair any damaged portions of the fences or gates. All locks used on-site shall be removed and new masterkeyed locks for each gate shall be provided. Six keys for each lock shall be given to the Contracting Officer.

9. SITE ROADS: At the completion of the work covered by this Contract, the Contractor shall regrade and compact the gravel access road as shown on the Drawings to a condition suitable for vehicular traffic as approved by the Contracting Officer.

10. PUBLIC ROADS: The Contractor shall return roads in the vicinity of the site entrance, as well as in the vicinity of any nearby borrow pits, to its original condition.

11. AS-BUILT DRAWINGS

11.1 The Contractor shall mark up one set of paper prints to show the as-built conditions. These as-built marked prints shall be kept current and available on the jobsite at all times. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. The as-built marked prints will be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Construction Contractor prior to submission of each monthly pay estimate. The drawings shall show the following information, but not be limited thereto:

11.1.1 The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.

11.1.2 Correct grade or alignment of roads, structures or utilities if any changes were made from contract plans.

11.1.3 Correct elevations if changes were made in site grading.

11.1.4 Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, etc.

11.1.5 The topography and grades of all drainage installed or affected as a part of the project construction.

11.1.6 All changes or modifications which result from the final inspection.

11.1.7 Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the as-built prints.

11.2 The Contractor shall prepare two copies of the progress as built prints and these shall be delivered to the Contracting Officer at the time of final inspection for his review and approval. These as-built marked prints shall be neat, legible and accurate. The review by Government personnel will be expedited to the maximum extent possible. Upon approval, one copy of the as-built marked prints will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the as-built marked prints to the Contracting Officer within ten (10) calendar days.

11.3 DRAWING PREPARATION: Upon approval of the as-built prints submitted, the Contractor will be furnished the original set of contract drawings with all amendments incorporated. These drawings shall be modified as may be necessary to correctly show all the features of the project as it has been constructed by bringing the contract set into agreement with the approved as-built prints, adding such additional drawings as may be necessary. These drawings are part of the permanent records of this project and the Contractor shall be responsible for the protection and safety thereof until returned to the Contracting Officer. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at his expense.

11.4 Only personnel proficient in the preparation of engineering drawings to standards satisfactory and acceptable to the Government shall be employed to modify the original contract drawing or prepare additional new drawings. All additions and corrections to the contract drawings shall be neat, clean and legible, and shall match the adjacent existing linework and/or lettering being annotated in type, density, size and style. All drafting work shall be done using the same medium (pencil, plastic lead or ink) that was employed on the original contract drawings and with graphite lead on paper base material. The Contracting Officer will review all as-built drawings for accuracy and conformance to the above specified drafting standards. The Contractor shall make all corrections, changes, additions, and deletions required to meet these standards. The title block to be used for any new as-built drawings shall be similar to that used on the original drawings.

11.5 When final revisions have been completed, each drawing shall be lettered or stamped with the words "RECORD DRAWING AS-BUILT" followed by the name of the General Contractor in letters at least 3/16" high. All original contract drawings shall be marked either "As-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions.

All original contract drawings be dated in the revision block (SEE ATTACHMENTS 1 and 2).

11.6 After receipt by the Contractor of the approved marked as-built prints and the original contract drawings the Contractor will within 30 days for contracts less than \$5 million or 60 days for contracts \$5 million and above, make the final as-built submittal. This submittal shall consist of the completed as-built drawings, two blue line prints of these drawings and the return of the approved marked as-built prints. They shall be complete in all details. All paper prints and reproducible drawings will become the property of the Government upon final approval. Failure to submit as-built drawings and marked prints as required herein shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

11.7 No separate payment will be made for the as-built drawings required under this contract, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor.

END

01700-4

AR301761

XYZ CONTRACTOR

DEC 84	AS - BUILT	
	29 APR 84	REVISED PER AMENDMENT NO.2 (DESCRIPTIVE)
	2 APR 84	REVISED PER AMENDMENT NO.1 (DESCRIPTIVE)
REV	DATE	DESCRIPTION
		BY



U.S. ARMY ENGINEER DISTRICT, BALTIMORE
CORPS OF ENGINEERS
BALTIMORE, MARYLAND

FT. INDIANTOWN GAP **PENNSYLVANIA**

EQUIPMENT CONCENTRATION SITE & AMSA

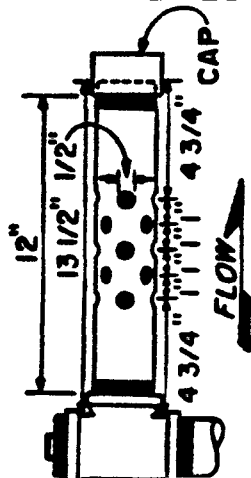
COVER SHEET

DRAWING NUMBER	PLATE
X-000-00-00	3

SCALE: AS SHOWN	DATE: 1 APR 84	SHEET 1
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RECORD DRAWING AS-BUILT XYZ CONTRACTOR

NOTE: USE STANDARD
2" STAINLESS STEEL
PIPE & FITTINGS.
EDGES OF HOLES TO
BE FREE OF BURRS
BUT NOT ROUNDED.
TUBE TO BE FIXED
IN A HORIZONTAL
POSITION.



DESIGN FOR 2" STATIC TUBE

NTS

AR301763

3	DEC 84	REVISED AS-BUILT	
2	29 APR 84	REVISED PER AMENDMENT NO.2 (DESCRIPTIVE)	A.E.P.
1	2 APR 84	REVISED PER AMENDMENT NO.1 (DESCRIPTIVE)	A.E.P.
REV	DATE	DESCRIPTION	BY
 U.S. ARMY ENGINEER DISTRICT, BALTIMORE CORPS OF ENGINEERS BALTIMORE, MARYLAND			
FT. INDIANTOWN GAP		PENNSYLVANIA	
EQUIPMENT CONCENTRATION SITE & AMSA			
COVER SHEET			
DRAWING NUMBER		X-000-00-00	
DRAWING NUMBER		3	
SCALE: AS SHOWN		DATE: 1 APR 84	SHEET 1

SECTION 01800

FIELD ENGINEERING1. SCOPE OF WORK

1.1 The Contractor shall provide and pay for the following field engineering services required for Project:

1.1.1 Survey work required in execution of Project.

1.1.2 Civil, geotechnical, or other professional engineering services specified, or required to execute Contractor's construction methods.

1.2 The Contracting Officer's Representative will identify existing control points and property line corner stakes indicated on the drawings, as required.

2. QUALIFICATIONS OF SURVEYOR AND ENGINEER

2.1 Registered land surveyor shall be licensed in the state in which the project is located, and approved by the Contracting Officer.

2.2 Registered professional engineer of the discipline required for the specific service on the project shall be licensed in the state in which the project is located.

2.3 Submit name and address of Surveyor and Professional Engineer to the Contracting Officer.

3. LAYOUT OF WORK

3.1 The Government has established bench marks and horizontal control points at the site of the work. These are described and indicated on contract drawings.

3.2 From these control points the Contractor shall lay out the work by establishing all lines and grades at the site necessary to control the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the specifications or on the contract drawings. The Contractor shall establish and maintain at the site of the work horizontal and vertical controls as shown in the contract drawings.

3.3 The above are minimum requirements and the Contractor shall place and establish such additional stakes and markers as may be necessary for control and guidance of his construction operations. All survey data shall be recorded in accordance with standard and approved methods. All field notes, sketches, recordings and computations made by the Contractor in establishing the above horizontal and vertical control points shall be available at all times during the progress of the work for ready examination by the Contracting Officer or his duly authorized representative.

3.4 The Contractor shall furnish, at his own expense, all such stakes, spikes, steel pins, templates, platforms, equipment, tools and material and all labor as may be required in laying out any part of the work from the control points established by the Government. It shall be the responsibility of the Contractor to maintain and preserve all stake and other markers established by him until authorized to remove them. If any of the control points established at the site by the Government are destroyed

by or through the negligence of the Contractor prior to their authorized removal, they may be replaced by the Contracting Officer, and the expense of replacement will be deducted from any amount due or which may become due the Contractor. The Contracting Officer may require that work be suspended at any time when horizontal and vertical control points established at the site by the Contractor are not reasonably adequate to permit checking the work. Such suspension will be withdrawn upon proper replacement of the control points.

END

01800-2

AR301765

SECTION 01950

PROJECT RECORD DOCUMENTS1. GENERAL REQUIREMENTS

1.1 The Contractor shall maintain at the site for the Contracting Officer one record copy of:

- 1.1.1 Drawings
- 1.1.2 Specifications
- 1.1.3 Addenda
- 1.1.4 Modifications to the Contract
- 1.1.5 Contracting Officer's Field Orders or written instructions
- 1.1.6 Written reports of any significant QA problems
- 1.1.7 Daily work activity summary reports, including:
 - a. Field test records
 - b. Photographs
 - c. Reports on any emergency response actions
 - d. Manifest documents and variance reports
 - e. Records of all site work
 - f. Chain-of-custody documents
 - g. Truck-load tickets and shipping papers (manifests)
 - h. All laboratory analytical results
 - i. Meteorological records
 - j. Daily inspection records for staging/storage areas
 - k. All safety and accident incident reports.
 - l. Reports on all ~~spill~~ incidents
 - m. Air monitoring reports and data
 - n. Construction quality control daily reports
 - o. Other items as may be required by the Contracting Officer

1.2 All project record documents shall be suitable for microfilm.

2. MAINTENANCE OF DOCUMENTS

2.1 The Contractor shall store documents in the Contractor's field office apart from documents used for work.

2.1.1 Provide files and racks for storage of documents.

2.1.2 Provide a locked cabinet or secure storage space.

2.2 File documents and samples to facilitate retrieval.

2.3 Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for work purposes.

2.4 Legibly mark each section of the Specification and Addenda to record changes made by Field Order or by Change Order.

2.5 Make documents available at all times for inspection by Contracting Officer.

3. SUBMITTALS

3.1 At the completion of field operations, the Contractor shall deliver record documents to the Contracting Officer including a consolidation and summary of the analytical and chemical QC results in final report format.

3.2 Accompany submittal with transmittal letter in duplicate, containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. Title and number of each record document
5. Signature of Contractor or his authorized representative

END

01950-2

AR301767

SECTION 02040

DUST CONTROL1. SCOPE OF WORK

1.1 The Contractor shall conduct operations and maintain the project site so as to finalize the creation and dispersion of dust. Dust control shall be used throughout the work at this site, especially during contaminated soil excavation, handling and transport, backfilling, rough grading, and placement of final soil cover.

2. MATERIALS

2.1 Waters which have been collected during the work and tested and found to be clean can be used for on-site dust control in any area. To supplement these sources of water, the Contractor must provide clean water, free from salt, oil, and other deleterious material.

2.2 The Contractor shall provide the necessary calcium chloride that conforms to ASTM D 98.

2.3 Chemical dust suppressants used in place of calcium chloride must be approved by the Contracting Officer.

3. GENERAL

3.1 The Contractor shall implement strict dust control measures during active construction periods on site. These control measures will generally consist of water applications that shall be applied a minimum of once per day during dry weather or more often as required to prevent dust emissions or as directed by the Contracting Officer.

3.2 The Contracting Officer may direct the Contractor to use water collected on-site for dust control.

3.3 The Contractor shall apply calcium chloride or chemical dust suppressants approved by the Contracting Officer to all dirt surfaces at the completion of clearing and grubbing activities, surface soil scraping work, and at least once per week during dry periods as directed by the Contracting Officer. Active excavation areas may require an application of calcium chloride at the end of every work day.

4. EXCAVATION

4.1 Water Application to Dirt Surfaces. For water application to soil surfaces, the Contractor shall:

4.1.1 Apply water with equipment consisting of a tank, spray bar and pump with discharge pressure gage.

4.1.2 Arrange spray bar height nozzle spacing and spray pattern to provide complete coverage of ground with water.

4.1.3 Disperse water through nozzles on spray bar at 20 psi, minimum. Keep areas damp without creating nuisance conditions such as ponding.

4.2 For water application to soil surfaces during excavation, the Contractor shall:

4.2.1 Apply water with equipment consisting of a tank, pump with discharge gage, hoses and mist nozzles.

4.2.2 Locate tank and spraying equipment so that the entire excavation area can be missed without interfering with excavation equipment or operations. Keep areas damp without creating nuisance conditions such as ponding.

4.2.3 Apply water spray in a manner to prevent movement of spray beyond the site boundaries.

4.3 For application of calcium chloride dust suppressant chemicals, the Contractor shall:

4.3.1 Apply by hand or variable rate spreader.

4.3.2 Prevent dust suppressant chemicals from entering and contaminating surface waters on or surrounding the project site.

4.3.3 Repair damage to property and surface or groundwater, including public or private water supplies, caused by the use of chemical dust suppressants. Make repairs at no cost to the Government.

END

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SECTION 02100

SITE CLEARING

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3. PAYMENT
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5. GRUBBING
6. TREE REMOVAL
7. DISPOSAL OF MATERIALS
8. DRUM REMOVAL AND DISPOSAL

1. DEFINITIONS:

1.1 Clearing: Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.2 Grubbing: Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

1.3 Drum Removal and Disposal: Drum removal and disposal shall consist of removing existing drums containing wastes from the surface of the landfill area, distributing the contents over the landfill surface, crushing the drums and incorporating the crushed drums into the landfill filling operation.

2. NOT USED

3. PAYMENT:

3.1 Clearing and Grubbing: Payment will be made as part of the contract lump sum amount and this price shall constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the work specified herein.

3.2 Drum Removal: Payment will be made at the contract unit price bid for this item of work. This price shall constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the work specified herein.

4. CLEARING: Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface. Trees and vegetation to be left standing shall be protected from damage incidental to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of large debris that obtrude, encroach upon, or otherwise obstruct the work. Loose rocks,

boulders, or rock piles present on the surface of the areas designated to be cleared shall be distributed and incorporated into the filling operation. All areas involved in the construction project are to be cleared. The landfill cap area can be bush-hogged to remove brush flush with the ground surface.

5. GRUBBING: Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground. Areas indicated on the drawings to receive fencing shall be cleared and grubbed as described above.

6. TREE REMOVAL: Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified hereinafter in paragraph DISPOSAL OF MATERIALS.

7. DISPOSAL OF MATERIALS:

7.1 Removing From Site: Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be piled on site so as not to interfere with other construction activities. The Contracting Officer shall designate the area for the disposal of such products.

8. DRUM REMOVAL AND DISPOSAL

8.1 After the drums on the landfill surface are opened the Contracting Officer shall be promptly notified prior to any contents being removed. At the direction of the Contracting Officer, the contents of the drums shall be distributed over the surface of the landfill and incorporated into the filling operation for the landfill. The empty drums shall be crushed to remove air pockets and also distributed and incorporated into the landfill filling operation.

END

SECTION 02150

EROSION AND RUNOFF CONTROL1. SCOPE OF WORK

1.1 The Contractor shall prepare a Soil Erosion and Sediment Control Plan and submit for approval to the Contracting Officer and furnish all labor, materials, equipment, and incidentals necessary to install and maintain the erosion control facilities as shown on the appended plan and required.

1.2 It is the Contractor's responsibility to modify and update the erosion control facilities to reflect any changes in proposed methods, areas, and scheduling of work activities. Any modifications must be submitted to the Contracting Officer for approval.

1.3 The plan shall consider the factors that contribute to erosion, runoff, and sedimentation including, but not limited to, the following:

1.3.1 Topographic features of the site.

1.3.2 Types, depth, slope, and extent of soils.

1.3.3 Proposed alteration of the site.

1.3.4 Amount of runoff from the site.

1.3.5 Staging and other materials handling activities.

1.3.6 Temporary control measures and facilities for use during active construction.

1.3.7 Maintenance program for control facilities, including disposal of materials removed from control facilities and the facilities themselves upon completion of seeding and establishment of vegetation.

2. RELATED REQUIREMENTS

2.1 Section 01036 Special Provisions.

2.2 Section 02201 Excavation, Filling, and Backfilling.

2.3 Section 02485 Turf.

3. ADDITIONAL REQUIREMENTS

3.1 The Contractor shall plan and construct any erosion control measures in addition to those designated on the submitted plan, as required for completion of the site work or as specified by the Contracting Officer.

4. MATERIALS

4.1 Staked straw bales or preassembled silt fence structures shall be utilized to control sediment runoff during construction activities. They shall be installed along the entire site perimeter. Silt fence shall be constructed of reinforced nylon or Mirafi filter fabric or approved equal constructed specifically for sedimentation control. The material must allow ultra fine filtration and entrapment of silt and sediment particles while at the same time allowing for the continued flow of water through the fabric.

4.2 Straw mulch comprised of straw of oats, wheat, barley or rye, shall be utilized on all newly graded subgrade and topsoiled areas that cannot be

seeded or stoned within 30 days of preparation to protect areas against washouts and erosion. Straw mulch shall be held in place using latex acrylic copolymer as defined in Section 02485.

4.3 In all newly graded topsoiled areas that are to be seeded and that exceed an 8% slope, an erosion control mat shall be placed. In similar areas with slopes larger than 5%, the erosion control mat shall be placed if so directed by the Contracting Officer. The erosion control mat shall be placed per the manufacturer recommendation. Erosion control mats shall be similar to Eromat by Armco.

5. CONSTRUCTION SEQUENCE

5.1 The Contractor shall prepare and submit a Soil Erosion and Sediment Control Plan to the Contracting Officer for approval at least 30 days after award of Contract.

5.2 Construction of erosion control measures along the perimeter of the site will be completed prior to any site preparation on site.

5.3 All temporary erosion control measures approved by the Contracting Officer will be maintained throughout the course of site construction activities.

5.4 Upon completion of the site seeding work detailed in Section 02485, any silt fencing or staked straw bales shall be reinforced and maintained until such time that substantial vegetation is established. Upon final acceptance of the site vegetation by the Contracting Officer, the Contractor shall remove all remaining erosion control structures and dispose of off site.

6. CONSTRUCTION METHODS

6.1 Diversion ditches shall be constructed to convey runoff from slope areas where erosion may result. Runoff should be conveyed laterally from these areas and appropriately disposed. Diversion ditches should be appropriately designed and constructed to convey runoff resulting from storm events and stabilized with erosion control blankets.

6.2 Rip rap lined waterways shall be installed where water conveyance channels are required.

6.3 Erosion control blankets shall be installed in all drainage swales and ditches as directed by the Contracting Officer in accordance manufacturer's instructions. The area to be covered shall be properly prepared, fertilized and seeded before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow, butted snugly at the ends and side and stapled. Blankets shall be placed a minimum of three rows (of four foot) wide (total 12 ft width) within the drainage swale/ditch and stapled together in accordance with manufacturer's instructions. The staples shall be made of wire, .091-in. in diameter or greater, "U" shaped with legs 6-in. in length and a 1-in crown. The staples shall be driven vertically into the ground, spaced approximately two (2) linear yards apart, on each side, and one row in the center alternately spaced between each side. Adjoining shall not be overlapped and shall utilize a common row of staples to attach.

6.4 When newly graded subgrade areas cannot be topsoiled and seeded because of season or weather conditions and will remain exposed for more than 30 days, the Contractor shall protect those areas against erosion and

washouts by whatever means necessary such as straw applied with a tar tack, wood chips or by other measures as approved by the Contracting Officer. Prior to application of topsoil, any such materials applied for erosion control shall be thoroughly incorporated into the subgrade by discing. Fertilizer shall be applied prior to spreading of topsoil.

6.5 On slopes, the Contractor shall provide against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until a good vegetative stand is established.

END

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SECTION 02201

EXCAVATION, FILLING AND BACKFILLING

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PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Association of State Highway and Transportation Officials (AASHTO):

T 180-83I

Moisture-Density Relations of
Soils Using a 10-lb (4.54 kg)
Rammer and an 18-in. (457 mm) Drop

1.2 American Society for Testing and Materials (ASTM) Publications:

D 1556-82	Density of Soil in Place by the Sand-Cone Method
D 1557-78	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
D 2167-84	Density and Unit Weight of Soil In-Place by the Rubber Balloon Method
D 2216-80	Laboratory Determination of Water (Moisture) content of Soil, Rock, and Soil-Aggregate Mixtures
D 2487-85	Classification of Soils For Engineering
D 2922-81	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D 3017-78	Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
C 117-84	Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
C 136-84a	Sieve Analysis of Fine and Coarse Aggregates
D 422-63	Particle-Size Analysis of Soils (R 1972)

1.3 Except as otherwise specified herein, the Commonwealth of Pennsylvania Department of Transportation Form 408 Specifications, dated 1976, including all supplements and addenda, shall apply to materials and workmanship for the work of this Section.

2.0 DEFINITIONS:

2.1 Satisfactory Materials:

2.1.1 Satisfactory materials for Common Fill include materials classified in ASTM D 2487 as GW, GP, GC, SW, SC, SP, and CL and shall be free of trash, debris, frozen matter, roots or other organic matter, or stones larger than 3 inches in any dimension.

2.1.2 Satisfactory materials for Select Fill include materials classified in ASTM D 2487 as SW, SC, SP, and CL and shall be free of trash, debris, frozen matter, roots or other organic matter, or stones larger than 1/4 inch in any dimension.

2.2 **Unsatisfactory Materials:** Unsatisfactory materials include materials classified in ASTM D 2487 as Pt, OH, OL, CH, MH, and ML and any other materials not defined as satisfactory.

2.3 Cohesionless and Cohesive Materials: Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. When classification is necessary during construction, determination of grain size for classification will be made in conformance with ASTM C 117, C 136, or D 422.

2.4 Degree of Compaction: Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method D or AASHTO T 180, Method D, abbreviated hereinafter as percent laboratory maximum density.

2.5 Nonexpansive Soils: Nonexpansive soils shall be satisfactory material having a plasticity index equal to or less than 12 when tested in accordance with ASTM D 4318.

2.6 Not Used

2.7 Acceptable Topsoil: includes selectively excavated topsoil material that is representative of local soils that produce heavy growths of crops, grass, or other vegetation, and is reasonably free from underlying subsoil, clay lumps, weeds, litter, brush, matted roots, toxic substances, or any material harmful to plant growth or which would hinder grading, planting, or maintenance operations. Topsoil shall not contain more than 5 percent by volume of stones or other such objects larger than (1) inch in any dimension. As an alternate, the contractor may propose a mixture of select fill and stabilized compost for approval. For this alternate the contractor shall submit the proposed mixture proportions, the compost source name and phone number, and a sample of the mixture to be used.

2.8 Rip-Rap:

2.8.1 Stone rip-rap shall be of hard, durable quality such as will not disintegrate under the elements, nor be easily broken by handling. It shall be clean and free from earth, dust, or other refuse or debris. Faces of stone shall be angular, not rounded in shape. Field stone will not be accepted. Stone shall weigh not less than 150 pounds per cubic foot. All stone shall be approved by the Contract Officer.

2.8.2 Each shipment shall be well graded conforming to the following:

<u>Size of Stone</u> <u>(inches)</u>	<u>Percent Smaller</u> <u>by weight</u>
10	100
6 - 10	30 - 50
4 - 6	20 - 30
2 - 4	10 - 20
less than 2	0 - 10

2.8.3 Rip-Rap shall be placed as indicated on the drawings so as to provide uniform coverage over the area shown. Care shall be taken during the placement of stone to prevent excessive breakage of stone or

damaging or puncturing the HDPE membrane or geotextile fabrics. In no case shall stone be dropped or thrown over 3 feet vertically or horizontally.

3. Not Used

PART 3 - EXECUTION

4. CLEARING AND GRUBBING: is specified in SECTION: CLEARING AND GRUBBING. The depressions resulting from clearing and grubbing operations shall be filled with satisfactory material placed and compacted in accordance with paragraph FILLING AND BACKFILLING.

5. NOT USED

6. EXCAVATION shall conform to the dimensions and elevations indicated except as specified hereinafter, and shall include trenching for utility systems, underground tanks, and all work incidental thereto. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered off of the landfill site proper, below the grades shown shall be removed as directed and replaced with satisfactory material. Satisfactory material removed below the depths indicated without specific direction of the Contracting Officer shall be replaced at no additional cost to the Government to the indicated excavation grade with satisfactory materials. Satisfactory material shall be placed and compacted as specified in paragraph FILLING AND BACKFILLING. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

6.1 The Contractor shall monitor for methane and other hazardous gases during all excavation activities within the landfill cap area as discussed in Section 01400.

7. DRAINAGE AND DEWATERING:

7.1 Drainage: Surface water shall be directed away from excavation and construction sites so as to prevent erosion. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained. Surface drainage from the uncapped landfill surface to offsite shall not be permitted.

7.2 Dewatering: Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Areas to be filled that are currently holding surface water shall be completely drained prior to placing fill. It shall be the Contractor's responsibility to determine the contaminant levels in such standing waters and to determine proper disposal techniques.

8. SHORING including sheet piling, shall be furnished and installed as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Shoring, bracing, and sheeting shall be removed as excavations are backfilled, in a manner to prevent caving.

9. CLASSIFICATION OF EXCAVATION: Excavation will be unclassified regardless of the nature of material encountered.

10. BLASTING will not be permitted.

11. NOT USED

12. BORROW: Approved materials shall be obtained from off-site sources.

13. EXCAVATED MATERAILS required for fill or backfill shall be placed in the proper section of the permanent work required under this section or shall be separately stockpiled if it cannot be readily placed. All excavated material from the landfill proper shall remain on site and incorporated beneath the landfill cap.

14. Not Used

15. SUBGRADE PREPARATION: In areas off of the landfill cap where unsatisfactory material is encountered in surfaces to receive fill or in excavated areas, this unsatisfactory material shall be removed and replaced with satisfactory materials. The surface shall be scarified to a depth of 6 inches before the fill is started. Where fill is to be placed on the landfill cap area surface, the landfill material shall be rolled and compacted by one pass of a 35 ton rubber-tired roller. Areas that fail to firm after compaction shall be brought to the attention of the Contracting Officer. Compaction and proof rolling for areas off the landfill cap shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified in paragraph FILLING AND BACKFILLING.

16. Not Used

17. FILLING AND BACKFILLING:

17.1 Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. The materials defined as Common Fill and Select Fill shall be placed where shown on the drawings. Satisfactory materials shall be placed in horizontal layers not exceeding 12 inches in loose thickness, or 6 inches when hand-operated compactors are used. After placing, each layer shall be plowed, disked, or otherwise broken up, moistened or aerated as necessary, thoroughly mixed and compacted as

specified. Backfilling shall not begin until construction below finish grade has been approved. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet or frozen areas. Each layer of fill and backfill shall be compacted to not less than the percentage of maximum density specified below:

	Percent Laboratory maximum density	
	Cohesive material	Cohesionless material
<u>Fill, embankment, and backfill</u>		
Under gravel areas	90	95
Under grassed areas and landfill cap	85	90

17.2 The moisture content of the fill materials shall be maintained not wetter than 2 percentage points above nor less than 2 percentage points below optimum moisture content as determined by testing as defined below.

17.3 Approved compacted subgrades that are disturbed by the Contractor's operations or adverse weather shall be scarified and compacted as specified hereinbefore to the required density prior to further construction thereon. Recomposition over underground utilities and heating lines shall be by hand tamping.

17.4 The Contractor shall determine by survey the volume of fill material required to fill the on-site pond to the waterline elevation. The records from this survey shall be submitted to the Contracting Officer.

18. TESTING shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Testing shall be performed by an approved commercial testing laboratory or may be performed by the Contractor subject to approval.

18.1 Field in-place density shall be determined in accordance with ASTM D 1556 or D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted if necessary by the procedure described in ASTM D 2922, paragraph "ADJUSTING CALIBRATION CURVE". ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gages shall also be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gages shall be made at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer. ASTM D 2937 shall be used only for soft, fine-grained, cohesive soils. The following number of tests, if performed at the appropriate time, shall be the minimum acceptable for each type operation.

18.2 In-Place Densities:

18.2.1 In-Place Density of Subgrades: One test per 1000 square feet or fraction thereof.

18.2.2 In-Place Density of Fills and Backfills: One test per 1000 square feet or fraction thereof of each lift for fill or backfill areas compacted by other than hand or hand-operated machines. The density for each lift of fill or backfill materials for trenches, pits, or other structures or areas less than 100 feet in width, which are compacted with hand or hand-operated machines shall be tested as follows: One test per each area less than 500 square feet, or one test for each 100 linear feet of long narrow fills 50 or more feet in length. If ASTM D 2922 is used, in-place densities shall be checked by ASTM D 1556 as follows: One check per lift for each 500 linear feet of long narrow fills, and a minimum of 3 checks per lift for other fill and backfill areas.

18.3 Moisture Contents: In the stockpile, excavation or borrow areas, a minimum of two tests per day per type of material or source of materials being placed during stable weather conditions. During unstable weather, tests shall be made as dictated by local conditions and approved moisture contents shall be tested in accordance with ASTM D 2216.

18.4 Optimum Moisture and Laboratory Maximum Density: Tests shall be made for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 5000 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

19. SUBMITTALS: All test results shall be submitted as Category II submittals in accordance with SECTION: SUBMITTALS.

20. GRADING: shall be constructed true to grade, shaped to drain, and shall be maintained free of trash and debris until final inspection has been completed and the work has been accepted.

21. SPREADING TOPSOIL: All areas disturbed by construction operations shall be topsoiled. The surface shall be free of materials that would hinder planting or maintenance operations. Topsoil shall be uniformly spread, graded, and compacted to the thickness, elevations, slopes shown, and left free of surface irregularities. Topsoil shall be compacted by one pass of approved equipment weighing 100 to 160 pounds per linear foot of roller. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to seeding, planting, or proper grading.

22. PROTECTION: Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work shall be repaired and grades reestablished to the required elevations and slopes.

END

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EXCAVATION, FILLING, AND BACKFILLING

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SECTION 02241

STABILIZED-AGGREGATE BASE COURSE

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PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS: Except as otherwise specified herein, the Commonwealth of Pennsylvania Department of Transportation Form 408 Specifications, dated 1976, including all supplements and addenda, shall apply to materials and workmanship for the work of this Section.

2. GENERAL: The work specified herein consists of the construction of a stabilized-aggregate base course to be used as a gravel pavement wearing surface. The work shall be performed in accordance with this specification and shall conform to the lines, grades, notes and typical sections shown in the plans.

3. DEFINITIONS:

3.1 Stabilized Aggregate Base: Stabilized Aggregate Base as used herein is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

3.2 Degree of Compaction: Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in AASHTO T 180 or ASTM D 1557, Method A or D, abbreviated hereinafter as percent laboratory maximum density.

4. PLANT, EQUIPMENT, MACHINES, AND TOOLS:

4.1 General Requirements: Plant, equipment, machines, and tools used in the work shall be subject to approval and shall be maintained in satisfactory working condition at all times. Other compacting equipment may be used in lieu of that specified, where it can be demonstrated that the results are equivalent. The equipment shall be adequate and have the capability of producing the results specified.

4.2 Steel-Wheeled Rollers: Steel-wheeled rollers shall be the self-propelled type weighing not less than 10 tons, with a minimum weight of 300 pounds per inch width of rear wheel. Wheels of the rollers shall be equipped with adjustable scrapers. The use of vibratory rollers is optional.

4.3 Pneumatic-Tired Rollers: Pneumatic-tired rollers shall have four or more tires, each loaded to a minimum of 30,000 pounds and inflated to a minimum pressure of 150 psi. The loading shall be equally distributed to all wheels, and the tires shall be uniformly inflated. Towing equipment shall also be pneumatic-tired.

4.4 Mechanical Spreader: Mechanical spreader shall be self-propelled or attached to a propelling unit capable of moving the spreader and material truck. The device shall be steerable and shall have variable speeds forward and reverse. The spreader and propelling unit shall be carried on tracks, rubber tires, or drum-type steel rollers that will not disturb the underlying material. The spreader shall contain a hopper, an adjustable screed, and outboard bumper rolls and be designed to have a uniform, steady flow of material from the hopper. The spreader shall be capable of laying material without segregation across the full width of the lane to a uniform thickness and to a uniform loose density so that when compacted, the layer or layers shall conform to thickness and grade requirements indicated. The Contracting Officer may require a demonstration of the spreader prior to approving use in performance of the work.

4.5 Sprinkling Equipment: Sprinkling equipment shall consist of tank trucks, pressure distributors, or other approved equipment designed to apply controlled quantities of water uniformly over variable widths of surface.

4.6 Tampers: Tampers shall be of an approved mechanical type, operated by either pneumatic pressure or internal combustion, and shall have sufficient weight and striking power to produce the compaction required.

4.7 Not Used

5. WEATHER LIMITATIONS: Base shall not be constructed when the atmospheric temperature is less than 35 degrees F. Base shall not be constructed on subgrades that are frozen or contain frost. If the temperature falls below 35 degrees F, completed areas shall be protected against any detrimental effects of freezing.

6. SAMPLING AND TESTING: Aggregate sampling and testing shall be performed in accordance with Section 703 of the PennDot specifications.

7. SUBMITTALS: In accordance with SECTION: SUBMITTALS, the Contractor shall submit data for the following items:

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7.1 CATEGORY I. None

7.2 CATEGORY II. For Approval:

7.2.1 Quality Control Results: Results of laboratory tests for quality control purposes shall be submitted to the Contracting Officer and approved prior to using the material.

7.2.2 Field Tests: Copies of field tests results shall be submitted within 24 hours after the tests are performed.

7.2.3 Test Results: Calibration curves and related test results shall be submitted prior to using the device or equipment being calibrated.

7.2.4 Sources of all materials shall be selected well in advance of the time that materials will be required in the work. Test results from samples shall be submitted for approval not less than 30 days before material is required for the work.

8. STOCKPILING MATERIALS: Materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at locations designated. Before stockpiling of material, storage sites shall be cleared, and sloped to drain. Materials obtained from different sources shall be stockpiled separately.

9. Not Used

10. Not Used

11. Not Used

PART 2 - PRODUCTS

12. MATERIALS:

12.1 Aggregates: Aggregates shall consist of crushed stone or slag, crushed gravel, angular sand, or other materials in accordance with PennDOT Specification Section 703, Gradation Number 2A. Aggregates will be obtained from offsite sources.

PART 3 - EXECUTION

13. GENERAL REQUIREMENTS: Placement and construction of the stabilized base course shall be in accordance with PennDOT Specification Section 350 unless otherwise noted herein.

14. Not Used

15. PREPARATION OF UNDERLYING COURSE:

15.1 Before constructing stabilized-aggregate base course, the previously constructed subgrade shall be cleaned of foreign substances. Subgrade shall conform to SECTION: EXCAVATION, FILLING AND BACKFILLING. Ruts or soft, yielding spots that may appear in the underlying course, areas having inadequate compaction, and deviations of the surface from requirements specified shall be corrected. For cohesionless underlying materials containing sands, sand-gravels, or

any other cohesionless material in harmful quantities, the surface shall be stabilized with aggregate prior to placement of the stabilized-aggregate course. Stabilization may be accomplished by mixing base-course material into the underlying course and compacting by approved methods. Stabilized material will be considered as part of the underlying course and shall meet all requirements for the underlying course. Finished underlying course shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until base course is placed. The finished and completed stabilized area shall conform to the lines, grades, cross section, and dimensions indicated.

16. COMPACTION: Each layer of stabilized-aggregate base course including shoulders shall be compacted to at least 90 percent of the maximum dry density.

16.1 Layer Thickness: Compacted thickness of the stabilized course shall be as indicated on the drawings.

17. FIELD QUALITY CONTROL:

17.1 Field Density tests shall be taken at least once per ft for each 2000 square yards of stabilized material. Calibration curves and calibration tests results shall be furnished within 24 hours of the conclusion of the tests. At least one field density test shall be performed for each 250 square yards of each layer of base material.

17.2 Not Used

17.3 Thickness: Thickness of the stabilized course shall be measured at intervals in such a manner as to ensure one measurement for each 500 square yards of stabilized course. Measurements shall be made in 3-inch diameter test holes penetrating the stabilized course.

18. Not Used

19. MAINTENANCE: The stabilized-aggregate base course shall be maintained in a satisfactory condition until accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact.

20. DISPOSAL OF UNSATISFACTORY MATERIALS: Removed in-place materials that are unsuitable for stabilization; material that is removed for the required correction of defective areas; and waste material and debris shall be disposed of on site as directed by the Contracting Officer.

END

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STABILIZED AGGREGATE BASE COURSE

AR301787

SECTION 02444

FENCE, CHAIN-LINK

INDEX

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11. GATES
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PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 Federal Specifications (Fed. Spec.):

FF-P-101F	Padlocks
RR-F-191J/GEN	Fencing, Wire and Post Metal (And Gates, Chain-Link Fence Fabric, and Accessories) (General Specification)
RR-F-191/1C	Fencing, Wire and Post, Metal (Chain-Link Fence Fabric) (Detail Specification)
RR-F-191/2C	Fencing, Wire and Post, Metal (Chain-Link Fence Gates) (Detail Specification)
RR-F-191/3C	Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces) (Detail Specification)
RR-F-191/4C	Fencing, Wire and Post, Metal (Chain-Link Fence Accessories Detail Specification)

1.2 American Society for Testing and Materials (ASTM) Publication:

C 94-84

Ready-Mixed Concrete

2. SHOP DRAWINGS shall be submitted in accordance with the SECTION SUBMITTALS. Drawings shall show post sizes and sections; post setting and bracing, gate details, barbed wire support arms; details of attachment of fabric and barbed wire to support members; and any other details required to erect the fence along the lines indicated.

PART 2 - PRODUCTS

3. MATERIALS shall conform to the following:

3.1 Chain Link Fence: Fed. Spec. RR-F-191 and detailed specifications forming the various parts thereto.

3.1.1 Fabric: Fed. Spec. RR-F-191/1, Type I or Type II, with 9-gage wire woven in 2-inch mesh; height, 6 feet

3.1.2 Gates: Fed. Spec. RR-F-191/2. Gate shall be the type and swing shown. Gate frames shall be constructed of Class 1, steel pipe, size SP2, as specified in RR-F-191/3. Gate fabric shall be as specified for chain-link fabric. Each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence. Vertical members of gate leaves shall be spaced so that no members are more than 8 feet apart. Gates over 10 feet wide shall be additionally braced with a 5/16-inch, minimum thickness, diagonal truss rod. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that padlock will be accessible from both sides of the gate regardless of the latching arrangement.

3.1.3 Posts: Fed. Spec. RR-F-191/3, zinc-coated; Class 1, steel pipe; Class 3, formed steel sections; or Class 6, steel square sections. Class 4, steel H-section may be used for line posts in lieu of line post shapes specified for the other classes. Sizes shall be as specified in Fed. Spec. RR-F-191/3 for the class used. Line posts shall be of the same class throughout the fence. Terminal (corner, gate, and pull) posts selected shall be of the same class throughout the fence. Gate post shall be either round or square, subject to the limitation specified in Fed. Spec. RR-F-191/3.

3.1.4 Braces : Fed. Spec. RR-F-191/3, zinc-coated; Class 1, steel pipe, size SP1 Class 3, form steel sections, size FS1, conforming to Fed. Spec. RR-F-191/3, may be used as braces if Class 3 line posts are furnished.

3.1.5 Accessories: Fed. Spec. RR-F-191/4. Ferrous accessories shall be zinc- or aluminum-coated.

3.1.5.1 Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment.

3.1.5.2 Barbed wire shall be zinc- or aluminum-coated steel wire.

3.1.5.3 Barbed wire support arms shall be the single-arm type and of the design required for the post furnished.

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3.2 Concrete: ASTM C 94, using 3/4-inch maximum-size aggregate, and having minimum compressive strength of 2000 psi at 28 days. Grout shall consist of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

3.3 Padlocks: FF-P-101, Type EPB, Size, 1-3/4 inch. Padlocks shall be keyed alike and each lock shall be furnished with two keys.

PART 3 - EXECUTION

4. GENERAL: Fence shall be installed to the lines and grades indicated. The area on either side of the fence line shall be cleared to the extent indicated. Line post shall be spaced equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts, however, runs between terminal posts shall not exceed 500 feet.

5. POSTS shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth of 36 inches. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to a minimum depth of 36 inches unless a penetration of 18 inches in solid rock is achieved before reaching the 36-inch depth in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than 10 inches in diameter for terminal post and 8 inches in diameter for line posts. Diameters of holes in solid rock shall be at least 1 inch greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post so as to be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Class 3 type line posts may be mechanically driven provided soil conditions are such that the driven posts develop strengths at least equal to posts set in concrete and rock is not encountered. Driven posts shall be set to a minimum depth of 3 feet and shall be protected with drive caps when being set.

6. NOT USED

7. BRACES AND TRUSS RODS shall be installed as required and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.

8. TENSION WIRES shall be installed along the top and bottom of the fence line and attached to the terminal posts of each stretch of the fence. Top tension wires shall be installed within the top 1 foot of the installed fabric. Bottom tension wire shall be installed within the bottom 6 inches

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of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

9. CHAIN-LINK FABRIC shall be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 15-inch intervals. Fabric shall be pulled taut to provide a smooth uniform appearance free from sag. Fabric shall be fastened to line posts at approximately 15-inch intervals and fastened to tension wires at approximately 24-inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 inches (plus or minus 1/2 inch) above the ground.

10. BARBED WIRE SUPPORTING ARMS AND BARBED WIRE shall be installed as indicated and as recommended by the manufacturer. Barbed wire shall be pulled taut and attached to the arms with clips or other means that will prevent easy removal.

11. GATES shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required. Padlocks shall be attached to gates or gate posts with chains to prevent padlock removal.

12. GROUNDING

12.1 FENCE shall be grounded at each side of every gate, at points 150 feet each side of overhead power-transmission lines, at intervals of every 1000 feet of length when fences are located in isolated places, and every 500 to 750 feet when in close proximity (100 feet or less) to public roads, highways, and buildings. Fence shall be grounded at locations where the fence alignment changes more than 15 degrees.

12.2 FENCE POSTS. Each fence post to be grounded shall be connected to a ground electrode consisting of a copper-clad steel ground rod 3/4 inch in diameter and 10 feet long, driven not less than 11 feet into the ground with rod located at the fence line or as near the fence line as is practicable. Connection of fence post to ground electrode shall be made below grade with not less than No. 4 AWG stranded-copper wire with TW insulation by approved molded exothermic weld process or approved clamp-type fitting of copper on fence post and electrode. Each gate panel shall be bonded with a flexible bond strap to its gate post.

END

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FENCE, CHAIN-LINK

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SECTION 02485

TURF

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PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

1.1 Federal Specification (Fed. Spec.):

O-F-241d Fertilizers, Mixed, Commercial

1.2 U.S. Department of Agriculture Publication:

Federal Seed Act of August 9, 1939 (53 Stat. 1275)
Rules and Regulations

1.3 American Society for Testing and Materials (ASTM) Publications:

D 977-85 Emulsified Asphalt

D 2028-76 Cutback Asphalt (Rapid-Curing Type) (R 1981)

D 2607-69 Peats, Mosses, Humus, and Related Products

1.4 American Sod Producers Association, Inc. (ASPA) Publication:

Guideline Specifications to Sodding (undated)

2. Not Used

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3. SUBMITTALS: In accordance with the SECTION: SUBMITTALS, the Contractor shall submit data for the following items. The data are to be submitted as Category II submittals.

3.1 Certificates of Compliance and Certified Laboratory Test Reports: Prior to the delivery of materials, certificates of compliance shall be submitted certifying that materials meet the requirements specified. Certified copies of the reports for the following materials shall be submitted.

3.1.1 Seed: For mixture percentage, pure live seed, weed seed content, germination.

3.1.2 Fertilizer: For chemical analysis composition percent.

3.1.3 Lime: For chemical analysis.

3.1.4 Peat: For compliance with ASTM D 2607.

3.1.5 Asphalt Adhesive: For compliance with ASTM D 977 and D 2028.

3.1.6 Chemical treatment material: For EPA registration and uses.

3.2 Manufacturer's Literature: Discussing physical characteristics, application and installation instructions for:

3.2.1 Erosion Control Material.

3.2.2 Chemical Treatment Material.

3.3 Delivery Schedule: Submittal of the schedule shall be at least 10 days before delivery.

3.4 Chemical Treatment Plan: Chemical Treatment Plan shall be submitted with proposed sequence of chemical treatment work. The common name, chemical composition, formulation, concentration, rate and method of application for all materials furnished; and the name and license of the state certified applicator(s) shall be included.

4. DELIVERY, STORAGE, AND HANDLING:

4.1 Delivery:

4.1.1 Turf material shall be inspected upon arrival at the jobsite, and unacceptable material shall be removed from the jobsite.

4.1.2 Not Used

4.1.3 Delivery of fertilizer and lime to the site shall be in original, unopened containers bearing manufacturer's chemical analysis. Instead of containers, fertilizer and lime may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

4.1.4 Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

4.1.5 Chemical treatment materials shall be delivered to the site in the original unopened containers with legible labels indicating the Environmental Protection Agency (EPA) registration number and the manufacturer's registered uses.

4.2 Storage:

4.2.1 Materials shall be stored in areas designated by the Contracting Officer.

4.2.2 Not Used

4.2.3 Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants.

4.2.4 Chemical treatment materials shall not be stored with other landscape materials.

4.3 Handling:

4.3.1 Materials: Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

4.3.2 Not Used

PART 2 - PRODUCTS

5. MATERIALS:

5.1 Seed:

5.1.1 Seed Classification: State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for mixture percentage, purity, germination, weed seed content, and inert material. Labels shall be in conformance with USDA Federal Seed Act, Rules and Regulations and applicable state seed laws.

5.1.2 Seed Mixtures: Seed mixtures shall be proportioned by weight as follows:

<u>Common Name</u>	<u>Mixture Percent by Weight Live Seed</u>
Perennial Rye Grass	20
Birdsfoot Trefoil	15
Kentucky 31 Fescue	55
Fescue Pennlawn Red	10

5.1.3 Weed Seed: Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed will be rejected. Perform field mixes on site in the presence of the Contracting Officer.

5.2 Not Used

5.3 Not Used

5.4 Soil Amendments: Consists of lime, fertilizer and soil conditioners.

5.4.1 Lime: Commercial grade ground hydrated limestone containing not less than 50 percent of total oxides, 85 percent calcium and magnesium oxides and ground to such fineness that a minimum 50 percent pass 100-mesh sieve and 98 percent pass 20-mesh sieve.

5.4.2 Fertilizer: Commercial grade, free flowing, uniform in composition and conforming to Fed. Spec. O-F-241.

5.4.2.1 Granular Fertilizer: Consists of nitrogen-phosphorus-potassium ratio: 10 percent nitrogen, 10 percent phosphorus, and 10 percent potassium.

5.5 Mulches: Free from weeds, mold, and other deleterious materials.

5.5.1 Straw: Stalks from oats, wheat, rye, barley, or rice shall be furnished in air-dry condition and with a consistency for placing with commercial mulch blowing equipment.

5.5.2 Hay: Native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings shall be furnished in an air-dry condition and with a consistency for placing with commercial mulch blowing equipment.

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5.5.3 Wood Cellulose Fiber: Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate visual metering during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 3.5 to 5.0. Use with hydroseeding application of grass seed and fertilizer. When added to water, it forms a homogenous slurry.

5.5.4 Wood Chips: Wood chips or shredded bark with maximum particle size of 3/16 inch.

5.6 Asphalt Adhesive:

5.6.1 Cutback Asphalt: Conforming to ASTM D 2028, designation RC-70.

5.6.2 Emulsified Asphalt: Conforming to ASTM D 977, Grade SS-1.

5.7 Water: A quality suitable for irrigation.

5.8 Not Used

5.9 Erosion Control Material:

5.9.1 Soil Erosion Control Blanket: Machine produced mat of wood excelsior formed from a web of interlocking wood fibers, covered on one side with either plastic netting or twisted kraft paper cord netting.

5.9.2 Soil Erosion Control Fabric: Knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips should last 6 to 8 months.

5.9.3 Soil Erosion Control Net: Heavy, twisted jute mesh weighing approximately 5 pounds per 100 square feet and 4 feet wide with mesh openings of approximately 1/2-inch square.

5.9.4 Soil Erosion Control Chemicals: High-polymer synthetic resin or cold water emulsion of selected petroleum resins.

5.9.5 Vegetable Based Gels: Physiologically harmless, without phytotoxic or crop damaging properties, naturally occurring powder based hydrophilic additives formulated to provide gels which will form membrane networks of water insoluble polymers within 4 hours after application.

5.9.6 Anchors: Erosion control anchor material shall be as recommended by the manufacturer.

PART 3 - EXECUTION

6. SEEDING TIMES:

6.1 Seeding Time: Seeding operations shall not be conducted in freezing weather or when the ground is frozen.

6.2 Not Used

6.3 Not Used

7. SITE PREPARATION:

7.1 Preparation of Seeding Areas:

7.1.1 The Contracting Officer shall verify the finished grades are as indicated on drawings, and the placing of topsoil and the smooth grading has been completed in accordance with the SECTION: EXCAVATION, FILLING, AND BACKFILLING.

7.1.2 Site preparation work shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory condition prevails, the work shall be stopped when directed.

7.2 Application of Soil Amendments:

7.2.1 Soil Test: A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

7.2.2 Lime: Lime shall be applied at the rate as recommended by the soil test. Lime shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.

7.2.3 Fertilizer: Fertilizer shall be applied at the rate of 500 pounds per acre. Fertilizer shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage or hydroseeding operation.

7.2.4 Not Used

7.2.5 Deviations: Deviations in the ground surface in relation to the grades indicated shall be corrected prior to turfing.

7.3 Tillage:

7.3.1 Soil shall be tilled to a minimum depth of 2 inches by plowing, disking, harrowing, rototilling or other method. On slopes 2 horizontal to 1 vertical and steeper, the soil shall be tilled to a minimum depth of 2 inches by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1 horizontal to 1 vertical and steeper, no tillage is required.

7.3.2 Lime and fertilizer, as specified, may be applied during tillage.

7.4 Finished Grading:

7.4.1 Turf areas shall be filled as needed or have surplus soil removed to attain the finished grade. Drainage patterns shall be maintained as indicated on drawings. Turf areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of erosion or grade deficiencies shall conform to topsoil requirements specified in the SECTION: EXCAVATION, FILLING AND BACKFILLING. Finished grade shall be 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas.

7.4.2 Not Used

7.4.3 Areas to be seeded shall have debris and stones larger than 1 inch in any dimension removed from the surface.

7.4.4 Finished graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion.

7.5 Not Used

8. SEEDING:

8.1 General: Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rains, traffic, or other cause, shall be reworked to restore the ground condition previously specified. Do not broadcast seed or hydroseed when the wind velocity is such as to prevent uniform seed distribution.

8.2 Applying Seed:

8.2.1 Broadcast Seeding: Seed shall be uniformly broadcast at the rate of 120 pounds per acre using broadcast seeders. Half of seed shall be broadcast in one direction, and the remainder at right angles to the first direction. Seed shall be covered to an average depth of 1/4 inch by disk harrow, steel mat drag, cultipacker, or other approved device.

8.2.2 Drill Seeding: Seed shall be uniformly drilled to an average depth of 1/2 inch and at the rate of 100 pounds per acre using equipment having

drills not more than 6-1/2 inches apart. Row markers shall be used with the drill seeder.

8.2.3 Rolling: Immediately after seeding, except for slopes 3 horizontal to 1 vertical and greater, the entire area shall be firmed with a roller not exceeding 90 pounds for each foot of roller width. Do not roll areas seeded with seed drills equipped with rollers.

8.3 Hydroseeding: Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. Wood cellulose fiber mulch shall be added at the rates recommended by the manufacturer after the seed, fertilizer and water have been thoroughly mixed to produce a homogenous slurry. Slurry shall be uniformly applied under pressure over the entire area. Adequate soil moisture shall be ensured by spraying water on the entire hydroseeded area and moisten the soil to a minimum depth of 2 inches. Do not roll the hydroseeded area.

8.4 Applying Mulch:

8.4.1 Straw or Hay Mulch: On the same day as seeding, mulch shall be spread uniformly at the rate of 1-1/2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of slopes 2 horizontal and 1 vertical and steeper. Do not bunch the mulch.

8.4.2 Anchoring the Mulch: Immediately after spreading the mulch, anchors shall be installed in the soil by a V-type-wheel land packer, a scalloped-disk land packer or other approved method or by spraying asphalt adhesive. When asphalt adhesive is applied to the in-place mulch, spraying shall be at the rate of between 10 to 13 gallons per 1000 square feet.

8.4.3 Mulch with Asphalt Adhesive: Straw or hay mulch shall be applied simultaneously with asphalt adhesive at the rate of 1-1/2 tons per acre by using a hydro-mulcher. The entire area shall be spread evenly. Do not bunch the mulch.

8.4.4 Wood Cellulose Fiber: Wood cellulose fiber mulch shall be applied as part of the hydroseeding operation.

8.5 Watering Seeded Areas: Watering shall be started within 7 days after completing the seeded area. Water shall be applied at the rate sufficient to ensure moist soil conditions to a minimum depth of 2 inches. Run-off and puddling shall be prevented.

9. Not Used

10. Not Used

11. EROSION-CONTROL:

11.1 Erosion Control Material: Erosion control shall be provided on slopes in excess of 5 percent, install in accordance with manufacturer's instructions. Placement of the erosion control material shall be accomplished without damage to installed material or without deviation to finished grade.

11.2 Temporary Turf Cover:

11.2.1 When there are contract delays in the turfing operation, the areas designated for turf shall be seeded to prevent erosion as directed by the Contracting Officer. The temporary seed shall be Rye Grain.

11.2.2 The quantity of 1/2 of the required soil amendments shall be

applied and the area tilled as specified in the paragraph SITE PREPARATION. Seed shall be applied at the rate of 100 pounds per acre.

11.2.3 Areas provided with the temporary cover shall be tilled and turfed with the specified permanent turf materials when directed to proceed with the contract.

12. RESTORATION AND CLEAN UP: Excess and waste material shall be removed and disposed of off the site. Adjacent paved areas shall be cleaned. Existing turf areas which have been damaged during the contract operations shall be restored to original conditions.

13. PROTECTION OF TURFED AREAS: Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required or as directed by the Contracting Officer.

14. TURF ESTABLISHMENT PERIOD:

14.1 Length of Period: On completion of the last day of the turfing operation, the Turf Establishment Period will be in effect for 3 months or until all work on the entire contract has been completed and accepted whichever is longer.

14.2 Stand of Turf:

14.2.1 A stand of turf from the seeding operation is defined as a minimum of 100 grass plants per square foot. Bare spots shall be no larger than 1 foot square. The total bare spots shall not exceed 2 percent of the total seeded area.

14.3 Maintenance During Establish Period:

14.3.1 General: Maintenance of the turfed areas shall include eradicating weeds, protecting embankments and ditches from erosion, maintaining erosion control material, and protecting turfed areas from traffic.

14.3.2 Repair: Turf condition shall be reestablished as specified herein for eroded areas, damaged or barren areas. Mulch shall be repaired or replaced as required.

14.3.3 Not Used

14.3.4 Watering: Watering shall be at intervals to obtain a moist soil condition to a minimum depth of 2 inches. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Run-off, puddling and wilting shall be prevented.

15. FINAL ACCEPTANCE: At the end of the Turf Establishment Period, a final inspection will be made. Final acceptance of the turf will be based upon a satisfactory stand of turf as defined in the paragraph TURF ESTABLISHMENT PERIOD. Rejected areas shall be replanted or repaired as directed by the Contracting Officer.

END

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SECTION 13450

HIGH DENSITY POLYETHYLENE MEMBRANE

INDEX

1. APPLICABLE PUBLICATIONS
2. SUBMITTALS
3. MATERIALS
4. GENERAL
5. WELDING
6. QUALITY CONTROL AND INSPECTION

PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Publications:

D 638	Tensile Strength Properties
D 792	Specific Gravity
D 413	Peel Adhesion and Seam Strength
D 123	Melt Index
D 1593	Gauge of Material
D 1004	Tear Resistance
D 1693	Environmental Stress Crack Resistance
D 1603	Carbon Content
D 3083	Bonded Seam Shear Strength

2.0 SUBMITTALS: Shop drawings of the proposed sheet layout and samples of the material to be used for the membrane shall be submitted as Category II submittals in accordance with the SECTION: SUBMITTALS. In addition the contractor shall submit an affidavit from the manufacturer certifying the physical properties of the membrane sheet to be supplied and a manufacturer's one year warranty in accordance with paragraph 6.4 below.

3.0 MATERIALS:

3.1 High Density Polyethylene Membrane: The membrane shall consist of unsupported polyethylene liner manufactured of domestic virgin first-quality product designed and manufactured specifically for the purpose of liquid containment in hydraulic structures. Carbon black 2% $\pm$.5% shall be added to the resin for ultraviolet resistance. The membrane shall be so produced as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter. Any such defect shall be repaired using the extrudate welding technique in accordance with the manufacturer's recommendations. The membrane system shall be manufactured, furnished and installed by a single vendor. The finished product shall be supplied as prefabricated panels in rolls. Panel size shall be determined by approved plans showing layout and dimensions of panels in the membrane system. The membrane shall be factory fabricated into large sections by means of a radiant heated welding apparatus. The fabricated sections shall be designed to minimize the amount of field seaming at the job site. The membrane shall meet or exceed the physical properties contained in the following table:

<u>PROPERTY</u>	<u>UNITS</u>	<u>TEST METHOD</u>	<u>VALUE</u>
Gauge of Material	mils	ASTM D 1593	60 $\pm$ 10%
Specific Gravity	g/cc	ASTM D 793A	>.94
Minimum Tensile Properties			
Tensile at Yield	psi	ASTM D 638	2400
Tensile at Break	psi		4000
Elongation at Yield	%		15
Elongation at Break	%		700
Modulus of Elasticity	psi		
80,000			
Tear Resistance, Min.	psi	ASTM D 1004	45
		Die C	
Low Temp. Brittleness	Deg.C	ASTM D 746B	-112
Resistance to Soil Burial	%	ASTM D 3083	
Tensile at Yield			+/-10
Tensile at Break			+/-10
Elongation at Yield			+/-10
Elongation at Break			+/-10
Modulus of Elasticity			+/-10
Environmental Stress Crack Res.	hrs.	ASTM D 1693	2000
Carbon Dispersion	SCORE	ASTM D 3015	A-1,2
Melt Index	g/10cm	ASTM D 1338	0.3 - 0.5

13450-2

AR301804

<u>PROPERTY</u>	<u>UNITS</u>	<u>TEST METHOD</u>	<u>VALUE</u>
Puncture Resistance	lbs.	FTMS 101B	270
Hydrostatic Resistance	psi	ASTM D 751A	450
Bonded Seam Strength, Shear	ppi	ASTM D 3083	90% of Sheet Strgth.
Bonded Seam Strength, Peel	ppi	ASTM D 413	90% of Sheet Strgth
Peel Adhesion, min.	ppi	ASTM D 413	Film Tear

3.3 Extrusion Joint Resin: Resin used for extrusion joining sheets and sheet to pipe shall be HDPE produced from the same resin as the sheet. Physical properties shall be the same as those of the resin used in manufacture of the HDPE membrane. The resin shall be supplied in black.

3.4 Sponge Rubber Sheetting: shall be type SCE-41, Neoprene/EPT/SBR, closed cell medium, 1/4 inch thick, one side adhesive.

3.5 Neoprene Adhesive: shall be used for gluing sponge rubber sheetting to concrete and HDPE surfaces.

PART 3 - EXECUTION

4. GENERAL: The HDPE membrane shall be installed to completely cover the landfill area. Installation shall be per the manufacturer's instructions.

4.1 Subgrade shall be prepared in accordance with SECTION: EXCAVATION, FILLING, AND BACKFILLING prior to placing the membrane. No sharp objects, broken stones, roots or other debris shall be visible on the surface of the subgrade prior to placing the cushion geotextile layer or the membrane.

4.2 Membrane panels shall be overlapped sufficiently to permit welding without having to splice small sections of material into the general panel layout.

5. WELDING: Field joints shall be made by overlapping adjacent sheets a minimum of eight (8) inches and extruding a ribbon of extrusion joining resin no less than 1.5 inches in width between the overlapped sheets or over the seam between the sheets where hand welds are required.

5.1 Prior to extrusion welding of the seams, all areas which are to become seam interfaces shall be cleaned of dust and dirt. The slick surfaces of the HDPE sheet which are to become part of the seam interface shall be roughened with a wire brush or other acceptable means before extrudate is placed between the overlapping sheets or over a lapped seam. Extrusion welding shall not take place unless the sheet is dry and the ambient temperature is adequate per manufacturer's instructions.

5.2 Joints between membrane sheets shall be field welded using the manufacturer's extrusion joining equipment and techniques. Preheating of the sheet interfaces and temperatures of the extrudate shall be per the manufacturer's directions.

5.3 Penetrations of Membrane Material: Penetrations for pipe, patches, etc., shall be field welded using an extrusion hand welder. The joining procedure shall consist of softening the liner material by heated air as described above. Directly following the application of heat, a hot strip of the same material from which the sheet is made will be extruded over the joint to produce the extruded joint. Repairs of small holes in the membrane shall be made according to the manufacturer's directions.

6. QUALITY CONTROL AND INSPECTION

6.1 The manufacturer shall test each resin batch used in production of the membrane sheet to ensure maximum consistency of raw material quality. The manufacturer shall certify that the membrane material meets or exceeds the material specifications as detailed above.

6.2 Sheet installation shall be conducted under the direct supervision of the manufacturer. Membrane material shall be inspected upon delivery to the job site. The welding process shall be continuously monitored and all field welds shall be tested. Test welds on sample liner material shall be run preceding all extensive welding to assure good weld quality under the prevailing site conditions; these weld samples shall be subsequently subjected to mechanical testing. A tensile testing machine shall be on-site for confirmation of the joint's tensile strength.

6.3 The following testing and sampling are to be used as an absolute minimum.

6.3.1 One sample weld as above shall be made daily for destructive tests on the weld seam. The weld shall be subjected to testing to verify the bonded seam strength in shear and peel. The test results must equal or exceed the values shown in paragraph 3.1 above. Should the test weld fail, additional test welds shall be made and tested until the required values are met. No additional payment will be made for the additional testing required. Field welding shall not commence for the day until the test weld results are satisfactory.

6.3.2 Non-destructive testing shall be used to verify the continuity of all field welds over the full length of the welds. Ultrasonic testing similar to ASTM E164 shall be used to confirm the thickness of the weld, homogeneity, and exclusions of extrudate over the entire length of each weld. Areas discovered to be non-continuous, or where the total liner thickness is thinned more than 10 percent of its original thickness, or where bubbles or other undesirable characteristics are found shall be repaired per manufacturer's instructions. No additional payment will be made for repair to the membrane prior to acceptance.

6.4 The membrane shall be warranted for a period of one year from date of installation against material defects and defects in manufacture.

END

13450-4

AR301806

HIGH DENSITY POLYETHYLENE MEMBRANE

(13) Category II Submittals

[illegible]

SECTION 13460

WELL ABANDONMENT

INDEX

1. SUBMITTALS
2. GENERAL REQUIREMENTS
3. PLACEMENT OPERATIONS

PART 1 - GENERAL

1. SUBMITTALS: In accordance with the SECTION: SUBMITTALS, the Contractor shall submit data for the following items required by this section.

1.1 Category I. None

1.2 Category II.

1.2.1 Procedures proposed for closing and abandoning the on site wells shall be submitted for approval.

1.2.2 Samples of materials to be used in the well closure; including gravel and cement shall be submitted for approval along with names and addresses of materials sources.

1.2.3 Well abandonment logs detailing the depth, location, and quantities of materials used shall be submitted for information.

2. GENERAL REQUIREMENTS: The well abandonment and closure work is to close the existing wells on the landfill site as shown on the drawings. The closing of these wells will prevent the vertical movement of surface water within the wells into the underlying groundwater.

2.1 Wells shall be filled with sterilized, dimensionally stable materials, compacted mechanically to avoid later settlement.

2.3 Well closure shall be performed in accordance with all state and local ordinances.

PART III - EXECUTION

3. PLACEMENT OPERATIONS: Wells to be abandoned and closed shall be filled to the total depth. The screened portion of the wells shall be fill with sterilized coarse gravel. Concrete, sand and cement grout, or cement grout shall be used to fill the remainder of the depth of the wells. The fill materials shall be introduced at the bottom of the well and placed progressively upward to the top of the well. All such sealing materials shall be placed using a grout or tremie pipe in such a way to avoid segregation or dilution of the sealing materials. Dumping grout from the surface is strictly prohibited.

3.1 All casings, liners, or filters are to be removed from the well concurrently with the filling operation.

3.2 The surface protective casing and any surrounding protective posts shall be removed.

3.3 Before equipment is removed from the site, the exact location of the abandoned wells shall be determined and recorded. Locations shall be coordinated to the state plan coordinate system utilizing permanent

reference monuments as prescribed by state or local regulatory agencies. Copies of these records shall be supplied to the Contract Officer and to the owner of the property.

END

13460-2

AR301809

WELL ABANDONMENT

ENG FORM 4288, Apr 84

EDITION OF 1 JUL 73 IS OBSOLETE.

Page _____ Of _____ Pages

(Preponent DAEN ECC O)

SECTION 13470

GAS VENTING SYSTEM

INDEX

- | | |
|----------------------------|-------------------------|
| 1. Applicable Publications | 4. Submittals |
| 2. General Requirements | 5. Materials |
| 3. Not Used | 6. Construction |
| | 7. Abandonment of Wells |

1. APPLICABLE PUBLICATIONS.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) PUBLICATIONS.

- | | |
|-----------|---|
| D 1586 | Standard Penetration Test (SPT) and Split Barrel Standard Method for Sampling of Soils. |
| D 1785-83 | Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120. |

1.2 COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, Form 408 Specifications, 1983.2. GENERAL REQUIREMENTS.

2.1 SCOPE. This specification applies to the furnishing of all labor, materials, and equipment required to complete the drilling and installation of gas vents at the Heleva Landfill Site.

2.1.1 Decontamination. The drilling and all associated equipment shall be thoroughly steam cleaned prior to arrival at the site, and before leaving the Heleva Landfill Site.

3. NOT USED

4. SUBMITTALS. In accordance with SECTION: SUBMITTALS, the Contractor shall submit data for the following items required by this section.

4.1 CATEGORY I. None.4.2 CATEGORY II.4.2.1 For Approval.

4.2.1.1 Samples of Material used in construction of gas vents including bentonite pellets, bentonite powder, gas vent gravel backfill, and cement.

4.2.2 For Information Only.

4.2.2.1 Gas Vent Construction Logs detailing the gas vent installation provided by the Contractor. These logs shall include depth of gas vent boreholes, length of riser pipe and vent screen, and quantities of backfill, bentonite, and concrete used.

5. MATERIALS. Materials shall conform to the respective specifications and other requirements presented below.

5.1 GAS VENT MATERIALS.

5.1.1 Riser Pipe and "U" Joint at top shall be 6-inch interior diameter, flush-threaded, Schedule 80 PVC (ASTM D 1785).

5.1.2 Slotted PVC shall be constructed as shown on the drawings.

5.1.3 Washed Stone Gravel Pack shall be AASHTO No. 67 gravel (PA Spec.).

5.1.4 Bentonite Pellets. 3/8-inch diameter bentonite pellets shall be used to create a seal above the gravel pack material.

5.1.5 Portland Cement Concrete shall be Type I and shall develop a compressive strength of 3,000 psi at 28 days.

5.2 DRILLING AND ASSOCIATED EQUIPMENT.

5.2.1 Drilling Rig.

5.2.1.1 Gas Vents. The drill rig must have the capability to drill a 12-inch diameter borehole through unconsolidated materials.

5.2.2 Pumps. Pumps of sufficient capacity to clean boreholes to a depth of 125.0 feet.

5.2.3 Grout Mixers. A grout mixer, hoses, and pumps of suitable capacity to backfill abandoned holes and to grout gas vents above the bentonite seal by the tremie method. With the tremie method, a pipe is lowered to a point 1/2 foot above the top of the bentonite seal. The tremie pipe is raised as grout is pumped through it; the pipe should always be submerged in the freshly deposited grout to avoid segregation or dilution.

5.2.4 Water Truck. A water truck and hose of sufficient size and length to complete the work.

5.2.5 Split-Barrel. A split-barrel sampler, associated rods, driving head and 140-pound hammer to conduct Standard Penetration Testing in accordance with ASTM D-1586.

5.2.6 Tremie Pipe. The tremie pipe must fit in the annular space between the riser pipe and the boring wall. It must be of sufficient length to be lowered in the annular space to a point 1/2 foot above the top of the bentonite seal.

6. CONSTRUCTION.

6.1 GAS VENTS.

6.1.1 Depth. Gas vents shall be drilled with the appropriate drill rig to a minimum depth of approximately 10 feet into the refuse.

6.1.2 Number. A total of 234 gas vents shall be installed on the landfill as shown on the gas vent and settlement monument location plan of the Drawings.

6.1.3 Construction. Gas vents shall be constructed as shown on Sheet Reference C-10.

6.1.4 Installation. Gas vents shall be installed at the completion of landfill rough grading or when directed by the Contracting Officer.

6.1.5 Pipe Boots shall be provided and installed where the gas vents protrude through the cap. These pipe boots should prevent water from traveling along the gas vent to below the cap.

6.1.6 Damage. The Contractor shall exercise care in constructing the cap as the Contractor is responsible for the repair or replacement of gas vents damaged prior to project closeout and final acceptance.

6.1.7 Cuttings. Cuttings from the boring operations shall be spread over the landfill surface prior to cap construction.

7. ABANDONMENT OF BORE HOLES. In the event that a vent bore hole must be abandoned, the abandonment operation shall be performed in accordance with the specification SECTION: WELL ABANDONMENT.

END

13470-3

AR301813

GAS VENTING SYSTEM

[illegible]

APPENDIX 1

SOIL BORING INFORMATION

AR301815

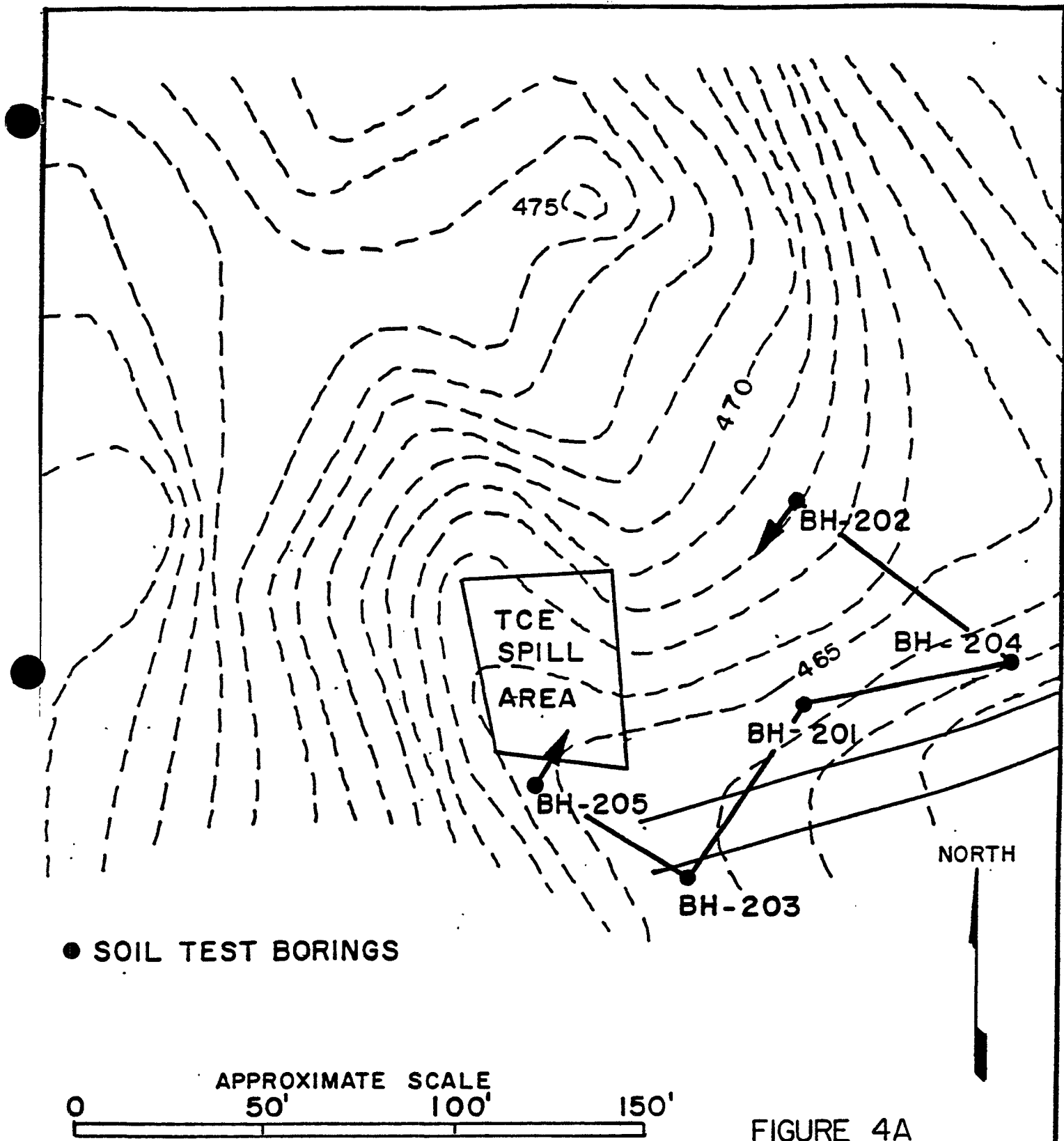
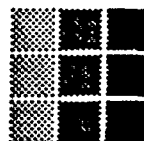


FIGURE 4A

GENERALIZED SOIL
CROSS-SECTION
LOCATION
AR301816



SIRRINE
ENVIRONMENTAL
CONSULTANTS

Greenville, South Carolina

TEST BORING REPORT

BORING NO. BH-201

PROJECT: Supplemental TCE Assessment

CLIENT: Army Corps of Engineers

CONTRACTOR: Environmental Drilling and Services, Inc.

EQUIPMENT USED: Mobile Drill B-80

JOB NO. E-1514

PAGE NO. 1 of 2

LOCATION: See Plan

ELEVATION: See Plan

DATE START: 4 August 1987

DATE FINISH: 15 August 1987

DRILLER: John Lawson

PREPARED BY: J. A. Wylie

GROUNDWATER		DEPTH TO:			CASING SAMPLER			CORE BARREL
DATE	MRS AFTER COMP	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	HSA	S	
8/14/87	WD	NE		4.0 ft	SIZE D	3-3/8 in	2 in	
8/14/87	WD	NE		12.0 ft	HAMMER WT		140 lb	
8/15/87	24	NE		22.5 ft	HAMMER FALL		30 in	

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
		7		
		9		3.5
5		14	S1	5.0
10				
		7		10.5
		11	S2	12.0
		12		
15				
20				

FIELD CLASSIFICATION AND REMARKS

SILTY SAND (SM)

Brown, dry, mostly fine sand, few silt, trace clay.
(HNU = 0.1 ppm)

SILTY SAND (SM)

Brown, moist, mostly fine sand, some silt, trace clay.
(HNU = 0.1 ppm)

Note: Duplicate sample BH-201-SA taken here.

AR301817

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE NO.		COMPONENT %	GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S	SPLIT SPOON	MOSTLY 80-100 %	WD - WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T	TUBE	SOME 30-45 %	NE - NOT ENCOUNTERED
11-20	MEDIUM DENSE	5-8	MEDIUM STIFF	U	UNDISTURBED PISTON	LITTLE 15-25 %	UR - NOT READ
21-30	DENSE	9-16	STIFF	G	GRAB SAMPLE	FEW 5-10 %	
31-40	VERY DENSE	16-30	VERY STIFF	X	OTHER	TRACE 45 %	
41+		31+	HARD	NR	NO RECOVERY		BORING NO. BH-201

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 4 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS	
25		4	S3	20.5	<u>SILT (ML)</u> Brown, moist, mostly silt, few fine sand, few clay, trace gravel (HNu = 0.4 ppm) Note: Some black discoloration. Note: QA/QC field split sample taken here. Bottom of exploration at 22.5 ft. Note: Auger refusal at 22.5 ft. is false refusal. Impenetrable debris encountered.	
		9		-		
		11		22.0		
30						

AR2010

BLOWS/FT.	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE ID.	COMPONENT %	GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S SPLIT SPOON	MOSTLY 50-100%	WD-WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T TUBE	SOME 30-45%	NE-NOT ENCOUNTERED
11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	U UNDISTURBED PISTON	LITTLE 15-25%	UR-NOT READ
31-50	DENSE	9-15	STIFF	G GRAB SAMPLE	FEW 5-10%	
51+	VERY DENSE	16-30	VERY STIFF	X OTHER	TRACE <5%	
		31+	HARD	NR NO RECOVERY		

BORING NO. BR-201

AR301818

TEST BORING REPORT

BORING NO. BH-202

PROJECT: Supplemental TCE Assessment
CLIENT: Army Corps of Engineers
CONTRACTOR: Environmental Drilling and Services, Inc.
EQUIPMENT USED: Mobile Drill R-80

JOB NO. F-1514
PAGE NO. 1 of 4
LOCATION: See Plan
ELEVATION: See Plan
DATE START: 17 August 1987
DATE FINISH: 18 August 1987
DRILLER: John Lawson
PREPARED BY: H. E. Corbett

GROUNDWATER		DEPTH TO:			CASING SAMPLER CORE		
DATE	WPS AFTER COMP	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	HSA	S
8/17/87	WD	NE		4.0ft	SIZE ID	3-3/8 in	2 in
8/17/87	WD	NE		52.0ft	HAMMER WT		140 lb
8/19/87	24	65.56 ft		77.0 ft	HAMMER FALL		30 in

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5					<u>SILTY SAND (SM)</u> Reddish brown, dry, mostly fine sand, few silt, trace clay. (H _{Nu} = 0.1 ppm)
		9	S1	2.5	
		6		-	
		8		4.0	
10					<u>SILTY SAND (SM)</u> Brown, moist, mostly fine sand, some silt/clay. (H _{Nu} = 1.4 ppm)
15					16.0 Ft.
20					

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE ID.		COMPONENT %		GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S	SPLIT SPOON	MOSTLY 80-100 % SOME 30-45 % LITTLE 15-25 % FEW 5-10 % TRACE <5 %	WD - WHILE DRILLING NE - NOT ENCOUNTERED UR - NOT READ	
5-10	LOOSE	3-4	SOFT	T	TUBE			
11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	U	UNDISTURBED PISTON			
31-50	DENSE	9-15	STIFF	G	GRAB SAMPLE			
51+	VERY DENSE	16-30	VERY STIFF	X	OTHER			
		31+	HARD	NR	NO RECOVERY			BORING NO. BH-202

BORING NO. BH-202

AR301819

TEST BORING REPORT

BORING NO. BH-202

PAGE 2 OF 4

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS	
25		10	S3	20.5	<u>SILTY CLAY (CL)</u> Red, moist, mostly clay, some silt, trace sand. (H _{Nu} = 50 ppm) Note: Garbage encountered up to this depth.	
		10		-		
		16		22.0		
30					27.0 Ft.	
35					<u>SANDY SILT (SM)</u> Brown, moist, mostly silt, some sand, trace clay. (H _{Nu} = 70 ppm) Note: Duplicate sample BH-202-SA taken here. Note: QA/QC field split sample BH-202-S4 taken here.	
40					37.0 Ft.	
45					<u>SILTY CLAY (CL)</u> Red, moist, mostly clay, some silt. (H _{Nu} = 100 ppm)	

BLOWS/FT.	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE ID.	COMPONENT %	GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S SPLIT SPOON	MOSTLY 80-100%	WD-WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T TUBE	SOME 30-45%	NE-NOT ENCOUNTERED
11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	U UNDISTURBED PISTON	LITTLE 15-25%	UR-NOT READ
31-50	DENSE	9-15	STIFF	G GRAB SAMPLE	FEW 5-10%	
51+	VERY DENSE	16-30	VERY STIFF	X OTHER	TRACE <5%	
		31+	HARD	NR NO RECOVERY		BORING NO. BH-202

AR301820

TEST BORING REPORT

BORING NO. BH-202

PAGE 3 OF 4

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
-50					47.0 Ft.
-55					<u>SANDY SILT (SM)</u> Reddish-brown, moist, mostly silt, some coarse-grained sand, some clay. (H _{Nu} = 89 ppm)
-60					<u>SANDY SILT (SM)</u> Brown to black, moist, mostly silt, some sand, trace clay. (H _{Nu} = 120 ppm) Note: TCE (?) film on sample when split-spoon opened. Note: Vapors escaping from borehole while drilling from 62.0 to 72.0 ft.
-65					
-70					

AR301821

BLOWS/FT.	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE ID.	COMPONENT %	GROUNDWATER ABBREV.	
0-4	VERY LOOSE	0-2	VERY SOFT	S	SPLIT SPOON	MOSTLY 80-100%	WD-WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T	TUBE	SOME 30-45%	NE-NOT ENCOUNTERED
11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	U	UNOBTAINED PISTON	LITTLE 15-25%	UR-NOT READ
31-50	DENSE	9-15	STIFF	G	GRAB SAMPLE	FEW 5-10%	
51+	VERY DENSE	16-30	VERY STIFF	X	OTHER	TRACE <5%	
		31+	HARD	NR	NO RECOVERY		

BORING NO. BH-202

TEST BORING REPORT

BORING NO. BH-202

PAGE 4 OF 4

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
75			S8	70.5	<u>SANDY SILT (SM)</u> Brown to black, wet, mostly silt, some sand, trace clay. (HNu = 1200 ppm)
				72.0	
80					
					77.0 Ft. Bottom of exploration at 77.0 ft. Note: Auger refusal at 77.0 ft.

AR301822

BLOWS/FT.	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE ID.	COMPONENT %	GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S SPLIT SPOON	MOSTLY 50-100%	WD-WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T TUBE	SOME 30-45%	NE-NOT ENCOUNTERED
11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	U UNDISTURBED PISTON	LITTLE 15-25%	UR-NOT READ
31-50	DENSE	9-15	STIFF	G GRAB SAMPLE	FEW 5-10%	
51+	VERY DENSE	16-30	VERY STIFF	X OTHER	TRACE <5%	
		31+	HARD	NR NO RECOVERY		

BORING NO. BH-202

TEST BORING REPORT

BORING NO. BH-203

PROJECT: Supplemental TCE Assessment
CLIENT: Army Corps of Engineers
CONTRACTOR: Environmental Drilling and Services, Inc.
EQUIPMENT USED: Mobile Drill R-80

JOB NO. F-1514
PAGE NO. 1 of 3
LOCATION: See Plan
ELEVATION: See Plan
DATE START: 18 August 1987
DATE FINISH: 19 August 1987
DRILLER: John Lawson
PREPARED BY: H. E. Corbett

GROUNDWATER		DEPTH TO:		CASING SAMPLER		CORE
DATE	WAS AFTER COMP	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	BARREL
8/18/87	WD	NE		20.5 ft	SIZE ID	3-3/8 in 2 in
8/19/87	WD	NE		42.0 ft	HAMMER WT	140 lb
8/20/87	WD	NE		52.0 ft	HAMMER FALL	30 in

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5					TOPSOIL
					0.5 Ft.
					FILL (with debris and garbage)
10					5.0 Ft.
15		5		10.5	CLAYEY SILT (ML) Reddish brown, moist, mostly silt, some clay, trace sand, little gravel. (HNu = 250 ppm)
		6	S1	-	
		8		12.0	
20					

AR 301823

BLOWS/FT. DENSITY		BLOWS/FT. CONSISTENCY		SAMPLE ID.	COMPONENT %		GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S	SPLIT SPOON	MOSTLY 80-100 %	WD - WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T	TUBE	SOME 30-45 %	NE - NOT ENCOUNTERED
11-20	MEDIUM DENSE	5-8	MEDIUM STIFF	U	UNDISTURBED PISTON	LITTLE 15-25 %	UR - NOT READ
21-30	DENSE	9-15	STIFF	G	GRAB SAMPLE	FEW 5-10 %	
31+	VERY DENSE	16-30	VERY STIFF	X	OTHER	45 %	
		31+	HARD	NR	NO RECOVERY		BORING NO. BH-203

TEST BORING REPORT

BORING NO. BH-203

PAGE 2 OF 3

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS	
25		6	S2	20.5	<u>CLAYEY SILT (ML)</u> Red, moist, mostly silt, some clay, trace sand, trace gravel. (H _{Nu} = 150 ppm) Note: Duplicate sample BH-203-SA taken here.	
		8		-		
		10		22.0		
30			S3	30.5	<u>SILTY SAND (SM)</u> Reddish brown, dry, mostly fine sand, some silt, trace clay, trace gravel. (H _{Nu} = 17 ppm)	
		7		-		
		10		32.0		
35			S4	40.5	<u>SILTY SAND (SM)</u> Red, dry, mostly fine sand, some silt, trace clay, trace gravel (weathered bedrock). (H _{Nu} = 26 ppm)	
		10		-		
		11		42.0		
40						
45						

27.5 Ft.

</

AR301824

SIRRINE ENVIRONMENTAL CONSULTANTS TEST BORING REPORT

BORING NO. BH-203

PAGE 3 OF 3

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
50					<u>SILTY SAND (SM)</u> Red, moist, mostly fine sand, some silt, little clay, trace gravel (HNu = 14 ppm)
		5	S5	50.5	Bottom of exploration at 52.0 ft. Note: Auger refusal at 52.0 ft.
		7		-	
		9		52.0	
55					
60					

AB301825

AR 301825

TEST BORING REPORT

BORING NO. BH-204

PROJECT: Supplemental TCE Assessment
CLIENT: Army Corps of Engineers
CONTRACTOR: Environmental Drilling and Services, Inc.
EQUIPMENT USED: Mobile Drill B-80

JOB NO. F-1514
PAGE NO. 1 of 3
LOCATION: See Plan
ELEVATION: See Plan
DATE START: 19 August 1987
DATE FINISH: 20 August 1987
DRILLER: John Lawson
PREPARED BY: H. E. Corbett

GROUNDWATER		DEPTH TO:			CASING SAMPLER			CORE
DATE	HRS AFTER COMP	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	HSA	S	BARREL
8/19/87	WD	NE		52.0 ft	SIZE ID	3-3/8 in	2 in.	
8/20/87	WD	60.0 ft		60.0 ft	HAMMER WT		140 lb.	
8/21/87	24	63.94 ft		67.0 ft	HAMMER FALL		30 in.	

ELEVATION: See Plan

DATE START: 19 August 1987

DATE FINISH: 20 August 1987

DRILLER: John Lawson

PREPARED BY: H. E. Corbett

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5					FILL (with debris and garbage)
10					15.0 Ft. SILTY SAND (SM) Brown, dry, mostly fine sand, some silt, trace clay. (H _{Nu} = 1.4 ppm)
15		5		15.5	
		5	S1	-	
		6		17.0	
20					

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE ID.		COMPONENT %		GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S	SPLIT SPOON	MOSTLY	80-100%	WD - WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T	TUBE	SOME	30-45 %	NE - NOT ENCOUNTERED
11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	U	UNDISTURBED PISTON	LITTLE	15-25 %	UR - NOT READ
31-50	DENSE	9-15	STIFF	G	GRAB SAMPLE	FEW	5-10 %	
51+	VERY DENSE	16-30	VERY STIFF	X	OTHER	TRACE	<5 %	
		31+	HARD	NR	NO RECOVERY			
								BORING NO BH-204

BORING NO. BH-204

AR301026

TEST BORING REPORT

BORING NO. BH-204

PAGE 2 OF 3

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
25		8	S2	25.5 - 27.0	<u>SILTY SAND (SM)</u> Reddish brown to black, dry, mostly fine sand, some silt, little clay. (H _{Nu} = 20 ppm)
30					
35					
40			S3	40.5 - 42.0	<u>SILTY CLAY (CL)</u> Red to brown, moist, mostly clay, some silt, trace sand. (H _{Nu} = 3 ppm)
45					

35.5 Ft.

AR301827

BLOWS/FT.	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE ID.	COMPONENT %	GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S SPLIT SPOON	MOSTLY 50-100%	WD-WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T TUBE	SOME 30-45%	NE-NOT ENCOUNTERED
11-20	MEDIUM DENSE	5-8	MEDIUM STIFF	U UNDISTURBED PISTON	LITTLE 15-25%	UR-NOT READ
21-30	DENSE	9-15	STIFF	G GRAB SAMPLE	FEW 5-10%	
31+	VERY DENSE	16-30	VERY STIFF	X OTHER	TRACE <5%	
		31+	HARD	NR NO RECOVERY		

BORING NO. BH-204

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 8 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
50					
		5	S4	50.5 - 52.0	<u>SILTY CLAY (CL)</u> Red to brown, moist, mostly clay, some silt, trace fine sand. (H _{Nu} = 1.4 ppm)
55					
60					
		3	S5	62.5 - 64.0	<u>SILTY CLAY (CL)</u> Orange, moist, mostly clay, some silt. (H _{Nu} = 0.6 ppm)
65					
					67.0 Ft.
					Bottom of exploration at 67.0 ft.
					Note: Auger refusal at 67.0 ft.
70					

APC01828

TEST BORING REPORT

BORING NO. BH-205

PROJECT: Supplemental TCE Assessment										JOB NO. F-1514	
CLIENT: Army Corps of Engineers										PAGE NO. 1 of 2	
CONTRACTOR: Environmental Drilling and Services, Inc.										LOCATION: See Plan	
EQUIPMENT USED: Mobile Drill B-80										ELEVATION: See Plan	
GROUNDWATER		DEPTH TO:				CASING SAMPLER		CORE BARREL		DATE START: 20 August 1987	
DATE	MRS AFTER COMP	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	HSA	S			DATE FINISH: 20 August 1987	
8/20/87	WD	NE		14.0 ft	SIZE ID	3-3/8 in	2 in.			DRILLER: John Lawson	
8/20/87	WD	NE		37.0 ft	HAMMER WT		140 lb.			PREPARED BY: H. E. Corbett	
					HAMMER FALL		30 in.				
DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS						
5					FILL (with debris and garbage)						
10					SILTY SAND (SM) Red, dry, mostly fine sand, some silt, trace clay, trace gravel. (H _{Nu} = 0 ppm)						
15											
20											

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE NO.	COMPONENT %	GROUNDWATER AB.	
0-4	VERY LOOSE	0-2	VERY SOFT	S	SPLIT SPOON	MOSTLY 50-100 %	WD - WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T	TUBE	SOME 30-45 %	NE - NOT ENCOUNTERED
11-20	MEDIUM DENSE	5-8	MEDIUM STIFF	U	UNOBTAINED PISTON	LITTLE 15-25 %	UR - NOT READ
21-30	DENSE	9-15	STIFF	G	GRAB SAMPLE	FEW 5-10 %	
31+	VERY DENSE	16-30	VERY STIFF	X	OTHER	TRACE 5 %	
		31+	HARD	NR	NO RECOVERY		

AR 301829

BORING NO. BH-205

TEST BORING REPORT

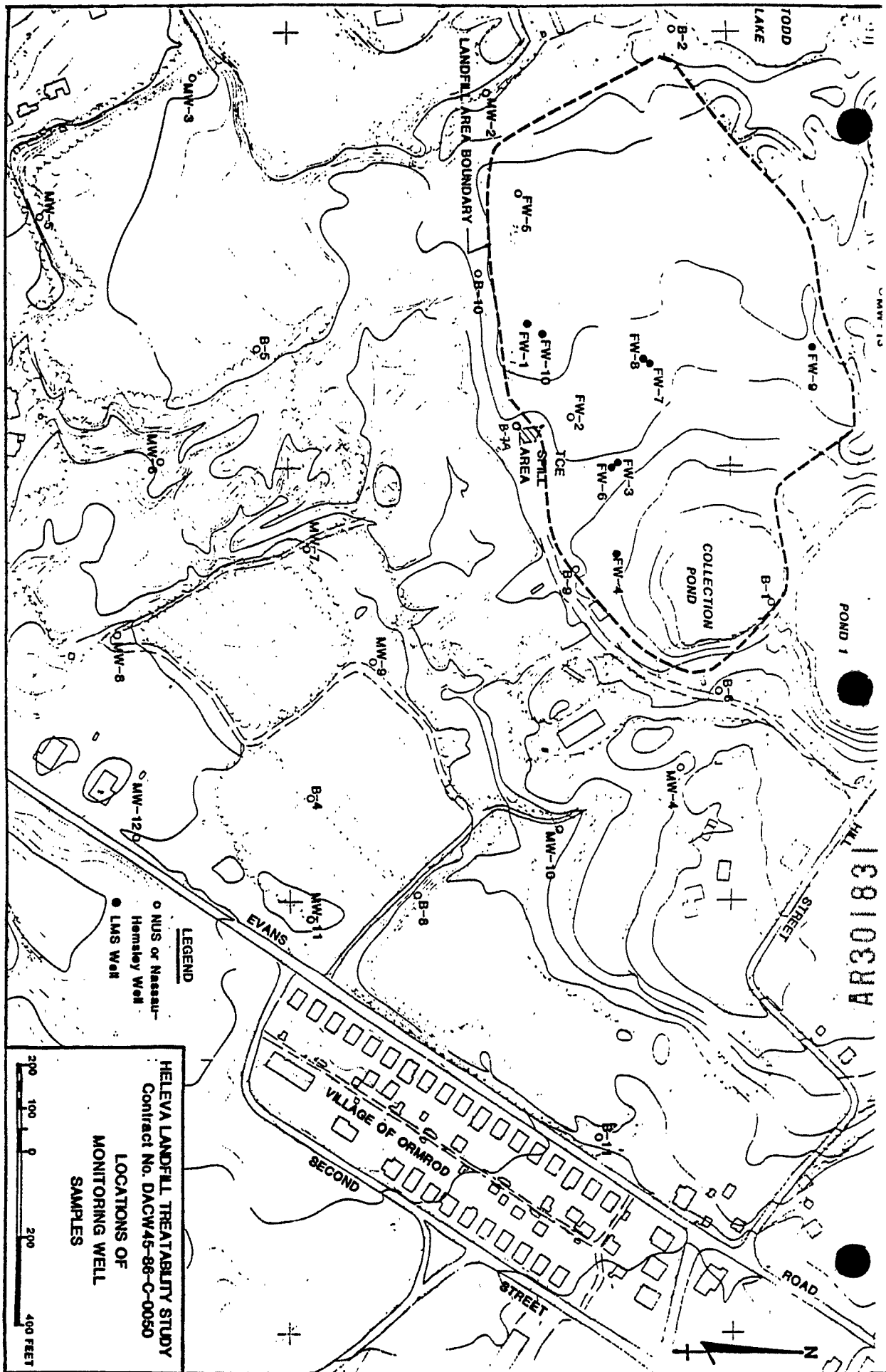
BORING NO. BH-205

PAGE 2 OF 2

DEPTH IN FEET	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS						
25											
30					26.5 Ft.						
					Competent Bedrock (HNu = 1.8 ppm)						
					30.0 Ft.						
35											
40											
45											

AR301830

BLOWS/FT.	DENSITY	BLOWS/FT	CONSISTENCY	SAMPLE ID.		COMPONENT %		GROUNDWATER ABBREV.
0-4	VERY LOOSE	0-2	VERY SOFT	S	SPLIT SPOON	MOSTLY	80-100%	WD-WHILE DRILLING
5-10	LOOSE	3-4	SOFT	T	TUBE	SOME	30-45%	NE-NOT ENCOUNTERED
11-30	MEDIUM DENSE	5-8	MEDIUM STIFF	U	UNDISTURBED PISTON	LITTLE	15-25%	NR-NOT READ
31-50	DENSE	9-15	STIFF	G	GRAB SAMPLE	FEW	5-10%	
51+	VERY DENSE	16-30	VERY STIFF	X	OTHER	TRACE	<5%	
		31-	HARD	NN	NO RECOVERY			BORING NO. BH-205

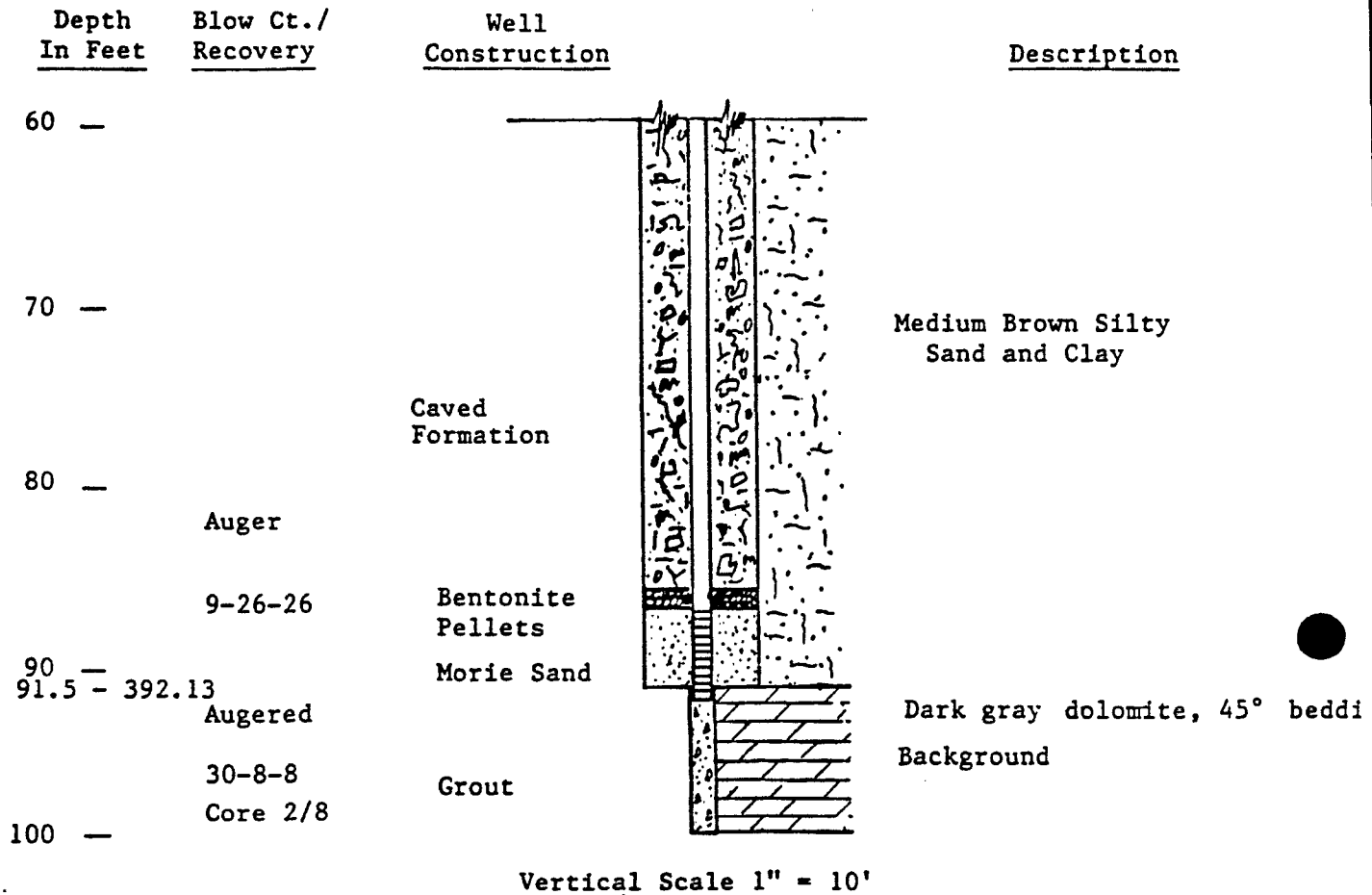


HELEVA LANDFILL TREATABILITY STUDY
Contract No. DACW45-86-C-0050
LOCATIONS OF
MONITORING WELL
SAMPLES

Heleva Landfill
Well FW-1
Project 8563

th t	Elev.	Blow Ct./ Recovery	Well Construction	Organic Vapors PPM	Description
0	486.93	Casing	12" hole to 91.5'		
0	483.63	Grade	2.3" hole to 99.5'		
10			2" steel riser and screen from 0-87' and 87-92', respectively		
20					
30			Caved Formation and Natural Backfill		Garbage with some clay. wet.
31	452.63			4	Background
40					
50					Medium Tan Silty Sand Moist to Wet.
60					

Heleva Landfill
Well FW-1 (cont'd)
Project 8563



Drilling Began: 1/23/86
Drilling Completed: 1/28/86
Well Construction Completed: 1/29/86
Well Development Completed: 2/24/86
Total Depth: 99.5'

Screen Interval: 87-92'
Hole Diameter: 12"/2.3"
Monitoring Tube: 2"
Yield: 0.2 gpm

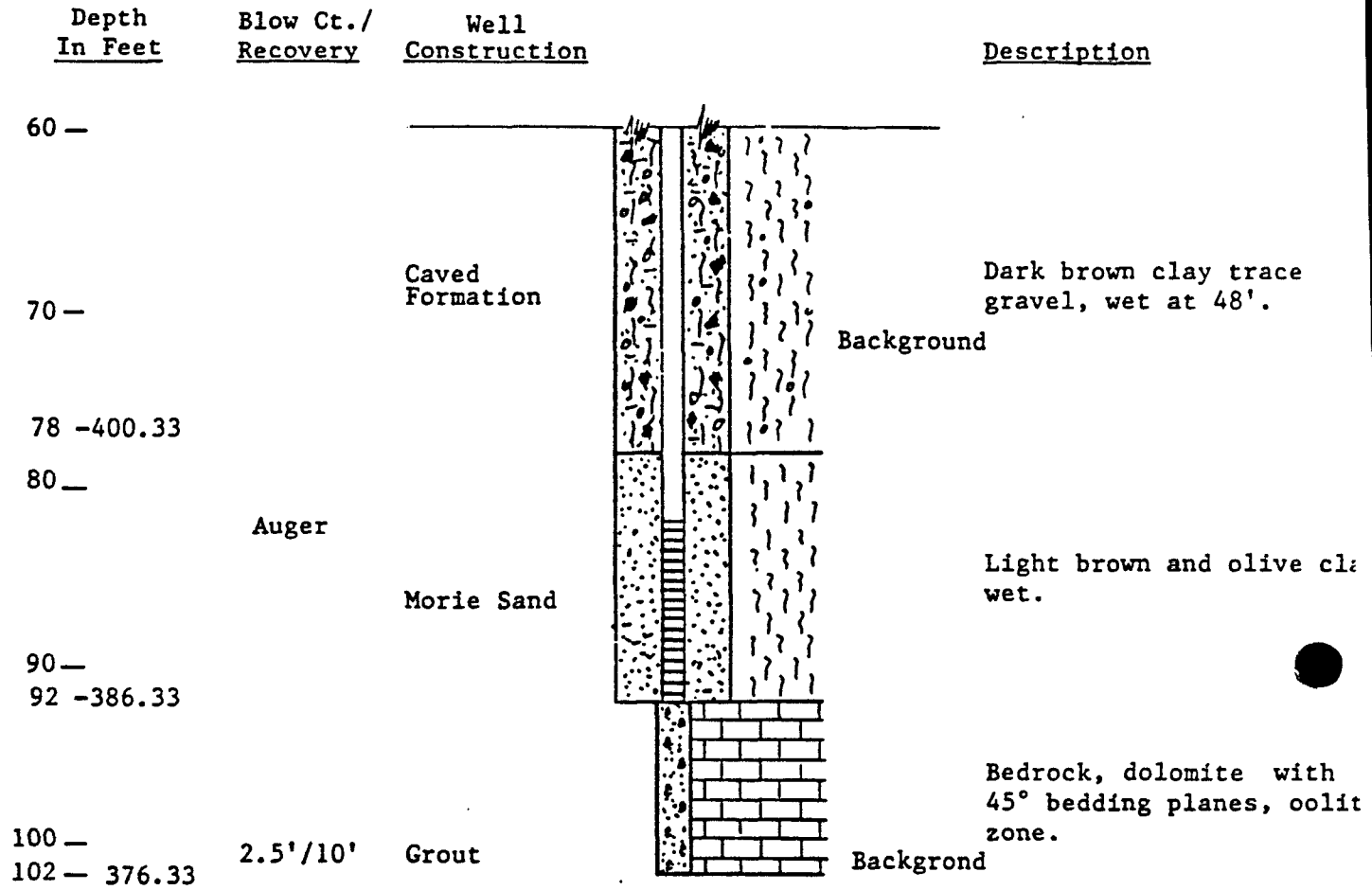
Heleva Landfill
Well FW-2
Project 8563

Depth in Feet	Elevation	Blow Ct./ Recovery	Well Construction	Organic Vapors (ppm)	Description
	478.33 Casing				
0—	474.53 Grade		12" hole to 92'		Cover (Fill)
			2.3" hole to 102'		
10—			2" steel riser and screen from 0-82' and 82-92', respectively	3.1	
20—					Garbage
30—					
33—	445.33	Auger			
40—		30-27-19	Caved Formation and Natural Backfill.		
		Auger			
		14-21-18			Dark brown clay trace gravel wet at 48'.
50—		Auger			Background
60—					

r.e. wright associates. inc.

AR301834

Heleva Landfill
Well FW-2 (cont'd)
Project 8563



Vertical Scale 1" = 10'

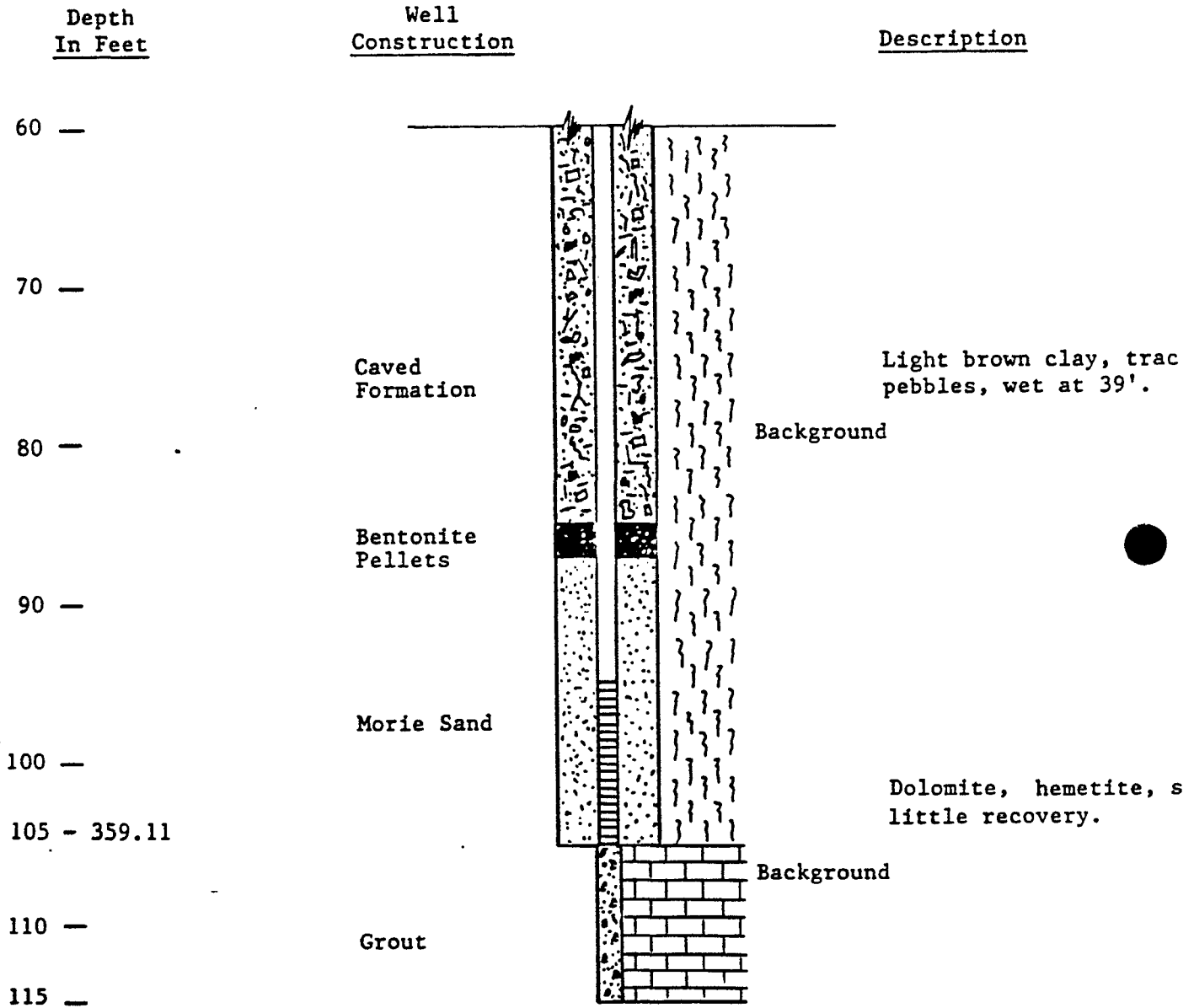
Drilling Began: 2/5/86
Drilling Completed: 2/6/86
Well Construction Completed: 2/8/86
Well Development Completed: 2/25/86
Total Depth: 102'

Screen Interval: 82-92
Hole Diameter: 12"/2.3"
Monitoring Tube: 2"
Yield: 1.5 gpm

Organic
Vapors
(ppm)

AR301836

Heleva Landfill
Well FW-3 (cont'd)
Project 8563



Vertical Scale 1" = 10'

Drilling Began: 2/12/86
Drilling Completed: 2/17/86
Well Construction Completed: 2/20/86
Well development Completed:
Total Depth: 115'

Screen Interval: 95-105'
Hole Diameter: 12"/2.3"
Monitoring Tube: 2"
Yield: 0.2 gpm

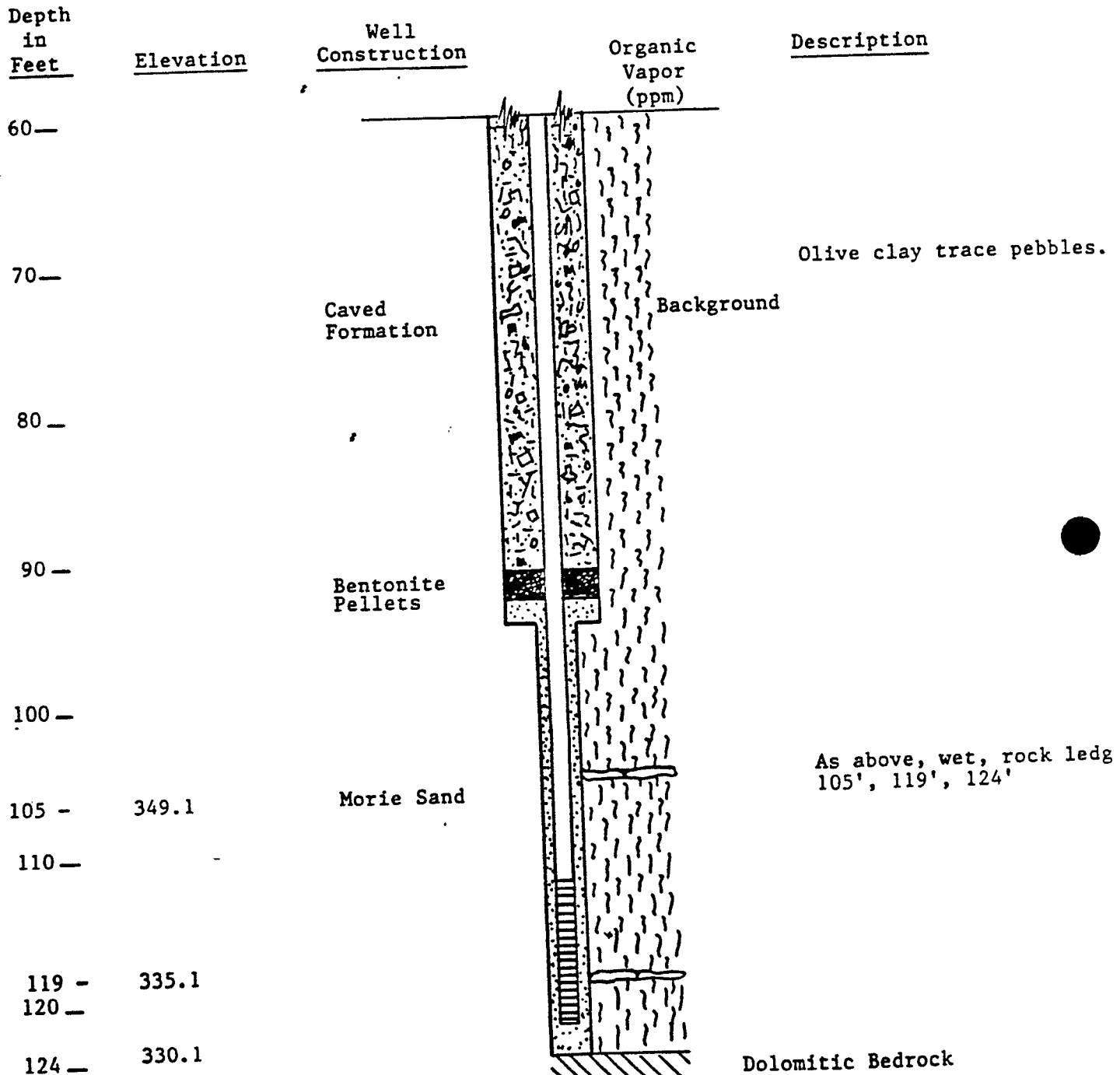
AR301837

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Heleva Landfill
Well FW-4
Project 8563

Depth in Feet	Elevation	Well Construction	Organic Vapor (ppm)	Description
0 —	456.65 Casing 454.1 Grade			
		12" hole to 95'		
		5" hole to 124'		Fill, garbage.
10 —			Background	
		2" steel riser and screen from 0-112' and 112-122', respectively.		
19—	435.1			
20 —				
30 —			Background	Light brown clay.
		Caved Formation and natural backfill		
37—	417.1			
40 —				
			Background	Olive brown silty clay.
49—	405.1			
50 —				
			Background	Brown and gray and black clay, mottled.
59—	395.1			
60 —				Olive clay trace pebbles.

Heleva Landfill
Well FW-4 (cont'd)
Project 8563



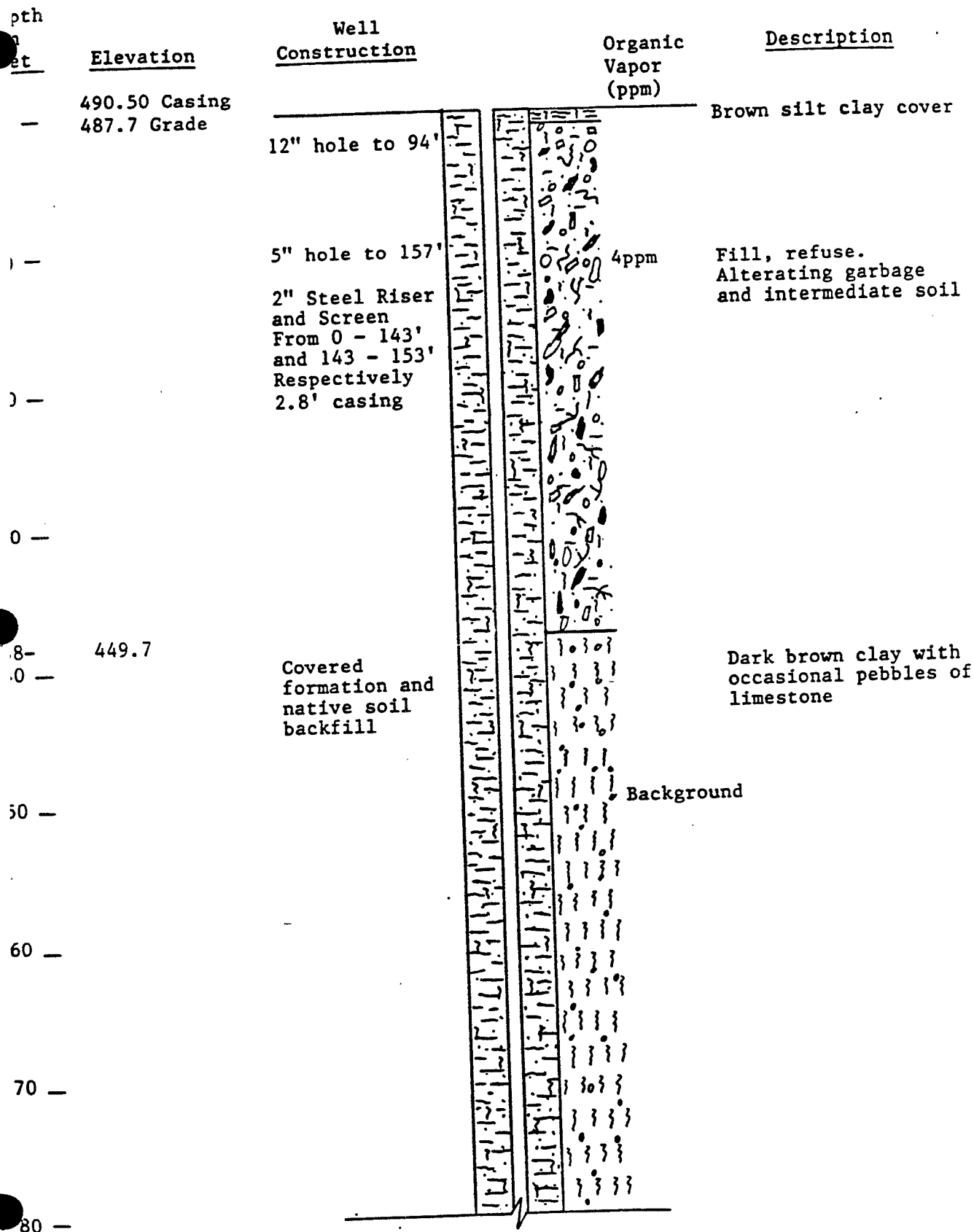
Vertical Scale 1" = 10'

Drilling Began: 2/22/86
Drilling Completed: 2/24/86
Well Construction Completed: 2/26/86
Well Development Completed:
Total Depth: 124'

Screen Interval: 112-122'
Hole Diameter: 12"/5"
Monitoring Tube: 2"
Yield: 1.0 gpm

r.e. wright associates. inc. 301839

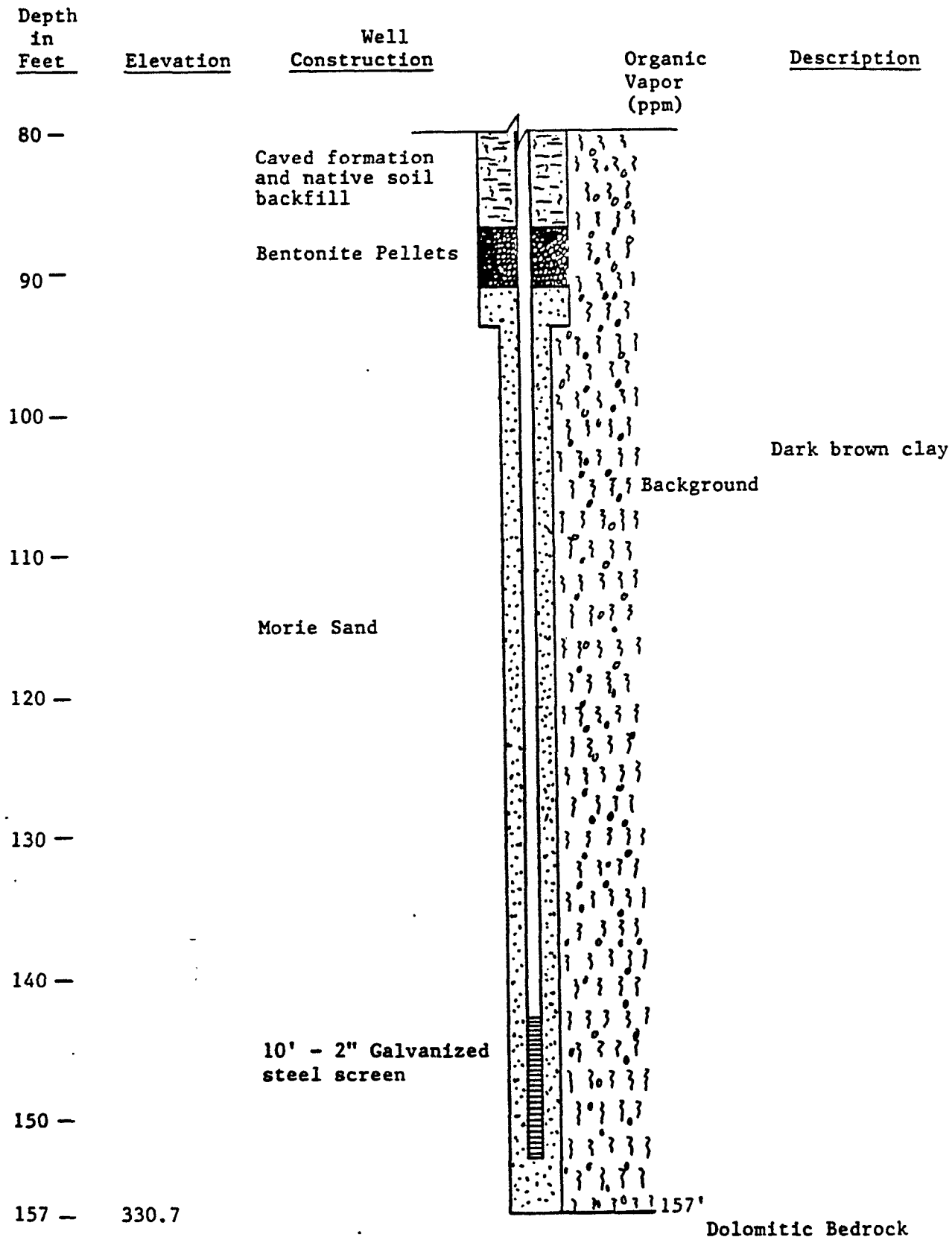
HELEVA LANDFILL
WELL FW-5
PROJECT 8563



r.e. wright associates. inc.

AR301840

HELEVA LANDFILL
WELL FW-5 (con't)
PROJECT 8563



Vertical Scale 1" = 10'

r.e. wright associates, inc.

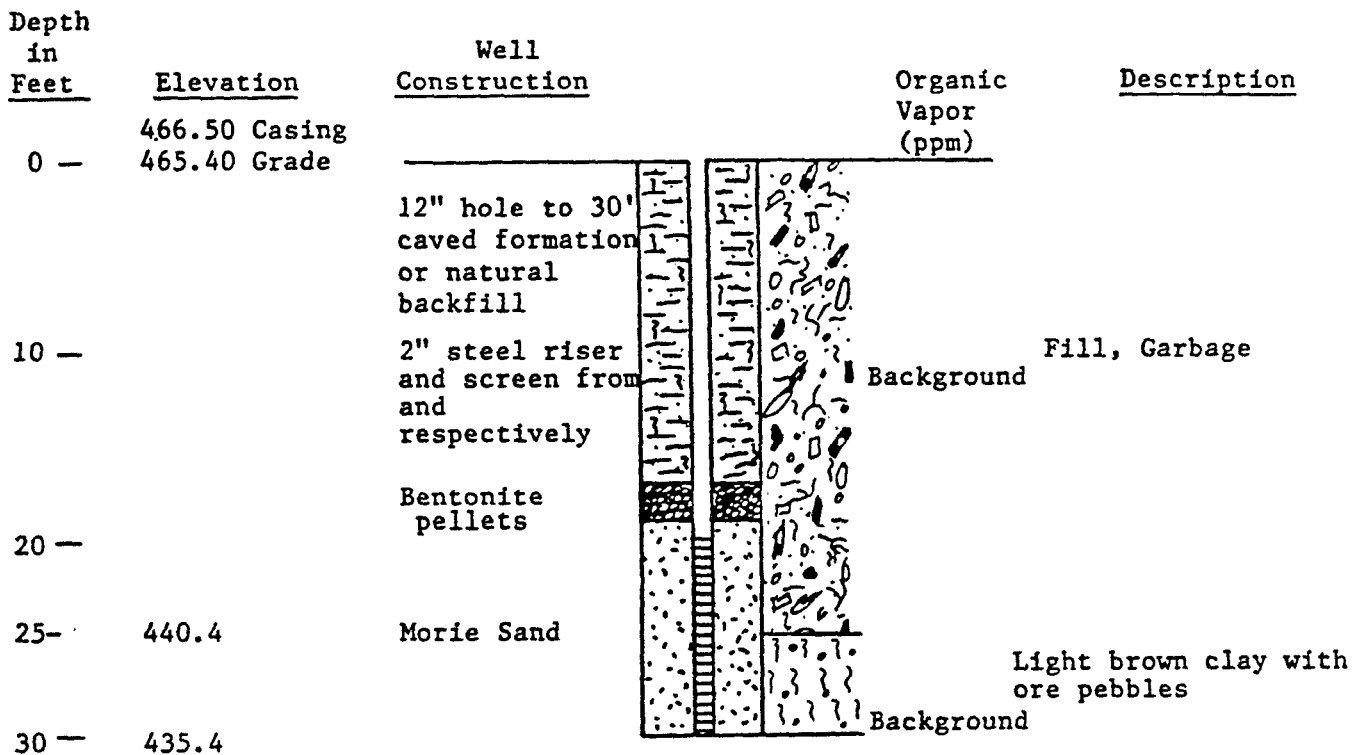
AR301841

HELEVA LANDFILL
WELL FW-5 (con't)
PROJECT 8563

Drilling Began: 2/27/86
Drilling Completed: 3/4/86
Well Construction Completed: 3/5/86
Well Development Completed: 3/18/86
Total depth: 157 feet

Screen Interval: 143 - 153
Hole Diameter: 12"/5"
Monitoring Tube: 2"
Yield: 0.1 gpm

HELEVA LANDFILL
WELL FW-6
PROJECT 8563

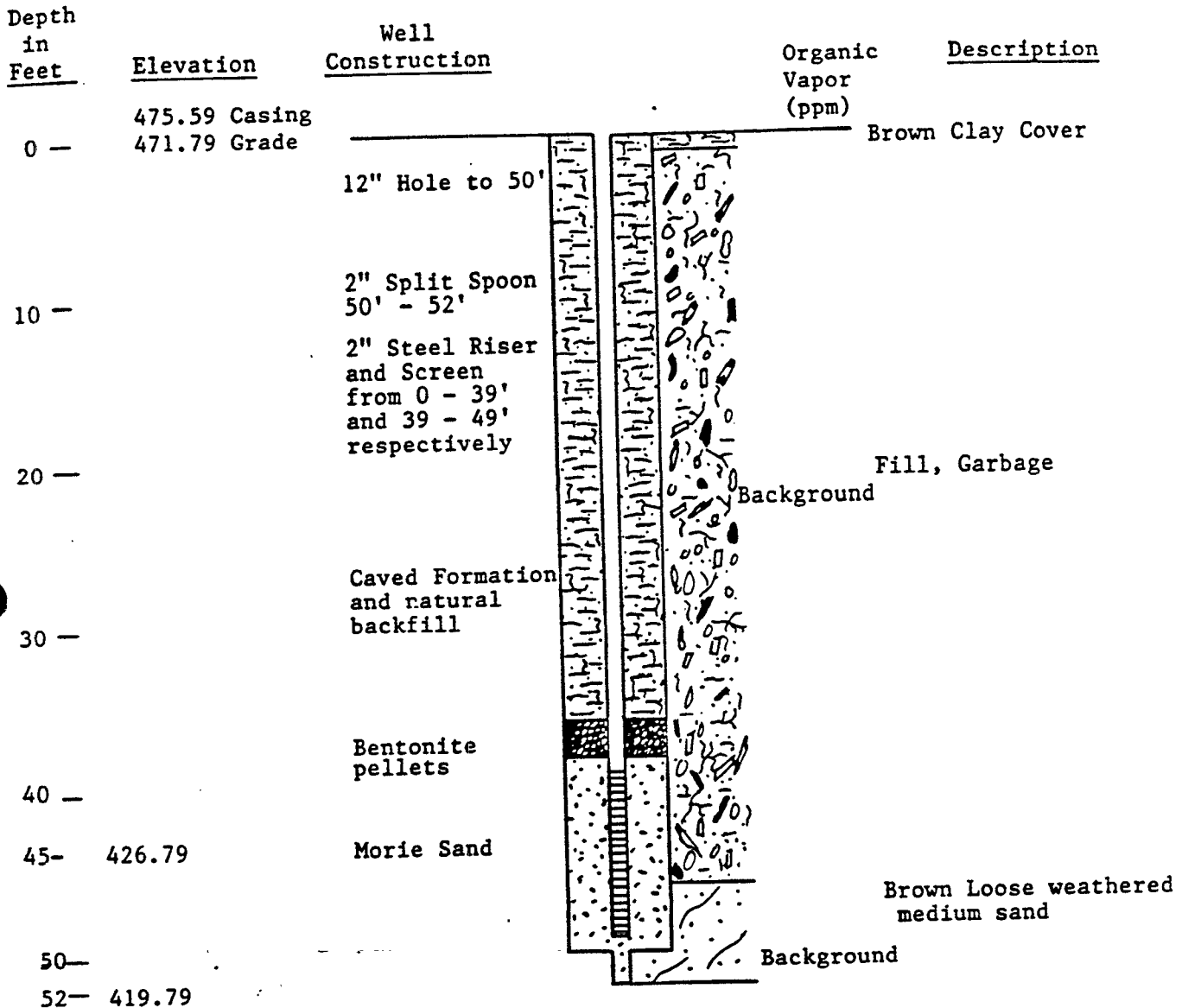


Vertical Scale 1" = 10'

Drilling Began: 3/6/86
Drilling Completed: 3/6/86
Well Construction Completed: 3/7/86
Well Development Completed:
Total Depth: 30 feet

Screen Interval: 20' - 30'
Hole Diameter: 12"
Monitoring Tube; 2"
Yield: None - Dry

HELEVA LANDFILL
WELL FW-7
PROJECT 8563



Vertical Scale 1" = 10'

Drilling Began: 3/8/86
Drilling Completed: 3/8/86
Well Construction Completed: 3/10/86
Well Development Completed: 3/25/86
Total Depth: 52 feet

Screen Interval: 39 - 49
Hole Diameter: 12"/2"
Monitoring Tube: 2"
Yield: 0.4 gpm

HELEVA LANDFILL
WELL FW-8
PROJECT 8563

Depth in Feet	Elevation	Well Construction	Organic Vapors (ppm)	Description
0 -	475.33 Casing 473.03 Grade	8" Hole to 93' 3" Hole to 142'		Brown Silty Clay Cover
10 -		2 23/64" Hole to 160'. 1 1/4" Steel Riser and Screen From 0 - 150' and 150' - 150' respectively		Fill, Garbage, very wet. Background
20 -				
30 -				
40 -				
45 -	428.03	Caved formation or Natural Backfill		
50 -				
60 -				Light Brown Clay with ore pebbles.
70 -				
80 -				

AR301845

HELEVA LANDFILL
WELL FW-8 (con't)
PROJECT 8563

Depth in Feet	Elevation	Well Construction	Organic Vapors (ppm)	Description
80 —			3.3	
			3.3	
			3.3	
			3.3	
			3.3	
90 —			3.3	
			3.3	
			3.3	
100 —		Caved formation and natural back- fill.	3.3	Light brown clay with ore pebbles.
			3.3	
			3.3	
110 —			3.3	
			3.3	
			3.3	
			3.3	
120 —			3.3	
			3.3	
			3.3	
			3.3	
130 —		Bentonite pellets	3.3	
			3.3	
			3.3	
			3.3	
140 —			3.3	
			3.3	
145- 328.03		Bentonite slurry	3.3	Weathered dark gray dolomite with iron ore in vugs
145- 328.03				
150 —		Morie Sand		
160 — 313.03				

Vertical Scale 1" = 10'

r.e. wright associates, inc.

AR 301 846

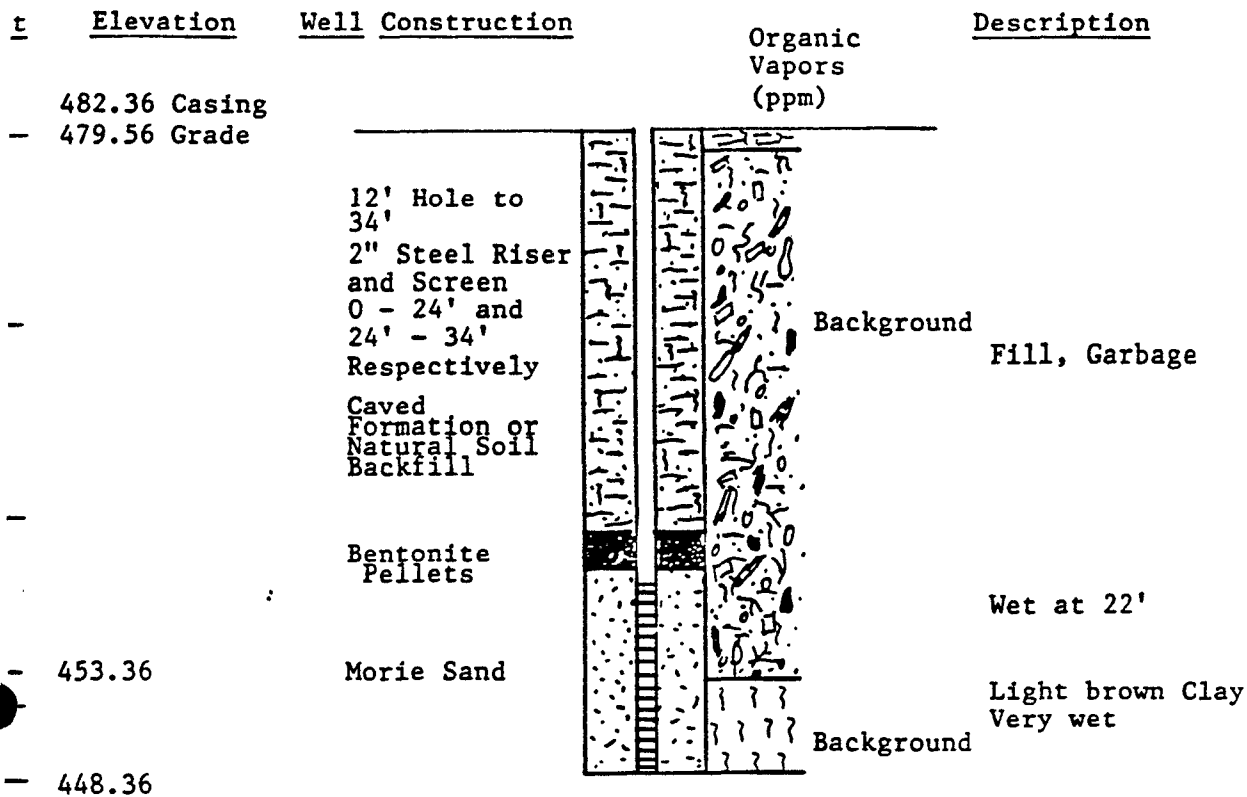
HELEVA LANDFILL
WELL FW-8 (con't)
PROJECT 8563

Drilling Began: 3/11/86
Drilling Completed: 3/14/86
Well Construction Completed: 3/17/86
Well Development Completed: 3/18/86

Screen Interval: 150 - 160
Hole Diameter: 8"/3"/2.3"
Monitoring Tube: 2"
Yield: 0.1 gpm

HELEVA LANDFILL
WELL FW-9
PROJECT 8563

th



Vertical Scale 1" = 10'

Drilling began: 3/18/86
Drilling Completed: 3/18/86
Construction Completed: 3/19/86
Development Completed dry
Total Depth: 34 feet

Screen Interval: 24-34 feet
Hole Diameter: 12"
Monitoring Tube: 2"
Yield: None

r.e. wright associates, inc.

AR301848

Project 8563

34 — 447.04

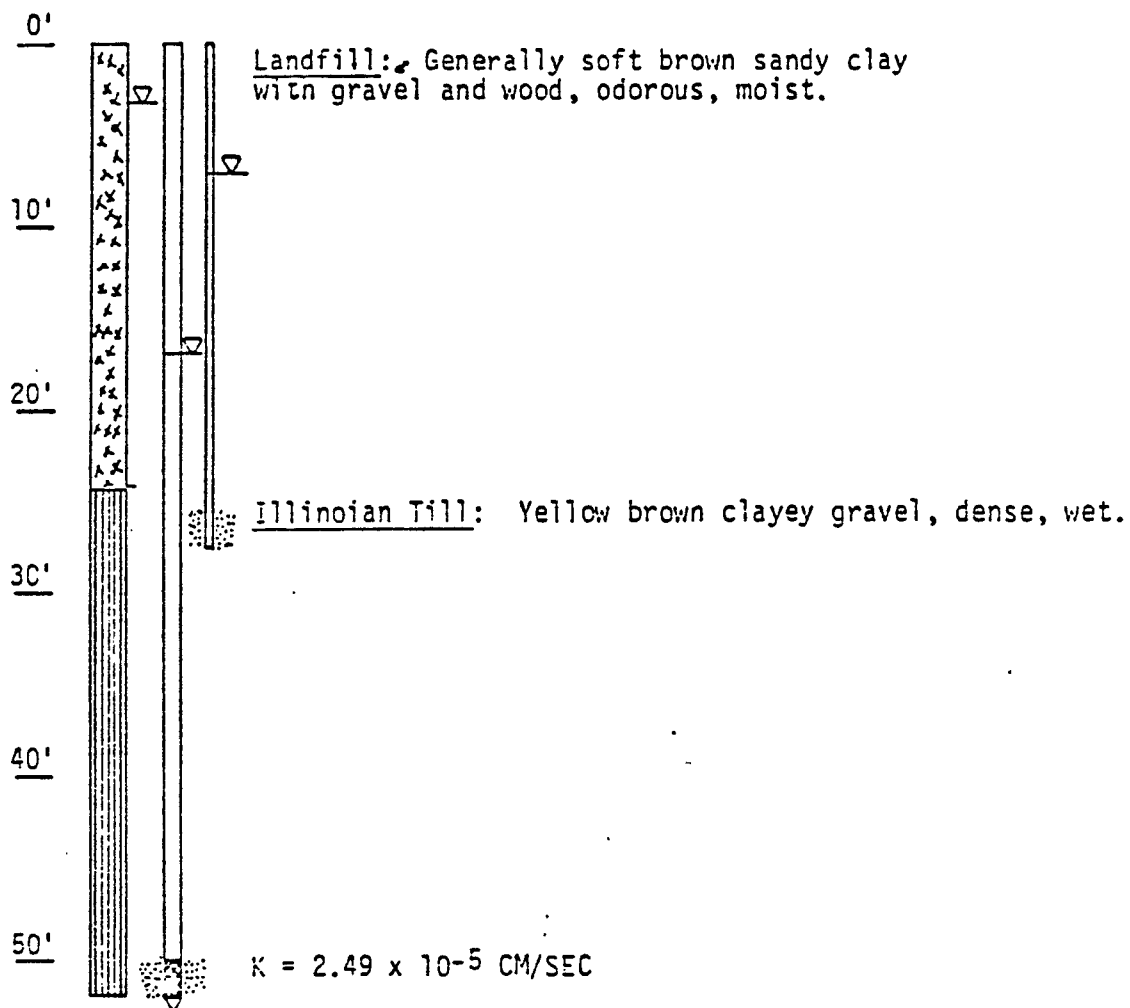
0.4

Screen Interval: 24'-34'
Hole Diameter: 12"
Monitoring Tube: 2"
Yield: 0.1 gpm

AR:301849

BORING 1

G.S.E. +432.44'



- NOTE: 1 - (K) determined by slug test.
2 - Water levels as of 6/6/74.
3 - Completed 3/26/74 by F. T. Kitlinski & Associates.

AR301850

For Nassaux-Hemsley, Inc.

F. T. NITLINSKI & ASSOCIATES

Chambersburg, Pa.

Harrisburg, Pennsylvania

Project No. 74-03-1971TEST BORING LOGBoring No. B-1Sheet 1 of 1Job Name and Location Heleva Landfill, N. Whitehall Township, Lehigh County, Pa.
Boring Location Per Nassaux-Hemsley Plan

Date Begin 3-25-74 Casing Size, O.D. 4 Spacing Size O.D. 2
 Date Completed 3-26-74 Hammer Weight 300 Hammer Wt. 140
 Depth of Soil 52.0' Hammer Drop 18 Hammer Drop 30
 Depth of Rock 0.0' Core Bit Size -- Rod No. 109
 Total Boring Depth 52.0' Driller H. Growden, Sr. Asst. Driller D. Glotfelty

Process & Ground Water Data

Date	Depth Reached	Depth Water	Hour
3-26-74	52.0'	3.5'	0 Hr.
3-27-74	52.0'	16.5'	24 Hr.

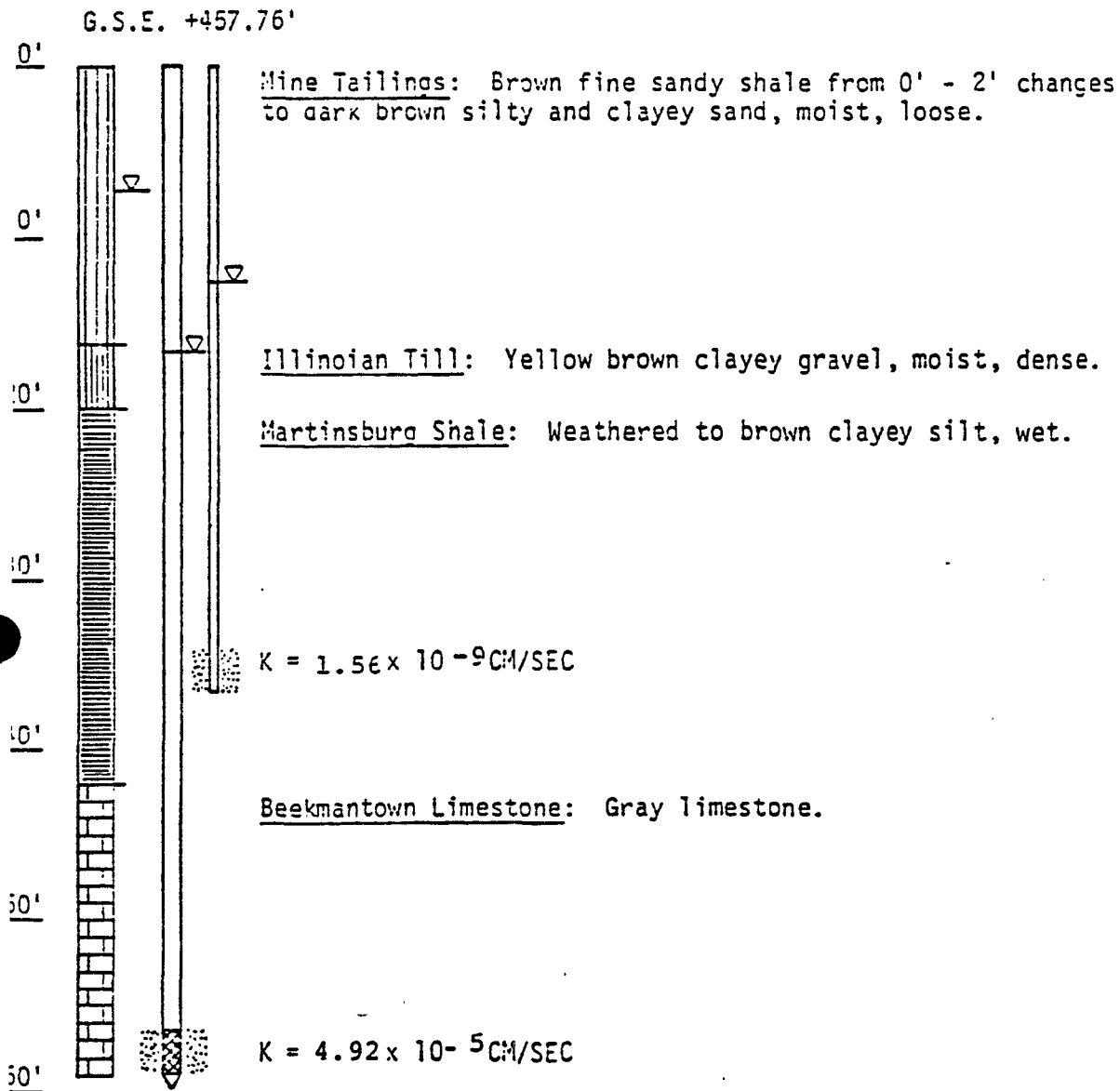
Ground Elev. 443.28Date of Test 3-26-74Depth Surf. Water ---Weather Windy & cool

BORING LOG		SPOON SAMPLE & ROCK CORE DATA				REMARKS	CASING BLOCS
Depth From To	Material Description	Sample No.	Depth	Blows in Spoon 6" Interval	Depth of Core	Remarks	
0.0	FILL-garbage, to wood, silty clay, 24.5 metal, etc.	1	0.0	10 18 25 31		No rock encountered	1
		2	5.0	15 17 19 27			2
		3	10.0	10 17 22 31			3
		4	15.0	14 17 19 27			4
24.5	Br. silty clay to moist-stiff to 52.0 hard	5	20.0	22 33 27 45			5
		6	25.0	10 11 17 21			6
		7	30.0	11 17 22 22			7
		8	35.0	10 11 12 12			8
		9	40.0	12 17 17 18		End of boring at 52.0'	9
		10	45.0	14 14 21 21			10
		11	50.0	20 20 20 20			11
		12	52.0				12

NOTE: Upon completion, boring developed into a double ground-water piezometer. Upper-level piezometer developed by placing 37.5' of 1/2" dia. galvanized steel pipe in hole and 1.5" of pipe above ground. Lower-level piezometer developed by placing 51.5' of 1-1/4" dia. plastic pipe, including a screened wellpoint, in hole and 1.5" of pipe above ground. Zone between pipe tips sealed with bentonite clay and saccate.

AR301851

BORING 2



- NOTE: 1 - (K) determined by slug test.
2 - Water levels as of 6/6/74.
3 - Completed 3/23/74 by F. T. Kitlinski & Associates.

AR301852

of Nassaux-Hemsley, Inc.

F. T. KITCHEN & ASSOCIATES

Chambersburg, Pa.

Harrisburg, Pennsylvania

Project No. 74-03-1971

TEST BORING LOG

Boring No. B-2

Sheet 1 of 1

Name and Location Heleva Landfill, N. Whitehall Township, Lehigh County, Pa.
 Boring Location Per Nassaux-Hemsley Plan

Date Began 3-26-74 Boring Size O.D. 4 Spoon Size O.D. 2
 Date Completed 3-28-74 Hammer Weight 300 Hammer Wt. 140
 Depth of Soil 42.5' Hammer Drop 18 Hammer Drop 30
 Depth of Rock 16.5' Core Bit Size NXM-2 1/8 Bit No. 109
 Total Boring Depth 59.0' Driller H. Growden, Sr. Asst. Driller D. Glotfelty

Progress & Ground Water Data

Date	Depth Reached	Depth Water	Time
3-28-74	59.0'	21.5'	0 Hr.

Ground Elev. 453.28
 Datum Elev. _____
 Depth Surf. Water _____
 Weather Warm

BORING LOG		SPOON SAMPLE & ROCK CORE DATA				REMARKS	CASING BLOWS
Depth From To	Material Description	Sample No.	Blows on Spoon 6" intervals	Depth of Core No. of Rec.	Depth of Core Run	water loss, cavities, etc.	0-1 4
0.0	Br. sandy topsoil to moist-loose	1	2.0 1 2.2 2				1-2 4
0.5		2	5.0 3 4 4 4				4 14
0.5	Br. silty sand to moist-loose to med.	3	10.0 4 4 4 5			Tricone refusal at 42.5'	12 12
6.0		4	15.0 11 12 14 17				7 5
6.5	Br. silty clay to moist-stiff to hard	5	20.0 16 16 21 20			Started coring at 42.5'	6 10
42.5		6	25.0 10 12 12 17				10 12
		7	30.0 15 15 15 20			No loss of drill water	12 12
		8	35.0 14 17 17 19	42.5			25 60
42.5	Gr. silty lime- to stone-broken	9	40.0 19 21 23 27	1	49.06.9	End of boring at 59.0'	25 25
9.0	med. hard			2	59.010.0		35 96
							145 130
							140 130

NOTE: Upon completion, boring developed into a double ground-water piezometer. Upper-level piezometer developed by placing 37.0' of 1/2" dia. galvanized steel pipe in hole and 2.0' of pipe above ground. Lower-level piezometer developed by placing 59.0' of 1/4" dia. plastic pipe, including a screened wellpoint, in hole and 2.0' of pipe above ground. Zone between pipe tips sealed with bentonite clay and saccate.

AR301853

HELEVA SANITARY LANDFILL

DRILLER'S LOGS FOR WELLS B-8, B-9 AND B-10 MOYER DRILLING; LEHIGHTON, PENNSYLVANIA

B-8 0'-118' Brown Clay
 118'-124' Gravel, Rounded
 124'-200' Black Limestone

6" diameter solid steel casing installed to 143'; 1½" diameter PVC pipe installed to 64.5'. Well completed 9/13/76; air-rotary.

B-9 0'-136' Brown Clay
 136'-143' Limestone

6" diameter steel casing to 143' which was slotted from 133'-143'. Well completed 9/13/76; air-rotary.

B-10 0'- 90' Clay, Boulders
 90'-102' Limestone, Water encountered at 99'

6" diameter slotted steel casing installed. Rate of flow from pump test 10 gpm. Well completed 10/22/76; air-rotary.

AR301854

APPENDIX C

FINAL DESIGN ESTIMATE

AR301855

SUMMARY

95 PERCENT ESTIMATE OF COST
FOR
HELEVA LANDFILL SITE
LEHIGH COUNTY, PENNSYLVANIA

Clearing and grubbing	12,681
Exc. - Cut to Fill	198,210
Common fill	1,042,749
Select fill	636,086
Drainage net	177,705
Geotextile installation	169,122
Synthetic Membrane	435,459
Topsoil	269,058
Fine Grading	23,984
Seeding	18,458
Fencing	70,097
Rip rap	27,793
Gravel paving	12,662
Settlement Markers	259
Gas Vents	461,423
Pump Onsite Pond	4,341
Erosion Control	18,192
Remove Monitor Wells	975
Reloc. Ohd. Power Line	0
Facilities	1,667

AR301856

Safety Operations	81,245
Soil Comp. Testing	26,198
Site Abandonment	1,505
Test Trench	2,828
Surveying	1,872
Equip Wash Area	13,112
Estimated Current Contract Costs	3,707,679
Profit - 10%	370,768
Contingencies - 5%	185,384
Subtotal	4,263,830
S & A - 5.5%	234,511
TOTAL ESTIMATED PROJECT COST	4,498,341

AR301857

UNIT COST SUMMARY

95 PERCENT ESTIMATE OF COST
FOR
HELEVA LANDFILL SITE
LEHIGH COUNTY, PENNSYLVANIA

DESCRIPTION	Direct Cost	Indirect Cost 7.5%	Total Cost	No. Units	Unit Meas.	Unit Cost
Clearing and grubbing	11,794	\$888	\$12,681	25	ac	\$507.26
Exc. - Cut to Fill	184,334	\$13,875	\$198,210	28,990	cy	\$6.84
Common fill	969,754	\$72,994	\$1,042,749	81,373	cy	\$12.81
Select fill	591,559	\$44,527	\$636,086	47,133	cy	\$13.50
Drainage net	165,265	\$12,440	\$177,705	864,560	sf	\$0.21
Geotextile sep.	157,283	\$11,839	\$169,122	1,784,011	sy	\$0.09
Synthetic Membrane	404,976	\$30,483	\$435,459	864,560	sf	\$0.50
Topsoil	250,224	\$18,835	\$269,058	16,446	cy	\$16.36
Fine Grading	22,305	\$1,679	\$23,984	847,700	sf	\$0.03
Seeding	17,166	\$1,292	\$18,458	125,333	sy	\$0.15
Fencing	65,190	\$4,907	\$70,097	4,300	lf	\$16.30
Rip rap	25,848	\$1,946	\$27,793	951	cy	\$29.23
Gravel paving	11,775	\$886	\$12,662	950	cy	\$13
Settlement Markers	241	\$18	\$259	3	ea	\$86
Gas Vents	429,123	\$32,300	\$461,423	234	ea	\$1,972
Pump Onsite Pond	4,037	\$304	\$4,341	1	LS	\$4,341
Erosion Control	16,918	\$1,273	\$18,192	1	LS	\$18,192
Remove Monitor Wells	907	\$68	\$975	19	ea	\$51
Reloc. Ohd. Power Line	1,850	\$139	\$1,989	1	LS	\$1,989
Facilities	1,550	\$117	\$1,667	1	LS	\$1,667
Safety Operations	75,558	\$5,687	\$81,245	1	LS	\$81,245
Soil Comp. Testing	24,364	\$1,834	\$26,198	1	LS	\$26,198
Site Abandonment	1,400	\$105	\$1,505	1	LS	\$1,505

AR301858

Test Trench	2,630	\$198	\$2,828	14	EA	\$202
Surveying	1,741	\$131	\$1,872	1	LS	\$1,872
Equip Wash Area	12,194	\$918	\$13,112	1	LS	\$13,112

AR301859

DIRECT COSTS

Description	Labor	Material	Plant	Amount
Clearing and grubbing	5,359	0	6,434	11,794
Exc. - Cut to Fill	75,875	0	108,460	184,334
Common fill	292,703	172,511	504,541	969,754
Select fill	64,227	374,707	152,624	591,559
Drainage net	7,093	155,794	2,378	165,265
Geotextile Installation	10,048	143,865	3,369	157,283
Synthetic Membrane	110,000	247,437	47,539	404,976
Topsoil	31,087	166,537	52,600	250,224
Fine Grading	7,511	0	14,794	22,305
Seeding	5,628	6,098	5,440	17,166
Fencing	0	65,190	0	65,190
Rip rap	5,283	12,097	8,468	25,848
Gravel paving	1,350	7,553	2,873	11,775
Settlement Markers	105	106	30	241
Gas Vents	155,665	46,596	226,861	429,123
Pump Onsite Pond	3,152	239	646	4,037
Erosion Control	2,223	14,496	199	16,918
Remove Monitor Wells	397	70	439	907
Relocate Ohd Power Line	0	1,850	0	1,850
Facilities	0	0	1,550	1,550
Safety Operations	56,743	18,815	0	75,558
Soil Comp. Testing	10,839	0	13,525	24,364
Site Abandonment	1,040	0	360	1,400
Test Trench	1,389	0	1,241	2,630
Surveying	1,577	164	0	1,741
Equip Wash Area	1,248	10,071	876	12,194

AR301860

850,541 1,444,195 1,155,248 3,449,984

FILE: CEAL
COST ESTIMATE ANALYSIS
PROJECT: Heleva Landfill
LOCATION: Lehigh County, Pennsylvania

INDIRECT COSTS

(Direct cost = \$3,449,984)

Sht. of Shts.
Date Prepared
4/88

Checked: J. Impens

Estimator: B. Cannon

CODE: C

DESCRIPTION	QUANT.		MH/ Units	LABOR		EQUIPMENT	MATERIAL	
	No.	Unit		Unit	Cost	Unit	Unit	Price
	Unit	Meas.	Total Hours	Price		Price	Cost	
OVERHEAD TO PRIME CONTRACTOR								
Superintendent (taxes/insur.)	6	mth		3700	\$22,200			\$22,200
Time Keeper	6	mth		2300	\$13,800			\$13,800
Office Trailer & Supplies	6	mth				280	\$1,680	\$1,680
Telephone	6	mth				110	\$660	\$660
Surveying	15	day		450	\$6,750			\$6,750
Mobilization (Equip.& Per.)	1	LS				6200	\$6,200	\$6,200
Demobilization	1	LS				1500	\$1,500	\$1,500
Temp. Power	1	LS				1000	\$1,000	\$1,000
Temp Water	1	LS				250	\$250	\$250
Pickup	6	mth				530	\$3,180	\$3,180
Toilet	6	mth				73	\$438	\$438
Project Sign	1	ea				350	\$350	\$350
Small Tools	1	LS						\$20,12
Cleanup	1	LS						\$4,32
Cyrene Office Expense (3% dir cost)	1	LS						\$103,50
Bid and performance bond	1	LS						\$39,22
Insurance (1% direct cost)	1	LS						\$34,50
								=====

TOTAL PRIME CONTR. OVERHEAD **

\$259,68

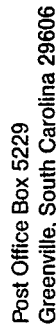
==== Construct. to begin 7/88 and end 1/89
6 month duration

TOTAL INDIRECT % = 7.5%

APPENDIX D

COLLECTION POND WATER TESTING RESULTS

AR301862



Chain Of Custody Record

[illegible]

AR 301 863

Original Report

[illegible]



Industrial & Environmental Analysts, Inc.

P.O. Box 12846 • Research Triangle Park, NC 27709 • 919-467-9919

Date: January 27, 1988

John Caimey
CRS Serrine
P.O. Box 5229
Greenville, SC 29606

Reference: IEA Report No. 219004

Dear Mr. Caimey,

Transmitted herewith are the results of analyses on two samples submitted to our laboratory on January 13, 1987.

Please see the enclosed reports for your results.

Very truly yours,

INDUSTRIAL & ENVIRONMENTAL ANALYSTS, INC.

Mark Randall
Senior Chemist

Offices and laboratories located in:

Essex Junction, Vermont
Research Triangle Park, North Carolina

AR301865

AR301865

Comments

BQL - BELOW QUANTITATION LIMIT

Tentatively Identified Compounds

IEA Sample ID: 219004 2

Client Sample ID: PW-102

Applicable Fraction: Volatile ☒ Base/Neutral ☐ Acid ☐ Other ☐

Tentatively Identified Compounds (TIC) refers to substances not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is 10% or more of that of the nearest internal standard.

TIC Name

Concentration

µg/L

None per above rules.

<5.

AR301866

Comments BQL - BELOW QUANTITATION LIMIT

Tentatively Identified Compounds

IEA Sample ID: 219004 1

Client Sample ID: PW-101

Applicable Fraction: Volatile ☒ Base/Neutral ☐ Acid ☐ Other ☐

Tentatively Identified Compounds (TIC) refers to substances not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is 10% or more of that of the nearest internal standard.

TIC Name

Concentration

µg/L

None per above rules.

<5.

AR301867

Comments

BQL - BELOW QUANTITATION LIMIT

GC/MS Purgeables

IEA Sample No. 219004 2Sample Identification PW-102Date Analyzed January 21, 1988By Olszewski

<u>Number</u>	<u>Compound</u>	<u>Quantitation Limit</u>	<u>Results</u>
		<u>ug/L</u>	<u>Concentration</u> <u>ug/L</u>
1	BENZENE	5	BQL
2	BROMODICHLOROMETHANE	5	BQL
3	BROMOFORM	5	BQL
4	BROMOMETHANE	10	BQL
5	CARBON TETRACHLORIDE	5	BQL
6	CHLOROBENZENE	5	BQL
7	CHLOROETHANE	10	BQL
8	2-CHLOROETHYL VINYL ETHER	5	BQL
9	CHLOROFORM	5	BQL
10	CHLOROMETHANE	10	BQL
11	DIBROMOCHLOROMETHANE	5	BQL
12	1,2-DICHLOROBENZENE	5	BQL
13	1,3-DICHLOROBENZENE	5	BQL
14	1,4-DICHLOROBENZENE	5	BQL
15	1,1-DICHLOROETHANE	5	BQL
16	1,2-DICHLOROETHANE	5	BQL
17	1,1-DICHLOROETHENE	5	BQL
18	trans-1,2-DICHLOROETHENE	5	BQL
19	1,2-DICHLOROPROPANE	5	BQL
20	cis-1,3-DICHLOROPROPENE	5	BQL
21	trans-1,3-DICHLOROPROPENE	5	BQL
22	ETHYL BENZENE	5	BQL
23	METHYLENE CHLORIDE	5	BQL
24	1,1,2,2-TETRACHLOROETHANE	5	BQL
25	TETRACHLOROETHENE	5	BQL
26	TOLUENE	5	BQL
27	1,1,1-TRICHLOROETHANE	5	BQL
28	1,1,2-TRICHLOROETHANE	5	BQL
29	TRICHLOROETHENE	5	BQL
30	TRICHLOROFLUOROMETHANE	5	BQL
31	VINYL CHLORIDE	10	BQL

AR301868

Comments

BQL - BELOW QUANTITATION LIMIT

GC/MS Purgeables

IEA Sample No. 219004 1

Sample Identification PW-101

Date Analyzed January 15, 1988

By Olszewski

<u>Number</u>	<u>Compound</u>	<u>Quantitation Limit</u>	<u>Results</u>
		<u>ug/L</u>	<u>Concentration</u> <u>ug/L</u>
1	BENZENE	5	BQL
2	BROMODICHLOROMETHANE	5	BQL
3	BROMOFORM	5	BQL
4	BROMOMETHANE	10	BQL
5	CARBON TETRACHLORIDE	5	BQL
6	CHLOROBENZENE	5	BQL
7	CHLOROETHANE	10	BQL
8	2-CHLOROETHYL VINYL ETHER	5	BQL
9	CHLOROFORM	5	BQL
10	CHLOROMETHANE	10	BQL
11	DIBROMOCHLOROMETHANE	5	BQL
12	1,2-DICHLOROBENZENE	5	BQL
13	1,3-DICHLOROBENZENE	5	BQL
14	1,4-DICHLOROBENZENE	5	BQL
15	1,1-DICHLOROETHANE	5	BQL
16	1,2-DICHLOROETHANE	5	BQL
17	1,1-DICHLOROETHENE	5	BQL
18	trans-1,2-DICHLOROETHENE	5	BQL
19	1,2-DICHLOROPROPANE	5	BQL
20	cis-1,3-DICHLOROPROPENE	5	BQL
21	trans-1,3-DICHLOROPROPENE	5	BQL
22	ETHYL BENZENE	5	BQL
23	METHYLENE CHLORIDE	5	BQL
24	1,1,2,2-TETRACHLOROETHANE	5	BQL
25	TETRACHLOROETHENE	5	BQL
26	TOLUENE	5	BQL
27	1,1,1-TRICHLOROETHANE	5	BQL
28	1,1,2-TRICHLOROETHANE	5	BQL
29	TRICHLOROETHENE	5	BQL
30	TRICHLOROFLUOROMETHANE	5	BQL
31	VINYL CHLORIDE	10	BQL

AR301869