STATE OF CALIFORNIA
ENVIRONMENTAL PROTECTION AGENCY
DEPARTMENT OF TOXIC SUBSTANCES CONTROL

In the Matter of: Former Naval Petroleum Reserve No. 1 Closure Project Elk Hills, CA CA4170024414 United States Department of Energy	Docket HWCA P1-08/09-003 CORRECTIVE ACTION CONSENT AGREEMENT Health and Safety Code Section 25187

INTRODUCTION

1. The Department of Toxic Substances Control (DTSC) and United States Department of Energy (DOE) enter into this Corrective Action Consent Agreement (Consent Agreement) and agree as follows:

1.1 Jurisdiction exists pursuant to Health and Safety Code section 25187, which authorizes DTSC to issue an order to require corrective action when DTSC determines that there is or may be a release of hazardous waste or hazardous waste constituents into the environment from a hazardous waste facility.

1.2 The parties enter into this Consent Agreement to avoid the expense of litigation and to promptly carry out the corrective action described below.

1.3 DOE is the prior owner and operator of a hazardous waste facility located at Elk Hills, California (formerly the Naval Petroleum Reserve No.1) (Facility).

1.4 DOE engaged in the management of hazardous waste pursuant to an Interim Status Document issued by the Department of Health Services, which was DTSC's predecessor agency, on April 6, 1981. DTSC issued a Hazardous Waste Post Closure Permit to DOE on December 31, 1997.

1.5 On December 2, 1997, DTSC and DOE entered into an *Agreement for* Site Assessment (ASA) for the Facility. DTSC and DOE subsequently entered into three Amendments to the ASA. The purpose of this Consent Agreement is to continue

the activities undertaken by DOE pursuant to the ASA and the three Amendments to the ASA and to complete the corrective action process required at the Facility.

1.6 The terms used in this Consent Agreement are as defined in California Code of Regulations, title 22, section 66260.10, except as otherwise provided.

1.7 DOE agrees to implement all DTSC-approved workplans and to undertake all actions required by the terms and conditions of this Consent Agreement, including any portions of this Consent Agreement incorporated by reference.

1.8 DOE waives any right to request a hearing on this Consent Agreement pursuant to Health and Safety Code section 25187.

FINDINGS OF FACT

2.1 On June 30, 1998, DTSC completed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA). The RFA identified 131 Solid Waste Management Units (SWMUs) and/or Areas of Concern (AOCs) that either have released or may release hazardous waste or hazardous waste constituents into the environment. The SWMUs and/or AOCs are listed in Exhibit A. Based on the information available to DTSC, including information contained in a Preliminary Endangerment Assessment completed in May, 1995, DTSC concludes that there has been a release of hazardous waste or hazardous waste constituents into the environment at or from the Facility, and that further investigation and corrective measures are necessary for the protection of the environment and public health.

2.2 Hazardous wastes or hazardous waste constituents have migrated or may migrate from the Facility into the environment through the following pathways: ingestion, inhalation and dermal contact of soil , ingestion and inhalation of water.

2.3 The hazardous waste and hazardous waste constituents of concern at the Facility include, but are not limited to, chromium VI (hexavalent chromium), arsenic, petroleum hydrocarbons, polynuclear aromatic hydrocarbons, lead, volatile organic compounds, semivolatile organic compounds and solvents.

2.4. The Facility is located near the towns of Taft and Tupman, the California Aqueduct, Kern Fan Element of the Kern Water Bank, the Tule Elk Reserve, and Buena Vista Aquatic Recreation Area.

2.5 Releases from the Facility may have migrated toward adjacent residences and habitats of certain federal and state endangered animal and plant species.

PROJECT COORDINATOR

3. Within 14 days of the effective date of this Consent Agreement, DTSC and DOE shall each designate a Project Coordinator and shall notify each other in writing of the Project Coordinator selected. Each Project Coordinator shall be

responsible for overseeing the implementation of this Consent Agreement and for designating a person to act in his/her absence. All communications between DOE and DTSC, and all documents, report approvals, and other correspondence concerning the activities performed pursuant to this Consent Agreement shall be directed through the Project Coordinators. Each party may change its Project Coordinator with at least seven days prior written notice.

WORK TO BE PERFORMED

4. DOE agrees to perform the work required by this Consent Agreement in a manner consistent with: the attached Scopes of Work; DTSC-approved RCRA Facility Investigation Workplan , Corrective Measures Study Workplan, Corrective Measures Implementation Workplan, and any other DTSC approved Workplans, and in accordance with the applicable state and federal laws, their implementing regulations, and the applicable DTSC and the United States Environmental Protection Agency guidance documents.

INTERIM MEASURES (IM)

5.1. DOE shall evaluate available data and assess the need for interim measures in addition to those specifically required by this Consent Agreement. Interim measures shall be used whenever possible to control or abate immediate threats to human health and/or the environment, and to prevent and/or minimize the spread of contaminants while long-term corrective action alternatives are being evaluated.

5.2. If at any time DOE identifies an immediate or potential threat to human health and/or the environment, discovers new releases of hazardous waste and/or hazardous waste constituents, or discovers new solid waste management units not previously identified, DOE shall notify DTSC Project Coordinator orally within 48 hours of discovery and notify DTSC in writing within 10 days of discovery summarizing the findings, including the immediacy and magnitude of the potential threat to human health and/or the environment. Within 30 days of receiving DTSC's written request, DOE shall submit to DTSC an IM Workplan for approval. The IM Workplan shall include a schedule for submitting to DTSC an IM Operation and Maintenance Plan and IM Plans and Specifications. The IM Workplan, IM Operation and Maintenance Plan, and IM Plans and Specifications shall be developed in a manner consistent with the Scope of Work for Interim Measures Implementation contained in as Attachment 1. If DTSC determines that immediate action is required, DTSC Project Coordinator may orally authorize DOE to act prior to DTSC's receipt of the IM Workplan.

5.3. If DTSC identifies an immediate or potential threat to human health and/or the environment, discovers new releases of hazardous waste and/or hazardous waste constituents, or discovers new solid waste management units not previously identified, DTSC will notify DOE in writing. Within 30 days of receiving DTSC's written notification, DOE shall submit to DTSC for approval an IM Workplan that identifies Interim Measures that will mitigate the threat. The IM Workplan shall include a schedule for submitting to DTSC an IM Operation and Maintenance Plan and IM Plans and Specifications. The IM Workplan, IM Operation and Maintenance Plan, and IM Plans

and Specifications shall be developed in a manner consistent with the Scope of Work for Interim Measures Implementation contained in as Attachment 1. If DTSC determines that immediate action is required, DTSC Project Coordinator may orally authorize DOE to act prior to receipt of the IM Workplan.

5.4. All IM Workplans shall ensure that the Interim Measures are designed to mitigate current or potential threats to human health and/or the environment, and should, to the extent practicable, be consistent with the objectives of, and contribute to the performance of, any remedy which may be required at the Facility.

5.5. Concurrent with the submission of an IM Workplan, DOE shall submit to DTSC a Health and Safety Plan in accordance with the Scope of Work for a Health and Safety Plan contained in Attachment 3.

5.6. Concurrent with the submission of an IM Workplan, DOE shall submit to DTSC for approval a Community Profile in accordance with Attachment 4. Based on the information provided in the Community Profile, if DTSC determines that there is a high level of community concern about the Facility, DTSC may require DOE to prepare a Public Participation Plan.

RCRA FACILITY INVESTIGATION (RFI)

6.1 DOE has submitted a Workplan for Site Investigation for DTSC's approval. DOE shall address DTSC's comments on this Workplan and shall complete the remaining requirements for a RFI Workplan in a manner consistent with the Scope of Work for a RCRA Facility Investigation contained in Attachment 2. DTSC will review the RFI Workplan and notify DOE in writing of DTSC's approval or disapproval.

6.2. The RFI Workplan shall detail the methodology to: (1) identify and characterize all sources of contamination; (2) define the nature, degree and extent of contamination; (3) define the rate of movement and direction of contamination flow; (4) characterize the potential pathways of contaminant migration; (5) identify actual or potential human and/or ecological receptors; and (6) support development of alternatives from which a corrective measure will be selected by DTSC. A specific schedule for implementation of all activities shall be included in the RFI Workplan.

6.3. DOE shall submit a RFI Report to DTSC for approval in accordance with DTSC-approved RFI Workplan schedule. The RFI Report shall be developed in a manner consistent with the Scope of Work for a RCRA Facility Investigation contained in Attachment 2. If there is a phased investigation, separate RFI Reports and a report that summarizes the findings from all phases of the RFI must be submitted to DTSC. DTSC will review the RFI Report(s) and notify DOE in writing of DTSC's approval or disapproval.

6.4. Concurrent with the submission of a RFI Workplan, DOE shall submit to DTSC a Health and Safety Plan in accordance with Attachment 3. If Workplans for both an IM and RFI are required by this Consent Agreement, DOE may submit a single Health and Safety Plan that addresses the combined IM and RFI activities.

6.5. DOE shall submit a RFI Summary Fact Sheet to DTSC that summarizes the findings from all phases of the RFI. The RFI Summary Fact Sheet shall be submitted to DTSC in accordance with the schedule contained in the approved RFI Workplan. DTSC will review the RFI Summary Fact Sheet and notify DOE in writing of DTSC's approval or disapproval, including any comments and/or modifications. When DTSC approves the RFI Summary Fact Sheet, DOE shall mail the approved RFI Summary Fact Sheet to all individuals on the Facility mailing list established pursuant to California Code Regulations, title 22, section 66271.9(c)(1)(D), within15 calendar days of receipt of written approval.

6.6. Concurrent with the submission of a RFI Workplan, DOE shall submit to DTSC for approval a Community Profile in accordance with Attachment 4. Based on the information provided in the Community Profile and any Supplement to the Community Profile, if DTSC determines that there is a high level of community concern about the Facility, DOE shall prepare a Public Participation Plan.

RISK ASSESSMENT

7. Based on the information available to DTSC, DOE is required to conduct a Risk Assessment to evaluate potential human health risk and ecological risk and to establish site-specific action levels and cleanup standards. DOE has submitted a Workplan for Human Health Risk Assessment and a Workplan for Ecological Scoping Assessment for DTSC's approval. DTSC will review these Workplans and provide comments to DOE. DOE shall submit to DTSC for approval a Risk Assessment Report in accordance with DTSC-approved Risk Assessment Workplan schedule(s).

CORRECTIVE MEASURES STUDY (CMS)

8.1. DOE shall prepare a Corrective Measures Study, if contaminant concentrations exceed human health-based or ecologically-based action levels established by the DTSC-approved Risk Assessment Report or if DTSC otherwise determines that the contaminant releases pose a potential threat to human health and/or the environment.

8.2. Within 45 days of DTSC's approval of the RFI Report (or DOE's receipt of a written request from DTSC), DOE shall submit a CMS Workplan to DTSC. The CMS Workplan is subject to approval by DTSC and shall be developed in a manner consistent with the Scope of Work for a Corrective Measures Study contained in Attachment 5.

8.3. The CMS Workplan shall detail the methodology for developing and evaluating potential corrective measures to remedy any contamination at the Facility. The CMS Workplan shall identify the potential corrective measures, including any innovative technologies, that may be used for the containment, treatment, remediation, and/or disposal of contamination.

8.4. DOE shall prepare treatability studies for all potential corrective measures that involve treatment except where DOE can demonstrate to DTSC's satisfaction that they are not needed. The CMS Workplan shall include, at a minimum, a summary of the proposed treatability study including a conceptual design, a schedule for submitting a Treatability Study Workplan, or DOE's justification for not proposing a treatability study.

8.5. DOE shall submit a CMS Report to DTSC for approval in accordance with DTSC-approved CMS Workplan schedule. The CMS Report shall be developed in a manner consistent with the Scope of Work for a Corrective Measures Study contained in Attachment 5. DTSC will review the CMS Report and notify DOE in writing of DTSC's approval or disapproval.

REMEDY SELECTION

9.1. DTSC will provide the public with an opportunity to review and comment on the final draft of the CMS Report, DTSC's proposed corrective measures for the Facility, and DTSC's justification for selection of such corrective measures. Depending on the level of community concern, DTSC may conduct a public hearing to obtain comments.

9.2. Following the public comment period, DTSC may select final corrective measures or require DOE to revise the CMS Report and/or perform additional corrective measures studies.

9.3. DTSC will notify DOE of the final corrective measures selected by DTSC in the Final Decision and Response to Comments. The notification will include DTSC's reasons for selecting the corrective measures.

CORRECTIVE MEASURES IMPLEMENTATION (CMI)

10.1. Within 90 days of DOE's receipt of notification of DTSC's selection of the corrective measures, DOE shall submit to DTSC a Corrective Measures Implementation (CMI) Workplan. The CMI Workplan is subject to approval by DTSC and shall be developed in a manner consistent with the Scope of Work for Corrective Measures Implementation contained in Attachment 6.

10.2. Concurrent with the submission of a CMI Workplan, DOE shall submit to DTSC a Health and Safety Plan in accordance with Attachment 3.

10.3. Concurrent with the submission of a CMI Workplan, DOE shall submit to DTSC for approval a Community Profile in accordance with Attachment 4. Based on the information provided in the Community Profile and any Supplement to the Community Profile, if DTSC determines that there is a high level of community concern about the Facility, DTSC may require DOE to prepare a Public Participation Plan.

10.4. The CMI program shall be designed to facilitate the design, construction, operation, maintenance, and monitoring of corrective measures at the

Facility. In accordance with the schedule contained in the approved CMI Workplan, DOE shall submit to DTSC the documents listed below, to the extent applicable. These documents shall be developed in a manner consistent with the Scope of Work for Corrective Measures Implementation contained in Attachment 6.

- o Operation and Maintenance Plan
- o Draft Plans and Specifications
- o Final Plans and Specifications
- o Construction Workplan
- o Construction Completion Report
- o Corrective Measures Completion Report

10.5. DTSC will review all required CMI documents and notify DOE in writing of DTSC's approval or disapproval.

10.6. As directed by DTSC, within 90 days of DTSC's approval of all required CMI documents, DOE shall establish a financial assurance mechanism for Corrective Measures Implementation. The financial assurance mechanisms may include any mechanism described in California Code of Regulations, title 22, sections 66264.143 or 66265.143 as applicable or any other mechanism acceptable to DTSC. The mechanism shall be established to allow DTSC access to the funds to undertake Corrective Measures Implementation tasks if DOE is unable or unwilling to undertake the required actions.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

11. DTSC must comply with the California Environmental Quality Act (CEQA) insofar as activities required by this Consent Agreement are projects subject to CEQA. DOE shall provide all information necessary to facilitate any CEQA analysis. DTSC will make an initial determination regarding the applicability of CEQA. If the activities are not exempt from CEQA, DTSC will conduct an Initial Study. Based on the results of the Initial Study, DTSC will determine if a Negative Declaration or an Environmental Impact Report (EIR) should be prepared. DTSC will prepare and process any such Negative Declaration. However, should DTSC determine that an EIR is necessary, such an EIR would be prepared under a separate agreement between DTSC and DOE.

DTSC APPROVAL

12.1. DOE shall revise any workplan, report, specification, or schedule in accordance with DTSC's written comments. DOE shall submit to DTSC any revised documents by the due date specified by DTSC. Revised submittals are subject to DTSC's approval or disapproval.

12.2. Upon receipt of DTSC's written approval, DOE shall commence work and implement any approved workplan in accordance with the schedule and provisions contained therein.

12.3. Any DTSC-approved workplan, report, specification, or schedule required under this Consent Agreement shall be deemed incorporated into this Consent Agreement.

12.4. Verbal advice, suggestions, or comments given by DTSC representatives will not constitute an official approval or decision.

SUBMITTALS

13.1. Beginning with the first full month following the effective date of this Consent Agreement, DOE shall provide DTSC with bi-monthly progress reports of corrective action activities conducted pursuant to this Consent Agreement. Progress reports are due within 30 days following the close of each reporting period. The progress reports shall conform to the Scope of Work for Progress Reports contained in Attachment 2, Section D. DTSC may adjust the frequency of progress reporting to be consistent with site-specific activities.

13.2. Any report or other document submitted by DOE pursuant to this Consent Agreement shall be signed and certified by the project coordinator, a responsible corporate officer, or a duly authorized representative.

13.3. The certification required by paragraph 13.2 above, shall be in the following form:

> I certify that the information contained in or accompanying this submittal is true, accurate, and complete. As to those portions of this submittal for which I cannot personally verify the accuracy, I certify that this submittal and all attachments were prepared at my direction in accordance with procedures designed to assure that qualified personnel properly gathered and evaluated the information submitted.
>
> Signature: _____
>
> Name: _____
>
> Title: _____
>
> Date: _____

13.4. DOE shall provide two paper copies and one digital pdf copy (CD) of all documents, including but not limited to, workplans, reports, and correspondence. Submittals specifically exempted from this copy requirement are all progress reports and correspondence of less than 15 pages, of which one copy is required.

13.5. Unless otherwise specified, all reports, correspondence, approvals, disapprovals, notices, or other submissions relating to this Consent Agreement shall be in writing and shall be sent to the current Project Coordinators.

PROPOSED CONTRACTOR/CONSULTANT

14. All work performed pursuant to this Consent Agreement shall be under the direction and supervision of a professional engineer or registered geologist, registered in California, with expertise in hazardous waste site cleanup. DOE's contractor or consultant shall have the technical expertise sufficient to fulfill his or her responsibilities. Within 14 days of the effective date of this Consent Agreement, DOE shall notify DTSC Project Coordinator in writing of the name, title, and qualifications of the professional engineer or registered geologist and of any contractors or consultants and their personnel to be used in carrying out the terms of this Consent Agreement.

ADDITIONAL WORK

15. DTSC may determine or DOE may propose that certain tasks, including investigatory work, engineering evaluation, or procedure/methodology modifications are necessary in addition to, or in lieu of, the tasks and deliverables included in any part of DTSC-approved workplans. DTSC shall request in writing that DOE perform the additional work and shall specify the basis and reasons for DTSC's determination that the additional work is necessary. Within 14 days after the receipt of such determination, DOE may confer with DTSC to discuss the additional work DTSC has requested. If required by DTSC, DOE shall submit to DTSC a workplan for the additional work. Such workplan shall be submitted to DTSC within 30 days of receipt of DTSC's determination or according to an alternate schedule established by DTSC. Upon approval of a workplan, DOE shall implement it in accordance with the provisions and schedule contained therein. The need for, and disputes concerning, additional work are subject to the dispute resolution procedures specified in this Consent Agreement.

QUALITY ASSURANCE

16.1. All sampling and analyses performed by DOE under this Consent Agreement shall follow applicable DTSC and U.S. EPA guidance for sampling and analysis. Workplans shall contain quality assurance/quality control and chain of custody procedures for all sampling, monitoring, and analytical activities. Any deviations from the approved workplans must be approved by DTSC prior to implementation, must be documented, including reasons for the deviations, and must be reported in the applicable report.

16.2. The names, addresses, and telephone numbers of the California State certified analytical laboratories DOE proposes to use must be specified in the applicable workplans.

SAMPLING AND DATA/DOCUMENT AVAILABILITY

17.1. DOE shall submit to DTSC upon request the results of all sampling and/or tests or other data generated by its employees, agents, consultants, or contractors pursuant to this Consent Agreement.

17.2. DOE shall notify DTSC in writing at least seven days prior to beginning each separate phase of field work approved under any workplan required by this Consent Agreement. If DOE believes it must commence emergency field activities without delay, DOE may seek emergency telephone authorization from DTSC Project Coordinator or, if the Project Coordinator is unavailable, his/her Branch Chief, to commence such activities immediately.

17.3. At the request of DTSC, DOE shall provide or allow DTSC or its authorized representative to take split or duplicate samples of all samples collected by DOE pursuant to this Consent Agreement. Similarly, at the request of DOE, DTSC shall allow DOE or its authorized representative to take split or duplicate samples of all samples collected by DTSC under this Consent Agreement.

ACCESS

18. Subject to the Facility's security and safety procedures, DOE agrees to provide DTSC and its representatives access at all reasonable times to the Facility and any off-site property to which access is required for implementation of this Consent Agreement and shall permit such persons to inspect and copy all records, files, photographs, documents, including all sampling and monitoring data, that pertain to work undertaken pursuant to this Consent Agreement and that are within the possession or under the control of DOE or its contractors or consultants.

RECORD PRESERVATION

19.1. DOE shall retain, during the pendency of this Consent Agreement and for a minimum of six years after its termination, all data, records, and documents that relate in any way to the performance of this Consent Agreement or to hazardous waste management and/or disposal at the Facility. DOE shall notify DTSC in writing 90 days prior to the destruction of any such records, and shall provide DTSC with the opportunity to take possession of any such records. Such written notification shall reference the effective date, caption, and docket number of this Consent Agreement and shall be addressed to:

Rizgar Ghazi, PE, Chief
Legacy Landfills and Corrective Action Office
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento CA 95826]

19.2. If DOE retains or employs any agent, consultant, or contractor for the purpose of carrying out the terms of this Consent Agreement, DOE will require any such agents, consultants, or contractors to provide DOE a copy of all documents produced pursuant to this Consent Agreement.

19.3. All documents pertaining to this Consent Agreement shall be stored in a central location at the Facility, or at a location otherwise agreed to by the parties, to afford easy access by DTSC and its representatives.

DISPUTE RESOLUTION

20.1. The parties agree to use their best efforts to resolve all disputes informally. The parties agree that the procedures contained in this section are the sole administrative procedures for resolving disputes arising under this Consent Agreement. If DOE fails to follow the procedures contained in this section, it shall have waived its right to further consideration of the disputed issue.

20.2. If DOE disagrees with any written decision by DTSC pursuant to this Consent Agreement, DOE's Project Coordinator shall orally notify DTSC's Project Coordinator of the dispute. The Project Coordinators shall attempt to resolve the dispute informally.

20.3. If the Project Coordinators cannot resolve the dispute informally, DOE may pursue the matter formally by placing its objection in writing. DOE's written objection must be forwarded to the Performance Manager, Legacy Landfill and Corrective Action Office, Department of Toxic Substances Control, with a copy to DTSC's Project Coordinator. The written objection must be mailed to the Performance Manager within 14 days of DOE's receipt of DTSC's written decision. DOE's written objection must set forth the specific points of the dispute and the basis for DOE's position.

20.4. DTSC and DOE shall have 14 days from DTSC's receipt of DOE's written objection to resolve the dispute through formal discussions. This period may be extended by DTSC for good cause. During such period, DOE may meet or confer with DTSC to discuss the dispute.

20.5. After the formal discussion period, DTSC will provide DOE with its written decision on the dispute. DTSC's written decision will reflect any agreements reached during the formal discussion period and be signed by the Unit Chief or his/her designee.

20.6. During the pendency of all dispute resolution procedures set forth above, the time periods for completion of work required under this Consent Agreement that are affected by such dispute shall be extended for a period of time not to exceed the actual time taken to resolve the dispute. The existence of a dispute shall not excuse, toll, or suspend any other compliance obligation or deadline required pursuant to this Consent Agreement.

RESERVATION OF RIGHTS

21.1. DTSC reserves all of its statutory and regulatory powers, authorities, rights, and remedies, which may pertain to DOE's failure to comply with any of the requirements of this Consent Agreement. DOE reserves all of its statutory and regulatory rights, defenses and remedies, as they may arise under this Consent Agreement, the Purchase and Sale Agreement entered into between DOE and Occidental Petroleum Corporation on January 27, 1998, and the Unit Plan Contract

Termination Agreement entered into between DOE and Chevron Corporation on February 5, 1998. This Consent Agreement shall not be construed as a covenant not to sue, release, waiver, or limitation on any powers, authorities, rights, or remedies, civil or criminal, that DTSC or DOE may have under any laws, regulations or common law.

21.2. DTSC reserves the right to disapprove of work performed by DOE pursuant to this Consent Agreement and to request that DOE perform additional tasks.

21.3. DTSC reserves the right to perform any portion of the work consented to herein or any additional site characterization, feasibility study, and/or remedial actions it deems necessary to protect human health and/or the environment. DTSC may exercise its authority under any applicable state or federal law or regulation to undertake response actions at any time. DTSC reserves its right to seek reimbursement from DOE for costs incurred by the State of California with respect to such actions. DTSC will notify DOE in writing as soon as practicable regarding the decision to perform any work described in this section.

21.4. If DTSC determines that activities in compliance or noncompliance with this Consent Agreement have caused or may cause a release of hazardous waste and/or hazardous waste constituents, or a threat to human health and/or the environment, or that DOE is not capable of undertaking any of the work required, DTSC may order DOE to stop further implementation of this Consent Agreement for such period of time as DTSC determines may be needed to abate any such release or threat and/or to undertake any action which DTSC determines is necessary to abate such release or threat. The deadlines for any actions required of DOE under this Consent Agreement affected by the order to stop work shall be extended to take into account DTSC's actions.

21.5. This Consent Agreement is not intended to be nor shall it be construed to be a permit. This Consent Agreement is not a substitute for, and DOEs not preclude DTSC from requiring, any hazardous waste facility permit, post closure permit, closure plan or post closure plan. The parties acknowledge and agree that DTSC's approval of any workplan, plan, and/or specification DOEs not constitute a warranty or representation that the workplans, plans, and/or specifications will achieve the required cleanup or performance standards. Compliance by DOE with the terms of this Consent Agreement shall not relieve DOE of its obligations to comply with the Health and Safety Code or any other applicable local, state, or federal law or regulation.

OTHER CLAIMS

22. Except as provided in this Consent Agreement, nothing in this Consent Agreement shall constitute or be construed as a release by DTSC or DOE from any claim, cause of action, or demand in law or equity against any person, firm, partnership, or corporation for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous constituents, hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken or migrating from the Facility.

23. DOE shall comply with all applicable waste discharge requirements issued by the State Water Resources Control Board or a California regional water quality control board.

OTHER APPLICABLE LAWS

24. All actions required by this Consent Agreement shall be conducted in accordance with the requirements of all local, state, and federal laws and regulations. DOE shall obtain or cause its representatives to obtain all permits and approvals necessary under such laws and regulations.

REIMBURSEMENT OF DTSC'S COSTS

25.1. DOE shall pay DTSC's costs incurred in the implementation of this Consent Agreement. Such costs shall include DTSC's costs incurred in the preparation and implementation of this Consent Agreement prior to the effective date of this Consent Agreement.

25.2. An estimate of DTSC's costs in overseeing the first 18 months of the project is attached as Exhibit A showing the amount of $287,513. It is understood by the parties that this amount is only a cost estimate for the activities shown on Exhibit A and it may differ from the actual costs incurred by DTSC in overseeing these activities or in implementing this Consent Agreement. DTSC will provide additional cost estimates to DOE as the work progresses under the Consent Agreement.

25.3. DOE shall make an advance payment to DTSC in the amount of $143,756 within 30 days of the effective date of this Consent Agreement. If the advance payment exceeds DTSC's costs, DTSC will refund the balance within 120 days after the execution of the Acknowledgment of Satisfaction pursuant to Section 27 of this Consent Agreement.

25.4. DTSC will provide DOE with a billing statement at least quarterly, which will include the name(s) of the employee(s), identification of the activities, the amount of time spent on each activity, and the hourly rate charged. If DOE DOEs do not pay an invoice within 60 days of the date of the billing statement, the amount is subject to interest as provided by Health and Safety Code section 25360.1.

25.5. DTSC will retain all costs records associated with the work performed under this Consent Agreement as required by state law. DTSC will make all documents that support the DTSC's cost determination available for inspection upon request, as provided by the Public Records Act.

25.6. Any dispute concerning DTSC's costs incurred pursuant to this Consent Agreement is subject to the Dispute Resolution provision of this Consent Agreement and the dispute resolution procedures as established pursuant to Health and Safety Code section 25269.2. DTSC reserves its right to recover unpaid costs under applicable state and federal laws.

25.7. All payments shall be made within 30 days of the date of the billing statement by check payable to the Department of Toxic Substances Control and shall be sent to:

Accounting Unit
Department of Toxic Substances Control
P. O. Box 806
Sacramento, California 95812-0806

All checks shall reference the name of the Facility, the DOE's name and address, and the docket number of this Consent Agreement. Copies of all checks and letters transmitting such checks shall be sent simultaneously to DTSC's Project Coordinator.

MODIFICATION

26.1. This Consent Agreement may be modified by mutual agreement of the parties. Any agreed modification shall be in writing, shall be signed by both parties, shall have as its effective date the date on which it is signed by all the parties, and shall be deemed incorporated into this Consent Agreement.

26.2. Any requests for revision of an approved workplan requirement must be in writing. Such requests must be timely and provide justification for any proposed workplan revision. DTSC has no obligation to approve such requests, but if it does so, such approval will be in writing and signed by the Chief of the Legacy Landfill and Corrective Action Office, Department of Toxic Substances Control, or his or her designee. Any approved workplan revision shall be incorporated by reference into this Consent Agreement.

TERMINATION AND SATISFACTION

27. The provisions of this Consent Agreement shall be deemed satisfied upon the execution by both parties of an Acknowledgment of Satisfaction (Acknowledgment). DTSC will prepare the Acknowledgment for DOE's signature. The Acknowledgment will specify that DOE has demonstrated to the satisfaction of DTSC that the terms of this Consent Agreement including payment of DTSC's costs have been satisfactorily completed. The Acknowledgment will affirm DOE's continuing obligation to preserve all records after the rest of the Consent Agreement is satisfactorily completed.

EFFECTIVE DATE

28. The effective date of this Consent Agreement shall be the date on which this Consent Agreement is signed by all the parties. Except as otherwise specified, "days" means calendar days.

SIGNATORIES

29. Each undersigned representative certifies that he or she is fully authorized to enter into this Consent Agreement.

DATE: 12-19-2008 BY: Original signed by

James A. Slutz
Assistant Secretary (Acting)
Office of Fossil Energy
FE-1/Forrestal Building
United States Department of Energy
1000 Independence Ave., S.W.
Washington, DC 20585

DATE: 12/23/08 BY: Original signed by

Rizgar Ghazi, P.E., Unit Chief
Legacy Landfills and Corrective Action Office
Department of Toxic Substances Control

EXHIBIT A

LIST OF ONE HUNDRED AND THIRTY-ONE (131) SOLID WASTE MANAGEMENT UNITS AND/OR AREAS OF CONCERN

The California Department of Toxic Substances Control identified the following 131 solid waste management units and/or areas of concern at Elk Hills in the "RCRA Facility Assessment for the Naval Petroleum Reserve No.1, Elk Hills Facility", June 30, 1998.

1. 01B CATCH BASIN; 1B GULLY PLUG
2. 01G SUMP
3. 01G SURFACE DUMP
4. 02B DRUM STORAGE AREA
5. 02B PCB SHED
6. 02B TRANSFORMER OIL TANK SETTING
7. 02G SURFACE DUMP [1]
8. 02G SURFACE DUMP [2]
9. 03G CATCH BASIN
10. 03G EAST SURFACE DUMP [1]
11. 03G EAST SURFACE DUMP [2]
12. 03G GAS PLANT, 03G GAS PLANT DRAINS
13. 04G DISPOSAL PIT
14. 04G DISPOSAL PIT -·CATCH BASIN
15. 05G SURFACE DUMP
16. 06M CATCH BASIN
17. 06M SURFACE DUMP
18. 06M WELL PAD AND SUMP
19. 07G SUMPS (3)
20. 07R DISPOSAL TRENCH
21. 08G CATCH BASIN [1]
22. 08G CATCH BASIN [2]
23. 09G SUMP AND ASSOCIATED CATCH BASIN
24. 10B SUMP
25, 10G CATCH BASIN
26. 10G EMERGENCY CATCH BASIN AND OVERFLOW (2ND)
27. 10G LACT TANK SETIING OIL WATER SEPARATOR
28. 10G SUMPS #1 AND #2
29. 10G SUMPS #3 AND #4
30. 10G SUMPS #6 AND LAND FARM; SUMP #5
31. 12G CATCH BASIN
32. 13B SUMP
33. 14B SUMPS (15)
34. 14Z SUMPS (4 SUMPS)
35. 18G 250,000 BARREL OIL SHIPPING TANKS
36. 18G BOILER
37. 18G CATCH BASINS (3); UNLINED & INACTIVE SUMP
38. 18R MUD DISPOSAL SUMPS
39. 18R MUD RECOVERY TANKS
40. 21S CATCH BASIN
41. 23R MIDDLE CATCH BASIN
42. 23R NORTH CATCH BASIN
43, 23R SOUTH CATCH BASIN
44. 23S SUMPS (4), 23S TANK SETTING

EXHIBIT A

LIST OF ONE HUNDRED AND THIRTY-ONE (131) SOLID WASTE MANAGEMENT UNITS AND/OR AREAS OF CONCERN

45. 24Z HISTORIC SUMPS (2)
46. 24Z SUMPS (2 WATER FLOOD)
47, 24Z SUMPS (2)
48, 24Z WASTEWATER DISPOSAL FACILITY
49. 25S BURNDUMP
50. 25S CATCH BASIN
51. 25S HISTORIC SUMP
52. 25S LACT
53. 25S SUMPS (3) LACT
54. 25S SURFACE DUMP [1]
55. 25S SURFACE DUMP [2]
56. 25S SURFACE SCATTER
57. 26R CATCH BASIN
58. 26S CATCH BASIN [IJ
59. 26S CATCH BASIN [2]
60. 26SEAST LANDFILL
61. 26S OIL SPILL AREA [1]
62. 26S OIL SPILL AREA [2]
63. 26S SUMP
64. 26S SURFACE DUMP [1]
65. 26S WEST LANDFILL/SURFACE DUMP
66. 26Z LACT SUMP
67. 26Z OIL SPILL AREA
68. 26Z SUMPS (7)
69. 26Z TRENCH DUMP
70. 27R LANDFARM
71. 27R RADIOACTIVE MATERIALS STORAGE AREA
72. 27R SUMP; OIL RECOVERY SUMP
73. 27R TRUCK WASHOUT SUMPS (4)
74. 27R WASTE MANAGE.MENT FACILITY
75. 27S CATCH BASIN
76. 27S SUMP
77, 27S SURFACE DUMP
78. 29R CATCH BASIN
79. 30R GULLY PLUG AND DIKE, 30R CATCH BASIN AREA
80. 30R SUMP AND ASSOCIATED CATCH BASIN [2]
81. 31S SURFACE DUMP
82. 31T SUMPS (3)
83. 33S COMPRESSOR PLANT AND RECLAIMED SUMP
84. 34S GASOLINE PLANT-BELRIDGE OIL CO.
85, 34S SURFACE DUMP [1]
86. 34S SURFACE DUMP [2]
87. 34S SURFACE DUMP [3]
88. 34S SURFACE DUMP [4]
89, 34S SURFACE DUMP [5]
90. 35R COGEN FACILITY
91. 35R DRUM STORAGE AREA [4]
92. 35R GAS PLANT
93. 35R GAS PLANT SUMP

EXHIBIT A

LIST OF ONE HUNDRED AND THIRTY-ONE (131) SOLID WASTE MANAGEMENT UNITS AND/OR AREAS OF CONCERN

94. 35R LAB PAD
95. 35R LANDFILL
96. 35R LOAP
97. 35S SUMP
98. 36R ABANDONED GAS PLANT
99. 36R EAST SURFACE SCATTER
100. 36R OLD CAMP DUMP
101. 36R SURFACE DUMP [1]
102. 36R SURFACE DUMP [2]
103. 36R WAREHOUSE - 2 USTs
104. 36R WEST LANDFILL
105. 36S ACCUMULATION PAD
106. 36S DRUM STORAGE AREAS [4]
107. 368 GAS PLANT - CHEVRON
108. 36S LANDFILL [1]
109. 36S LANDFILL [2]
110. 36S SURFACE DUMP [1]
111. 36S SURFACE DUMP [2]
112. 36S SURFACE SCATTER
113. 36S TANK SETTING
114. 36S TELEPHONE BUILDING
115. 36S WAREHOUSE - 5 USTs
116. 36S WASTE OIL STORAGE TANKS
117. ASBESTOS, TEXACO 8" PIPELINE (10B, 11B, 27S, 28S, 29S)
118. BRAKE LININGS
119. CHROMIUM SITES
120. DEPLETED ANODE BEDS
121. FLANGE GASKETS
122. LOW TEMPERATURE SEPARATOR PLANT #1 (LOAP)
123. LOW TEMPERATURE SEPARATOR PLANT #2 (LOAP)
124. LUB FLUIDS STORAGE & REFUELING AREAS
125. MISC SUMP SURVEY
126. SEPTIC TANKS
127. SHALLOW OIL ZONE (SOZ) TANK SETTINGS ABANDONED
128. TRANSFORMERS
129. UNIT VEHICLES - BRAKE LININGS
130. WELL PADS / ARSENIC SITES
131. WELLS

LL&CA STAFF					GEOLOGIC/ENGINEERING STAFF				TOXICOLOGY				PUBLIC PARTICIPATION				LEGAL COUNSEL			
	SUP HSE I		SUP HSE II		EG		Senior Supervising EG		STAFF TOXICOLOGIST (SPECIALIST)		SENIOR TOXICOLOGIST		PUBLIC PARTICIPATION SPECIALIST		PUBLIC PARTICIPATION SUPERVISOR		STAFF COUNSEL		STAFF COUNSI (Specialist/Super	
$161	Rate =	$189	Rate =	$208	Rate =	$161	Rate =	$208	Rate =	$164	Rate =	$172	Rate =	$113	Rate =	$129.00	Rate =	$165	Rate =	$2
: 3726)	(Class Code: 3724)		(Class Code: 3723)		(Class Code: 3756)		(Class Code: 3751)		(Class Code: 7978)		(Class Code: 7943)		(Class Code: 5373)		(Class Code: 5372)		(Class Code: 5778)		(Class Code: 5	
TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TOTAL	HRS	TO
$6,440		$0	1	$208		$0		$0		$0		$0		$0		$0.00		$0		
$4,508		$0	1	$208	2	$322		$0	2	$328		$0		$0		$0.00		$0		
$644		$0		$0		$0		$0		$0		$0		$0		$0.00	14	$2,310	1	
$2,576		$0	2	$416		$0		$0		$0		$0		$0		$0.00		$0		
$14,168	0	$0	4	$832	2	$322	0	$0	2	$328	0	$0	0	$0	0	$0.00	14	$2,310	1	
$3,220		$0	2	$416	12	$1,932		$0	30	$4,920	2	$344		$0		$0.00		$0		
$3,220		$0	2	$416	12	$1,932	1	$208	30	$4,920	2	$344		$0		$0.00		$0		
$5,796		$0	2	$416	18	$2,898	1	$208	40	$6,560	2	$344		$0		$0.00		$0		
$7,728		$0	2	$416	28	$4,508	1	$208	40	$6,560	2	$344		$0		$0.00		$0		
$19,964	0	$0	8	$1,664	70	$11,270	3	$624	140	$22,960	8	$1,376	0	$0	0	$0.00	0	$0	0	
$21,252		$0	8	$1,664	132	$21,252	8	$1,664	60	$9,840	4	$688		$0		$0.00		$0		
$16,100		$0	4	$832	120	$19,320	4	$832	100	$16,400	4	$688		$0		$0.00		$0		
$20,608		$0	5	$1,040	40	$6,440	4	$832	12	$1,968	2	$344	20	$2,260	2	$258.00		$0		
$57,960	0	$0	17	$3,536	292	$47,012	16	$3,328	172	$28,208	10	$1,720	20	$2,260	2	$258.00	0	$0	0	
$1,610		$0	1	$208	10	$1,610	1	$208	20	$3,280	2	$344		$0		$0.00		$0		
$1,610		$0	1	$208	10	$1,610	1	$208	40	$6,560	2	$344		$0		$0.00		$0		
$0		$0		$0	0	$0		$0		$0		$0		$0		$0.00		$0		
$0		$0		$0	0	$0		$0		$0		$0		$0		$0.00		$0		
$3,220	0	$0	2	$416	20	$3,220	2	$416	60	$9,840	4	$688	0	$0	0	$0.00	0	$0	0	
$0		$0		$0		$0		$0		$0		$0		$0		$0.00		$0		
$0		$0		$0		$0		$0		$0		$0		$0		$0.00		$0		
$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0.00	0	$0	0	
$5,000		$0				$3,000		$0		$3,000		$0		$0		$0.00		$0		
$5,000	0	$0	0	$0	0	$3,000	0	$0	0	$3,000	0	$0	0	$0	0	$0.00	0	$0	0	
$14,297	0	$0	4.65	$967	57.6	$9,274	3.15	$655	56.1	$9,200	3.3	$568	3	$339	0.3	$38.70	2.1	$347	0.15	
$114,609	-	$0	35.7	$7,415	441.6	$74,098	24.2	$5,023	430.1	$73,536	25.3	$4,352	23.0	$2,599	2.3	$297	16.1	$2,657	1.2	

) fiscal year rates. At the beginning of each fiscal year, it is a policy of DTSC to provide an updated annual cost estimate using the new rates in effect for that fiscal year (July 1 to June 30).

ATTACHMENT 1

SCOPE OF WORK FOR INTERIM MEASURES IMPLEMENTATION

PURPOSE

Interim measures are actions to control and/or eliminate releases of hazardous waste and/or hazardous constituents from a facility prior to the implementation of a final corrective measure. Interim measures must be used whenever possible to achieve the goal of stabilization which is to control or abate threats to human health and/or the environment, and to prevent or minimize the spread of contaminants while long-term corrective action alternatives are being evaluated.

SCOPE

The documents required for Interim Measures (IM) are, unless the Department of Toxic Substances Control (DTSC) specifies otherwise, an IM Workplan, an Operation and Maintenance Plan and IM Plans and Specifications. The scope of work (SOW) for each document is specified below. The SOWs are intended to be flexible documents capable of addressing both simple and complex site situations. If the Owner/Operator or Respondents can justify, to the satisfaction of DTSC, that a plan or portions thereof are not needed in the given site specific situation, then DTSC may waive that requirement.

The scope and substance of interim measures should be focused to fit the site specific situation and be balanced against the need to take quick action.

DTSC may require the Owner/Operator or Respondents to conduct additional studies beyond what is discussed in the SOWs in order to support the IM program. The Owner/Operator or Respondents will furnish all personnel, materials and services necessary to conduct the additional tasks.

A. Interim Measures Workplan

The Owner/Operator or Respondents shall prepare an IM Workplan that evaluates interim measure options and clearly describes the proposed interim measure, the key components or elements that are needed, describes the designer's vision of the interim measure in the form of conceptual drawings and schematics, and includes procedures and schedules for implementing the interim measure(s). The IM Workplan must be approved by the DTSC prior to implementation. The IM Workplan must, at a minimum, include the following elements:

1. Introduction/Purpose

Describe the purpose of the document and provide a summary of the project.

2. Conceptual Model of Contaminant Migration

   It is important to know where the contaminants are and to understand how they are moving before an adequate interim measure can be developed. this critical question, the Owner/Operator or Respondents must present a conceptual model of the site and contaminant migration. The conceptual model consists of a working hypothesis of how the contaminants may move from the release source to the receptor population. The conceptual model is developed Henry's Law Constant, etc.) for each contaminant and assessing how the contaminant may migrate given the existing site conditions (geologic features, depth to ground water, etc.). Describe the phase (water, soil, gas, non-aqueous) and location where contaminants are likely to be found. This analysis may have already been done as part of earlier work (e.g., Current Conditions Report). If this is the case, then provide a summary of the conceptual model with a reference to the earlier document.

3. Evaluation of Interim Measure Alternatives

   List, describe and evaluate interim measure alternatives that have the potential to stabilize the facility. Propose interim measures for implementation and provide rationale for the selection. Document the reasons for excluding any interim measure alternatives.

4. Description of Interim Measures

   Qualitatively describe what the proposed interim measure is supposed to do and how it will function at the facility.

5. Data Sufficiency

   Review existing data needed to support the design effort and establish whether there are sufficient accurate data available for this purpose. The Owner/Operator or Respondents must summarize the assessment findings and specify any additional data needed to complete the interim measure design. DTSC may require or the Owner/Operator or Respondents may propose that sampling and analysis plans and/or treatability study workplans be developed to obtain the additional data. Submittal times for any new sampling and analysis plans and/or treatability study workplans must be included in the project schedule.

6. Project Management

Describe the levels of authority and responsibility (include organization chart), lines of communication and a description of the qualifications of key personnel who will direct the interim measure design and implementation effort (including contractor personnel).

7. Project Schedule

   The project schedule must specify all significant steps in the process, when any key documents (e.g., plans and specifications, operation and maintenance plan) are to be submitted to DTSC and when the interim measure is to be implemented.

8. Design Basis

   Discuss the process and methods used to design all major components of the interim measure. Discuss the significant assumptions made and possible sources of error. Provide justification for the assumptions.

9. Conceptual Process/Schematic Diagrams.

10. Site plan showing preliminary plant layout and/or treatment area.

11. Tables listing number and type of major components with approximate dimensions.

12. Tables giving preliminary mass balances.

13. Site safety and security provisions (e.g., fences, fire control, etc.).

14. Waste Management Practices

    Describe the wastes generated by the construction of the interim measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

15. Required Permits

    List and describe the permits needed to construct the interim measure. Indicate on the project schedule when the permit applications will be submitted to the applicable agencies and an estimate of the permit issuance date.

16. Sampling and Monitoring

    Sampling and monitoring activities may be needed for design and during construction of the interim measure. If sampling activities are necessary,

the IM Workplan must include a complete sampling and analysis section which specifies at a minimum the following information:

a. Description and purpose of monitoring tasks;
b. Data quality objectives;
c. Analytical test methods and detection limits;
d. Name of analytical laboratory;
e. Laboratory quality control (include laboratory *QA/QC* procedures in appendices)
f. Sample collection procedures and equipment;
g. Field quality control procedures:
    - duplicates (10% of all field samples)
    - blanks (field, equipment, etc.)
    - equipment calibration and maintenance
    - equipment decontamination
    - sample containers
    - sample preservation
    - sample holding times (must be specified)
    - sample packaging and shipment
    - sample documentation (field notebooks, sample labeling, etc.);
    - chain of custody;
h. Criteria for data acceptance and rejection; and
i. Schedule of monitoring frequency.

The Owner/Operator or Respondents shall follow all DTSC and USEPA guidance for sampling and analysis. DTSC may request that the sampling and analysis section be a separate document.

17. Appendices including:

Design Data - Tabulations of significant data used in the design effort;

Equations - List and describe the source of major equations used in the design process;

Sample Calculations - Present and explain one example calculation for significant calculations; and

Laboratory or Field Test Results.

B. Interim Measures Operation and Maintenance Plan

The Owner/Operator or Respondents shall prepare an Interim Measures Operation and Maintenance (O&M) Plan that includes a strategy and procedures for performing operations, maintenance, and monitoring of the interim measure(s). An Interim Measures Operation and Maintenance Plan shall be

submitted to DTSC simultaneously with the Plans and Specifications. The O&M plan shall, at a minimum, include the following elements:

1. Purpose/Approach

   Describe the purpose of the document and provide a summary of the project.

2. Project Management

   Describe the levels of authority and responsibility (include organization chart), lines of communication and a description of the qualifications of key personnel who will operate and maintain the interim measure(s) (including contractor personnel).

3. System Description

   Describe the interim measure and identify significant equipment.

4. Personnel Training

   Describe the training process for O&M personnel. The Owner/Operator or Respondents shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, start up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

5. Start-Up Procedures

   Describe system start-up procedures including any operational testing.

6. Operation and Maintenance Procedures

   Describe normal operation and maintenance procedures including:

   a. Description of tasks for operation;
   b. Description of tasks for maintenance;
   c. Description of prescribed treatment or operation condition, and
   d. Schedule showing frequency of each O&M task.

7. Replacement schedule for equipment and installed components.

8. Waste Management Practices

Describe the wastes generated by operation of the interim measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

9. Sampling and Monitoring

Sampling and monitoring activities may be needed for effective operation and maintenance of the interim measure. If sampling activities are necessary, the O&M plan must include a complete sampling and analysis section which specifies at a minimum the following information:

a. Description and purpose of monitoring tasks;
b. Data quality objectives;
c. Analytical test methods and detection limits;
d. Name of analytical laboratory;
e. Laboratory quality control (include laboratory QA/QC procedures in appendices)
f. Sample collection procedures and equipment;
g. Field quality control procedures:
   - duplicates (10% of all field samples)
   - blanks (field, equipment, etc.)
   - equipment calibration and maintenance
   - equipment decontamination
   - sample containers
   - sample preservation
   - sample holding times (must be specified)
   - sample packaging and shipment
   - sample documentation (field notebooks, sample labeling, etc.);
   - chain of custody;
h. Criteria for data acceptance and rejection; and
i. Schedule of monitoring frequency. The Owner/Operator or Respondents shall follow all DTSC and USEPA guidance for sampling and analysis. DTSC may request that the sampling and analysis section be a separate document.

10. O&M Contingency Procedures:

a. Procedures to address system breakdowns and operational problems including a list of redundant and emergency back-up equipment and procedures;

b. Should the interim measure suffer complete failure, specify alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and/or the environment or exceed cleanup standards; and

c. The O&M Plan must specify that, in the event of a major breakdown and/or complete failure of the interim measure (includes emergency situations), the Owner/Operator or Respondents will orally notify DTSC within 24 hours of the event and will notify DTSC in writing within 72 hours of the event. The written notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on human health and the environment.

11. Data Management and Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data. The O&M Plan shall specify that the Owner/Operator or Respondents collect and maintain the following information:

a. Progress Report Information

- Work Accomplishments (e.g., performance levels achieved, hours of treatment operation, treated and/or excavated volumes, concentration of contaminants in treated and/or excavated volumes, nature and volume of wastes generated, etc.).

- Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).

b. Monitoring and laboratory data;

c. Records of operating costs; and

d. Personnel, maintenance and inspection records.

DTSC may require that the Owner/Operator or Respondents submit additional reports that evaluate the effectiveness of the interim measure in meeting the stabilization goal.

C. Interim Measures Plans and Specifications

[Note - The decision to require the submittal of plans and specifications should be based on the site specific situation. The requirement for plans and specifications should be balanced against the need to quickly implement interim measures at a facility.]

The Owner/Operator or Respondents shall prepare Plans and Specifications for the interim measure that are based on the conceptual design but include additional detail. The Plans and Specifications shall be submitted to DTSC simultaneously with the Operation and Maintenance Plan. The design package must include drawings and specifications needed to construct the interim measure. Depending on the nature of the interim measure, many different types of drawings and specifications may be needed. Some of the elements that may be required are:

- General Site Plans
- Process Flow Diagrams
- Mechanical Drawings
- Electrical Drawings
- Structural Drawings
- Piping and Instrumentation Diagrams
- Excavation and Earthwork Drawings
- Equipment Lists
- Site Preparation and Field Work Standards
- Preliminary Specifications for Equipment and Material

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications to DTSC, the Owner/Operator or Respondents shall:

a. Proofread the specifications for accuracy and consistency with the conceptual design; and
b. Coordinate and cross-check the specifications and drawings

ATTACHMENT 2

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION (RFI)
PURPOSE

The purpose of this RCRA Facility Investigation is to determine the nature and extent of releases of hazardous waste or constituents from regulated units, solid waste management units, and other source areas at the Facility and to gather all necessary data to support the Corrective Measures Study. The RFI must include characterization of the facility (processes, waste management, etc.), environmental setting, source areas, nature and extent of contamination, migration pathways (transport mechanisms) and all potential receptors.

SCOPE

The documents required for an RFI are a Current Conditions Report, a RCRA Facility Investigation Workplan, a RCRA Facility Investigation Report, a Health and Safety Plan. The scope of work (SOW) for each document is specified below. Scope of work for Public Participation Plan for the entire corrective action process is also included.

A. Current Conditions Report
The Current Conditions Report must describe existing information pertinent to the facility including operations, processes, waste management, geology, hydrogeology, contamination, migration pathways, potential receptor populations and interim corrective measures. The required format for a current conditions report is described below.

1. Introduction
1.1 Purpose
Describe the purpose of the current conditions report (e.g., summary and evaluation of existing information related to the facility; required as a component of RFI).

1.2 Organization of Report
Describe how the report is organized.

2. Facility Description
Summarize background, current operations, waste management and products produced at the facility. Include a map that shows the general geographic location of the facility.

Describe current facility structures including any buildings, tanks, sumps, wells, waste management areas, landfills, ponds, process areas and storage areas. Include detailed facility maps that clearly show current property lines, the owners of all adjacent property, surrounding land use (residential, commercial,

agricultural, recreational, etc.), all tanks, buildings, process areas, utilities, paved areas, basements, rights-of-way, waste management areas, ponds, landfills, piles, underground tanks, wells and other facility features.

3. Facility History
3.1 Ownership History
Describe the ownership history of the facility.

3.2 Operational History
Describe in detail how facility operations, processes and products have changed over time (historical aerial photographs could be useful for this purpose).

3.3 Regulatory History
Describe all permits (including waste discharge requirements, if located in California) requested or received, any enforcement actions taken by regulatory agencies and any closure activities that are planned or underway.

3.4 Waste Generation
Describe all wastes (solid or hazardous) that have been generated at the facility. Include approximate waste volumes generated and summaries of any waste analysis data. Show how the waste stream (volume and chemical composition) has changed over time.

3.5 Waste Management
Describe in detail all past solid and hazardous waste treatment, storage and disposal activities at the facility. Show how these activities have changed over time and indicate the current status. Make a clear distinction between active waste management units and older out of service waste management units. Identify which waste management units are regulated under RCRA or California Health and Safety Code.

Include maps showing: (1) all solid or hazardous waste treatment, storage or disposal areas active after November 19, 1980, (2) all known past solid waste or hazardous waste treatment, storage or disposal areas regardless of whether they were active on November 19, 1980, and (3) all known past or present underground tanks or piping.

3.6 Spill and Discharge History
Provide approximate dates or periods of past product and waste spills, identify the materials spilled and describe any response actions conducted. Include a summary of any sampling data generated as a result of the spill. Include a map showing approximate locations of spill areas at the facility.

3.8 Chronology of Critical Events

Provide a chronological list (including a brief description) of major events, communications, orders, notices of violation, spills, discharges that occurred throughout the facility's history.

4. Environmental Setting

4.1 Location/Land Use

Discuss facility size, location and adjacent land use. Include a rough demographic profile of the human population who use or have access to the facility and adjacent lands. Provide approximate distance to nearest residential areas, schools, nursing homes, hospitals, parks, playgrounds, etc.

4.2 Local Ecology

Describe any endangered or threatened species near the facility. Include a description of the ecological setting on and adjacent to the facility. Provide approximate distance to nearest environmentally sensitive areas such as marsh lands, wetlands, streams, oceans, forests, etc.

4.3 Topography and Surface Drainage

Describe the regional and site specific topography and surface drainage patterns that exist at the facility. Include a map that shows the topography and surface drainage depicting all waterways, wetlands, floodplains, water features, drainage patterns and surface water containment areas.

4.4 Climate

Discuss mean annual temperatures, temperature extremes, 24-hour rainfall, average annual rainfall, prevailing wind direction, etc.

4.5 Surface Water Hydrology

Describe the facility's proximity (distance) to surface water bodies (e.g. coastal waters, lakes, rivers, creeks, drainage basins, floodplains, vernal pools, wetlands, etc.). Describe flows on-site and flows that leave the site.

4.6 Geology

Describe the regional and site specific geology including stratigraphy and structure. Include cross sections to show the subsurface stratigraphy. Cross-sections should be at a natural scale (vertical equals horizontal) and of sufficient detail to accurately plot cut and fill, alluvium, and structural features. Cross-sections should be taken on a grid pattern oriented normal to major geologic structure and spaced close enough to determine geology and ground water flow on a unit-by-unit basis.

4.7 Hydrogeology

Describe the regional and site specific hydrogeologic setting including any information concerning local aquifers, ground water levels, gradients, flow direction, hydraulic conductivity, and velocity. Include potentiometric surface

contour maps and show direction of groundwater flow. Describe the beneficial uses of the ground water (e.g. drinking water supply, agricultural water supply, etc.). Describe temporal variations (seasonal and historical).

4.8 Ground Water Monitoring System
Describe the facility's ground water monitoring system including a table detailing the existing well construction. The table must, at a minimum, identify the following construction details for each well:

- Well ID
- Completion Date
- Drilling Method
- Borehole Diameter (inches)
- Well Casing Diameter and Type
- Measuring Point Elevation (feet MSL)
- Borehole Depth (feet BGS)
- Depth of Well (feet)
- Screened Interval
- Formation Screened
- Slot Size and Type (inches)
- Filter Pack Material
- Filter Pack Thickness
- Type of Filter Pack Seal
- Thickness of Filter Pack Seal
- Pump System (dedicated or non-dedicated)
- Type of Pump
- Approximate Depth to Water (feet BGS)

If some of this information is not available, so indicate on the table with an "NA". {BGS: Below Ground Surface, MSL: Mean Sea Level} The monitoring well locations must be shown on the facility map (see Section A.2 of this Attachment).

5. Existing Degree and Extent of Contamination
For each medium where the Consent Agreement identifies a release (e.g. soil, ground water, surface water, air, etc.), describe the existing extent of contamination. This description must include all available monitoring data and qualitative information on the locations and levels of contamination at the facility (both onsite and offsite). Include a general assessment of the data quality, a map showing the location of all existing sampling points and potential source areas and contour maps showing any existing ground water plumes at the facility (if ground water release). Highlight potential ongoing release areas that would warrant use of interim corrective measures (see section 8, Interim Corrective Measures and Stabilization Assessment).

5.1 Previous Investigations
List and briefly describe all previous investigation that have occurred at the facility, agencies (e.g., DTSC's Site Mitigation Branch, the Regional Water

Quality Control Board, etc.) which required and/or oversaw the investigations, and agency contacts.

6. Potential Migration Pathways
6.1 Physical Properties of Contaminants
Identify the applicable physical properties for each contaminant that may influence how the contaminant moves in the environment. These properties could include melting point (OC), water solubility (mg/L), vapor pressure (mm Hg), Henry's law constant (atm m3/mol), density (g/mL), dynamic viscosity (cp), kinematic viscosity (cs), octanol/water partition coefficient (log Kow), soil organic carbon/water coefficient (log koc) and soil/water partition coefficients. Include a table that summarizes the applicable physical properties for each contaminant.

6.2 Conceptual Model of Contamination Migration
Develop a conceptual model of contaminant migration. The conceptual model consists of a working hypothesis of how the contaminants may move from the release source to the receptor population. The conceptual model is developed by looking at the applicable physical parameters for each contaminant and assessing how the contaminant may migrate given the existing site conditions (geologic features, depth to ground water, etc.).

Describe the phase (water, soil, gas, non-aqueous) and location where contaminants are likely to be found (e.g., if a ground water contaminant has a low water solubility and a high density, then the contaminant will likely sink and be found at the bottom of the aquifer, phase: non-aqueous). Include a discussion of potential transformation reactions that could impact the type and number of contaminants (i.e., what additional contaminants could be expected as a result of biotic and abiotic transformation reactions given the existing soil conditions). A typical conceptual model should include a discussion similar to the following: benzene, ethylbenzene, toluene, and xylenes are potential contaminants at the facility. Based on their high vapor pressures and relatively low water solubility's (see Henry's Law constant), the primary fate of these compounds in surface soils or surface water is expected to be volatilization to the atmosphere. These mono-cyclic aromatic hydrocarbons may leach from soils into ground water. The log koc (soil organic carbon/water partition coefficient) values for these compounds ranges from 1.9 to 4.0 indicating that sorption to organic matter in soils or sediments may occur only to a limited extent.

7. Potential Impacts of Existing Contamination
Describe the potential impacts on human health and the environment from any existing contamination and/or ongoing activities at the facility. This description must consider the possible impacts on sensitive ecosystems and endangered species as well as on local populations. Potential impacts from any releases to ground water, surface water, soil (including direct contact with contaminated surface soil) and air (including evaporation of volatile organic compounds from

contaminated soil) must be discussed. If air could be a significant pathway, soil gas or vapor emissions and/or ambient air monitoring should be described.

7.1 Ground Water Releases

Identify all wells (municipal, domestic, agricultural, industrial, etc.) within a 1-mile radius of the facility. Include a summary of available water sampling data for any identified municipal, industrial or domestic supply wells.

Develop a well inventory table that lists the following items for each identified well:

- Well Designation
- State ID
- Reported Owner
- Driller
- Date of Completion
- Original Use of Well
- Current Use of Well
- Drilling Method
- Borehole Diameter (inches)
- Casing Diameter (inches)
- Perforated Interval (feet)
- Gravel Pack Interval (feet)
- Total Well Depth (feet)
- Depth of Water (feet below ground surface)
- Date of Water Level Measurement

If some of this information is not available, so indicate on the table with an "NA". Include a regional map showing the facility, ground water flow direction and the location of all identified wells within a 1-mile radius of the facility. Identify and describe any potential ground water discharge to surface water bodies. Identify and list all relevant and applicable water standards for the protection of human health and the environment (e.g., maximum contaminant levels, water quality standards, etc.).

7.2 Surface Water Releases

Discuss the facility's potential impact on surface water within a 2-mile radius of the facility. Describe the potential beneficial uses of the surface water (e.g., drinking water supply, recreational, agricultural, industrial, or environmentally sensitive). Identify all water supply intake points and contact areas within a 2-mile radius of the facility. Include a summary of the most recent water sampling data available for each of the identified water supply intake points. Include a description of the biota in surface water supply intake points. Include a description of the biota in surface water bodies on, adjacent to, or which can be potentially affected by the release. Also summarize any available sediment sampling data. Include a regional map showing the facility, surface water flow

direction, beneficial use areas, and the location of any identified water supply intake points or contact areas that are within a 2-mile radius of the facility.

7.3 Sensitive Ecosystem/Habitats
Discuss the facility's potential impact on sensitive ecosystem.

8. Interim Corrective Measures and Stabilization Assessment
Identify all corrective measures that were or are being undertaken at the facility to stabilize contaminant releases. Describe the objective of the corrective measures including how the measure is mitigating a potential threat to human health and the environment. Summarize the design features of the corrective measure. Include a schedule for completing any ongoing or future work. Identify and describe potential interim corrective measure alternatives that could be implemented immediately to stabilize any ongoing releases and/or prevent further migration of contaminants.

9. Date Needs
Assess the amount and quality of existing data concerning the facility and determine what additional information must be collected to meet the objectives of the RFI. This assessment must identify any additional information that my be needed to (1) support development of interim measures for early action and (2) adequately evaluate and compare corrective measures alternatives (e.g., field work, treatability studies, computer modeling, literature searches, vendor contacts, etc.). For example, if soil vapor extraction (SVE) is a likely option to address contamination at the facility, then the RFI should collect applicable field data to assess SVE (e.g., soil gas analysis, depth to ground water, etc.). The RFI Workplan must detail how this additional information will be collected.

10. References
Provide a list of references cited in the Current Conditions Report.

B. RCRA Facility Investigation Workplan
The RCRA Facility Investigation (RFI) Workplan shall define the procedures necessary to:

1. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any ground water contamination in and around the facility.
2. Characterize the geology and hydrogeology in and around the facility.
3. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any soil contamination in and around the facility.
4. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any soil gas contamination in and around the facility.
5. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any surface water contamination (includes surface water sediments) at the facility.

6. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any air releases at the facility.
7. Identify and characterize any potential sources of contamination.
8. Characterize the potential pathways of contaminant migration.
9. Identify any actual or potential receptors.
10. Gather all data to support a risk and/or ecological assessment.
11. Gather all necessary data to determine where interim measures are needed and to support the use of interim measures to address immediate threats to human health and/or the environment, to prevent or minimize the spread of contaminants, to control sources of contamination and to accelerate the corrective action process.
12. Gather all necessary data to support the Corrective Measures Study (required for all releases). This could include conducting treatability, pilot, laboratory and/or bench scale studies to assess the effectiveness of a treatment method.

The RFI Workplan shall describe all aspects of the investigation, including project management, sampling and analysis, well drilling and installation and quality assurance and quality control. If the scope of the investigation is such that more than one phase is necessary, the "Phase 1" RFI Workplan must include a summary description of each phase. For example, the first phase of a RF! could be used to gather information necessary to focus the second phase into key areas of the facility that need further investigation.

The required format for an RFI Workplan is described below:
1. Introduction
Briefly introduce the Workplan. Discuss the Consent Agreement requiring the RFI and how the Workplan is organized.

2. Investigation Objectives
2.1 Project Objectives
Describe the overall objectives and critical elements of the RFI. State the general information needed from the site (e.g., soil chemistry, hydraulic conductivity of aquifer, stratigraphy, ground water flow direction, identification of potential receptors, etc.). The general information should be consistent with the objectives of the RFI and the data needs identified in the Current Conditions Report.
2.2 Data Quality Objectives
Provide data quality objectives that identify what data are needed and the intended use of the data.
3. Project Management
Describe how the investigation will be managed, including the following information:

- Organization chart showing key personnel, levels of authority and lines of communication;
- • Project Schedule; and
- • Estimated Project Budget.

- Identify the individuals or positions who are responsible for: project management, field activities, laboratory analysis, database management, overall quality assurance, data validation, etc. Include a description of qualifications for personnel performing or directing the RFI, including contractor personnel.
-

4. Facility Background

Summarize existing contamination, local hydrogeologic setting and any other areas of concern at the facility, Include a map showing the general geographic location of the facility and a more detailed facility map showing the areas of possible contamination. Provide a reference to the Current Conditions Report and/or other applicable documents as a source of additional information.

5. Field Investigation

5.1 Task Description

Provide a qualitative description of each investigation task. Example tasks may include, but are not limited to the following:

Task 1: Surface Soil Sampling
Task 2: Surface Geophysics, Subsurface Soil Boring, and Borehole Geophysics
Task 3: Data Gathering to Support Interim Corrective Measures
Task 4: Monitoring Well installation
Task 5: Aquifer Testing
Task 6: Ground Water Sampling
Task 7: Potential Receptor Identification
Task 8: Treatability Studies

5.2 Rationale for Sampling

Describe where all samples will be collected (location and depth), types of matrices that will be sampled and the analytical parameters. Explain the rationale for each sampling point, the total number of sampling points, and any statistical approach used to select these points. The conceptual model of contaminant migration developed in the Current Conditions Report should be considered when selecting sampling locations and depths. If some possible sampling points are excluded, explain why. Describe any field screening techniques that will be used to identify samples for laboratory analysis. Include the rationale for use of field screening techniques and criteria for sample selection.

5.2.1 Background Samples

Background samples should be analyzed for the composite set of parameters for each matrix; treat sediments, surface soils and subsurface soils as separate matrices. Background samples are collected, numbered, package, and sealed in the same manner as other samples. For long term and/or especially large projects, it is recommended that 10% of samples collected be from background locations.

5.3 Sample Analysis
List and discuss all analysis proposed for the project. Include a table that summarizes the following information for each analysis to be performed:

- Analytical Parameters
- Analytical Method Reference Number (from EPA SW 846)
- Sample Preparation and/or Extraction Method Reference Number (from SW 846)
- Practical Quantization Limits
-

Discuss the rationale for selection of the analytical parameters. The rationale must relate to site history and the RFI objectives. The achievable detection limits or quantization limits stated in the selected methods must be adequate for valid comparisons of analytical results against any action levels or standards. For example, the objective may be to collect ground water data for comparison with Maximum Contaminant Levels (MCLs). If this were the case, it would be important to ensure that any ground water test methods had detection limits below the MCLs. Give an explanation if all samples from the same matrix will not be analyzed for the same parameters.

Provide the name(s) of the laboratory(s) that will be doing the analytical work. Indicate any special certifications or ratings of the laboratory. Describe the steps that will be taken to select and pre-qualify analytical laboratories to be used including any previous audits and/or other criteria. If a specific laboratory has not yet been selected, list at least 3 laboratories that are being considered for the analytical work.

5.4 Sample Collection Procedures
Describe how sampling points will be selected in the field, and how these locations will be documented and marked for future reference. If a sampling grid will be used, describe the dimensions and layout planned for the grid. Outline sequentially or step-by-step the procedure for collecting a sample for each matrix and each different sampling technique. Include a description of sampling equipment (including materials of construction), field measurements, sample preservation, housekeeping cleanliness techniques and well purging procedures. The procedure described must ensure that a representative sample is collected, and that sample handling does not result in cross contamination or unnecessary loss of contaminants. Special care in sample handling for volatile organic Samples must be addressed. Describe how and when duplicates, blanks, laboratory quality control samples and background samples will be collected. The RFI must include sufficient maps and tables to fully describe the sampling effort. This shall include, at a minimum, a map showing all proposed sampling locations and tables that contain the following information:

- Sample Collection Table
- Sampling Location/Interval
- Analytical Parameters (e.g., volatile organic compounds)

- Analytical Method Number
- Matrix
- Preservation Method
- Holding Times
- Containers (quantity, size, type plus footnotes that discuss source and
- grade of containers
- Sample Summary Table
- Sample Description/Area (include QC samples)
- Analytical Parameters
- Analytical Method Number
- Preparation or Extraction Method Number
- Matrix
- Number of Sample Sites

Number of Analyses

5.4.1 Equipment Decontamination

Describe the decontamination procedure for all drilling and sampling equipment (including metal sleeves). Clearly document the decontamination procedures.

5.4.2 Equipment Calibration and Maintenance

Logbooks or pre-formatted calibration worksheets should be maintained for major field instruments, to document servicing, maintenance and instrument modification. The calibration, maintenance and operating procedures for all instruments, equipment and sampling tools must be based upon manufacturer's instructions. List all field equipment to be used, specify the maintenance/calibration frequency for each instrument and the calibration procedures (referenced in text and included in appendices).

5.4.3 Sample Packaging and Shipment

Describe how samples will be packaged and shipped. All applicable Department of Transportation regulations must be followed.

5.4.4 Sample Documentation

Discuss the use of all paperwork including field notebooks, record logs, photographs, sample paperwork, and Chain of Custody forms (include a blank copy in RFI Workplan Appendices) and seals. Describe how sample containers will be labeled and provide an example label if available. At a minimum, each sample container label should include: project 10, sample location, analytical parameters, date sampled and any preservative added to the sample. A bound field log book must be maintained by the sampling team to provide a daily record of events. Field log books shall provide the means of recording all data regarding sample collection. All documentation in field books must be made in permanent ink. If an error is made, corrections must be made by crossing a line through the error and entering the correct information. Changes must be initialed, no entries shall be obliterated or rendered unreadable. Entries in the log book must include, at a minimum, the following for each

- days sampling:
- Date
- Starting Time
- Meteorological Conditions
- Field Personnel Protection
- Level of Personnel Protection
- Site Identification
- Field Observations/Parameters
- Sample Identification Numbers
- Location and Description of Sampling Points
- Number of Samples Collected
- Time of Sample Collection
- Signature of Person Making the Entry
- Problems encountered and actions taken to resolve problems
- Photo Log
- Deviations from Work Plan

5.4.5 Disposal of Contaminated Materials
Describe the storage and disposal methods for all contaminated cuttings, well development and purge water, disposable equipment, decontamination water, and any other contaminated materials. The waste material must be disposed of in a manner consistent with local, state and federal regulations.

5.4.5 Standard Operating Procedures
If Standard Operating Procedures (SOPs) are referenced, the relevant procedure must be summarized in the RFI Workplan. The SOP must be specific to the type of tasks proposed and be clearly referenced in the RFI Workplan. The SOP must also be directly applicable, as written, to the RFI Workplan; otherwise, modifications to the SOP must be discussed. Include the full SOP description in the RFI Workplan appendix.

5.5 Well Construction and Aquifer Testing
When new monitoring wells (or piezometer) are proposed, describe the drilling method, well design and construction details (e.g., depth of well, screen length, slot size filter pack material, etc.) and well development procedures. Describe the rationale for proposed well locations and selection of all well design and construction criteria (e.g., provide rationale for selection of slot size and screen length). When aquifer testing is proposed, describe the testing procedures, flow rates, which wells are involved, test periods, how water levels will be measured, and any other pertinent information.

6. Quality Assurance and Quality Control
Quality control checks of filed and laboratory sampling and analysis serve two purposes: to document the data quality, and to identify areas of weakness within the measurement process which need correction. Include a summary table of data quality assurance objectives that, at a minimum, lists:

- Analysis Group (e.g., volatile organic compounds)
- Matrix
- Practical Quantization Limits (PQL)
- Spike Recovery Control Limits (%R)
- Duplicate Control Limits +/-(RPD)
- QA Sample Frequency
- Data Validation

A reference may note the specific pages from EPA's SW 846 Guidance Document that list the test method objectives for precision and accuracy. If the field and laboratory numerical data quality objectives for precision are the same and presented on a single table, then a statement should be made to this effect and added as a footnote to the table (e.g., "These limits apply to both field and laboratory duplicates"). Include a copy of the analytical laboratory quality assurance/quality control plan in the appendices of the RFI Workplan and provide the equations for calculating precision and accuracy.

6.1 Field Quality Control Samples

6.1.1 Field Duplicates

Duplicates are additional samples that must be collected to check for sampling and analytical precision. Duplicate samples for all parameters and matrices must be collected at a frequency of at least one (1) sample per week or ten (10) percent of all field samples, whichever is greater. Duplicates should be collected from points which are known or suspected to be contaminated. For large projects, duplicates should be spread out over the entire site and collected at regular intervals. Duplicates must be collected, numbered, packaged, and sealed in the same manner as other samples; duplicate samples are assigned separate sample numbers and submitted blind to the laboratory.

6.1.2 Blank Samples

Blank samples are samples that must be collected to check for possible cross-contamination during sample collection and shipment and in the laboratory. Blank samples should be analyzed for all parameters to be evaluated. At least one blank sample per day must be collected for all water and air sampling. Additionally, field blanks are required for soil sampling if non-dedicated field equipment is being used for sample collection. Equipment and filed bottle blank samples may be required. Blank samples must be prepared using analytically-certified, organic-free (HPLC-grade) water for organic parameters and metal-free (deionized/distilled) water for inorganic parameters. Blanks must be collected, numbered, packaged, and sealed in the same manner as other samples; blank samples are assigned separate sample numbers and submitted blind to the laboratory. The following types of blank samples may be required:

Equipment Blank: An equipment blank must be collected when sampling equipment or a sample collection vessel is decontaminated and reused in the field. Use the appropriate "blank" water to rinse the sampling equipment after the

equipment has been decontaminated and then collect this water in the proper sample containers.

Field Bottle Blank: This type of blank must be collected when sampling equipment decontamination is not necessary. The field bottle blank is obtained by pouring the appropriate "blank" water into a container at a sampling point.

6.2 Laboratory Quality Control Samples
Laboratories routinely perform medium spike and laboratory duplicate analysis on field samples as a quality control check. A minimum of one (1) field sample per week or one (1) per 20 samples (including field blanks and duplicates), whichever is greater, must be designated as the "Lab QC Sample" for the matrix and laboratory duplicate analysis. Laboratory quality control samples should be selected from sampling points which are suspected to be moderately contaminated. Label the bottles and all copies of the paperwork as "Lab QC Sample"; the laboratory must know that this sample is for their QC analyses. The first laboratory QC sample of the sampling effort should be part of the first or second day's shipment. Subsequent laboratory QC samples should be spread out over the entire sampling effort. For water matrices, 2-3 times the normal sample volume must be collected for the laboratory QC sample.

6.3 Performance System Audits by Respondents
This section should describe any internal performance and/or system audit which the Respondents will conduct to monitor the capability and performance of the project. The extent of the audit program should reflect the data quality needs and intended data uses. Audits are used to quickly identify and correct problems thus preventing and/or reducing costly errors. For example, a performance audit could include monitoring field activities to ensure consistency with the workplan. If the audit strategy has already been addressed in a QA program plan or standard operating procedure, cite the appropriate section which contains the information.

7. Data Management
Describe how investigation data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data. To document any quality assurance anomalies, the RFI QC Summary Forms (see Appendix C) must be completed by the analytical laboratory and submitted as part of the RFI Report. In addition, provide examples of any other forms or checklists to be used. Identify and discuss personnel and data management responsibilities, all field, laboratory and other data to be recorded and maintained, and any statistical methods that may be used to manipulate the data.

8. References
Provide a list of references cited in the RFI Workplan.

C. RCRA Facility Investigation Report

An RFI Report must be prepared that describes the entire site investigation and presents the basic results. The RFI Report must clearly present an evaluation of investigation results (e.g., all potential contaminant source areas must be identified, potential migration pathways must be described, and affected media shown, etc.).

The RFI Report must also include an evaluation of the completeness of the investigation and indicate if additional work is needed. This work could include additional investigation activities and/or interim corrective measures to stabilize contaminant release areas and limit contaminant migration. If additional work is needed, a Phase 2 RFI Workplan and/or Interim Corrective Measures Workplan must be submitted along with the RFI Report.

At a minimum, the RFI Report must include:

- A summary of investigation results (include tables that summarize analytical results).
- A complete description of the investigation, including all data necessary to understand the project in its entirety including all investigative methods and procedures.
- A discussion of key decision points encountered and resolved during the course of the investigation.
- Graphical displays such as isopleths, potentiometric surface maps, cross-sections, plume contour maps (showing concentration levels, isoconcentration contours), facility maps (showing sample locations, etc.) and regional maps (showing receptor areas, water supply wells, etc.) that describe report results. Highlight important facts such as geologic features that may affect contaminant transport.
- Tables that list all chemistry data for each matrix investigated.
- An analysis of current and existing ground water data to illustrate temporal changes for both water chemistry and piezometric data (use graphics whenever possible).
- A description of potential or known impacts on human and environmental receptors from releases at the facility.
- A discussion of any upset conditions that occurred during any sampling events or laboratory analysis that may influence the results. The discussion must include any problems with the chain of custody procedures, sample holding times, sample preservation, handling and transport procedures, field equipment calibration and handling, field blank results that show potential sample contamination and any field duplicate results that indicate a potential problem. Summary tables must be provided that show the upset condition and the samples that could be impacted. The RFI QC Forms (see Appendix C) must be completed by the analytical laboratory and submitted as part of the RFI Report.
- Assessment of the entire QA/QC program effectiveness.

In addition to the RFI Report, DTSC may require the Respondents to submit the analytical results (database) on a CD (DTSC will specify the format). All raw laboratory reports (e.g., analytical reports) must be kept at the facility and be made available or sent to the Department upon request.

D. Scope of Work for Progress Reports
Progress reports shall, at a minimum, include:

1. All actions taken during the reporting period to achieve compliance with the Consent Agreement;
2. A summary of any findings made during the reporting period;
3. All problems or potential problems encountered during the reporting period (also discuss problem solutions);
4. All projected work for the next reporting period as well as anticipated problems and avoidance measures;
5. A discussion of any changes in personnel that occurred during the reporting period;
6. Summaries of all contacts with representatives of the press, local community or public interest groups.
7. Summary of treatment system effectiveness. Provide a comparison of treatment system operation to predicted performance levels (applicable only if there is an operating treatment system);
8. The results of any sampling tests and/or other data generated during reporting period; and
9. A discussion of any deviation from the Work Plan and reasons for the deviation.

E. Scope of Work for a Public Participation Plan

The Public Participation Plan (PPP) must address the public involvement needs for all aspects of corrective action including interim Measures (IM), RCRA Facility Investigation (RFI), Corrective Measures Study (CMS) and Corrective Measures Implementation (CMI). the additional information, see DTSC's Public Participation Manual and RCRA Public Involvement Manual. The PPP shall include the following elements:

1. Introduction
Describe the public involvement goals and objectives for corrective action (e.g., provide for citizen input and involvement, provide the community with information updates and respond to inquiries). Specify the minimum requirements mandated by law, regulation and policy.

The amount of public involvement work must be consistent with the nature and degree of community concerns and with any state or federal requirements. The public involvement program should be flexible and able to respond to changing

public concerns as the corrective action process proceeds from the RFI to the CMS and into Corrective Measure Implementation (CMI).

2. Public Participation Background
Identify and describe any known issues or community concerns related to the facility (historically and currently) and environmental issues in general (i.e., awareness of other sites and facilities nearby, involvement in agency decision making related to these other sites). Indicate if any community or local officials have been interviewed. Acquire and describe demographic information about the potentially impacted community, to include non-English-speaking populations.

3. Techniques to Reach Public Participation Goals
Many public participation techniques may be used to accomplish the objectives. These techniques include: fact sheets, information community workgroup meetings, community advisory committees, community meetings, information repositories, mailing lists and public service announcements. Include a detailed description of how the local community will be contacted and informed. At a minimum, the following items must be developed as described below:

3.1 Mailing List
Establish and maintain a mailing list of: all local officials; interested, affected and potentially affective private citizens; residents within a one-half mile radius of the facility; contiguous property owners and occupants, (expanded to include owners and occupants of property on off-site plume, if applicable; and news media representatives who should receive fact sheets or other information regarding the investigation/migration activities at the facility. The mailing list shall also include DTSC "Mandatory Mailing List". The mailing list must be expanded as time goes on to include all interested persons. The mailing list should be submitted to DTSC separately from the PPP.

3.2 Information Repository
Establish and maintain at least one information repository at a location convenient to public access (e.g., local library). The purpose of the information repository is to allow open and convenient public access to site-related documents approved by DTSC for public disclosure. Therefore, all documents for the information repository must be approved by DTSC. At a minimum, the repository for a site must include copies of the following:

- Order or Consent Agreement
- Regional Water Quality Control Board Orders
- RFI Workplans
- RFI Reports
- Interim Measure Workplans
- Corrective Measures Study Workplans
- Corrective Measures Study Reports
- Public Involvement Plan

- Statement of Basis for Remedy Selection
- Other Information
- Copy of relevant laws, regulations and. policies;
- Copies of press releases and newspaper clippings that refer to the site
- Brochures, fact sheets, and other information about relevant laws, regulations and policies and the specific site
- Any other relevant material (e.g., published studies on the potential risks associated with specific chemicals that have been found at the site).

3.3 Fact Sheet

The Respondents shall prepare fact sheets to inform the community of a key event in the corrective action process (e.g., interim measures, RFI, RFI findings, etc.), as indicated in the PPP or directed by DTSC in response to changing site conditions. It is important that all fact sheets be written clearly so that the public will understand the information. In general, facility fact sheets should include: a description of the overall investigation/remedial process from start to finish; a summary of existing contamination at the facility; a summary of possible impacts on the local community (e.g., drinking water supplies, etc.); a summary of any interim measures being taken or planned at the facility; a synopsis of upcoming activities; and a description of public participation opportunities to include a brief description about the potential uses of available documents in and the location of the information repository. All fact sheets must be approved by DTSC before distribution.

4. Submittal Schedule.

The submittal schedule must tie technical milestones (when key documents are to be submitted to DTSC) to public involvement activities

ATTACHMENT 3

SCOPE OF WORK FOR HEALTH AND SAFETY PLAN

Department of Toxic Substances Control (DTSC) may require that the Owner/Operator or Respondents prepare a Health and Safety Plan for any corrective action field activity (e.g., soil or ground water sampling, drilling, construction, operation and maintenance of a treatment system, etc.). The Health and Safety Plan must, at a minimum, include the following elements:

1. Objectives

   Describe the goals and objectives of the Health and Safety Plan (must apply to on-site personnel and visitors). The Health and Safety Plan must be consistent with the facility Contingency Plan, OSHA Regulations, NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985), all state and local regulations and other DTSC guidance as provided.

2. Hazard Assessment

List and describe the potentially hazardous substances that could be encountered by field personnel during field activities.

Discuss the following:

- Inhalation Hazards
- Dermal Exposure
- Ingestion Hazards
- Physical Hazards
- Overall Hazard Rating

Include a table that, at a minimum, lists: Known Contaminants, Highest Observed Concentration, Media, Symptoms/Effects of Acute Exposure.

3. Personal Protection/Monitoring Equipment

   For each field task, describe personal protection levels and identify all monitoring equipment. Describe any action levels and corresponding response actions (i.e., when will levels of safety be upgraded). Describe decontamination procedures and areas.

4. Site Organization and Emergency Contacts

   List and identify all contacts (include phone numbers). Identify the nearest hospital and provide a regional map showing the shortest route from the

facility to the hospital. Describe site emergency procedures and any site safety organizations. Include evacuation procedures for neighbors (where applicable). Include a facility Map showing emergency station locations (first aid, eye wash areas, etc.).

ATTACHMENT 4

COMMUNITY PROFILE OUTLINE

The following items should be included in the Community Profile:

SITE DESCRIPTION

- Description of proposed project.
- Map, description of the site/facility location.
- Description of the surrounding land uses and environmental resources (including proximity to residential housing, schools, churches, etc.).
- Visibility of the site to neighbors.
- Demographics of community in which the site is located (e.g., socioeconomic level, ethnic composition, specific language consideration, etc.). This information may be found in local libraries (e.g., census records).

LOCAL INTEREST

- Contacts with community members - any inquiries from community members, groups, organizations, etc. (include names, phone numbers, and addresses on the key contact list).
- Community interactions - any current meetings, events, presentations, etc.
- Media coverage - any newspaper, magazine, television, etc., coverage.
- Government contacts - city and county staff, state and local elected officials.

KEY CONTACT LIST

Names, addresses, and phone numbers of city manager, city/county planning department staff, local elected officials, and other community members with whom previous contact has been made.

PAST PUBLIC INVOLVEMENT ACTIVITIES

Any ad hoc committees, community meetings, workshops, letters, newsletters, etc., about the site or similar activity.

KEY ISSUES AND CONCERNS

- Any specific concerns/issues raised by the community regarding the site/facility or any activities performed on the site/facility.
- Any anticipated concerns/issues regarding the site/facility.
- Any general environmental concerns/issues in the community.

PP Review _____ Date _____

ATTACHMENT 5

SCOPE OF WORK FOR A CORRECTIVE MEASURES STUDY

PURPOSE
The purpose of the corrective Measures Study (CMS) is to:

1. Develop and evaluate corrective measure alternatives that may be taken at the Facility to address releases of hazardous wastes (including hazardous constituents); and

2. Recommend the corrective measures to be taken at the Facility that are protective of human health and the environment.

SCOPE

A Corrective Measures Study Workplan and Corrective Measures Study Report are required of the CMS. The Scope of Work (SOW) for the Corrective Measures Study Workplan and Report describe what should be included in each document.

The SOWs are intended to be flexible documents capable of addressing both simple and complex site situations. The scope and substance of the CMS should be focused to fit the complexity of the site-specific situation. It is anticipated that Respondent's sites with complex environmental problems may need to evaluate a number of technologies and corrective measure alternatives. For other facilities, however, it may be appropriate to evaluate a single corrective measure alternative.

The Department may require Respondents to conduct additional studies beyond what is discussed in the SOWs in order to support the CMS. The Respondents will furnish all personnel, materials and services necessary to conduct the additional tasks. The SOW for the Corrective Measures Study Workplan and Report are specified below:

A. Corrective Measures Study Workplan

The Corrective Measures Study (CMS) Workplan shall, at a minimum, include the following elements:

1. A brief project summary.

2. A description of the overall purpose of the CMS;

3. Corrective measure objectives including proposed media cleanup standards and points of compliance. Include the justification and supporting rationale for the proposed media cleanup standards and points of compliance. The proposed media cleanup standards must be based on available promulgated federal and state cleanup standards, risk based analysis, data

and information gathered during the corrective action process (e.g., from Facility Investigation, etc.), and/or information from other applicable guidance documents. The Department may require that the Owner/Operator or Respondents conduct a risk assessment to gather information for establishing cleanup standards. Based on the CMS Report and other information including public comments, the Department will establish final cleanup standards and points of compliance as part of the remedy selection process;

4. A description of the specific corrective measure technologies and/or corrective measure alternatives which will be studied;

5. A description of the general approach to investigating and evaluating potential corrective measures;

6. A summary description of any proposed treatability, pilot, laboratory and/or bench scale studies. Proposed studies must be further detailed in either the CMS Workplan or in separate workplan. Submittal times for separate workplans must be included in the CMS Workplan project schedule;

7. A proposed outline for the CMS Report including a description of how information will be presented;

8. A description of overall project management including overall approach, levels of authority (include organization chart), lines of communication, budget and personnel. Include a description of qualifications for personnel directing or performing the work;

9. A project schedule that specifies all significant steps in the process and when key documents (e.g., CMS Report) are to submitted to DTSC.

B. Corrective Measures Study Report

The Corrective Measures Study (CMS) Report shall, at a minimum, include the following elements:

1. Introduction

Describe the purpose and intent of the document.

2. Description of Current Conditions

The Respondents shall include a brief discussion of any new information that has been developed since the RCRA Facility Investigation Report was finalized. This discussion should concentrate on those issues which could significantly affect the evaluation and selection of the corrective measure alternative(s).

3. Corrective Action Objectives

The Respondents shall propose corrective action objectives including applicable media cleanup standards. The Respondents shall propose and justify media cleanup standards and points of compliance.

4. Identification and Screening of Corrective Measure Technologies

a. Identification

List and briefly describe potentially applicable technologies for each affected media that may be used to achieve the corrective action objectives. Include a table that summarizes the available technologies.

The Respondents should consider innovative treatment technologies. Innovative technologies are defined as those technologies for source control other than incineration, solidification/stabilization and pumping with conventional treatment for contaminated groundwater. Innovative treatment technologies may require extra initial effort to gather information, analyze options and to adapt the technology to site specific situations. However, in the long run, innovative treatment technologies could be more cost effective. Treatability studies and on-site pilot scale studies may be necessary for evaluating innovative treatment technologies.

b. Screening

Technologies must be screened to eliminate those that may prove unfeasible to implement given the existing set of waste and site-specific conditions. The screening is accomplished by evaluating technology limitations and using contaminant and site characterization information from the RCRA Facility Investigation to screen out technologies that cannot be fully implemented at the facility. The screening process must focus on eliminating those technologies which have several limitations for a given set of waste and site-specific conditions.

As with all decisions during the CMS, the screening of technologies must be fully documented. This is especially true if the screening step indicates that only one corrective action technology should proceed to the next step and be evaluated in detail. List the corrective action technologies selected for further evaluation. Also document the reasons for excluding any corrective action technologies. Include a table that summarizes the findings.

5. Corrective Measure Alternative Development

   Assemble the technologies that pass the screening step into specific alternatives that have potential to meet the corrective action objectives. List and briefly describe each corrective measure alternative.

   Each alternative may consist of an individual technology or a combination of technologies used in sequence (e.g., treatment train). Depending on the site specific situation, different alternatives may be considered for separate areas of the facility. List and briefly describe each corrective measure alternative.

6. Evaluation of Corrective Measure Alternatives
   The four corrective action standards and five remedy selection decision factors described below shall be used to evaluate the corrective measure alternatives. All alternatives must meet the corrective action standards before the remedy selection decision factors are used for further evaluation.

   The corrective action standards are as follows:

   - Be protective of human health and the environment;
   - Attain media cleanup standards;
   - Control the source(s) of releases in order to reduce or eliminate, to the extent practicable, further releases of hazardous wastes (including hazardous constituents) that may pose a threat to human health and the environment
   - Comply with any applicable federal, state, and local standards for management of wastes.

   The remedy selection decision factors are as follows:

   - Short- and Long-Term Effectiveness;
   - Reduction of Toxicity, Mobility and/or Volume;
   - Long-Term Reliability;
   - Implementability; and
   - Cost.

   The corrective action standards and remedy selection decision factors are described in further detail below.

a. Be Protective of Human Health and the Environment
Describe in detail how each corrective measure alternative is protective of human health and the environment.

This standard for protection of human health and the environment is a general mandate of the California hazardous waste statute. The standard requires that remedies include any measures that are needed to be protective. These measures mayor may not be directly related to media cleanup, source control, or management of wastes. An example would be a requirement to provide alternative drinking water supplies in order to prevent exposures to a contaminated drinking water supply.

b. Attain Media Cleanup Standards
Describe in detail each corrective measure alternatives ability to meet the proposed media cleanup standards.

c. Control the Sources of Releases
Describe in detail each corrective measure alternatives ability to control the sources of releases.

A critical objective of any remedy must be to stop further environmental degradation by controlling or eliminating further releases that may pose a threat to human health and the environment. Unless source control measures are taken, efforts to cleanup releases may be ineffective or, at best, will essentially involve a perpetual cleanup. Therefore, an effective source control program is essential to ensure the long-term effectiveness and protectiveness of the corrective action *effort.*

The source control standard is not intended to mandate a specific remedy or class of remedies. Instead, the Owner/Operator or Respondents are encouraged to examine a wide range of options. This standard should not be interpreted to preclude the equal consideration of using other protective remedies to control the source, such as partial waste removal, capping, slurry walls, in-situ treatment/stabilization and consolidation.

d. Comply With Any Applicable Standards for Management of Wastes

Discuss how any specific waste management activities will be conducted in compliance with all applicable state or federal regulations (e.g., CAMU closure requirements, land disposal restrictions).

e. Short- and Long-Term Effectiveness
Each corrective measure alternative must be evaluated as to its effectiveness in protecting human health and the environment and

meeting the corrective action objectives. Both short- and long-term components of effectiveness must be evaluated; short-term referring to the construction and implementation period, and long-term referring to the period after the remedial action is complete. Estimate approximately how much time it will take to implement each corrective measure alternative, how much time to see initial beneficial results, and how much time to achieve the corrective action objectives.

The evaluation of short-term effectiveness must include possible threats to the safety of nearby communities, workers, and environmentally sensitive areas (e.g., oceans, wetlands) during construction of the corrective measure alternative. Factors to consider are fire, explosion, exposure to hazardous substances and potential threats associated with treatment, excavation, transportation and re-disposal or containment of waste material. Laboratory and/or field studies are extremely useful in estimating the effectiveness of corrective measures and should be used whenever possible.

The evaluation of long-term effectiveness must include possible threats to the safety of nearby communities workers, and environmentally sensitive areas (e.g., oceans, wetlands) during operation of the corrective measure alternative.

f. Reduction of Toxicity, Mobility and/or Volume

Each corrective measure alternative must be evaluated for its ability to reduce the toxicity, mobility, and/or volume of the contaminated media. Reduction in toxicity, mobility, and/or volume refers to changes in one or more characteristics of the contaminated media by the use of corrective measures that decrease the inherent threats associated with the media.

Estimate how much the corrective measure alternative will reduce the waste toxicity, volume and/or mobility (compare initial site conditions to post-corrective measure conditions). In general, the Department strongly prefers corrective measures that have a high degree of permanence and reduce the contaminant toxicity, mobility and volume through treatment.

g. Long-Term Reliability

Each corrective measure alternative must be evaluated with regards to its long-term reliability. This evaluation includes consideration of operation and maintenance requirements.

Demonstrated and expected reliability is a way of assessing the risk and effect of failure. Discuss whether the technology or combination of technologies have been used effectively together under analogous site conditions, whether failure of anyone technology in the alternative has

an impact on receptors or contaminant migration, and whether the alternative would have the flexibility to deal with uncontrollable changes at the site (e.g., heavy rain storms, earthquakes, etc).

Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements must also be considered.

Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure alternative shall be evaluated in terms of the projected useful life of the overall alternative and of its component technologies. Useful life is defined as the length of time the necessary or required level of effectiveness can be maintained.

h. Implementability of Corrective Measure Alternatives

The implementability criterion addresses the technical and administrative feasibility of implementing a corrective measure alternative and the availability of various services and materials needed during implementation. Each corrective measure alternative must be evaluated using the following criteria:

Construction and Operation: Corrective measure alternatives must be feasible to implement given the existing set of waste and site-specific conditions. This evaluation was initially done for specific technologies during the screening process and is addressed again in this detailed analysis of the alternative as a whole. It is not intended that the screening process be repeated here, but instead to highlight key differences and/or changes from the screening analysis that may result from combining technologies.

Administrative Feasibility: Discuss the administrative activities needed to implement the corrective measure alternative (e.g., permits, public acceptance, rights of way, off-site approvals, etc.).

Availability of Services and Materials: Discuss the availability of adequate off-site treatment, storage capacity, disposal services, needed technical services and materials, and the availability of prospective technologies for each corrective measure alternative.

i. Cost

Develop a preliminary cost estimate for each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include both capital and operation and maintenance costs. Include a description of how the costs were estimated and what assumptions were used.

- The preliminary capital cost estimate must consider all key costs including, at a minimum, costs for engineering, mobilization, demobilization, site preparation, construction, materials, labor, equipment purchase and rental, sampling, analysis, waste disposal, permitting and health and safety measures.

- The preliminary operation and maintenance cost estimate must consider all key costs including, at a minimum, costs for labor, training, sampling, analysis, maintenance materials, utilities, waste disposal, waste treatment, permitting and health and safety measures.

- Calculate the net present value of preliminary capital and operation and maintenance costs for each corrective measure alternative.

7. Owner/Operator or Respondents' Recommended Corrective Measure Alternative

The Owner/Operator or Respondents may recommend a preferred corrective measure alternative for consideration by the Department. Such a recommendation should include a description and supporting rationale for the preferred alternative that is consistent with the corrective action standards and remedy selection decision factors discussed above.

Based on the CMS Report and other information including public comments, the Department will establish final cleanup standards, points of compliance and will select a final remedy for the facility

ATTACHMENT 6

SCOPE OF WORK FOR CORRECTIVE MEASURES IMPLEMENTATION

PURPOSE

The purpose of the Corrective Measures Implementation (CMI) program is to design, construct, operate, maintain and monitor the performance of the corrective measure or measures selected by DTSC. Corrective measures are intended to protect human health and/or the environment from hazardous waste releases from the Facility. The Respondents will furnish all personnel, materials and services necessary to implement the corrective measures program.

SCOPE

The documents required for Corrective Measures Implementation are a Conceptual Design, Final Plans and Specification, Operation and Maintenance Plan, Construction Workplan, Construction Completion Report, Health and Safety Plan, Corrective Measure Completion Report and Progress Reports. The scope of work (SOW) for each document is specified below.

DTSC may require the Respondents to conduct additional studies beyond what is discussed in the SOWs in order to support the CMI program. The Respondents will furnish all personnel, materials and services necessary to conduct the additional tasks.

A. Conceptual Design

The Respondents shall prepare a Conceptual Design (CD) that clearly describes the size, shape, form, and content of the proposed corrective measure, the key components or elements that are needed, describes the designers vision of the corrective measure in the form of conceptual drawings and schematics, and includes procedures and schedules for implementing the corrective measure(s).

The CD must, at a minimum, include the following elements:

1. Introduction/Purpose

   Describe the purpose of the document and provide a summary description of the project.

2. Corrective Measures Objectives

   Discuss the corrective measure objectives including applicable media cleanup standards.

3. Conceptual Model of Contaminant Migration

   It is important to know where the contaminants are and to understand how they are moving before an adequate corrective measure can be developed. To address this critical question, the Respondents must present a conceptual model of the site and contaminant migration. The conceptual model consists of a working hypothesis of how the contaminants may move from the release source to the receptor population. The conceptual model is developed by looking at the applicable physical parameters (e.g., water solubility, density, Henry's Law Constant, etc.) for each contaminant and assessing how the contaminant may migrate given the existing site conditions (geologic features, depth to groundwater, etc.). Describe the phase (water, soil, gas, non-aqueous) and location where contaminants are likely to be found. This analysismay have already been done as part of earlier work (e.g., Current Conditions Report). If this is the case, then provide a summary of the conceptual model with a reference to the earlier document. If not, then field validation of the conceptual model is required.

4. Description of Corrective Measures

   Considering the conceptual model of contaminant migration, qualitatively describe what the corrective measure is supposed to do and how it will function at the Facility. Discuss the constructability of the corrective measure and its ability to meet the corrective measure objectives.

5. Data Sufficiency

   Review existing data needed to support the design effort and establish whether or not there is sufficient accurate data available for this purpose. The Respondents must summarize the assessment findings and specify any additional data needed to complete the corrective measure design. Sampling and analysis plans and/or treatability study workplans may have to be developed to obtain additional data. Submittal times for any new sampling and analysis plans and/or treatability study workplans must be included in the project schedule.

6. Project Management

   Describe the management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will direct the corrective measure design and implementation effort (including contractor personnel).

7. Project Schedule

   The project schedule must specify all significant steps in the process and when all CMI deliverables (e.g., Operation and Maintenance Plan, Corrective Measure Construction Workplan, etc.) are to be submitted to the Department.

8. Design Criteria

   Specify performance requirements for the overall corrective measure and for each major component. The Respondents must select equipment that meets the performance requirements.

9. Design Basis

   Discuss the process and methods for designing all major components of the corrective measure. Discuss the significant assumptions made and possible sources of error. Provide justification for the assumptions.

10. Conceptual Process/Schematic Diagrams

11. Site plan showing preliminary plant layout and/or treatment area.

12. Tables listing number and type of major components with approximate dimensions.

13. Tables giving preliminary mass balances.

14. Site safety and security provision (e.g., fences, fire control, etc.).

15. Waste Management Practices

    Describe the wastes generated by the construction of the corrective measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

16. Required Permits

    List and describe the permits needed to construct and operate the corrective measure. Indicate on the project schedule when the permit applications will be submitted to the applicable agencies and an estimate of the permit issuance date.

17. Long-Lead Procurement Considerations

    The Respondents shall prepare a list of any elements or components of

the corrective measure that will require custom fabrication or for some other reason must be considered as long-lead procurement items. The list must include the reason why the items are considered long-lead items, the length of time necessary for procurement, and recognized sources of such procurement; -

18. Appendices including:

Design Data - Tabulations of significant data used in the design effort;

Equations - List and describe the source of major equations used in the design process;

Sample Calculations - Present and explain one example calculation for significant or unique design calculations; and Laboratory or Field Test Results.

Laboratory or Field Test Results.

B Final Plans and Specifications

Final Plans and Specifications shall be submitted to DTSC simultaneously with the final Operation and Maintenance Plan, Construction Workplan, and a detailed cost estimate of the project. The final design package must consist of the detailed drawings and specification needed to construct the corrective measure. Depending on the nature of the corrective measure, many different types of drawings and specifications may be needed. Some of the elements that may be required are:

General Site Plans
Process Flow Diagrams
Mechanical Drawings
Electrical Drawings
Piping and Instrumentation Diagrams
Structural Drawings
Excavation and Earthwork Drawings
Site Preparation and Field Work Standards
Construction Drawings
Installation Drawings
Equipment Lists
Detailed Specifications for Equipment Material

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the final project specifications to DTSC, the Respondents shall:

a. Proofread the specifications for accuracy and consistency with the preliminary

b. Coordinate and cross-check the specification and drawings.

All designs must be certified by an independent registered professional engineer.

C. Operation and Maintenance Plan

The Respondents shall prepare an Operation and Maintenance (O&M) Plan that includes a strategy and procedures for performing operations, long term maintenance, and monitoring of the corrective measure. A final Operation and Maintenance Plan shall be submitted to the Department simultaneously with the final Plans and Specifications. The O&M plan shall, at a minimum, include the following elements:

1. Introduction/Purpose

   Describe the purpose of the document and provide a summary description of the project.

2. Project Management

   Describe the management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will operate and maintain the corrective measures (including contractor personnel).

3. System Description

   Describe the corrective measure and identify significant equipment.

4. Personnel Training

   Describe the training process for O&M personnel. The Respondents shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, start up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

5. Start-Up Procedures

   Describe system start-up procedures including any operational testing.

6. Operation and Maintenance Procedures

   Describe normal operational and maintenance procedures including:

   a. Description of tasks for operation;
   b. Description of tasks for maintenance;
   c. Description of prescribed treatment or operation conditions; and
   d. Schedule showing frequency of each O&M task.

7. Replacement schedule for equipment and installed components.

8. Waste Management Practices

   Describe the wastes generated by operation of the corrective measure and how they will be managed. Also, discuss drainage and indicate how rainwater runoff will be managed.

9. Sampling and monitoring activities may be needed for effective operation and maintenance of the corrective measure. If sampling activities are necessary, the O&M plan must include a complete sampling and analysis section which specifies the following information:

   a. Description and purpose of monitoring tasks;
   b. Data quality objectives;
   c. Analytical test methods and detection limits;
   d. Name of analytical laboratory;
   e. Laboratory quality control (include laboratory *QNQC* procedures in appendices);
   f. Sample collection procedures and equipment;
   g. Field quality control procedures:
      - duplicates (10% of all field samples)
      - blanks (field, equipment, etc.)
      - equipment calibration and maintenance
      - sample containers
      - sample preservation
      - sample holding times (must be specified)
      - sample packaging and shipment
      - sample documentation (field notebooks, sample labeling, etc.
      - chain of custody
   h. Criteria for data acceptance and rejection; and
   i. Schedule of monitoring frequency.

The Respondents shall follow all DTSC and USEPA guidance for sampling and analysis.

10. Corrective Measures Completion Criteria

Describe the process and criteria (e.g., groundwater cleanup goal met at all compliance points for 1 year) for determining when corrective measures may cease. Also describe the process and criteria for determining when maintenance and monitoring may cease. Criteria for corrective measures such as landfill cap must be carefully crafted to account for the fact that a landfill cap will never actually "cease" but will need to be maintained and monitored for a long period of time. Satisfaction of the completion criteria will trigger preparation and submittal of the Corrective Measures Completion Report.

11. O&M Contingency Procedures:

a. Procedures to address system breakdowns and operational problems including a list of redundant and emergency back-up equipment and procedures;

b. Should the corrective measure suffer complete failure, specify alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and/or the environment or exceed cleanup standards;

c. The O&M Plan must specify that, in the event of a major breakdown and/or complete failure of the corrective measure (includes emergency situations), the Respondents will orally notify the Implementing Agency within 24 hours of the event and will notify the Department in writing within 72 hours of the event. The written notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on human health and/or the environment; and

d. Procedures to be implemented in the event that the corrective measure is experiencing major operational problems, is not performing to design specifications and/or will not achieve the cleanup goals in the expected time frame. For example, in certain circumstances both a primary and secondary corrective measure may be selected for the Facility. If the primary corrective measure were to fail, then the secondary would be implemented. This section would thus specify that if the primary corrective measure failed, then design plans would be developed for the secondary measure.

12. Data Management and Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data. The O&M Plan shall specify that the Respondents collect and maintain the following information:

a. Progress Report Information

- Work Accomplishments (e.g., performance levels achieved, hours of treatment operation, treated and/or excavated volumes, concentration of volume of wastes generated, etc.).

- Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).

b. Monitoring and laboratory data

c. Personnel, maintenance and inspection records.

This data and information should be used to prepare Progress Reports and the Corrective Measure Completion Report.

D. Construction Workplan

The Respondents shall prepare a Construction Workplan which documents the overall management strategy, construction quality assurance procedures and schedule for constructing the corrective measure. A draft Construction Workplan shall be submitted to the Department simultaneously with the draft Plans and specifications and draft Operation and Maintenance Plan. A final Construction workplan shall be submitted to the Department simultaneously with the final plans and Specifications and final Operation and Maintenance Plan. Upon receipt of written approval from the Department, the Respondents shall commence the construction and provisions contained therein. The Construction Workplan must be approved by the Department prior to the start of corrective measure construction. The Construction Workplan must, at a minimum, include the following elements:

1. Introduction/Purpose

Describe the purpose of the document and provide a summary description of the project.

2. Project Management

Describe the construction management approach including levels of authority and responsibility (include organization chart), lines of

communication and the qualifications of key personnel who will direct the corrective measure construction effort and provide construction quality assurance/quality control (including contract personnel);

3. Project Schedule

   The project schedule must include timing of key elements of the bidding process, timing for initiation and completion of all major corrective measure construction tasks as specified in the Final Plans and Specifications, and specify when the Construction Completion Report is to be submitted to DTSC.

4. Construction Quality Assurance/Quality Control Program

   The purpose of construction quality assurance is to ensure, with a reasonable degree of certainty, that a completed corrective measure will meet or exceed all design criteria, plans and specifications. The Construction Workplan must include a complete construction quality program to be implemented by the Respondents.

5. Waste Management Procedures

   Describe the wastes generated by construction of the corrective measure and how they will be managed.

6. Sampling and Analysis

   Sampling and monitoring activities may be needed for construction quality assurance/quality control and/or other construction related purposed. If sampling activities are necessary, the Construction Workplan must include a complete sampling and analysis section which specifies the following information:

   a. Description and purpose of monitoring tasks;
   b. Data quality objectives;
   c. Analytical test methods and detection limits;
   d. Name of analytical laboratory;
   e. Laboratory quality control (include laboratory *QNQC* procedures in appendices);
   f. Sample collection procedures and equipment;
   g. Field quality control procedures:
      - duplicates (10% of all field samples)
      - blanks (filed, equipment, etc.)
      - equipment calibration and maintenance
      - equipment decontamination
      - sample containers

- sample preservation
- sample holding times (must be specified)
- sample packaging and shipment
- sample documentation (field notebooks, sample labeling, etc.)
- chain of custody;

h. Criteria for data acceptance and rejection; and
i. Schedule of monitoring frequency.

The Respondents shall follow all DTSC and USEPA guidance for sampling and analysis.

7. Construction Contingency Procedures

a. Changes to the design and/or specifications may be needed during construction to address unforeseen problems encountered in the field. Procedures to address such circumstances, including notification of DTSC, must be included in the Construction Workplan;

b. The Construction Workplan must specify that, in the event of a construction emergency (e.g., fire, earthwork failure, etc.), the Respondents will orally notify DTSC within 24 hours of the event and will notify DTSC in writing within 72 hours of the event. The written notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on public health and/or the environment; and

c. Procedures to be implemented if unforeseen events prevent corrective measure construction. For example, in certain circumstances both a primary and secondary corrective measure may be selected for the Facility. If the primary corrective measure could not be constructed, then the secondary would be implemented. This section would thus specify that if the primary corrective measure could not be constructed, then design plans would be developed for the secondary measure.

8. Construction safety procedures should be specified in a separate Health and Safety Plan

9. Data Management Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data. The Construction Workplan shall specify that the Respondents collect and maintain the following information:

a. Progress Report Information

- Work Accomplishments (e.g., hours of operation, excavated volumes, nature and volume of wastes generated, area of cap completed, length of trench completed, etc.).

- Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).

b. Monitoring and laboratory data;

c. Records of construction costs; and

d. Personnel, maintenance and inspection records.

This data and information should be used to prepare progress reports and the Construction Completion Report.

10. Cost Estimate/Financial Assurance

If financial assurance for corrective measure construction and operation is required by an enforcement order, consent agreement, facility permit, or through use of Department discretion, the Construction Workplan must include a cost estimate, specify which financial mechanism will be used and when the mechanism will be established. The cost estimate shall include both construction and operation and maintenance costs. An initial cost estimate shall be included in the draft Construction Workplan and a final cost estimate shall be included in the final Construction Workplan. The financial assurance mechanism may include a performance or surety bond, a trust fund, a letter of credit, financial test and corporate guarantee equivalent to that in the California Code of Regulations, Title 22, Section 66264.143,66265.143 or any other mechanism acceptable to the Department. Financial assurance mechanisms are used to assure the Department that the Owner/Operator or Respondents have adequate financial resources to construct and operate the corrective measure.

E. Health and Safety Plan

The Respondents must prepare a Health and Safety (H&S) Plan for construction, operation and maintenance of the corrective measure. The H&S Plan must, at a minimum, include the following elements:

1. Objectives

Describe the goals and objective of the health and safety program (must apply to on-site personnel and visitors). The health and safety plan must be consistent with the Facility Contingency Plan, Occupational Safety and Health Administration (OSHA) Regulations, NIOSH Occupational Safety

and Health Guidance Manual for Hazardous Waste Site Activities (1985), all state and local regulations.

2. Hazard Assessment

   List and describe the potentially hazardous substances that could be encountered by field personnel during construction and/or operation and maintenance activities.

   Discuss the following:

   - Inhalation Hazards
   - Dermal Exposure
   - Ingestion Hazards
   - Physical Hazards
   - Overall Hazard Rating

Include a table that, at a minimum, lists: Known Contaminants, Highest Observed Concentration, Media, Symptoms/Effects of Acute Exposure.

3. Personal Protection/Monitoring Equipment

   a. For each operational task, describe personal protection levels and identify all monitoring equipment.

   b. Describe any action levels and corresponding response actions (i.e., when will levels of safety be upgraded).

   c. Describe decontamination procedures and areas.

4. Site Organization and Emergency Contacts

   List and identify all contacts (include phone numbers). Identify the nearest hospital and provide a regional map showing the shortest route from the facility to the hospital. Describe site emergency procedures and any site safety organizations. Include evacuation procedures for neighbors (where applicable). Include a Facility Map showing emergency station locations (first aid, eye wash areas, etc.).

F. Construction Completion Report

   The Respondents shall prepare a Construction Completion (CC) Report which documents how the completed project is consistent with the Final Plans and Specifications. A CC Report shall be submitted to the Department when the construction and any operational tests have been

1. Purpose

2. Synopsis of the corrective measure, design criteria, and certification that the corrective measure was constructed in accordance with the Final Plans and Specifications;

3. Explanation and description of any modifications to the Final Plans and Specifications and why these were necessary for the project;

4. Results of any operational testing and/or monitoring, indicating how initial operation of the corrective measure compares to the design criteria.

5. Summary of significant activities that occurred during construction. Include a discussion of problems encountered and how they were addressed.

6. Summary of any inspection findings (include copies of key inspection documents in appendices).

7. As built drawings; and

8. A schedule indicating when any treatment systems will begin full scale operations.

G. Corrective Measure Completion Report

The Respondents shall prepare a Corrective Measure Completion (Cl\ilC) Report when the Respondents believe that the corrective measure completion criteria have been satisfied. The purpose of the CMC Report is to fully document how the corrective measure completion criteria have been satisfied and to justify why the corrective measures and/or monitoring may cease.

The CMC Report shall, at a minimum, include the following elements:

1. Purpose

2. Synopsis of the corrective measure

3. Corrective Measure Completion Criteria

Describe the process and criteria for determining when corrective measures, maintenance and monitoring may cease. Corrective measure completion criteria were given in the final Operation and Maintenance (O&M) Plan.

4. Demonstration that the completion criteria have been met. Include results of testing and/or monitoring, indicating how operation of the corrective measure compares to the completion criteria.

5. Summary of work accomplishments (e.g., performance levels achieved, total hours of treatment operation, total treated and/or excavated volumes, nature and volume of wastes generated, etc.).

6. Summary of significant activities that occurred during operations. Include a discussion of problems encountered and how they were addressed.

7. Summary of inspection findings (include copies of key inspection documents in appendices); and

8. Summary of total operation and maintenance costs.

H. Submittal Summary

The following list provides a summary of when and how key documents should be submitted to the Department. The Department may adjust this list to meet site-specific circumstances.

1. The submittal schedule for the documents listed below should be included in an consent agreement, permit or otherwise specified by the Department.

o Conceptual Design (CD)

2. The submittal schedule for the documents listed below must be specified in the CD. The groupings reflect which documents should be submitted together.

   o Draft Plans and Specifications
   o Draft Operation and Maintenance Plan
   o Draft Construction Workplan
   o Final Plans and Specifications
   o Final Operation and Maintenance Plan
   o Final Construction Workplan

3. The submittal schedule for the document listed below must be specified in the Final Construction Workplan.

   o Construction Completion Report

4. The submittal schedule for the document listed below is based on when the Respondents believe the completion criteria have been satisfied.

- o Corrective Measure Completion Report

5. The submittal schedule for Progress Reports and a Health and Safety Plan shall be specified in the consent agreement or permit