

**Site Assessment and Cleanup**

**Corrective Action Guidelines**

**County of Riverside  
Community Health Agency  
Department of Environmental Health**

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## I. INTRODUCTION

All corrective actions associated with unauthorized releases of hazardous materials and hazardous waste in the County of Riverside must be overseen by the County of Riverside, Community Health Agency, Department of Environmental Health (DEH) or the appropriate California Regional Water Quality Control Board (RWQCB). Corrective action includes all steps involved in the process of investigating and remediating contamination to reduce the impact of pollution to the environment. The actions may include: initial mitigative measures to remove free product from the environment, site investigations, reporting of data and interpretations, remediation, and verification of remedial success.

The following are guidelines for the implementation of corrective actions at contaminated sites in Riverside County. Variations to these guidelines will only be accepted by the DEH on a case by case basis. These guidelines are not all inclusive and do not relieve the responsible party of any responsibility to satisfy additional requirements of this office or any statutes. These guidelines are published with the intent to aid the responsible party in assessing and remediating the contamination at their sites. Responsible parties are encouraged to contact the DEH for assistance regarding all aspects of site cleanup.

Personnel from this office will witness field activities and review workplans and reports submitted for each site. California Business and Professions Code Sections 6735, 7835, and 7835.1 require that engineering and geologic evaluations and judgments be performed by, or under the direction of, registered professionals. All technical documents (e.g., workplans, reports, etc.) submitted to this office should include a wet ink signature and seal by one or more of the following California Registered professionals:

- Professional Geologist (PG),
- Certified Engineering Geologist (CEG)
- Professional Engineer (PE), or
- Certified Hydrogeologist (CHG).

Because of the complex range of factors that may affect a site, no single set of qualifications can be specified. Therefore more than one signature of a licensed professional may be required during the corrective action process at one site.

**Copies of all correspondence submitted to this office should be sent to the appropriate California Regional Water Quality Control Board office.**

As of July 1, 2005, all reports relating to underground storage tank (UST) cleanups are required to be electronically submitted to the State Geotracker database (<http://www.geotracker.swrcb.ca.gov>). Geotracker issues a confirmation number to all submittals indicating that the electronic document has been successfully received. The confirmation number shall be included with all reports submitted to the DEH.

## II. SEQUENCE OF EVENTS FOLLOWING A RELEASE

A typical sequence of events encountered during the corrective action process is presented below. Certain portions of the following sequence of events may need to be repeated during the course of cleanup. Preliminary Site Investigations/Assessments should be implemented with plume delineation completed within six months time. Requests for time extensions will not be granted for inability to complete tasks and are only being considered for special circumstances where documented “tangible” efforts have failed to result in completion of the task.

- A. Release discovery & reporting.
- B. Contaminant source removal/stoppage.
- C. UST sites incorporated into Local Oversight Program (LOP).
  - 1. Responsible Party (RP) identification.
  - 2. Notification letters sent to all RP's.
- D. Plume/contamination delineation - Site Investigation/Assessment.
  - 1. Submit workplan.
  - 2. Workplan accepted by DEH.
  - 3. Conduct field activities.
  - 4. Submit site investigation report.
- E. Interim remedial action/plume stabilization (i.e. free product removal, SVE, etc.).
- F. Remedial investigation.
  - 1. Submit workplan for feasibility study and pilot testing.
  - 2. Workplan accepted by DEH.
  - 3. Conduct field activities.
  - 4. Submit remediation plans (Remedial Action Plan).
  - 5. Remediation plans accepted by DEH.
- G. Remedial Action.
  - 1. Implement remediation.
  - 2. Submit quarterly remediation progress reports and final remediation report when remediation complete.
- H. Verification sampling and post-remediation monitoring.
- I. Submit Closure Request Document.
- J. Site Closure/No Further Action (NFA) letter issued by DEH.

**Note: A workplan must be submitted to, and accepted by, the DEH prior to the commencement of any field activity. Quarterly reporting of site activities pertaining to the unauthorized release is required until a site closure letter is issued by the DEH.**

### III. MINIMUM REQUIREMENTS FOR WORKPLANS

A workplan describing all planned activities must be submitted to and accepted by the DEH prior to conducting any corrective action field work at a site. If similar activities to those performed during a previous phase are planned, an addendum to a previously accepted workplan may be submitted in lieu of preparing a completely new workplan.

If site conditions warrant additional work as described in the accepted workplan, but outside the original scope of work, this work is encouraged to be conducted following verbal or written acceptance by DEH staff.

The DEH staff assigned to oversee the site cleanup must be notified at least 5 working days prior to the commencement of all site field activities. The staff will visit the site to observe field activities and verify that work is being conducted as per the accepted workplan. **All sampling conducted for verification of cleanup must be witnessed by DEH staff.**

Workplans must include the following information:

- A. Name and address of the site, current address of all responsible party (ies) – including any new property owners, and address of the preparer of the workplan.
- B. Date of workplan.
- C. Site location map, including surrounding land use and sensitive receptors.
- D. Site history relating to the contamination, including:
  - 1. Type of contamination.
  - 2. Location of release.
  - 3. Date release discovered.
  - 4. Date release stopped and actions taken to stop release.
  - 5. Corrective actions performed to date, including source removal/stoppage.
- E. Site map showing:
  - 1. Pertinent landmarks/structures on-site or in the immediate vicinity including wells, storm drains, etc.
  - 2. Location of all **previous** and **current** areas storing hazardous materials/waste including containers, above and below ground storage tanks, or other areas associated with the contamination. Existing and removed UST system components (tanks, dispensers, piping, etc.) shall be shown, where applicable.
  - 3. Location of previously completed and proposed activities (samples, borings, monitoring wells).
  - 4. Scale, north arrow, and legend. All maps shall be drawn to scale.

### **III. MINIMUM REQUIREMENTS FOR WORKPLANS, continued**

5. Name and address of site and date of workplan.
  6. Historic and current groundwater flow directions and current groundwater data maps if proposing additional wells.
  7. Approximate extent of soil and groundwater contamination.
- F. Geology and hydrogeology, including information on first groundwater and source of this information and location of all water wells within 1 mile. A map showing the well location shall be included.
- G. Drilling information, including rationale for the number, location, and depth of proposed borings and sampling points.
- H. Well design and construction, including well completion diagrams.
- I. Sampling information including:
1. Location of sampling points and explanation/rationale.
  2. Methods and procedures for collecting soil and groundwater samples.
  3. Sample analytical methods (including which samples will be analyzed, QA/QC, name of the certified lab, chain of custody etc.).
- J. Equipment decontamination procedures.
- K. Time schedule for the proposed work to be conducted.
- L. Waste storage and disposal methods.
- M. Site Specific Health and Safety Plan must be available on site during field activities.

#### **IV. MINIMUM REQUIREMENTS FOR SITE HEALTH & SAFETY PLANS**

Prior to conducting any field work, a Site Health and Safety Plan must be prepared by an appropriately qualified person. The Plan shall comply with Health and Safety Code 1910.120 (b)(4) and must be signed by a qualified person. The Site Health and Safety Plan should be updated throughout the project to reflect new site conditions and incorporate information from previous site activities. The Site Health and Safety Plan should include, but is not limited to, the following:

- A. A brief site history.
- B. Scope of work to be conducted under the Plan.
- C. Identification of chemicals present at the site including notation of those known to the State to be carcinogenic or teratogenic.
- D. Material Safety Data Sheets (MSDS) for all known or suspected hazardous contaminants at the site.
- E. A chemical hazard analysis for all contaminants at the site to include: threshold limit values (TLV), time weighted averages (TWA), short-term exposure limits (STEL), immediately dangerous to life and health limits (IDLH), routes of exposure, symptoms, and target organs.
- F. Type(s) of air monitoring equipment to be used and its calibration schedules.
- G. Identification of personal protective equipment required and conditions for upgrading this equipment.
- H. The location of any easily seen wind direction indicator.
- I. Identification of other possible health and safety risks, (e.g., climate conditions, noise, electrical lines, adjacent chemical bulk storage tanks, moving equipment, fire and explosion, adjacent chemical manufacturing operations, and shoring requirements for all excavations over five feet in depth).
- J. A plan showing site controls, if applicable, with exclusion and support zones. Show the required personal protective equipment, including respirators, that should be worn.
- K. Description and location of safety equipment.
- L. Decontamination procedures for personnel and personal protective equipment.
- M. Emergency Response Plan, including first aid measures, location and directions of the nearest hospital, and emergency phone numbers.
- N. Qualifications of the person signing the Site Health and Safety Plan (Site Safety Officer, etc.).

## **V. MINIMUM REQUIREMENTS FOR REPORTS**

All reports submitted to the DEH shall include the following information:

- A. Summary of work performed and synopsis of conclusions and recommendations.
- B. Site Information, including:
  - 1. Name and address of the site, current address of all responsible party(ies) – including any new property owners, and address of the preparer of the report.
  - 2. Date of report.
  - 3. Site location map, including surrounding land use and sensitive receptors.
  - 4. Site history relating to contamination.
    - a. Type of contamination.
    - b. Location of release.
    - c. Date release discovered.
    - d. Corrective actions performed to date, including source removal /stoppage.
- C. Geology/Hydrogeology, including:
  - 1. Local and regional geology.
  - 2. Site geology (i.e. soil types, etc.) and conditions influencing contaminant conditions.
  - 3. Depth to groundwater (first encountered and after well development) and historical depth to groundwater (cite source).
  - 4. Current and historic groundwater flow direction and gradient.
  - 5. Identification of possible contaminant migration paths (i.e. wells, utility lines, faults and associated topography, geological structures and hydrogeological features).
  - 6. Regional, local, and site recharge and discharge zones.
  - 7. Geologic cross sections showing all pertinent data collected to date.
- D. Field Activities, including.
  - 1. Description of field activities including soil and groundwater sampling methods and locations.
  - 2. Drilling methods.
  - 3. Boring/well locations (including justification for placement).
  - 4. Design, construction, and development of wells (including well completion diagrams).
  - 5. Boring backfill methods and materials.
  - 6. Analyses performed on samples, including the justification for selection of samples which were analyzed, and laboratory methods used.

## V. MINIMUM REQUIREMENTS FOR REPORTS, continued

7. Boring logs, including.
  - a. Signature of a registered professional (PG, CEG, PE, CHG).
  - b. Name and address of site.
  - c. Date and time of drilling.
  - d. Name of person logging the borehole and gathering site data.
  - e. Drill company and drilling equipment.
  - f. Boring/monitoring well number.
  - g. Description of subsurface materials (using Unified Soil Classification System).
  - h. Sample locations (including sample label identification).
  - i. Moisture.
  - j. Depth to first encountered groundwater and depth stabilized in well.
  - k. Rate of penetration (blow counts).
  - l. Vapor monitoring data (i.e., headspace).
  - m. Backfill material and seal material.
  - n. Field observations by the geologist on-site.
  - o. Well completion information.
8. **All deviations from the accepted workplan shall be documented.**

### E. Site Maps and Geologic Cross-Sections, including:

1. All information specified in Section III (E) of this document.
2. All pertinent soil, groundwater, and contaminant data collected to-date.
3. Lateral and vertical extent of soil contamination, including iso-concentration contours for TPHg, benzene, MTBE, TBA and all other detected contaminants of concern.
4. Extent of groundwater contamination (dissolved and free-product accumulations), including iso-concentration contours of dissolved constituents and thickness contours of free-product. Separate maps for TPHg, benzene, MTBE, TBA and all other detected contaminants of concern shall be included.
5. Current and historic groundwater flow directions.

### F. Soil Cuttings and Fluids Generated On-site.

1. Description of the storage and security of materials generated from the site. See Appendix C Management of Materials Generated During Field Activities) for details. **Materials must be removed from the site within 90 days of generation.**
2. Disposition of materials removed from the site. (Copies of manifests signed through receiving facility must be submitted to the DEH.)

**V. MINIMUM REQUIREMENTS FOR REPORTS, continued**

G. Analytical Results and Findings, including:

1. Laboratory analytical data for the current sampling event(s) in tabular format, including sample identification, depth, location, and constituents.
2. Cumulative tables showing previous and current laboratory results.
3. Copies of current laboratory reports, chain of custody forms, and field notes.

H. Interpretations and Conclusions, including discussions of:

1. The data and findings of work completed.
2. Lateral and vertical extent of soil contamination.
3. The extent of groundwater contamination with discussion regarding off-site migration, if appropriate.

I. Recommendations.

1. The registered professional shall provide recommendations and rationale for further assessment, and/or remediation, or no further action.
2. **Reports lacking recommendations will not be accepted.**

Note: Reports will not be accepted if a workplan has not been submitted and accepted prior to field activities. The Geotracker confirmation number shall be included with all reports submitted to the DEH.

**VI. QUARTERLY STATUS, MONITORING, and REMEDIATION PROGRESS REPORTING (UST CLEANUP SITES ONLY)**

The California Code of Regulations Title 23, Division 3, Chapter 16, Section 2652(d) requires all responsible parties of underground storage tanks which have had an unauthorized release of petroleum and other related products to provide, at a minimum, a quarterly status report to this office every three (3) months until site closure has been granted. The status report should detail all investigative, remedial, or other actions which have occurred at the site. The status report should include, at minimum, information listed on the sample quarterly status report form enclosed with this document (Appendix D). The quarterly status report shall be submitted within 15 days of the end of each quarter as follows:

Quarter 1 - January through March.....	Submit by April 15
Quarter 2 - April through June.....	Submit by July 15
Quarter 3 - July through September.....	Submit by October 15
Quarter 4 - October through December.....	Submit by January 15

If the DEH has also required quarterly groundwater, soil, and/or vapor monitoring, the monitoring reports should accompany or incorporate the quarterly status reports and be submitted according to the above dates. Quarterly groundwater monitoring and remediation reports should include, at a minimum, the following:

- A. Description of field activities (e.g., purging techniques, sampling procedures, maintenance of remediation system, decontamination, etc.).
- B. Findings (e.g., product thicknesses, depth to groundwater, groundwater flow direction, remediation progress, changes since previous quarter).
- C. A table showing the most current groundwater levels and laboratory data showing TPH, BTXE, and oxygenates (MTBE, TBA, ETBE, TAME, DIPE). If other contaminants of concern are detected this shall be noted and may be included on a separate table.
- D. A cumulative table showing all (current and historic) laboratory data as well as depth to groundwater and groundwater elevations. The table shall also identify the well screen intervals.
- E. Site maps showing the current flow direction and contaminant plume, including concentration contours for TPH, BTXE, MTBE, TBA and all other detected contaminants of concern.
- F. A map showing historic groundwater flow directions.
- G. Estimated amount of contaminants removed during the reporting period as well as total amount removed from the site. Amounts should be reported in both pounds and gallons. TPH, benzene, toluene, ethylbenzene, total xylenes, MTBE, TBA, and any other contaminants of concern shall be reported.
- H. Discussion of current results, recent and long-term trends, and conclusions, interpretations, and recommendations.
- I. Laboratory analytical reports and chain-of-custody forms for the current quarter.

**VI. QUARTERLY STATUS, MONITORING, and REMEDIATION PROGRESS REPORTING, continued**

- J. **All groundwater monitoring wells shall be monitored on a quarterly basis and cumulative results shall be reported to this office each quarter.** Upon request, the DEH may allow reduced sampling frequencies of individual wells if analyses show consistent non-detectable contaminant levels.

Note: The Geotracker confirmation number shall be included with all reports submitted to the DEH.

## VII. MINIMUM REQUIREMENTS FOR REMEDIAL ACTION PLANS

The Remedial Action Plan should select remediation alternatives based on site specific constraints and conditions including: type of contamination, site geology and hydrogeology, site specific engineering constraints, environmental and public health effects, cleanup goals, and cost. All remediation alternatives should be considered and evaluated for each site. Pilot studies should be conducted to evaluate the effectiveness of remedial alternatives for the site prior to preparing remedial action plans. The Remedial Action Plan must detail all activities to be undertaken.

All items listed in Section V Minimum Requirements for Reports of this document should be included in the Remedial Action Plan as well as the following information:

- A. Summary of site conditions based on previous site investigations.
  - 1. Type of contamination and estimated quantity of contaminated material to be remediated.
  - 2. Cumulative table of all current and historic laboratory data collected to date.
  - 3. Maps and cross sections showing: horizontal and vertical extent of soil and groundwater contamination, sample locations, groundwater flow direction, lithology, location of chemical storage areas, location of current and former tanks, including system components (tanks, dispensers, piping, etc.), and all other pertinent information.
  - 4. Map showing adjacent land use(s) (i.e. residential, commercial, etc.) drawn to scale.
  - 5. Site vicinity map showing sensitive receptors, including water wells, schools, hospitals, etc. within a one-mile radius of the site.
- B. Pilot and Feasibility Studies.
  - 1. Documentation of the feasibility study and rationale for choice of remediation method (including laboratory data, field testing, case studies, and cost).
  - 2. Interpretation of pilot testing results.
  - 3. A demonstration of the effectiveness of the proposed remediation system.
- C. Discussion of cleanup goals and estimated time of cleanup. (See Section VIII Cleanup Goals). Once site remediation is completed, a plan for verifying site conditions and effectiveness of remediation shall be submitted to the DEH.
- D. Remediation details.
  - 1. Activities to be completed, including system design, equipment to be utilized, and implementation/operation specifics. When excavation or physical removal of contamination is proposed, plans for verification sampling and disposal of impacted materials are necessary.
  - 2. Site map showing contaminant plume, area to be remediated, remediation wells, and radius of influence (where applicable).

## VII. MINIMUM REQUIREMENTS FOR REMEDIAL ACTION PLANS, continued

3. Site map including equipment setup, treatment area location, etc.
  4. Signature of professional(s) who designed the treatment system.
  5. Statement indicating who (qualified professional) will be overseeing operation and effectiveness of remedial equipment.
  6. Hours of operation.
  7. Time schedule for anticipated remediation system installation and operation progress.
  8. All applicable permits from local agencies should be obtained prior to installing remediation equipment and/or implementing remedial operations.
- E. Health and Safety Plan.
- F. Quarterly Monitoring/Remediation Progress plans.
1. Frequency of sampling/monitoring of soil, groundwater, and/or vapors. **Individual samples from each well shall be analyzed by a state certified laboratory a minimum of once per quarter.**
  2. Procedures for collecting samples, analyzing samples, and reporting results.
  3. Evaluation of remediation system effectiveness.
  4. Estimated amount of contaminants removed during the reporting period as well as total amount removed from the site. Amounts should be reported in both pounds and gallons. TPH, benzene, toluene, ethylbenzene, total xylenes, MTBE, TBA, and any other contaminants of concern shall be reported.
  5. Laboratory results and remediation progress shall be evaluated and reported quarterly to the DEH in the form of remediation progress reports, as per Section VI Quarterly Status and Monitoring Reporting. The remedial progress reports shall be submitted each quarter until remedial action is terminated.

## VIII. CLEANUP GOALS

The Registered Professional shall use site specific data to evaluate the need for site remediation and to set appropriate cleanup goals for the site. The goals shall be based on subsurface site conditions, type of contamination, current or anticipated site usage, likely migration of contaminants, water usage, etc. **In no case should residual contaminant concentrations negatively affect human health or the environment.** The cleanup goals shall be included in the Remedial Action Plan.

Final maximum acceptable levels of contamination will be evaluated by the DEH and/or the RWQCB on a case by case basis. Factors used to determine cleanup levels may include, but are not limited to, the following:

### A. Soil.

1. Types, quantity, and concentrations of contaminant(s).
2. Soil type(s).
3. Depth to groundwater and separation distance between contaminants and groundwater.
4. Groundwater usage.
5. Vapor migration and potential exposure.
6. Human exposure.
7. Proximity to sensitive receptors (ie. wells, surface water, structures, etc.)
8. Final disposition of soil.
9. Floodplain location.
10. Recharge zones.
11. Present site usage.
12. Future site usage.

### B. Groundwater.

Cleanup levels for groundwater are determined on a site specific basis in conjunction with the appropriate California Regional Water Quality Control Board. Remediation of contamination will not be required below background concentration levels. All groundwater within Riverside County is considered beneficial. The DEH will consult with the appropriate California Regional Water Quality Control Board regarding site closure for all soil and groundwater cases within Riverside County.

### C. Preliminary Remediation Goals set by EPA.

## **IX. MINIMUM REQUIREMENTS FOR CLOSURE REQUEST DOCUMENTS**

Prior to conducting a site closure evaluation, a closure request document must be submitted to the DEH. This document shall be a standalone document summarizing site conditions and all assessment and cleanup efforts conducted at the site. Two copies of the document shall be submitted to the DEH. The document shall include, at a minimum, the following information:

- A. Site history and background information.
- B. Identification of all sensitive receptors within ½ mile of the site including a vicinity map clearly identifying the site, the sensitive receptors, and surrounding land use.
- C. Identification of current and future land use at the site and surrounding properties.
- D. Cumulative tables with groundwater information (analytical results and depth to groundwater), discussions regarding trends in current and historic groundwater conditions, and historic groundwater flow directions plotted on a site map.
- E. Cumulative tables with all soil sampling results.
- F. Tables showing the maximum soil and groundwater concentrations detected at the site as well as tables showing the highest and deepest soil and groundwater concentrations remaining at the site after remediation.
- G. Site maps showing maximum detected groundwater concentrations in each well and current groundwater conditions in each well.
- H. Site maps and cross sections showing lithology, borings, wells, sampling results, contaminant contours, and remediation locations.
- I. Tables and graphs showing vapor concentrations as well as periodic and cumulative vapor hydrocarbon removal rates and volumes, if vapor extraction has been conducted at the site.
- J. Tables and graphs showing periodic and cumulative free-product and groundwater removal rates and volumes, if free-product and/or groundwater remediation has been conducted at the site.
- K. Calculated mass remaining in-situ and contaminant degradation rate.
- L. Disposal information concerning any impacted materials generated on-site.
- M. All current record owners of fee title (property owners) must be identified and notified of the closure request. Documentation must be included in the closure document to confirm this has been completed.

## **APPENDIX A: INVESTIGATIVE TECHNIQUES**

### **Soil Borings and Monitoring Wells Excavations and Excavation Sampling**

## APPENDIX A1: INVESTIGATION TECHNIQUES –soil borings and monitoring wells

The DEH staff overseeing the cleanup must be notified at least five working days prior to the commencement of all site field activities. Staff may visit the site to observe field activities and verify that work is being conducted as per the accepted workplan. All sampling conducted for verification of cleanup must be witnessed by DEH staff.

### A. Soil Borings.

**All borings shall be advanced to a minimum depth of 40 feet below ground surface (bgs) and 30 feet below deepest contamination. If groundwater is deeper than 120' bgs, the boring shall be advanced to 40 feet below deepest contamination. Laboratory analyses of six (or eight) consecutive samples showing non-detectable concentrations of petroleum constituents in the bottom of the boring will be necessary to verify that the extent of contamination has been determined.**

**If groundwater is encountered during drilling, a monitoring well must be installed. It is advisable to obtain a well permit prior to field activities if groundwater may be encountered.**

1. All downhole equipment must be decontaminated (utilizing a steam cleaner or three step wash) prior to use and between each boring.
2. The borehole should be logged using the Uniform Soil Classification System.
3. Under normal circumstances, drilling fluids shall not be introduced to the drill hole. If hydration is necessary due to extremely tight drilling conditions, only potable water shall be used to hydrate the materials on the outside of auger flight. Water shall not be added to the inside of the augers. The boring log shall indicate the depth and quantity of potable water added.
4. Boreholes must be backfilled with cement and/or bentonite grout using a tremie pipe to fill the void space from the bottom of the boring to ground surface. Drill cuttings are not acceptable backfill material.
5. Details regarding the storage of materials generated during field activities are included in Appendix C: Management and Characterization of Materials Generated During Field Activities.

### B. Soil sampling procedures for soil borings and monitoring wells.

Sampling must be performed in accordance with EPA SW 846 guidelines.

1. Undisturbed soil samples shall be collected from all borings at five-foot intervals and at changes in lithology. Modified California split-spoon samplers, Shelby tubes, or continuous core samplers shall be used to collect the soil samples. A minimum of one boring per site shall be continuously cored. All soil samples shall be analyzed by the laboratory using the analytical test methods specified in Appendix B: Laboratory Analyses and Detection Limits. Instruments such as FIDs or PIDs shall be used for qualitative data only, not for quantitative analysis. **Composite samples from soil borings are not acceptable.**

## **APPENDIX A1: INVESTIGATION TECHNIQUES –soil borings and monitoring wells, continued**

2. All materials encountered during drilling shall be described in detail using the Unified Soil Classification System and shall be logged by or under the direction of a registered professional. Boring logs must be signed by the registered professional.
3. All sampling equipment must be thoroughly decontaminated prior to the collection of each sample. The decontamination process shall consist of scrubbing all equipment with soapy water (TSP, Alconox, or equivalent), rinsing with clean water, and a final rinsing with deionized water (three-bucket decontamination method).
4. There should not be any headspace in the soil sample sleeves once the sample is collected. If headspace is unavoidable, the boring log shall indicate that the sample contained headspace.
5. Soil sample sleeve ends shall be covered with Teflon sheeting, capped with polyethylene slip caps, taped, and labeled to identify boring number and depth. Sample identification must correlate between all references (chain-of-custody, lab results, report, and site plan).
6. Samples shall be placed immediately into a cooled container and maintained at 4°C until delivery to a California certified hazardous waste testing laboratory. Proper chain-of-custody procedures must be followed and the laboratory must state the condition of the samples upon receipt (i.e. chilled, headspace, etc.).
7. The laboratory must receive samples within 24 hours of sampling and analysis must occur within the allowed holding time.

### **C. Monitoring Wells.**

Groundwater monitoring wells must be installed in accordance with State and Local Agency regulations and the following:

1. Obtain a permit from the DEH – Water/Land Use Section for all areas except City of Indio where well permits can be obtained from the Indio Public Works Department.
2. The well casing must extend the entire length of the boring and must rest on several inches of filter pack material. Wells must be screened to accommodate for fluctuations in the groundwater table, however, screen shall not exceed a length of 10 feet above groundwater and 15 feet below groundwater. Monitoring wells should never be screened across two water bearing zones.
3. All well casings must have a bottom cap or plug.

**APPENDIX A1: INVESTIGATION TECHNIQUES –soil borings and monitoring wells,  
continued**

4. The minimum outside diameter (O.D.) of a well is two inches however the agency recommends a minimum of 4". The following relationship between boring diameter and casing size should be utilized:

Casing O.D.	Minimum boring diameter
Two inch	Six inch
Four inch	Eight inch
Six inch	Ten inch
> six inches	Casing O.D. + four inches

5. Centralizers are required unless the casing is installed while hollow stem augers are in place.
6. Characterize aquifer materials for proper selection of filter pack and screen. Appropriate filter material shall be utilized to prevent the migration of natural soil into the well. The filter pack should extend to at least two feet above the top of the perforations. The filter material should be tremied into the borehole to prevent bridging.
7. The well shall be surged and purged prior to installation of the seal material to aid in settling of the filter pack.
8. A minimum three foot thick bentonite seal must be placed directly on top of the gravel pack. Conditions shall dictate the type of bentonite and the placement method to be used.
9. A cement and/or bentonite grout seal shall be tremied into the remaining portion of the annular space above the bentonite seal. DEH - Water Engineering should be contacted for approved seal materials.
10. The well head must be secured and have a water tight cap.
11. The groundwater well shall be developed a minimum of 72 hours after construction. The development of the groundwater monitoring well should continue until the discharge water is clear and free of solids, and the temperature, electrical conductivity, and pH have stabilized.
12. Monitoring well elevations must be professionally surveyed to a county or USGS benchmark.
13. All unused or abandoned wells shall be properly destroyed in accordance with the California Well Standards. Well destruction permits shall be obtained prior to destruction. Overdrilling is the recommended method of well destruction.

**D. Groundwater Sampling Procedures.**

Sampling must be performed in accordance with EPA SW 846 guidelines.

## APPENDIX A1: INVESTIGATION TECHNIQUES –soil borings and monitoring wells, continued

1. Groundwater monitoring wells shall be developed a minimum of 72 hours after well construction and sampling of the groundwater shall occur no sooner than 72 hours after well development.
2. Groundwater levels and free product thicknesses, if applicable, shall be measured in each well immediately before purging and sampling activities.
3. Groundwater shall be purged from each well prior to sampling. A minimum of three well volumes shall be purged until consecutive temperature, conductivity, and pH measurements stabilize within 10% and turbidity is less than 10 NTUs. The well shall be allowed to recover to at least 80% of its original level prior to sample collection.

The DEH accepts no-purge groundwater sampling if all of the following conditions are met:

- a. The wells have been sampled a minimum of two times previously.
- b. The wells must be impacted with petroleum contaminants only, located in an unconfined aquifer, properly developed, and screened across the water table.
- c. Laboratory data for the pre-purge and post-purge groundwater samples must show no significant differences.

A sampling event, in which samples are collected via both purge and no-purge methods, is required for evaluation purposes prior to the acceptance of the proposal for the discontinuation of purging.

4. Groundwater should be collected in pre-cleaned (unused) Teflon or polyethylene disposable bailers then decanted into laboratory prepared vials. The vials shall have open top caps with Teflon septas to prevent loss of volatiles. Once filled, the sample vial shall not have any headspace.
5. Samples shall be labeled to identify site, well number, and date of collection.
6. A field blank sample shall be prepared and submitted to the laboratory for analysis. This sample must be analyzed for the same constituents as the groundwater sample(s).
7. Samples shall be placed immediately into a cooled container and maintained at 4°C until delivery to a California certified laboratory.
8. Follow proper chain-of-custody procedures. Laboratory must state condition of samples upon receipt (e.g., chilled, seals intact) on the Riverside County Sample Receipt Form.
9. Laboratory must receive samples within 24 hours of sampling and analysis must occur within the allowed holding times.

**APPENDIX A1: INVESTIGATION TECHNIQUES –soil borings and monitoring wells,  
continued**

10. All equipment must be thoroughly decontaminated between each well and prior to the collection of each sample. The decontamination process shall consist of scrubbing all equipment in a bucket containing soapy water (TSP, Alconox, or equivalent), rinsing with clean water, and final rinsing with deionized water.
11. **All groundwater monitoring wells shall be monitored on a quarterly basis and cumulative results shall be reported to this office each quarter as per Section VI of this document.** Upon request, the DEH may allow reduced sampling frequencies of individual wells if analyses show consistent non-detectable contaminant levels.

## **APPENDIX A2: INVESTIGATION TECHNIQUES –Excavations and Excavation Sampling**

### **Excavations**

Prior to excavation, a site assessment must be conducted to define the extent of contamination. The DEH staff assigned to oversee the cleanup must be notified at least five working days prior to the commencement of all site field activities. DEH staff may visit the site to observe field activities and verify that work is being conducted as per the accepted workplan.

DEH staff must witness **all** sampling conducted for verification of site remediation. Confirmation soil samples must be obtained from the sidewalls and excavation floor. At a minimum, one sample for every hundred square feet at the bottom of the excavation and along the walls shall be obtained. Additional samples may be required based on soil lithology and/or types of contaminants.

All applicable grading permits from local agencies shall be obtained prior to commencement of field activities.

### **Excavation Sampling**

All sampling should be performed in accordance with EPA SW 846 guidelines and the following requirements:

- A. Discrete, undisturbed soil samples shall be collected.
- B. Samples shall be collected in brass or stainless steel sleeves or laboratory prepared glass jars with Teflon-lined lids. Samples containing volatile organic chemicals shall completely fill the sample container with no headspace. Sleeves are preferred when sampling for volatile organic chemicals. Samples containing volatile constituents must be collected at a minimum of 12 inches below the surface of stockpiles and excavations.
- C. Soil sample sleeve ends shall be covered with Teflon sheeting, capped with plastic slip caps, taped, and labeled to identify location and depth. Glass jars should be closed with a Teflon-lined lid, taped, and labeled to identify location and depth.
- D. Samples shall be placed immediately into a cooled container and maintained at 4°C until delivery to a California certified hazardous waste testing laboratory. Proper chain-of-custody procedures must be followed. The laboratory must state the condition of the samples upon receipt (e.g., chilled, seals intact) on the Riverside County Sample Receipt Form when provided by DEH staff.
- E. The laboratory must receive samples within 24 hours of sampling and laboratory analysis must occur within the allowed holding time.
- F. Data generated by field instruments such as photo-ionization and flame-ionization detectors should be used for recording field conditions, however, they are not acceptable for quantifying contaminant concentrations.

## **APPENDIX B: Laboratory Analyses and Detection Limits for UST Cleanups**

COUNTY OF RIVERSIDE  
ENVIRONMENTAL RESOURCES MANAGEMENT DIVISION  
**LOCAL OVERSIGHT PROGRAM**  
LABORATORY ANALYSES AND DETECTION LIMITS FOR UST CLEANUPS

MATERIALS STORED IN UST	LABORATORY ANALYSES			DETECTION LIMITS	
	Contaminant	Soil	Groundwater	Soil	Groundwater
GASOLINE	TPH (C <sub>5</sub> -C <sub>12</sub> )	8015(GRO) or 8260B	8015(GRO) or 8260B	5.0 ppm	50 ppb
	Volatile Organics, oxygenates & Ethanol	8260B <sup>1</sup> (full scan)	8260B <sup>1</sup> (full scan)	5 ppb BTXE, MTBE 10 ppb DIPE, ETBE, TAME 50 ppb TBA, 1 ppm Ethanol	0.5 ppb BTXE 1 ppb MTBE 5 ppb DIPE, ETBE, TAME 10 ppb TBA, 1 ppm Ethanol
	Total Lead <sup>2</sup>	SW-846 Method	SW-846 Method	5 ppm	5.0 ppb
DIESEL	TPH (C <sub>10</sub> -C <sub>24</sub> )	8015(DRO) or 8260B	8015(DRO) or 8260B	10.0 ppm	0.5 ppm
	Volatile Organics & oxygenates	8260B <sup>1</sup> (full scan)	8260B <sup>1</sup> (full scan)	5 ppb BTXE, MTBE 10 ppb DIPE, ETBE, TAME 50 ppb TBA	0.5 ppb BTXE 1 ppb MTBE 5 ppb DIPE, ETBE, TAME 10 ppb TBA
	PNA's <sup>3</sup>	8310 or 8270	8310 or 8270	Analyte Specific <sup>4</sup>	Analyte Specific <sup>4</sup>
WASTE OIL	TPH (C <sub>24</sub> -C <sub>40</sub> )	8015 Fuel Screen	8015 Fuel Screen	5.0 ppm	1.0 ppm
	Volatile Organics	8260B <sup>1</sup> (full scan)	8260B <sup>1</sup> (full scan)	5 ppb BTXE, MTBE 10 ppb DIPE, ETBE, TAME 50 ppb TBA	0.5 ppb BTXE 1 ppb MTBE 5 ppb DIPE, ETBE, TAME 10 ppb TBA
	Title 22 Metals: Cd, Cr, Pb, Zn, Ni <sup>2</sup>	SW-846 Methods	SW-846 Methods	Specific to Analysis <sup>4</sup>	Specific to Analysis <sup>4</sup>
OTHER	Product Specific	Contact Laboratory & DEH		Specific to Analysis	

<sup>1</sup>Analyze all soil and groundwater samples for all constituents of the 8260B (full scan) plus all oxygenates and alcohols. Report and identify all peaks on the chromatographs. If BTXE and/or oxygenates are the only constituents detected, please contact LOP staff for approval to discontinue full scan analyses on future sampling events. Detection limits for groundwater samples must be below drinking water standards as per DHS.

<sup>2</sup>The analyses for these contaminants shall be run on the sample with the highest TPH concentration at UST sites. Lead shall be analyzed at all sites dispensing fuel prior to 1992 and at non-fuel UST sites.

<sup>3</sup>The analysis for polynuclear aromatics shall be run on the soil sample with the highest TPH (DRO) concentration per boring **and** on all samples collected from one groundwater sampling event.

<sup>4</sup>Detection limits must not exceed drinking water standards as per DHS.

**APPENDIX C: MATERIALS GENERATED DURING FIELD ACTIVITIES**

**Management of Materials  
Characterization and Disposal of Materials**

## **APPENDIX C1: Management of Materials Generated during Field Activities**

All materials generated as a result of field activities are considered hazardous until laboratory analyses demonstrate otherwise. In order to minimize the spread of contamination, and reduce human and environmental exposure, the following procedures must be adhered to when storing materials generated during field activities:

- A. All materials generated must be clearly labeled, secured from public access, and containerized or completely covered, lined, and bermed to prevent discharge to the environment.
- B. Stockpiled soil shall be placed on an impervious surface, such as uncompromised concrete or plastic sheeting, moistened, and covered with plastic sheeting to minimize dust emissions. The plastic sheeting must be maintained in good condition.
- C. The contents of all drums and/or other containers stored on-site associated with this cleanup shall be clearly marked by placing "**SOIL**" or "**NON-POTABLE WATER**" in large letters on the exterior of the container in public view. Labels indicating the owner of the contents, the date of generation, the contents of drum, and an emergency contact phone number must be placed on all drums.
- D. If it is determined that the generated materials are hazardous as per Title 22 of the California Code of Regulations, all management requirements specified in the Code shall be followed.
- E. **All generated materials must be removed from the site within ninety (90) days from the date of generation for proper disposal, treatment, or recycling.**

## APPENDIX C2: Characterization and Disposal of Materials Generated During Field Activities

All materials generated during field activities are presumed to be hazardous until proven otherwise. Proper sampling and laboratory analysis must be conducted to characterize the stockpiled materials. Data generated by field instruments such as photo-ionization and flame-ionization detectors are not acceptable for quantifying contaminant concentrations. DEH staff must witness characterization sampling and must approve any contaminant levels which will remain on-site. Sampling procedures should be performed in accordance with Appendix A: Investigation Techniques - Excavations.

A. Determination of the minimum number of samples required:

**NOTE: This represents the minimum number of samples that are required to characterize soil stockpiles. Additional samples may be required depending on the variables that exist at each site.**

1. Stockpiles less than 10 cubic yards: minimum of 2 sampling points, one from each half of the stockpile. Sample points must be located randomly over a three dimensional grid.
2. Stockpiles from 10 to 20 cubic yards: minimum of 3 sampling points, one from each third of the stockpile. Sample points must be located randomly over a three dimensional grid.
3. Stockpiles from 20 to 500 cubic yards: minimum of 4 sampling points for each 100 cubic yards or portions thereof. Section the stockpile into quarters and distribute the number of samples equally among the sections. Sample points must be located randomly over a three dimensional grid.
4. Stockpiles greater than 500 cubic yards: Contact the DEH staff assigned to oversee the site for guidance on the minimum number of samples that will be required.
5. **Compositing of samples in the field is NOT acceptable.** Composite samples are acceptable only if the compositing is performed by the laboratory and pre-approved by DEH staff.

B. Laboratory Analyses.

The analyses required for contaminated soils will depend on the historical and present use of the site and the type of known or suspected contaminant(s). All analyses must be performed by a California certified hazardous waste testing laboratory using analytical methods approved by the EPA and Cal-EPA. Representative samples shall be analyzed using the laboratory test methods specified in Appendix B.

C. Written acceptance for the final disposition of contaminated soil must be obtained from all interested regulatory agencies, regardless of the method or location of disposal. Multiple agencies may be involved with different methods of treatment and/or disposal. Each agency may condition their acceptance with special handling or disposal requirements.

## Appendix C2: Characterization And Disposal Of Materials Generated During Field Activities, continued

1. Soils to be taken to a permitted hazardous waste facility (Class I, Class II, or Treatment, Storage, and Disposal Facility):

The lead agency for the oversight of the cleanup of the contamination must be informed in writing. This procedure is normally part of the Remedial Action Plan for the site. This applies for both treatment and disposal.

2. Soils to be disposed at a Class III Facility (sanitary landfill):

Written acceptance from the following agencies must be obtained for disposal at a County of Riverside Class III Facility:

- a. California Regional Water Quality Control Board.
  - b. Riverside County Department of Environmental Health, Environmental Resources Management Division - Solid, Liquid, & Medical Waste Regulation, Local Enforcement Agency (LEA).
  - d. County of Riverside Waste Management Department.
3. Soils to be disposed at or taken to a location other than a Class I, II, III Facility or Treatment, Storage, and Disposal Facility:

Written acceptance must be obtained from the DEH. Written acceptance from other regulatory agencies may be required depending upon the conditions at the site and the method of treatment or disposal.

## **APPENDIX D: Quarterly Status Report Form**

# QUARTERLY STATUS REPORT

**SEND TO:** County of Riverside  
Department Environmental Health  
Environmental Resources Management Division  
P.O. Box 7600  
Riverside, CA 92513

**Quarter 1** - January thru March ..... **Submit by April 15**  
**Quarter 2** - April thru June ..... **Submit by July 15**  
**Quarter 3** - July thru September ..... **Submit by October 15**  
**Quarter 4** - October thru December..... **Submit by January 15**

**DATE** \_\_\_\_\_ **QUARTER #** \_\_\_\_\_ **YEAR** \_\_\_\_\_

**1. SITE INFORMATION:**

Site # : \_\_\_\_\_  
Site Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City/Zip: \_\_\_\_\_

**2. RESPONSIBLE PARTY INFORMATION:**

Contact: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
City/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_

**3. CONSULTANT INFORMATION:**

Contact: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
City/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_

**4. WORK PERFORMED THIS QUARTER**

A. \_\_\_\_\_  
B. \_\_\_\_\_  
C. \_\_\_\_\_

**5. WORK PROPOSED FOR NEXT QUARTER**

A. \_\_\_\_\_  
B. \_\_\_\_\_  
C. \_\_\_\_\_

**SITE STATUS**

- 6. Current Phase of Project** (Initial Assmnt./Add'l Assmnt./Correct. Action Plan/ Remediation/Post Remediation Monitoring/Etc.)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 7. Describe Corrective and Remedial Techniques, Including Investigations, Implemented to Date Which Were Undertaken to Determine the Nature, and extent of Soil, Groundwater or Surface Water Contamination** (LPH Removal / Pump & Treat / VES / Excavation / Etc.)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 8. Describe Corrective and Remedial Techniques to be Implemented in the Future and Include Time Schedule for the Initiation of the Activities** (LPH Removal / Pump & Treat / VES / Excavation / Etc.)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 9. Currently Monitoring:** \_\_\_\_ Soil \_\_\_\_ Groundwater \_\_\_\_ None
- 10. Monitoring Frequency:** \_\_\_\_ Quarterly \_\_\_\_ Monthly \_\_\_\_ Other \_\_\_\_ N/A
- 11. Is Liquid Phase Hydrocarbon (LPH) Present Onsite?** \_\_\_\_ Yes \_\_\_\_ No  
If Yes; Cumulative LPH Recovered to Date \_\_\_\_ gallons  
LPH Recovered This Quarter \_\_\_\_ gallons
- 12. Cumulative Soil Removed to Date** \_\_\_\_\_ cu. yds.
- 13. Amount of Soil Removed This Quarter** \_\_\_\_\_ cu. yds.
- 14. Are Contaminated Soils or Liquids Generated From Investigation or Cleanup Currently Stored On-Site?** \_\_\_\_ Yes \_\_\_\_ No  
If Yes, Date Generated \_\_\_\_\_ How Much \_\_\_\_\_
- 15. Permits** (AQMD/LOCAL AGENCY/NPDES/ETC.)  
\_\_\_\_\_

**ENCLOSURES :**

## **APPENDIX E: Address List**

## **APPENDIX E: Address List**

### **State Local Oversight Program:**

State of California  
Water Resources Control Board  
Division of Clean Water Programs  
Local Oversight Program  
2014 T Street  
Mail: P.O. Box 944212  
Sacramento, CA 94244-2120  
(916) 227-4306

RWQCB  
Colorado River Basin Region  
73-720 Fred Waring Drive, Suite 100  
Palm Desert, CA 92260  
(760) 346-7491

RWQCB  
San Diego Region  
9174 Sky Park Court, Suite 100  
San Diego, CA 92123-4340  
(858) 467-2952

### **Underground Storage Tank Cleanup Fund:**

State of California  
Water Resources Control Board  
Underground Storage Tank Cleanup Fund  
2014 T Street  
Mail: P.O. Box 944212  
Sacramento, CA 94244-2120  
(916) 227-4307 / (800) 813-3863

### **Well Permits:**

County of Riverside  
Department of Environmental Health  
Environmental Resources  
Management Division  
Water Engineering Section  
4080 Lemon St. (CAC 2nd floor)  
P.O. Box 1206  
Riverside, CA 92507  
(951) 955-8980

### **UST Upgrade/Removal Loans:**

California Trade and Commerce Agency  
Underground Storage Tank Loan Program  
801 K Street, Suite 1600  
Sacramento, CA 95814  
(916) 445-6733

County of Riverside  
Department of Environmental Health  
Environmental Resources  
Management Division  
Water Engineering Section  
46-209 Oasis St. Room 207 (CAC)  
Indio, CA 92201  
(760) 863-7000

### **California Regional Water Quality Control Board Regional Offices:**

RWQCB  
Santa Ana Region  
3737 Main St., Suite 500  
Riverside CA 92501-3339  
(951) 782-4130

City of Indio  
Public Works Department  
100 Civic Center Mall  
Indio, CA 92201  
(760) 342-6530

## **APPENDIX E: ADDRESS LIST cont.**

### **Other County Offices:**

County of Riverside  
Department of Environmental Health  
Solid, Liquid, & Medical Waste  
Regulation (LEA)  
4080 Lemon St. (CAC 9th Floor)  
P.O. Box 1280  
Riverside, CA 92507  
(951) 955-8980

County of Riverside  
Solid Waste Enforcement  
2500 N. Palm Canyon, Suite A3  
Palm Springs CA 92262  
(760) 320-1048

County of Riverside  
Waste Management Department  
1995 Market St.  
Riverside, CA 92501  
(951) 955-1370

### **Air Quality:**

South Coast Air Quality Management  
District  
Air Toxics Control Branch  
21865 Copley Drive  
Diamond Bar, CA 91765-4182  
(909) 396-2000

### **DTSC:**

California Department of Toxic  
Substances Control  
245 W Broadway Suite 425  
Long Beach, CA 90802-4444  
[www.dtsc.ca.gov](http://www.dtsc.ca.gov)

## **APPENDIX F: Glossary**

## **APPENDIX F: Glossary**

**Aquifer** - An underground geological formation that contains water and is capable of yielding water to a well or spring. A water-bearing formation.

**Bentonite** - A hydrous aluminum silicate available in powder, granular or pellet form and used to provide a tight seal between the well casing and borehole.

**BTXE** - Benzene, toluene, total xylenes, and ethyl benzene.

**Boring** - A hole created by a drilling device.

**Capillary fringe** - An increasingly moist area that is in continuity with and lies above the groundwater table.

**Casing** - An impervious durable pipe placed in a well to prevent the borehole walls from caving and to seal off surface drainage or undesirable water, gas, or other fluids and prevent their entrance into the well.

**CEG** - State of California Certified Engineering Geologist.

**CHG** - State of California Certified Hydrogeologist

**Chain-of-Custody** - A document which tracks samples from the point of collection to delivery at the laboratory. All persons that have physical custody of the samples shall sign and date acceptance and/or relinquishment.

**Compositing of samples** - A process done by a laboratory which combines samples by physical mixing.

**Consultant** - Any firm or individual which is involved in the assessment and/or cleanup of contamination resulting from an underground tank leak. The consultant is hired by the responsible party.

**Contamination** - The introduction into soil or groundwater of any chemical material, organic material, live organism or radioactive material that will adversely affect the quality of the groundwater.

**Discharge zone** - An area where water is removed from the saturated zone and travels across the water table surface.

**Dissolved product** - That portion of the contaminant which has dissolved into the groundwater.

**EPA** - The Federal Environmental Protection Agency.

**FIDs** - Flame ionization detectors.

**Free product** - That portion of the contaminant which forms an immiscible layer and can float on the water table.

**Gradient** - The slope of the water table under which groundwater movement takes place.

**Groundwater** - Any water below the surface of the earth, usually referring to the zone of saturation.

**Headspace** - The air space at the top of a water or soil sample.

## **APPENDIX F: Glossary, continued**

**Hydrocarbon** - An organic compound consisting exclusively of the elements carbon and hydrogen. Derived principally from petroleum, coal tar, and plant sources.

**Hydrogeology** - The science that deals with subsurface waters and related geologic aspects of surface water.

**IDLH** - Immediately Dangerous to Life or Health.

**Iso-concentration maps** - Site maps showing contaminant trends using lines of equal concentrations.

**LC50** - Lethal concentration required to kill 50 percent of a given population.

**Lithology** - 1). The description of rock or soil in outcrop or hand sample on the basis of such characteristics as color, mineralogic composition and grain size. 2). The physical character of a rock or soil.

**Local Oversight Program (LOP)** - The Program within the County of Riverside Department of Environmental Health Environmental Resources Management Division which oversees the cleanup of leaking USTs as contracted by the State of California.

**LPH** - Liquid phase hydrocarbons.

**Manifest** - A State mandated document which tracks the shipping and disposal of hazardous waste.

**MSDS** - Material Safety Data Sheet.

**MTBE** - Methyl *tertiary*-butyl ether

**NTUs** - Nephelometric Turbidity Units.

**NPDES** - National Pollution Discharge Elimination System.

**OSHA** - Occupational Safety and Health Administration.

**PCBs** - Polychlorinated Biphenyls.

**PE** - State of California licensed Professional Engineer.

**PG** - State of California Professional Geologist.

**pH** - A designation for the degree of acidity or alkalinity of any material.

**PIDs** - Photoionization detectors.

**Plume** - A mass of contamination extending outward from the source.

**PNAs** - Polynuclear aromatics.

**ppb** - Part per billion, ug/kg, ug/L.

**ppm** - Part per million, mg/kg, mg/L.

**Purge** - Removing well water to eliminate drilling debris or impurities and to bring fresh groundwater into the well to enable the collection of water samples which are representative of the water in the aquifer under investigation.

## **APPENDIX F: Glossary, continued**

**QA/QC** - Quality assurance / Quality control.

**Rate of penetration** - The rate at which the drill proceeds in the deepening of the borehole.

**Recharge zone** - An area where water enters the saturated zone at the water table surface.

**Remedial action** - Activities taken to correct a problem such as contamination of soil or groundwater.

**Responsible Party (RP)** - Owner and/or operator of an UST from which an unauthorized release has taken place, and every other person, organization, or agency which is legally responsible for Local Oversight costs. The term includes all persons, organizations, and agencies classified as "Responsible Parties" by applicable State Water Board regulations.

**RWQCB** - California Regional Water Quality Control Board (Colorado River Basin, San Diego, or Santa Ana Regions).

**SB2004** - Senate Bill 2004 which provides for the State UST Cleanup Fund.

**SCAQMD** - South Coast Air Quality Management District.

**Site assessment** - Activities taken to determine the extent of contamination.

**Site investigation** - Activities taken to determine if contamination exists.

**STEL** - Short Term Exposure Limit.

**TCLP** - Toxicity Characteristic Leaching Procedure.

**Threshold limit** - A chemical concentration above which adverse health or environmental effects may occur.

**TLV** - Threshold Limit Value.

**TPH** - Total petroleum hydrocarbon.

**Tremie** - A method whereby filter pack or bentonite/cement slurries are pumped uniformly into the annular space of the borehole through the use of a tremie pipe.

**TSDf** - Treatment, Storage, and Disposal Facility.

**TWA** - Time-weighted average.

**Uncompromised concrete** - Concrete which does not contain cracks, holes, or other features which could allow moisture to pass through and migrate into the soil beneath the concrete.

**UST** - Underground storage tank.

**Volatiles** - Liquid or solid compounds with a tendency to pass into the vapor state, commonly BTXE in petroleum products.