13 April 2017

Chevron Environmental Management Company
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WATER CODE SECTION 13267 ORDER NO. R5-2017-0811 FOR SUBMITTAL OF TECHNICAL AND MONITORING REPORTS, CHEVRON STATION #9-2797, 115 HIGHWAY 49, JACKSON, AMADOR COUNTY, CASE # 030019

You are legally required to respond to this Order. Please read it carefully.

As described in the findings below, an unauthorized release of petroleum constituents was discovered in 1982 at Chevron Station #9-2797, located at 115 Highway 49 in Jackson, California (Site) and identified by Amador County assessor parcel number 020-344-013.

The unauthorized release originated from an underground storage tank (UST) system. In 2015, following extensive investigation and remedial efforts, the Central Valley Water Board conditionally concluded that the Site met the requirements of State Water Board Resolution No. 2012-0016, the State Water Board Low-Threat Underground Storage Tank Case Closure Policy (*Low-Threat Closure Policy*), provided that the public was given an opportunity to comment on the closure plan and that the monitoring and remediation wells at the Site were properly destroyed pursuant to local ordinance and in compliance with county permitting requirements. Despite multiple requests from the Central Valley Water Board to Chevron Environmental Management Company (hereafter referred to as the Responsible Party), the wells were never destroyed. Therefore, the case remains open.

The Central Valley Water Board is issuing the attached Technical Reporting Order R5-2017-0811 (Order) pursuant to Water Code section 13267 to ensure that the five abandoned or permanently inactive groundwater monitoring wells at the Site are not acting as conduits posing a continuing threat to water quality. The Order will require periodic sampling of these wells, and will authorize the Central Valley Water Board to impose civil liability if the wells are not monitored in accordance with the schedule specified herein.

As an alternative to complying with the monitoring requirements imposed by this Order, the Responsible Party may elect to properly destroy the abandoned or permanently inactive wells within 60 days of the issuance of this Order, thereby ameliorating any future risk to water quality posed by these wells.

The Assistant Executive Officer finds, with respect to the Responsible Party's acts, or failure to act, the following:

1. In 1972 Chevron constructed service station #9-2797, located at 115 Highway 49 in Jackson, Amador County. According to the March 1994 *Report of Ground Water Monitoring* prepared by Geotechnical Research and Development, retail gasoline station operations at the Site began in 1973. At that time, Jerry Campbell leased the Site from Chevron for the purposes of operating the retail gasoline station.

2. As part of service station construction, Chevron installed two 10,000-gallon USTs for regular and unleaded gasoline, one 5,000-gallon UST for premium gasoline, and one 1,000-gallon UST for waste oil. A May 1982 inventory check revealed that that approximately 25 gallons of premium fuel and an undetermined amount of unleaded fuel had been lost. Chevron is named as the Responsible Party under this Order because it, or its corporate predecessor, had control over a UST at the time of or following an unauthorized release of a hazardous substance. (Cal. Code Regs., tit. 23, § 2720.)

3. In July 1982, Chevron removed the four USTs, the associated product piping, and an undocumented volume of petroleum hydrocarbon impacted sand fill material. Chevron enlarged the tank pit and installed three 10,000-gallon USTs for regular, unleaded, and premium gasoline, along with one 1,000-gallon UST for waste oil. The USTs were single-wall fiberglass construction. On 18 September 1990, Chevron tested the four USTs and found them to all be "tight." Information related to service station construction, product loss, and UST installations is documented in the 8 May 1991 *Subsurface Investigation* report prepared by Sierra Environmental Services.

4. In February 1991, Chevron sold the property to Jerry Campbell, as documented in the March 1994 *Report of Ground Water Monitoring*. As documented in an 18 November 1991 letter from Chevron to Jerry Campbell, Chevron retained responsibility for contamination existing as a result of past service station operation during Chevron ownership.

5. From 20 to 21 March 1991, Chevron installed monitoring wells MW-1, MW-2, and MW-3, as documented in the 8 May 1991 *Subsurface Investigation* report prepared by Sierra Environmental Services.

6. In October 1991 Chevron removed the three 10,000-gallon gasoline USTs and one 1,000-gallon waste oil UST. Chevron also removed the associated product lines and approximately 1,620 cubic yards of petroleum hydrocarbon impacted soil as discussed in the 27 November 2000 *Work Plan for Site Assessment* prepared by SECOR International Incorporated (SECOR).

7. In February 1994, Jerry Campbell discovered a leak in the fuel filter for one of the regular unleaded gasoline dispensers. The volume of gasoline released to the subsurface beneath the dispenser is unknown. On 1 March 1994, Geotechnical Research and Development observed 1.2 inches of free product in monitoring well MW-3. Observation of the fuel leak and presence of free product is documented in the March 1994 *Report of Ground Water Monitoring*.

8. From 7 to 13 July 2001, Chevron conducted a dual-phase extraction (DPE) pilot test with continuous extraction from monitoring well MW-3. SECOR estimated that approximately 52.5 pounds of total petroleum hydrocarbons as gasoline (TPH-g) were removed during the pilot test, as presented in the 6 August 2001 *Dual Phase Extraction Pilot Test Report*. From April to May 2002, Chevron removed approximately 148 pounds of petroleum hydrocarbons as gasoline from the subsurface via DPE using monitoring well MW-3.

9. On 19 March 2002, Chevron installed monitoring well MW-4, as detailed in the 8 August 2002 *Second Quarter 2002 Report of Activities* prepared by SECOR. Chevron later installed monitoring well MW-5 on 29 September 2008.

10. On 15 January 2013 Chevron submitted a *No Further Action Required Report*. Central Valley Water Board staff responded to this closure request in a letter dated 6 March 2013 which stated that Site conditions did not meet the *Low-Threat Closure Policy* groundwater-specific criteria.

11. On 25 November 2013, Chevron submitted a *Low Threat Closure Request* report. Central Valley Water Board staff responded to this closure request in a letter dated 3 December 2013 which stated that Site conditions still did not meet the *Low-Threat Closure Policy* groundwater-specific criteria due to increasing tert-butyl alcohol (TBA) concentration trends at monitoring wells MW-3 and MW-5, and the possible threat to Jackson Creek and requested Chevron submit a work plan for surface water sampling of Jackson Creek.

12. Chevron collected two rounds of surface water samples from Jackson Creek on 30 June 2014 and 17 October 2014 and did not detect petroleum hydrocarbon constituents during either event.

13. In a 12 June 2015 letter, Central Valley Water Board staff conditionally approved the Site for closure and requested that the Site monitoring wells be destroyed.

14. In a 14 April 2016 letter, Central Valley Water Board staff again requested that the Site monitoring wells be destroyed. This letter included a deadline of 1 July 2016 for a report documenting destruction of Site wells. Chevron failed to meet this requested deadline.

15. This facility remains an active fueling station subject to surface spills and industrial runoff. Improperly maintained and sealed monitoring wells may act as conduits allowing contaminants to migrate quickly to groundwater. Site monitoring wells have not been sampled since September 2014.

16. California Well Standards[1] state that a monitoring well is considered abandoned or permanently inactive if it has not been used for one year, unless the owner demonstrates intention to use the well again. The wells at the Site are considered abandoned or inactive.

[1] Publicly available at http://www.water.ca.gov/pubs/groundwater/water_well_standards__bulletin_74-81_/ca_well_standards_bulletin74-81_1981.pdf, as supplemented by Department of Water Resources Bulletin 74-90, publicly available at http://www.water.ca.gov/pubs/groundwater/water_well_standards__bulletin_74-90_/ca_well_standards_bulletin74-90_1991.pdf.

17. California Well Standards state that an inactive or abandoned monitoring well must be properly destroyed to:

    a. Ensure the quality of groundwater is protected; and

    b. Eliminate a possible physical hazard to humans and animals.

18. The *Low-Threat Closure Policy* states that all wells and borings installed for the purpose of investigating, remediating, or monitoring the unauthorized release must be properly destroyed before a case is closed under the *Low-Threat Closure Policy*.

19. Health and Safety Code section 115700, subdivision (d) defines a "permanently inactive well" as "a well that has not been used for a period of one year, unless the person owning land in fee simple or in possession thereof under lease or contract of sale demonstrates an intent for future use for water supply, groundwater recharge, drainage, or groundwater level control, heating or cooling, cathodic protection, groundwater monitoring, or related uses."

20. Water Code section 13267 (b)(1) states that:

> In conducting an investigation the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or, discharging, or who proposes to discharge waste within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The technical reports required by this Order are necessary to ensure the protection of human health and reasonable progress toward closure of this case. The Site wells were last monitored on 3 September 2014, are inactive, and are a potential conduit for pollutants to migrate from above ground to below ground. The burden, including costs, for regularly reporting progress, is justified due to the ongoing concerns articulated in this Order.

REQUIRED ACTIONS

IT IS HEREBY ORDERED that, pursuant to Water Code section 13267, the Responsible Party is required to:

Monitoring Specifications

1. Monitor and sample all wells installed in conjunction with the Site investigation which have not been properly abandoned. As shown in Figure 1, which is attached and made part of this Order by reference, five groundwater monitoring wells have not been abandoned. Groundwater samples shall be collected and analyzed quarterly using standard Environmental Protection Agency (EPA) protocol and methods shown in Table 1, below.

TABLE 1
Monitoring and Reporting Program No. R5-2017-0811
CHEVRON #9-2797, 115 HIGHWAY 49
JACKSON, AMADOR COUNTY

Constituents		TPHg	TPHd and TPHmo	BTEX	Fuel Oxygenates	TBA	Lead Scavengers	Halogenated Solvents	Metals	PAHs
EPA Method		8015M or 8260B	8015M	8020 or 8260B	8260B	8260B	8260B	8260B	6010	8270 SIM
Maximum Practical Quantitation Limit[1] (µg/L)		50	50	0.5	0.5	5	0.5	0.5	Varies	Varies
Sampling Frequency[2]	Well									
Quarterly	All Monitoring Wells	x	x	x	x	x	x	x	x	x

[1] If the maximum practical quantitation limit is exceeded for a non-detectable result, the Responsible Party shall provide an explanation in the report text. All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as trace.

[2] All wells shall be monitored quarterly for free phase petroleum product thickness and water levels, which shall be reported in feet and feet mean sea level, respectively, to the nearest 0.01 foot.

TPHg – total petroleum hydrocarbons as gasoline	**TBA** – tertiary butyl alcohol	**µg/L** – micrograms per liter
TPHd – total petroleum hydrocarbons as diesel	**Lead Scavengers** – ethylene dichloride, ethylene dibromide	**Metals** – cadmium, chromium (VI and total), lead, nickel, zinc.
TPHmo – total petroleum hydrocarbons as motor oil	**Halogenated Solvents** – trichloroethylene, tetrachloroethylene	**BTEX** – benzene, toluene, ethylbenzene, and total xylenes
Fuel Oxygenates – methanol, ethanol, methyl tertiary butyl ether, tertiary amyl methyl ether, diisopropyl ether, ethyl tertiary butyl ether	**PAHs** (polycyclic aromatic hydrocarbons) – naphthalene, acenaphthene, acenaphthylene, anthracene, phenanthrene, fluorene, chrysene, fluoranthene, pyrene, benzo(b)fluoranthene, benzo(a) pyrene, benzo(k)fluoranthene, benzo(a)anthracene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, benzo(g,h,i)perylene.	

Reporting Specifications

2. When reporting data, the Responsible Party shall arrange the information in tabular form so that the date, constituents, and concentrations are readily discernible and shall summarize the data in such a manner as to illustrate clearly the compliance with this Order.

3. **Quarterly reports are due by the first day of the second month following the close of each calendar quarter** (i.e. 1 May, 1 August, 1 November, and 1 February). The first monitoring report is due 1 August 2017. Quarterly reports are to conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30, and shall be submitted electronically over the internet to the State Water Resources Control Board Geotracker database until such time as the Executive Officer determines that the reports are no longer necessary. Each report shall include the following minimum information:

   (a) A description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants, groundwater elevations in the wells, how and when samples were collected, and whether the pollutant plume(s) is delineated and stable.

   (b) Groundwater elevation contour maps for all groundwater zones.

Explanation for TABLE #2: MINIMUM VERIFICATION ANALYSES

1. As other methodologies are developed and accepted by the USEPA and the DHS, they may also be used if they have equal or better performance than the listed methods.

2. For drinking water sources, USEPA and DHS recommend that the 500 series methods for volatile organics be used in preference to the 8000-wastewater series methods due to lower detection limits and superior laboratory QA/QC. The 500 series currently comparable to Method 8260B is Method 524.2.

3. Appropriate analyses are to be used for detection of leaking tank contents. For example, there may be multiple fuels dispensed from the individual tank over its active life. Regulators must determine if the UST was used for multiple fuels, and require the appropriate analyses.

4. Total Petroleum Hydrocarbons as gasoline (TPHg) and diesel (TPHd) ranges (volatile and extractible, respectively) are to be analyzed and characterized by GC/FID with a fused capillary column and prepared by EPA method 5030 (purge and trap) for volatile hydrocarbons, or extracted by sonication using Method 3550 for extractible hydrocarbons. Fused capillary columns are preferred to packed columns; a packed column may be used as a “first cut" with "dirty" samples or once the hydrocarbons have been characterized and proper QA/QC is followed.

5. Silica gel cleanup of TPHg and TPHd samples to remove weathered hydrocarbons or breakdown products is not acceptable, as these compounds removed may contribute to impairment of beneficial uses of water through adverse taste and odor and/or toxicity. If natural background compounds are suspected to be contributing to high TPH concentrations that are not associated with the petroleum hydrocarbon release, comparison with samples from background locations, out of the influence of the petroleum hydrocarbon release may be used to justify adjusting TPH concentrations.

6. Tetraethyl lead analysis may be requested if the total lead concentration exceeds the naturally occurring (or background) concentration for lead.

7. Oil and Grease (O & G) analysis may be requested when heavy, straight chain hydrocarbons are present. As of 1 January 2002, US EPA requires O & G analysis by EPA Method 1664A.

8. Practical Quantitation Limits (PQLs), also called Reporting Limit by many laboratories, are influenced by analytical method selection, matrix problems and laboratory QA/QC procedures. The PQLs shall be equal to or lower than the detection limits (DLRs) for purposes of reporting published by DHS (http://www.dhs.ca.gov/ps/dsdwem/chemicals/DLR/dlrindex.htm).

9. PQL chain-of-custody and the signed laboratory data sheets are to be submitted containing the laboratory's assessment of the condition of the samples on receipt including temperature, suitable container type, air bubbles present/absent in VOA bottles, proper preservation, appropriate holding time, etc. The sheets must also include the dates sampled, submitted, prepared for analysis, and analyzed.

10. PEAKS THAT DO NOT CONFORM to the standards must be reported by the laboratories, including any unknown complex mixtures that elute at times which vary from the standards. These mixtures may not compare to the standards and may not be readily identified; however, they are to be reported. At the discretion of the LIA or the Regional Board the following information is to be contained in the laboratory report:

- The relative retention time for the unknown peak(s) relative to the reference peak in the standard;
- Copies of the chromatogram(s);
- Type of column used;
- Initial temperature;
- Temperature program in degrees Celsius per minute; and
- Final temperature.

3. Hydrographs and plots of chemical concentrations versus time for each monitoring well that has had detectable levels of contaminants.

4. An estimate of the quantity of contaminants remaining in soil and groundwater.

5. The anticipated date for completion of cleanup activities.

6. An identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program.

7. A proposal and rationale for any necessary revisions to the groundwater sampling plan and/or list of analytes.

<u>4.0 CORRECTIVE ACTION PLAN (CAP) -§2725</u>

Once the lateral and vertical extent of soil and groundwater degradation is defined, the discharger is to proceed with the CAP. The CAP is separated into the Problem Assessment Report (PAR), the Feasibility Study (FS), and the Final Remediation Plan (FRP). At every step of the CAP, the lead regulatory agency will review submitted documentation, and direct the discharger to proceed with proposed actions, or modify these actions to meet regulatory compliance for protection of water resources, health and safety, and sensitive ecological receptors until the FRP is successfully implemented and no further action is required at the site.

<u>4.1 Problem Assessment Report (PAR)</u>

The PAR summarizes the PIER and all additional investigations that characterize the site. The PAR should include sufficient detail on the nature and extent of the contamination to provide a basis for future decisions regarding subsequent cleanup and abatement actions. The discharger is to propose site-specific cleanup goals, and identify available remedial alternatives that have a substantial likelihood to achieve cleanup goals and objectives.

Investigations and characterization activities are to be presented accurately in the PAR, and should include the following minimum information:

- The depth and extent of free product found, including an estimate of volume removed and volume remaining.

- Figures delineating lateral and vertical extent of soil contamination, groundwater degradation plume(s), and vapor plumes as appropriate.

- Tables summarizing analytical data such as compound concentrations found in soil and groundwater, and sample depth.

- An evaluation of the physical and chemical characteristics of the hazardous substance or its constituents, including its toxicity, persistence and potential for migration in water, soil, and air.

- An estimate of the mass of contaminants remaining in soil and groundwater.

- Identification of applicable cleanup levels for affected or threatened groundwater and surface water, and a rationale for selecting these levels.

  Note: Cleanup levels for leaking underground storage tanks sites are based on regulatory requirements as presented in *State Water Board Resolution 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under California Water Code Section 13304, and Water Quality Control Plans of the Central Valley Region, including "Policy for Investigation and Cleanup of Contaminated Sites*."

- Cross sections based upon boreholes, monitoring wells, trenches, and supporting geological mapping logs.

- A site map showing sensitive receptors (i.e.) local water supply wells, buildings or utilities impacted or potentially threatened).

- A risk assessment will be necessary to demonstrate that the site poses no unacceptable risks to human health or the environment. The site-specific risk assessment must use the Office of Environmental Health Hazard (OEHHA) toxicity date (cancer slopes). This information may streamline the consideration of remedial alternatives and the timeline for implementation.

- Appropriate conclusions and recommendations for the next phase of work.

- An updated Site Conceptual Model illustrating site conditions showing the extent of known soil and groundwater impact relative to the leaking UST system and the relationship between contaminants and potential receptors. (See Figure 1 below for an example).

4.2 Feasibility Study (FS) Report

The FS Report provides a summary of remedial alternatives evaluated to address applicable cleanup levels for affected or threatened human health and/or waters of the State. The FS Report must include a cost evaluation for at least two remedial alternatives and a recommendation for the preferred remedial action. The FS should identify the preferred remedial technologies and may recommend pilot testing of the selected remedial technologies before full-scale design.

The FS Report is to include the following minimum information:

1. An evaluation of remedial alternatives that have a substantial likelihood to achieve cleanup of all impacted soils and/or soils and groundwater. At a minimum, two of the following technologies must be evaluated for implementability, cost and effectiveness, (other technologies not listed may also be evaluated):
   - Excavation;
   - Soil vapor extraction;
   - Bioventing;
   - Bioremediation (bio barriers);
   - Groundwater extraction and treatment;
   - Biosparging;
   - In-situ oxidation;
   - Dual-phase extraction and treatment and
   - Monitored natural attenuation.

2. The rationale for selecting the preferred remedial alternative for restoring and protecting impacted or threatened waters.

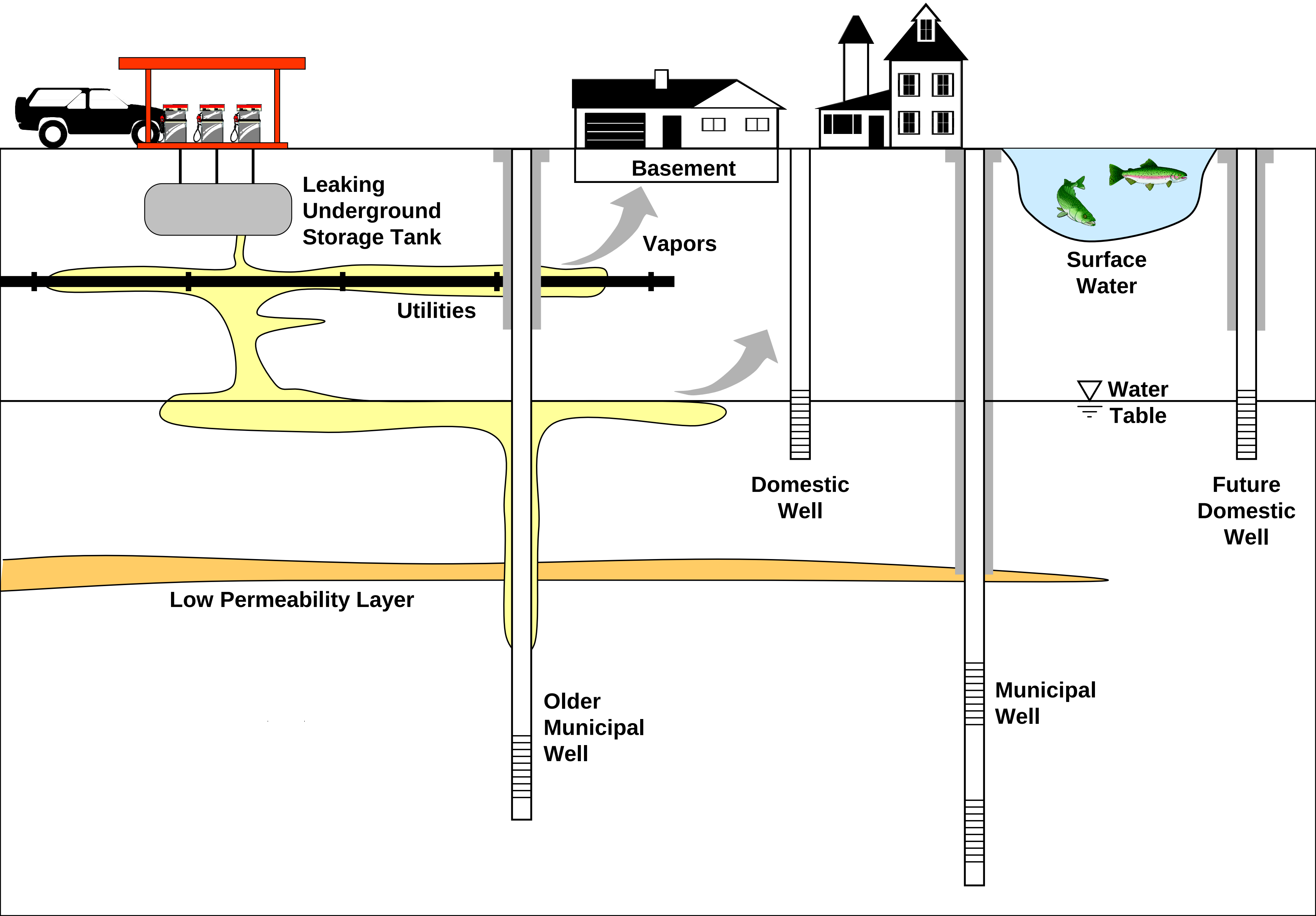
3. A timeframe for achieving remedial goals.

4. A cost comparison for remedial alternatives evaluated.

With minimal investigation and explanation, some remedial alternatives may be eliminated as simply not feasible for the site. For instance, soil vapor extraction is practical in sandy soils but difficult to justify for tighter clay soils where excavation and landfill disposal may be more effective in meeting cleanup levels.

Note: If the proposed alternatives include either soil disposal to a landfill, groundwater discharge to the sanitary sewer, or venting vapor to the atmosphere, etc., the discharger must include assurances from each appropriate regulating agency that the proposed activity is acceptable and permissible.

A General Site Conceptual Model



5. Disposal methods requiring either the Regional Board's General Permit for discharge to surface water (NPDES) or land (WDRs) may be evaluated. Selection of this type of disposal requires the responsible party to submit an application and supporting documentation in a timely manner. (See Region 5 Web page).

4.3 Final Remediation Plan (FRP)

The FRP is a corrective action implementation plan with detailed plans of the approved remedial system to be installed, and a proposed schedule for system construction and startup.

The FRP is to include the following minimum information:

- A description of the remedial technology approved by the LIA and/or Regional Board.
- A listing of the approved cleanup levels from the PAR, and predicted timeframe to meet these cleanup levels using the selected remedial alternative.
- Detailed plans for installation of the approved remedial alternative, such as soil to be excavated, layout of the soil vapor extraction system, air sparge injection points, the number and placement of remedial wells and associated equipment, the proposed pumping rate, disposal of wastes, etc.
- A discussion of implementation, including a phased schedule for construction and system startup.
- Operation and maintenance procedures, tests, and schedules including startup, long-term monitoring program for influent and effluent concentrations and periodic evaluation of the need for system optimization.

Should delays occur or time extensions be needed, such requests, with supporting documentation, are to be submitted by letter to the LIA and/or Regional Board.

5.0 VERIFICATION MONITORING-§2727

Verification monitoring includes all activities required to verify implementation of the CAP and evaluate its effectiveness. The discharger shall verify successful completion of the CAP through sampling or other monitoring of soil and/or groundwater for a period of time determined by the lead agency to demonstrate that seasonal groundwater fluctuations will not mobilize any remaining contamination in quantities sufficient to degrade water quality and that rebound of contaminant concentrations will be insignificant. Using the monitoring results obtained during this period, the discharger shall evaluate the effectiveness of corrective actions at the site.

6.0 NO FURTHER ACTION REQUIRED (NFAR) REPORTING

All regulatory agencies, including the Regional Board, are required to issue a standard Case NFAR letter when closure is appropriate. That letter is described in Section 25296.10(g) of the Health and Safety Code. The purpose for a NFAR report is to provide a document upon which the regulator may make an objective decision regarding a request by the responsible party for site NFAR when contaminants remain but are no longer considered to be a significant risk. (See Disclaimer, page 2). In general, Regional Board staff approve NFAR requests when risks to public health and safety and ecological receptors are reduced to insignificant levels and:

1. Groundwater quality/beneficial uses are not threatened by soil contamination, and chemical contaminants in groundwater have been remediated to non-detectable levels, or

2. Groundwater contains detectable contaminants below water quality objectives and concentrations are expected to reach background conditions through natural processes within a reasonable period of time, or

3. Groundwater contains contaminants above water quality objectives, where best avail-

able, cost-effective technology has been implemented and chemical concentrations in groundwater are projected to meet water quality objectives through natural processes within a reasonable period of time, i.e., prior to any potential future beneficial use of groundwater. Patterns of existing and projected future demands for usable water resources in the area must be considered in determining what period of time is reasonable.

Regional Board staff recognize that the total cleanup of a site, although possible, is not always technically or economically feasible. Therefore, a NFAR designation for a UST site may be considered if the source has been removed and analysis of the groundwater concentration trends indicates the chemical plume is reducing in size, such that compliance with water quality objectives will be achieved within a reasonable period.

6.1 NFAR Process

When Regional Board or LIA staff concur that the petroleum source is removed or remediated, risks to public health and safety and ecological receptors are reduced to insignificant levels, and groundwater has been cleaned up to levels protective of existing and future beneficial uses, no further action is appropriate for a site.

At this point, the discharger will be requested to submit a closure report to the lead agency and the Regional Board with a formal request for no further action at the subject site. The discharger must also certify in writing a complete list of all record fee title owners to the Regional or LIA. Once the lead agency has reviewed the closure report and the NFAR request, and determines that the NFAR report substantiates the request for closure, Regional Board or LIA staff will notify all current record owners of fee title to the site of the determination that no further corrective action is required. The lead agency will request monitoring wells and remedial systems are properly destroyed, transferred or maintained under City/County approved permit. A NFAR letter will be issued once verification of proper well destruction/equipment removal is received.

A NFAR letter indicates that the discharger is no longer required to conduct active remediation, monitoring, or reporting work at the site unless new information indicates the presence of previously unknown water quality impacts or threats to health, safety or sensitive ecological receptors or that prior site characterization is shown to have been misrepresented.

6.2 Case Evaluation

The following recommendations in sections 6.3, 6.4 and 6.5 below apply only to sites contaminated with petroleum hydrocarbon fuels, (i.e., gasoline, diesel, kerosene, stoddard solvent, mineral spirits, fuel oil, aviation fuel mixtures and their additives), and should not be used for release cases involving chlorinated solvents, metals or other types of contaminants.

Each site is evaluated on a case-by-case basis to determine if it is a “low risk” site. (A site may be considered a low risk site by definition, or achieve a low risk status by site remediation.) For each site, complete characterization is required to determine the lateral and vertical extent of contamination, the risk to human health and safety and the environment (including the unsaturated zone, groundwater, and surface water), and the impacts on or threats to existing and potential future beneficial uses of water resources. The discharger must demonstrate that the selected remedial measure(s) are effective, and site monitoring must show that the remedial measure(s) applied by the discharger has a high probability to reduce or remove the petroleum hydrocarbons to acceptable levels within a reasonable period.

6.3 NFAR Criteria for Low Risk Vadose Zone Cases

Vadose zone cases are those sites for which documentation has been provided to demonstrate that fuel hydrocarbons or additives have not reached and are not expected to reach groundwater. If site conditions do not meet the criteria below, then additional remediation may be required. All of the following must be demonstrated in order to designate a vadose zone site as “low risk”.

1. The release has been stopped and the source of contamination has been removed or remediated. Soil that contains mobile constituents in concentrations that threaten to degrade water quality or result in a significant risk to human health and safety or the environment (as determined by site specific data, or as concluded using appropriate mathematical models) should be considered a source.

2. The site has been adequately characterized. The vertical and lateral extent of subsurface impact must be defined to the degree that it is necessary to evaluate whether the site currently poses, or in the future may pose, a significant threat to human health and safety, waters of the State, or other nearby sensitive receptors. The level of detail required at a given site will depend on the contaminants of concern, the types of potential receptors and exposure pathways, and the proximity of the potential receptors. Groundwater beneath a site and adjacent surface waters are to be considered as receptors.

3. No waters of the State, or other sensitive receptors are likely to be impacted. Waters of the State include all groundwater and surface water regardless of current use. Central Valley aquifers generally are not segregated into discrete units, but are subject to vertical and horizontal migration of water (either by natural or man-induced mechanisms) and any pollutants carried by or in the water may degrade the waters of the State. Groundwater sample(s) are required in all cases unless it can be shown that the collection of such sampling) is unreasonable or unattainable, (e.g., the estimated depth to water is greater than 100 feet below the deepest soil impacts).

6.4 NFAR for Cases Above Background Groundwater Conditions

Ideally, the goal of remediation is to ensure that contaminants are cleaned up to background water quality. However, contaminants may be allowed to remain in the groundwater above background levels in certain cases. Any proposal to leave contaminants in groundwater at levels above background must include justification for such degradation. Cleanup levels above background must also conform to all applicable state policies, regulations and procedures. See *Policy for Investigation and Cleanup of Contaminated Sites* in Chapter IV of the Water Quality Control Plans (Basin Plans) for the Central Valley Region.

Central Valley Regional Water Quality Control Board staff have closed UST cases that do not meet background water quality levels, but the water quality objectives at the site are met, or will be met within a reasonable timeframe. In most of these instances, concentrations of pollutants were either below or close to applicable water quality objectives prior to closure.

Cases that have been closed above background levels in groundwater were deemed to be low risks to other receptors such as surface water and drinking water wells. Regional Board staff considers the following low risk factors when making this determination:

1. The source of the UST release has been identified and removed.

2. Free-phase product in groundwater has been removed to the full extent practicable, in accordance with the UST Regulations (Title 23, CCR, Section 2655).

3. Contaminants remaining in the vadose zone cannot migrate in soil vapor or leach at concentrations that would cause

groundwater to exceed water quality objectives.

4. There are no existing water supply wells, surface waters or other receptors threatened by the remaining contaminants in soil or groundwater.

5. Pollutants remaining in groundwater do not create or threaten to create risk to human health and safety, or to future beneficial use(s) of the groundwater. Patterns of existing and future demands for usable water resources in the area must be considered in determining what period of time is reasonable to reach non-detectable (or background) concentrates.

6. The plume size is stable and sufficiently limited in lateral and vertical extent and contaminant concentrations detected in groundwater show a decreasing trend with time. One hydrologic cycle (four quarters) of monitoring after active remediation measures have ceased is usually considered to be the minimum necessary to determine site groundwater and plume conditions.

Issuing NFAR letters for low risk cases is consistent with State regulations and policies. The practice of closing low risk cases is also consistent with the actions taken by the State Water Resources Control Board and Regional Boards throughout the State.

<u>6.5 NFAR for Cases Exceeding Water Quality Objectives</u>

The Regional Board and LIA staff are receiving more requests each year from UST owners or operators to grant closure of UST cases where groundwater has not attained water quality objectives. The responsible parties believe that they have implemented reasonable cleanup and abatement at these sites and that it is no longer technologically or economically feasible to continue corrective actions and monitoring.

A common example is when remedial actions have reduced groundwater contaminants by a large percentage, but constituents still exceed water quality objectives. This may occur at sites where hard to reach soil contamination remains beneath building foundations, and the contamination continues to leach to groundwater. In these difficult cases, responsible parties may argue that the incremental cost for further mass removal exceeds the incremental benefit.

Regional Board staff believe that in some cases it is reasonable to issue a NFAR letter for sites that do not meet water quality objectives but present a low risk and are expected to meet water quality objectives in the near future. To receive such case closure, responsible parties need to demonstrate that site contaminants are degrading, and that site contaminants will reduce to levels protective of beneficial uses in a reasonable period of time.

Numerical water quality limits for petroleum fuel mixtures, constituents and additives, consistent with applicable water quality objectives, are available in the following staff document *Beneficial Use-Protective Water Quality Limits for Components of Petroleum-Based Fuels*. This document is updated regularly and available on the Regional Board website at: http://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/search.shtml.

Board staff are currently requiring the following information to support requests to issue a NFAR letter at UST sites with contaminant concentrations above water quality objectives:

1. Demonstration that the plume is stable with either an overall annual decrease in size or an annual decrease in contaminant concentration trend.

2. Calculations or modeling results, including monitoring verification of model conclusions, which show when water quality objectives are predicted to be achieved.

3. Verification that there are no current or anticipated uses of the impaired water within the timeframe projected to meet water quality objectives. Institutional controls may be needed to prevent such use if this period is not sufficiently short.

6.6 NFAR Documentation

The purpose for a NFAR request report is to provide a document upon which the regulator may make an objective decision regarding the requested closure. At a minimum, the NFAR request must include the information outlined below. Responsible parties are to provide a one or two sentence narrative summary for each numbered item below, and list the section number where supporting information can be found in the NFAR request. Additional information submitted, such as fate and transport modeling, must include the assumptions and variables used. The NFAR request must include signatures of registered professionals as required by the California Business and Professions Code.

1. Site history and current site conditions.

2. Site geology and hydrogeology.

3. Sensitive potential receptors including water supply wells and surface water.

4. Provide a map showing the location of all water supply wells used for municipal, domestic, agriculture, industrial and other uses within 2,000 feet of the site. Provide well details and distances in a table.

5. Provide scaled site maps of the area impacted showing locations of former and existing tank systems, excavation and sample locations, boring and monitoring well locations, groundwater elevation contours, subsurface utilities, buildings, streets, and any nearby surface waters.

6. Provide boring logs and cross-sections to show site lithology.

7. Report the volume of excavated soil disposed off-site, or remaining on-site.

8. Describe the fate of any remaining monitoring and remediation wells (destroyed, ownership transferred, or to remain in use).

9. Provide tabulated results of all groundwater elevations and depths to water.

10. Provide tabulated results of all sample analyses, including the sampling method and detection limits. Analytical results must include TPH and BTEX constituents, lead, MtBE, EtBE, TBA, ETBE, DIPE, TAME, ethanol, methanol, ethylene dibromide, 1,2-dichloroethane and other constituents as indicated in Table #2 above. Provide any WET or TCLP results.

11. Discuss concentration and mass changes over time, and current concentrations of contaminants remaining in groundwater at the site.

12. Provide isoconcentration contour maps of contaminants of concern to define the lateral and vertical extent of contaminants remaining in soil and groundwater. The contour maps should present an estimated “zero line” of contaminant concentrations both on-site and off-site.

13. Provide a summary of the remedial method(s) used to clean up the site. Include the calculated zone of influence, assumptions used to design the remedial system(s), and the duration of remedial activities.

14. Provide a discussion of whether background is unattainable using best available remediation method(s).

15. Provide a discussion (and estimate) of contaminant mass remaining in soil and groundwater versus contaminant mass removed or destroyed by soil excavation or remedial actions.

16. Provide assumptions, parameters, calculations and the model used in any risk assessments.

17. Provide assumptions, parameters, calculations and the model used in fate and transport modeling.

18. Provide a rationale why the conditions remaining at the site will not adversely impact water quality, human health, and safety, or other beneficial uses. The rationale for NFAR must include a finding about present and future water use, and risks the site may still represent to human health and safety, and water quality.

19. Provide a list of technical reports submitted for site assessment, corrective action, confirmation sampling, and closure.

20. Provide any additional comments supporting site NFAR.

    When the lead agency determines that the closure report substantiates the closure request, remedial and monitoring activities may cease. A request to destroy monitoring and remedial wells will be issued, and upon verification of proper well destruction, transfer of ownership, or other lead agency approved use, Board or LIA staff will issue a NFAR letter for the site.

DISCLAIMER

The NFAR letter does not relieve the tank owner of any responsibilities mandated under the California Health and Safety Code and California Water Code if existing, additional, or previously unidentified contamination at the site causes or threatens to cause pollution or nuisance or is found to pose a threat to public health or water quality. Changes in land use may require further assessment and possible mitigation.

ACROMYMS
(As used in Appendix A)

CAL EPA	California Environmental Protection Agency
CAP	Corrective Action Plan
CCR	California Code of Regulations
DHS	Department of Health Services
DLR	Detection Limits Reportable
FRP	Final Remediation Plan
FS	Feasibility Study
GCFID	Gas Chromatography - Flame Ionization Detector
H&SC	Health & Safety Code
IRIS	Integrated Risk Information System - US EPA
LIA	Local Implementing Agency
LOP	Local Oversight Program (An LIA Receiving SWRCB funds)
LUFT	Leaking Underground Fuel Tank
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MVA	Minimum Verification Analysis
NFAR	No Further Action Required
NPDES	National Pollutant Discharge Elimination System
OEHHA	Office of Environmental Health Hazard Assessment
PAH/PNA	Polynuclear Aromatic Hydrocarbon/Polynuclear Aromatic
PAR	Problem Assessment Report
PEF	Potency Equivalent Factors
PIER	Preliminary Investigation and Evaluation Report
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RB	Regional Water Quality Control Board (Regional Board)
SWRCB	State Water Resources Control Board
TCLP	Total Concentrate Leachate Procedure
US EPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOA	Volatile Organic Analysis
WET	Waste Extraction Test
WDR	Waste Discharge Requirements

TABLE 1 - CHECKLIST OF REQUIRED DATA FOR NO FURTHER ACTION REQUESTS AT UNDERGROUND TANK SITES

Site Name and Location:

- ☐ *1. Distance to production wells for municipal, domestic, agriculture, industry and other uses within 2000 feet of the site;*
- ☐ *2. Site maps, to scale, of area impacted showing locations of any former and existing tank systems, excavation contours and sample locations, boring and monitoring well elevation contours, gradients, and nearby surface waters, buildings, streets, and subsurface utilities;*
- ☐ *3. Figures depicting lithology (cross section), treatment system diagrams;*
- ☐ *4. Stockpiled soil remaining on-site or off-site disposal (quantity);*
- ☐ *5. Monitoring wells remaining on-site, fate;*
- ☐ *6. Tabulated results of all groundwater elevations and depths to water;*
- ☐ *7. Tabulated results of all sampling and analyses:*
  - ☐ *Detection limits for confirmation sampling*
  - ☐ *Lead analyses*
- ☐ *8. Concentration contours of contaminants found and those remaining in soil and groundwater, and both on-site and off-site:*
  - ☐ *Lateral and* ☐ *Vertical extent of soil contamination*
  - ☐ *Lateral and* ☐ *Vertical extent of groundwater contamination*
- ☐ *9. Zone of influence calculated and assumptions used for subsurface remediation system and the zone of capture attained for the soil and groundwater remediation system;*
- ☐ *10. Reports / information* ☐ *Unauthorized Release Form* ☐ *QMRs (Dates)*
  ☐ *Well and boring logs* ☐ *PAR* ☐ *FRP* ☐ *Other (report name)*
- ☐ *11. Best Available Technology (BAT) used or an explanation for not using BAT;*
- ☐ *12. Reasons why background was/is unattainable using BAT;*
- ☐ *13. Mass balance calculation of substance treated versus that remaining;*
- ☐ *14. Assumptions, parameters, calculations and model used in risk assessments, and fate and transport modeling;*
- ☐ *15. Rationale why conditions remaining at site will not adversely impact water quality, health, or other beneficial uses; and*
- ☐ *16. WET or TCLP results*

By:	*Comments:*
Date:	