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Oakland Operations Office, Oakland, California

FINAL WORK PLAN FOR NITRATE DELINEATION SAMPLING AND STORM WATER PROTECTION IN THE SOUTHWEST TRENCHES AREA

at the

Laboratory for Energy-Related Health Research (LEHR)
University of California at Davis, California

Prepared for:

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December 7, 1998

Rev. 0

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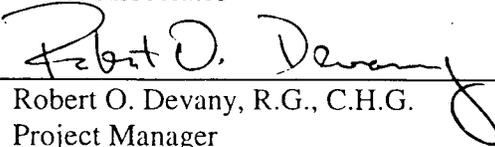
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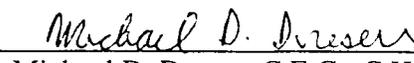
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APPENDIX

- Appendix A Responses to Comments on Draft Work Plan

ACRONYMS

AHAs	Activity Hazard Analyses
ANSI	American National Standards Institute
ALARA	As Low As Reasonably Achievable
bgs	Below ground surface
COC	Constituent of Concern
CPGERP	Contingency Plan and General Emergency Response Procedures
CZ	Control Zone
DL	Designated-Level
EZ	Exclusion Zone
FC	Field Coordinator
Gal	Gallon
GERT	General Emergency Response Training
GEL	General Engineering Laboratories, Inc.
HWP	Hazardous Work Permit
HSC	Health and Safety Coordinator
HSPs	Health and Safety Procedures
HDPE	high density polyethylene
ID	Identification

IT	International Technology Corporation
LEHR	Laboratory for Energy-Related Health Research
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
pCi/g	PicoCurie(s) per gram
PHSP	Project Health and Safety Plan
PQAS	Project Quality Assurance Specialist
PTL	Project Task Leader
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RPP	Radiation Protection Program
RCM	Radiological Control Manager
RCT	Radiological Control Technician
RSO	Radiological Safety Officer
RPM	Remedial Project Manager
RA	Removal Action
SAP	Sampling and Analysis Plan
SC	Site Coordinator
SHSO	Site Health and Safety Officer
SOP	Standard Operating Procedure
SQP	Standard Quality Procedure
STWPP	Storm Water Protection Plan

TSM	Tailgate Safety Meeting
USCS	Unified Soil Classification System
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
UC Davis	University of California, Davis
WA	Weiss Associates

1. INTRODUCTION

This Work Plan presents the sampling and analysis approach, methods, and procedures for delineating nitrate in soil, and storm water protection for the nitrate-impacted area at the Southwest Trenches Area at the Laboratory for Energy-related Health Research (LEHR) site at the University of California, Davis (UC Davis). This Work Plan has been prepared in response to a request by the Remedial Project Managers (RPMs) for the LEHR Environmental Restoration project. Specifically, following the Removal Action (RA) at the Southwest Trenches Area in the Summer of 1998, the field screening analytical results were presented to the RPMs for their review. Nitrate was the only driver constituent of concern (COC) that remained above its target cleanup level. Because of schedule constraints and cost effectiveness considerations, it was agreed among the Department of Energy (DOE) and the RPMs to backfill the nitrate-impacted areas in October 1998, and return in the Spring of 1999 to remove the nitrate-contaminated soil. In the meantime, additional analytical data will be collected to better delineate the nitrate-impacted area and storm water protection will be provided for the winter months to minimize infiltration of rainwater in the nitrate-impacted area.

The nitrate delineation described in this work plan is planned for December 1998 and will supplement the planned Designated-Level (DL) Sampling (WA, 1998a) planned for February 1999 (i.e., prior to the removal of the nitrate-impacted soil). This phased sampling approach will allow for evaluation of the pending RA confirmation data and the nitrate delineation results prior to conducting the DL sampling. Subsequently, the nitrate delineation and DL sampling results will be utilized in planning the final removal action activities at the Southwest Trenches Area.

The Draft Work Plan was distributed for review on November 10, 1998. Comments were received from Christine Judal of UC Davis and Duncan Austin of Department of Toxic Substances Control. Their comments have been addressed in this Final Work Plan; a summary of comments and responses is provided in Appendix A.

1.1 Background

Following completion of the Southwest Trenches RA, screening samples collected from the sidewalls and bottom of the excavations were evaluated and the results presented to DOE and the RPMs. This evaluation, referred to as the "Phase I Data Evaluation," identified nitrate as the only driver COC with concentrations greater than the screening criteria. Specifically, in the Western Excavation Area shown in Figure 1-1, nitrate was detected above the 36 mg/kg background concentration at depths ranging from 5 ft to 19 ft below ground surface (bgs). The highest nitrate concentrations were detected in Trench W8 (Figure 1-1) at concentrations of 1,070 and 830 mg/kg.

Figure 1-1 presents the location of nitrate concentrations above background at the completion of the 1998 excavation activities.

To mitigate potential ground water impacts, excavation of the nitrate-impacted soil was recommended at the September 16, 1998 RPM meeting. It was further decided that this RA should be performed during the Spring of 1999 due to schedule and logistical issues relating to weather and waste management. In the meantime, it was agreed that additional sampling and analysis should be performed to delineate the extent of the nitrate-impacted soil. In addition, it was also agreed that temporary storm water protection should be installed to mitigate nitrate migration in the unsaturated zone.

1.2 Objectives

1.2.1 Nitrate Delineation

The objective of the nitrate delineation task is to collect sufficient soil samples to characterize the extent of nitrate-impacted soil. Subsequently, an excavation and confirmation sampling plan will be developed that will guide the removal of nitrate-impacted soil.

The Designated-Level Sampling Plan (WA, 1998a) was designed to assess the potential impact of residual COCs on the ground water following completion of the RA. The original scope of the Designated-Level sampling has been expanded however, to include a program for delineation of nitrate in the soil.

The Designated-Level Sampling Plan is divided into two phases:

- Phase I – Nitrate delineation sampling and analysis; and,
- Phase II – Designated-Level sampling for residual COCs (Full Suite).

The scope of the Phase I sampling is the subject of this Work Plan. The scope of the Phase II Designated-Level sampling will remain as described in the RA Workplan (WA, 1998a).

1.2.2 Storm Water Protection Plan

The objective of the Storm Water Protection Plan (SWPP) is to install a temporary cover over the nitrate-impacted areas to minimize rainwater infiltration. By reducing infiltration of rainwater, the downward migration of nitrate in the unsaturated zone will be minimized.

1.3 Schedule

Upon completion of trench backfilling and grading activities, the storm water protection cover will be installed. Currently, we estimate this activity will begin on December 19. The nitrate delineation sampling is tentatively scheduled to begin on December 7, 1998 and continue for a 2-week period.

2. NITRATE DELINEATION PLAN

This section describes the proposed field activities for the nitrate delineation sampling plan. The nitrate-impacted area within the Southwest Trenches Area is shown in Figure 1-1. The sampling approach, sample collection and handling methods, and the analytical plan are described below.

2.1 Sampling Approach

Delineation of nitrate in soil will be performed using direct push drilling. Direct-push drilling has been successfully used at LEHR in the past and produces minimal waste while providing high quality core for logging and sample collection.

Figure 1-2 presents the proposed borehole locations in the nitrate-impacted area. A total of 39 borehole locations are concentrated in the vicinity of Trenches W-8 and W-10 on a 10-foot grid pattern. All borings will be drilled to a depth of 30 ft bgs or until ground water is encountered. Sampling will occur in 3-foot intervals, starting at 12 ft depth in locations over excavated waste cells and starting at 3 ft depth for locations outside previously excavated areas.

At the conclusion of soil sampling, all boreholes will be filled with cement grout to a depth of one foot below grade. Grout will be mixed above ground and placed into the borehole with a tremie pipe. After the grout has set, the top foot of the borehole will be filled with soil, and the location will be marked with a flag. The borehole locations will be surveyed at the completion of the sampling task.

2.2 Lithologic Logging, Sample Collection, and Handling

Lithological core logging will be performed using the Unified Soil Classification System (USCS) as described in Standard Operating Procedure (SOP) 15.1, Logging of Soils (WA, 1998b). Soil sample collection will be conducted in accordance with SOP 3.2, Subsurface Soil Sampling While Drilling (WA, 1998b). Sample Chain-of-Custody records will be prepared in accordance with SOP 1.1, Chain-of-Custody (WA, 1998b). Sample handling, packaging, and shipping will be conducted in accordance with SOP 2.1, Sample Handling, Packaging and Shipping (WA, 1998b). Finally, decontamination of sampling equipment will be performed in accordance with SOP 6.1, Sampling Equipment and Well Material Decontamination (WA, 1998b). The following section discusses additional details of sample handling procedures.

The usability of the data obtained during this investigation will depend on its quality. A number of factors affect data quality. Sample collection methods are as important to consider as the methods used for sample analysis. Following proper procedures for both sample collection and analysis reduces sampling and analytical error. To ensure sample integrity, samples will be handled using complete Chain-of-Custody documentation and preserved using proper sample preservation techniques, holding times, and shipment methods. Obtaining valid and comparable data also requires adequate Quality Assurance/Quality Control (QA/QC) procedures and documentation.

The components of the sample documentation and custody system will include the following:

- Chain-of-Custody form;
- Field logbook;
- Sample numbers;
- Sample labels; and,
- Custody seals.

2.2.1 Chain-of-Custody Form

Chain-of-Custody forms will be completed by the sampling team members to track sample custody as well as to specify the requested analyses. Chain-of-Custody forms will be completed in accordance with the requirements of SOP 1.1, Chain-of-Custody (WA, 1998b).

2.2.2 Field Logbook and/or Field Activity Daily Logs

Descriptions and observations made during field and sampling activities will be documented in the field logbook and/or Field Activity Daily Logs (FADLs). The following will be recorded in the field logbook or FADL:

- Project name and number;
- Location of site;
- Purpose of sampling;
- Description of field activities;
- Names of sampling personnel;
- Date and time of entries;
- Sample matrix;
- Date and time of sample collection;

- Sample locations, identification (ID) number and methodology;
- Field observations;
- Results of field measurements; and,
- Results of field calibrations for instruments used.

2.2.3 Sample Numbers

A unique alphanumeric ID number will be assigned to each sample collected, using the following format:

aabbccddd

Where,

- aa = Type of sample and matrix
SS - Soil Sample
- bb = Two-letter acronym designating the sample area at the site
DT - Disposal Trench (Southwest Trenches Area)
- c = Type of activity
F - Field Screening
- ddd = Chronological sample number (e.g., 001, 002, 003)

For example, SSDTF592 is the 592nd soil sample obtained from the disposal trench.

2.2.4 Sample Labels

Sample labels will be attached to individual sample containers and will contain the following information:

- Project number;
- Sample ID number;
- Date and time collected;
- Initials of sampler; and,
- Requested analyses.

2.2.5 Custody Seals

Custody seals will be used to detect tampering and will be placed over the lids of coolers and annotated with the following information:

- Project number;
- Sample ID number;
- Date and time; and,
- Initials of sampler.

2.3 Analytical Plan

The analytical plan for the nitrate delineation sampling consists of analyzing soil samples for the following parameter:

- Nitrate (as Nitrogen) using EPA Method 300.0

For quality control purposes, 10% duplicate soil samples will be collected along with one rinsate blank and analyzed for nitrate.

3. STORM WATER PROTECTION PLAN

The SWPP consists of two components: 1) a grading plan and 2) an impermeable cover design. Each component is described in more detail below.

3.1 Grading Plan

One of the requirements of the backfill and compaction described in the RA Workplan (WA, 1998a), is to return the site to its original grade. However, the original grade had limited relief and precipitation ponded in depressions and low spots. To promote runoff and minimize ponding and subsequent infiltration, the surface of the nitrate-impacted area will be elevated relative to the adjoining ground.

Figure 1-3 presents the conceptual grading plan for the Southwest Trenches Area. A minimum 1% grade sloping away from the nitrate-impacted area will be provided. The grading plan is designed to direct storm water runoff to the north where a catch basin is located. The surface area of Southwest Trenches is less than ½ acre and will not contribute significantly to the east. Because this is a temporary grade and detailed elevation data is not yet available, field adjustments to this conceptual grade are likely. A final grading plan (i.e., when all RAs are complete) will be provided in future RA documents.

3.2 Cover Design

A 6-mil high density polyethylene (HDPE) cover will be placed over the entire Southwest Trenches Area as shown in Figure 1-3 to eliminate direct infiltration of rain water and prevent soil loss from wind. The cover will measure approximately 130 by 130 ft and will be weighted down by sand bags. If several sheets are required, the sheets will be overlapped by a minimum of 2 feet to prevent water entry. The cover design will allow for early removal during sampling activities.

4. QUALITY ASSURANCE

This section presents the QA/QC measures for the nitrate-impacted soil sampling and storm water cover. The objective of this section is to provide a framework to ensure that quality is integrated within every aspect of the project. The section incorporates the Final Quality Assurance Project Plan (QAPP) (WA, 1998c) by referencing applicable and appropriate sections of the QAPP.

Personnel conducting or supervising the work presented in this work plan are responsible for certifying that they have been instructed in applicable sections of the work plan, including health and safety, that may affect their work. This certification will be obtained, documented and filed for each affected worker by the Project Task Leader, or designee, in accordance with the requirements outlined in the QAPP.

4.1 Responsibilities

Section 2 of the QAPP is applicable in its entirety. Roles and responsibilities of individuals are defined in the QAPP.

Weiss Associates (WA) - Weiss Associates responsibilities include management and oversight in all areas. WA will obtain the required samples, coordinate with the selected laboratory, and review/validate the analytical data. WA will provide on-site health and safety oversight.

International Technology Corporation (IT) - IT is responsible for providing the labor for performing the grading and storm water protection cover installation. IT is also responsible for providing all required on-site radiological support, when necessary.

4.2 Quality Control Management

Section 3 of the QAPP is applicable in its entirety. The SOPs, specifications and other supporting documents prepared for this work comply with specific requirements of the QAPP. This section serves as the Total Quality Control Plan for this action. Quality control meetings including inspections will be held to discuss all aspects of work that impact quality.

4.3 Document Control and Records Management

Section 4 of the QAPP is applicable in its entirety. The nitrate delineation will produce a number of documents and records that are to be managed as set forth in this section. Typical records that will be generated under this task include: certifications and training records, health and safety records, field activity logs, photographs, etc. The Field Coordinator (FC) will be responsible for maintenance and updates of the specified project submittals.

4.4 Personnel Training and Qualification

Section 5 of the QAPP is applicable in its entirety. The fieldwork will be conducted by individuals who are physically capable of performing the work; have demonstrated capability to perform the specific functions in accordance with the approved procedures and work plan; and are familiar with technical aspects of the equipment and procedures that are used. Field personnel will be trained to meet the requirements of the Health and Safety Plan and quality affecting tasks prior to commencement of work. Subcontracted services will be selected based on a demonstrated record of experience and certifications necessary to safely and accurately perform the assigned project tasks.

4.5 Instructions, Procedures, and Drawings

Section 6 of the QAPP is applicable in its entirety. The applicable SOPs, Standard Quality Procedures (SQPs) and health and safety procedures (HSPs) developed for the project were developed in accordance with this section of the QAPP. Additional SOPs, SQPs, and HSPs may be developed as needed according to the guidelines of the QAPP.

4.6 Procurement Quality Assurance Activities

Section 7 of the QAPP is applicable in its entirety. This section describes the requirements for the preparation, review, and approval of procurement documents and changes thereto to ensure that quality assurance controls are maintained.

4.7 Field Activities

Section 8 of the QAPP is applicable in its entirety. This section describes the field operations associated with the environmental investigation activities to assure that sampling strategies are implemented consistent with the project planning documents, including this work plan.

In addition to the field sampling activities, other fieldwork will be conducted under Section 8 of the QAPP. The previous sections describe the operations associated with the field activities to assure that fieldwork is implemented consistent with the project planning documents. QA/QC will be implemented using the graded approach. Each subcontractor will be held responsible for their work, and shall perform all first line acceptance inspections. The Project Quality Assurance Specialist (PQAS) and Project Task Leader (PTL) will be responsible for inspecting and accepting completed work from subcontractors. The Project QA Manager and Project Manager have final acceptance authority for the quality of all RA work. A three-phase QC system consisting of preparatory, initial and follow up phase inspections will be implemented as discussed in Section 13 of the QAPP. The PQAS will be responsible for ensuring that testing and inspections are in accordance with accepted industry methods and practices. PQAS responsibilities include, but are not limited to: conducting inspections and daily tailgate meetings, reviewing schedules, conducting site surveillance, generating daily reports, and authorizing temporary work shut down if work practices or procedures are determined to be incorrect or out of compliance and cannot be immediately corrected.

4.8 Analytical Activities

Section 9 of the QAPP is applicable in its entirety. This section of the QAPP describes the specifications and controls that the laboratory is required to perform in support of the project tasks. Laboratory pre-qualifications consistent with this section are stipulated in the procurement requirements.

4.9 Report Preparation

Section 11 of the QAPP is applicable in its entirety. This section describes the methods and requirements for the preparation, review, and approval of project reports. The report types anticipated under this nitrate delineation activity include but are not limited to data reports and technical memoranda containing field data summary reports.

4.10 Review of Work Activities

Section 12 of the QAPP is applicable in its entirety. This section describes the technical and formal peer review required on end products of the project activities.

4.11 Inspections

Section 13 of the QAPP is applicable in its entirety. This section provides the criteria for inspecting nitrate delineation work. These inspections typically cover field activities that require planned inspections to verify that the quality of work meets project standards. Preparatory and initial phase inspections will be conducted for each phase of work, and follow-up phase inspections will be conducted weekly for all tasks lasting more than one week.

4.12 Calibration and Maintenance of Measuring and Test Equipment

Section 14 of the QAPP is applicable in its entirety. This section of the QAPP describes the responsibilities and methods for the control, calibration, and preventative maintenance of measurement and test equipment used in activities affecting quality to assure their proper operation.

4.13 Test Control

Section 15 of the QAPP is applicable in its entirety. This section of the QAPP describes the controls to be implemented for the performance of tests required to verify the acceptability of the data collection for the project task.

4.14 Non-Conformance Control and Corrective Actions

Section 16 of the QAPP is applicable in its entirety. This section of the QAPP describes the responsibilities and methods for all personnel to promote and ensure continuous improvement of items and work processes, thereby enhancing the effectiveness of the program or project tasks and resultant quality.

4.15 Change Control

Section 17 of the QAPP is applicable in its entirety. This section of the QAPP addresses the process to be implemented on a project task for changes from the procedures, Sampling and Analysis Plan (SAP), or specific requirements. In the case where field conditions result in a significant impact to the way work can be completed, a change can be made to the work process under this guidance.

4.16 Audits and Surveillance

Section 18 of the QAPP is applicable in its entirety. This section of the QAPP establishes the methods and responsibilities for planning, scheduling, and performing audits, surveillance, and management assessments. Planned and scheduled audits shall be performed by the PQAS or designee to verify compliance with all aspects of the work plan.

4.17 Materials, Equipment, Tools

Materials, equipment, and tools required to complete the scope of work may include, but are not limited to:

- Sample containers and coolers, as required;
- Sampling equipment;
- Polyethylene sheeting;
- DOT-approved 55-gallon (gal.) drums;
- Reinforced drum liners;
- Photography equipment and supplies;
- Personal Protection Equipment (PPE); and,
- Drill rig.

5. DATA MANAGEMENT

Samples collected for laboratory analysis will be analyzed by General Engineering Laboratories, Inc. (GEL) in Charleston, South Carolina. Laboratory reports (hard copies and electronic files) will be forwarded from GEL to WA (contact Santiago Lee). These results will be validated by WA according to the procedures defined in SOP 21.1 Data Validation (WA, 1998b) and transferred to the project database in accordance with procedures described in the QAPP.

6. INVESTIGATION-DERIVED WASTE

Direct push drilling produces minimal waste. Upon completion of the borehole all core below clean backfill will be placed in a 55-gal. drum and entered into the waste tracking system. Core derived from the clean backfill will be returned or placed near the point of origin.

6.1 Decontamination Solutions

Decontamination solutions will consist of water (withalconox) used to clean the sample collection tools. The decontamination water will be stored in 55 gal. drums and labeled accordingly. The drums will be sampled, followed by appropriate disposal.

7. HEALTH AND SAFETY

Health and safety considerations for the activities described in this work plan are covered by the following documents: the Project Health and Safety Plan (PHSP) (WA, 1998c); Health and Safety Procedures (HSPs) (WA, 1998e) and SOPs (WA, 1998b), as referenced in this work plan; the Contingency Plan and General Emergency Response Procedures (CPGERP) (WA, 1998f); the As Low As Reasonably Achievable (ALARA) Program (WA, 1997); and the Radiation Protection Program (RPP) (WA, 1998g). The health and safety considerations presented in this section of the work plan, coupled with the foregoing listed documents, represent the safety and health program required by 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response and 10 CFR 835, Occupational Radiation Protection, for these work activities.

7.1 Hazard Analysis

A job hazard analysis identifies potential safety, health and environmental hazards and provides for the protection of personnel. Hazard analysis helps to ensure that all safety concerns are met. The Activity Hazard Analyses (AHAs) to be followed for this project, entitled "Soil Boring and Soil Sampling", is included as an Appendix of the PHSP. A hazard analysis for these activities, as well as specific additional control measures to be followed, are described in Section 5 of the PHSP. Specific sections describing hazard analysis and control have been included from the PHSP, where applicable.

During these activities, the Site Coordinator (SC), Site Health and Safety Officer (SHSO), Radiological Control Manager (RCM), Radiological Safety Officer (RSO), Radiological Control Technician (RCT), or Health and Safety Coordinator (HSC) will monitor the site for any changes in conditions that would require modification of work conditions (i.e., PPE). In the event that changes arise in radiological or industrial health and safety conditions that are not covered by this work plan or referenced documents, this work plan will be modified in accordance with the procedures contained in Standard Quality Procedure (SQP) 11.1, "Fieldwork Variances/Request For Information" (WA, 1998c).

7.1.1 *Confined Space Entry*

Confined space entry is not anticipated for the performance of any planned work plan activity. If a confined space entry becomes necessary, procedures specified in HSP 5.1, Confined Space Entry, will be followed.

7.1.2 Radiological Exposure

Based on recent removal actions, radiological exposure is not a concern during the Nitrate Delineation.

Personnel working in and around the Southwest Trenches Area shall wear Level D PPE as described in Section 7.2.3.

7.1.3 Chemical Exposure

Soil boring and soil sampling during the Nitrate Delineation may present exposure to chemicals and nuisance dust through contact, ingestion and inhalation. Contact with chemicals will be evaluated and controlled by the proper use of PPE. Ingestion of chemicals will be minimized by avoiding contact where possible, proper use of PPE and personal hygiene (e.g. washing of hands and face). Engineering controls will be used to reduce the potential exposure to chemicals, where practical. Available data indicate that soil samples will contain nitrate at levels well below any occupational exposure concern.

Personnel in the exclusion zone shall wear Level D PPE as described in Section 7.2.3. The level of PPE will be modified if monitoring results dictate a need for a change.

No contact with ground or surface water is anticipated during the nitrate delineation. However, occupational safety and health issues dealing with ground or surface water contact are covered in the PHSP should this situation arise.

7.1.4 Heat Stress

The Nitrate Delineation is scheduled to be performed in December when heat stress will not be a concern to workers in Level D PPE. The SHSO will be aware of the potential for heat stress, and if necessary, will establish a work regime in accordance with the PHSP, Section 5 and HSP 3.1, Working in Hot Environments. All workers will have medical clearance prior to working on-site.

7.2 Hazard Controls

The following control measures will be implemented during the Nitrate Delineation. These control measures are intended to supplement the PHSP.

7.2.1 Hazardous Work Permit

Hazardous Work Permits (HWPs) will be used to control work in the exclusion zone and other areas where hazardous conditions may exist. An HWP will be issued in accordance with the procedures specified in the PHSP (WA, 1998b) and in accordance with HSP 17.1, Hazardous Work Permits. The following information will be described or referenced in the HWP:

- Scope of work to be performed;
- Anticipated radiological, safety, and industrial hygiene conditions;
- PPE and respiratory protection requirements;
- Radiological and industrial hygiene monitoring requirements;
- Dosimetry requirements;
- Work Plan or Activity Hazard Analysis;
- Period for which the HWP is valid; and,
- Additional requirements for entry.

7.2.2 Site Control and Work Zones

The site control and work zones will be enclosed by boundary ropes or ribbons supported with stanchions. The placement of the stanchions and boundaries will be controlled by the RSO and/or the SHSO to facilitate access to the work area for equipment. The boundaries for site control and work zones will be set up and signs posted in accordance with the PHSP and the RPP.

7.2.3 PPE

Workers in the exclusion zone will wear Level D PPE in accordance with the PPE selection matrix in the PHSP unless otherwise specified in the HWP for the task.

Level D PPE will consist of the following when specified in the HWP:

- Hard hat, American National Standards Institute (ANSI) approved;
- Steel-toed boots;
- Safety glasses with side shields;
- Chemical resistant gloves; and,
- Leather work gloves.

7.2.4 Decontamination Procedures

The decontamination area will be set up adjacent to the exclusion zone (EZ) for equipment and personnel. The area will be delineated with traffic cones and/or radiological barrier tape. The decontamination zone will be posted with the appropriate warning sign.

Decontamination procedures will be conducted in accordance with Section 10 of the PHSP for personnel decontamination, equipment decontamination and PPE decontamination.

7.2.5 Training

Personnel performing activities associated with the Nitrate Delineation will receive training covering this work plan.

Applicable workers who will enter exclusion zone shall have:

- Completed at least 40 hours of hazardous waste operations-related training, as required by Occupational Safety and Health Administration (OSHA) Regulation 29 CFR 1910.120;
- Completed an 8-hour refresher course within the past 12 months if they completed the 40-hour training more than 12 months prior to the start of the field activities;
- Training covering the Contingency Plan and General Emergency Response Procedures (WA, 1998f);
- A minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. The SC shall have also completed an additional 8 hours of relevant supervisory health and safety training;
- Hazard Communications training in accordance with Section 15 of the PHSP;
- Site Hazard Briefing to include instructions on emergency response procedures, location of emergency equipment, and location of emergency notification list; and,
- Daily Tailgate Safety Meetings (TSMs).

All visitors entering the site areas that require Level A, B, or C PPE for entry will provide evidence of having completed the 40-hour HAZWOPER course! Visitors entering the Control Zone (CZ) will be escorted and required to complete GERT training. The PHSM may deny site access to any personnel with appropriate justification.

Two or more people certified in First Aid, CPR and Blood-Borne Pathogens will be on-site at all times when hazardous waste operations are conducted.

7.2.6 *Buddy System*

The buddy system is a method of organizing employees into work groups and is designed to provide those employees with assistance when needed. Each employee in a work group is designated to be observed by at least one other person. Assignment of designated partners should take place during the TSM.

The responsibility of the buddy is to:

- Provide assistance, if needed;
- Maintain line of sight contact or verbal contact with workers in the EZ;
- Observe for signs of chemical exposure, physical trauma, or heat stress such as:
 - changes in complexion and skin discoloration;
 - changes in coordination or demeanor;
 - excessive saliva and pupillary response; or,
 - changes in speech pattern;
- Periodically verify the integrity of all protective clothing; and,
- Notify the SC if emergency help is needed.

Entry to or exit from the EZ under the conditions described earlier without a designated partner is prohibited.

7.2.7 *Safety Equipment*

In addition to other equipment specified in this work plan, the following safety equipment will be staged in the support zone:

- First aid kit;
- Portable eyewash station and hand shower;
- Spill kit;
- Air horn;
- Directions to medical facilities;
- Portable radio for emergency communications;

- Hearing protection; and,
- Fire extinguisher.

8. REFERENCES

- Weiss Associates (WA), 1997, Final As Low As Reasonably Achievable (ALARA) Program Management, Rev. 2, LEHR, University of California at Davis, California, June.
- WA, 1998a, Draft Final Work Plan for Removal Actions in the Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic System Areas, Rev. D, University of California at Davis, California, Weiss Associates, July.
- WA, 1998b, Final Standard Operating Procedures, LEHR, University of California at Davis, California, Weiss Associates, March.
- WA, 1998c Final Standard Quality Procedures for Environmental Restoration/Waste Management, Rev. 0, LEHR, University of California at Davis, California, Weiss Associates, February.
- WA, 1998c, Final Quality Assurance Project Plan for Environmental Waste Management, LEHR, University of California at Davis, California, Weiss Associates, Rev 1, February.
- WA, 1998d, Final Project Health and Safety Plan for Environmental Restoration/Waste Management, Rev. 0, LEHR, University of California at Davis, California, Weiss Associates, January.
- WA, 1998e, Final Health and Safety Procedures, LEHR, University of California at Davis, California, Weiss Associates, January.
- WA, 1998f, Final Contingency Plan and General Emergency Response Procedures, Rev. 1, LEHR, University of California at Davis, California, Weiss Associates, January.
- WA, 1998g, Final Radiological Protection Program, Rev. 2, LEHR, University of California at Davis, California, Weiss Associates, January.

FIGURES

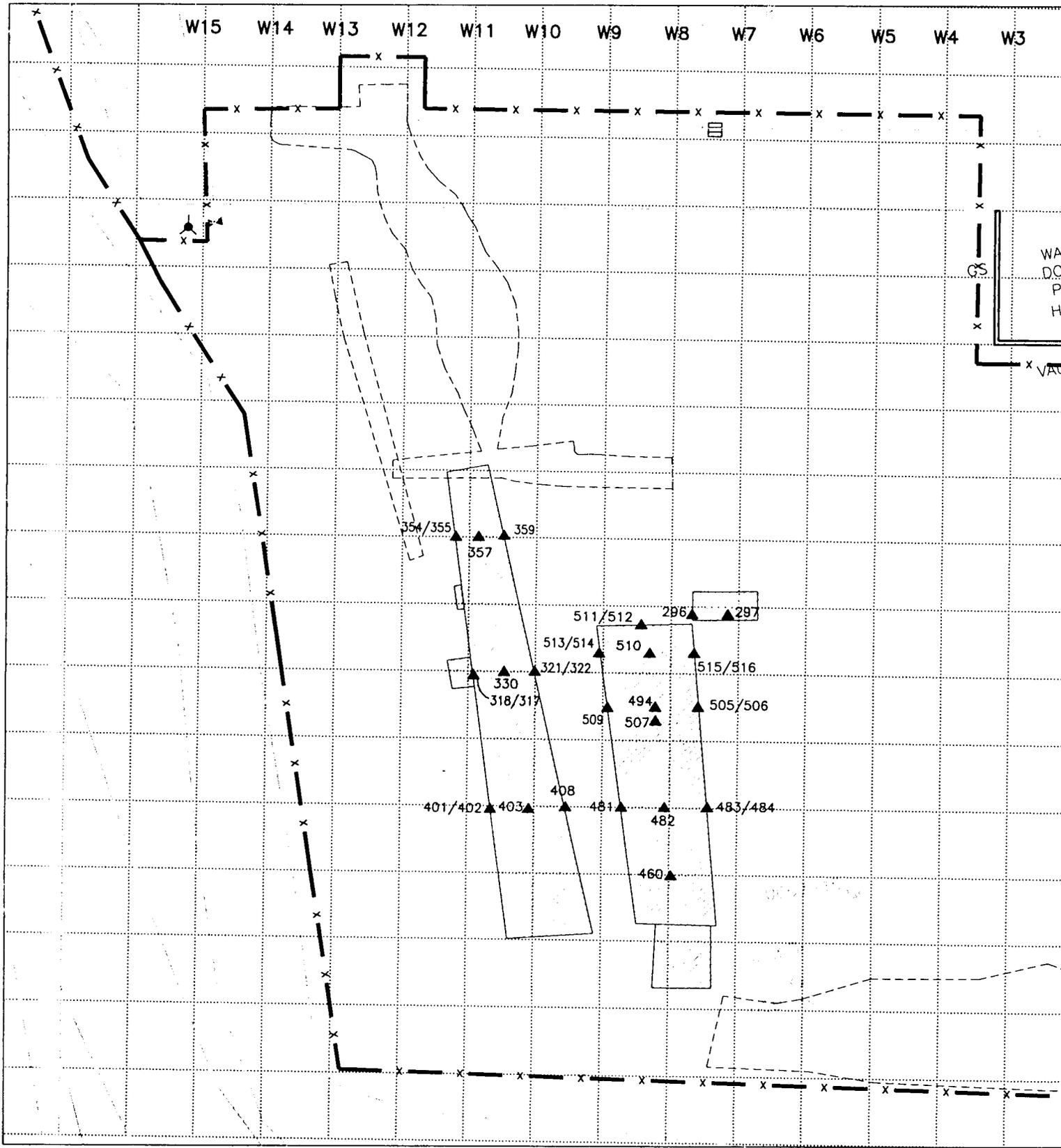


Figure 1-1. Impacted Area and Sample Locations With Nitrate Detection Greater Than Background, LEHR, Southwest

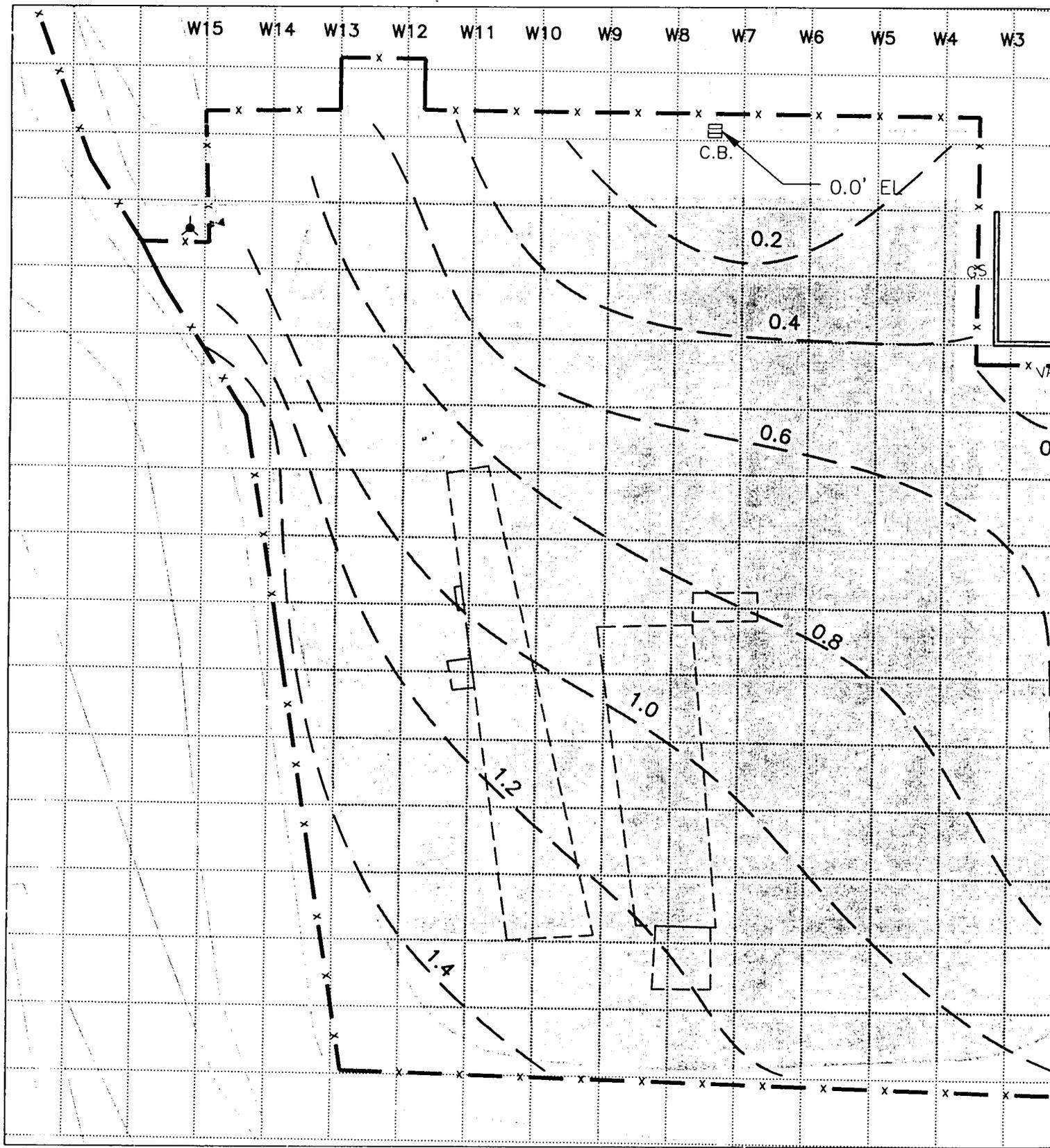


Figure 1-3. Conceptual Grading Plan for the Southwest Trenches Area, LEHR, Southwest Trenches, UC Davis, Cal

APPENDIX A

RESPONSES TO COMMENTS ON DRAFT WORK PLAN

**COMMENTS TO DRAFT WORK PLAN
FOR NITRATE DELINEATION SAMPLING AND STORM WATER PROTECTION IN
THE SOUTHWEST TRENCHES AREA (REV. C),
AT THE LABORATORY FOR ENERGY-RELATED HEALTH RESEARCH (LEHR),
UNIVERSITY OF CALIFORNIA AT DAVIS, CALIFORNIA**

Comments from: Christine Judal, University of California at Davis

The following comments were provided in an e-mail from Christine Judal, UC Davis, dated November 30, 1998.

Comment 1: Section 1.1, First paragraph, last sentence. Since the remedial action is not complete, given the known levels of nitrate still present in soil, change the end of this last sentence from "completion of the RA." to something like: "completion of the 1998 excavation activities".

Response: Comment noted. Text revised accordingly.

Comment 2: Section 2.1, second paragraph states that sampling will be performed "in three-foot intervals, starting at 12 ft depth in locations over excavated waste cells." However, in some of these areas, the previous excavation depth was closer to 19 feet. State how you will avoid taking samples of the fill material or how this will be taken into consideration for the sample collection and reporting. Also, how will the presence of the grout columns affect further excavation of nitrate-impacted soil and final remedial action?

Response: The previous excavation depth didn't exceed 12 ft. At that depth, a geotextile filter liner was placed in the excavation to denote the depth of fill. A 1.5 in. grout column will have no effect on future remedial action. Revision to text not required.

Comment 3: Section 3.1: The wording of this section should discuss where the stormwater will be directed after it runs off the southwest area, to show that planning has been done to prevent it from contributing to additional ponding that already occurs in the adjoining southern trench and/or dog pen areas.

Response: The grading plan is designed to direct storm water runoff to the north where a catch basin is located. Text revised accordingly.

Comment 4: Figure 1-2 Proposed Sample Locations: The addition of two sample locations at W12/S8 & S9 would complete the pattern of enclosing the prior trench perimeter with borings. What was the rationale for not including these particular locations?

Response: Comment noted. The boring pattern is being adjusted in Figure 1-2 accordingly.

**COMMENTS TO DRAFT WORK PLAN
FOR NITRATE DELINEATION SAMPLING AND STORM WATER PROTECTION IN
THE SOUTHWEST TRENCHES AREA (REV. C),
AT THE LABORATORY FOR ENERGY-RELATED HEALTH RESEARCH (LEHR),
UNIVERSITY OF CALIFORNIA AT DAVIS, CALIFORNIA**

Comments from: Duncan Austin, Department of Toxic Substances Control

The following comments were provided verbally from Duncan Austin of DTSC on November 18, 1998.

Comment 1: Request that the entire Southwest Trenches Area be covered with plastic.

Response: Comments noted. Text revised accordingly.