

ATTACHMENT 1

Groundwater Investigations and Cleanups General Overview of Process, Regulations, and Guidelines

By

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The State Water Resource Control Board (SWRCB) and the Regional Water Boards are the state agencies with primary responsibility for the coordination and control of water quality. Therefore, when a discharge (release) of pollutants to soil and/or water is discovered, it is reported to the Regional Water Board for oversight and/or enforcement.

California Water Code (CWC) Section 13307 provides that policies and procedures to be followed in oversight of investigation and cleanup and abatement activities will include:

- Decisions as to when a person may be required to undertake an investigation;
- Concurrence with step-by-step investigation to determine the nature and extent of possible soil and groundwater pollution at a site;
- Identification and utilization of the most cost effective methods for detecting contamination or pollution and cleaning up or abating the effects of contamination or pollution; and
- Determining reasonable schedules for investigation and cleanup, abatement, or other remedial action. This will include recognition of the danger to public health and the waters of the state posed by a discharge and the need to mitigate those dangers. At the same time taking into account, to the extent possible, the resources, both financial and technical, available to the person responsible for the discharge.

Many federal, state, and local agencies have certain regulatory authority for responding and addressing the release of pollutants to the environment. Coordination with the U. S. Environmental Protection Agency, state agencies within California Environmental Protection Agency (Department of Toxic Substance Control, Air Resource Control Board) air pollution control districts, local environmental health agencies, and other responsible federal, state, and local agencies is required. The coordination promotes effective protection of water quality, human health, and the environment and is also in the best interest of the people of the state. The principles of coordination are embodied in many statutes, regulations, and interagency memoranda of understanding or agreement which affect the State and Regional Water Boards and these agencies.

A phased approach to site investigation should facilitate adequate delineation of the nature and extent of the pollution, and may reduce overall costs and environmental damage. Investigations inherently build on previous information and data may be dependant on seasonal and other temporal variations. Adverse consequences of greater costs or increased environmental damage can result from improperly planned

investigations and the lack of consultation and coordination with the Regional Water Board and/or other agencies.

There are always circumstances under which a phased, iterative approach may not be necessary to protect water quality, and there are other circumstances under which phases may need to be compressed or combined to expedite cleanup and abatement.

Preparation of written workplans prior to initiation of significant elements or phases of investigation and cleanup and abatement generally saves Regional Water Board and discharger resources. The results are superior and the overall cost effectiveness is enhanced.

Discharger reliance on qualified professionals promotes proper planning, implementation, and long-term cost-effectiveness of investigation and cleanup and abatement activities. Requirements for professionals may be found in the California Business and Professions Code Sections 6735, 7835, and 7835.1.

It should be noted that the basis for Regional Water Board decisions regarding investigation, and cleanup and abatement includes: (1) site-specific characteristics; (2) applicable state and general statutes and regulations; (3) applicable water quality control plans adopted by the State Water Board and the Regional Water Boards, including beneficial uses, water quality objectives, and implementation plans; (4) State Water Board and Regional Water Board policies including State Water Board Resolutions No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Water in California) and No. 88-63 (Sources of Drinking Water): and relevant standards, criteria, and advisories adopted by other state and federal agencies.

Regional Water Board staff oversight for the discharges are completed under two separate State Water Resource Control Board's programs, discharges associated with an underground storage tank (UST) and all other sources of discharge are associated with the Site Cleanup/Department of Defense Program(SCP). There are separate laws, regulations, and policies for the programs, however, the process is similar.

Underground Storage Tanks

The regulations specifically for cleanup of discharges associated with USTs are found in the California Code of Regulations (CWC) and Title 23, Division 3, Chapter 16 of the CWC. Article 11 of Chapter 16 sets out the steps for the cleanup and abatement of discharges associated with USTs. The statute that required the development of the regulations is found in Chapter 6.7 of the California Health and Safety Code beginning with section 25280.

For discharges associated with USTs, the State Water Board has contracted with some counties to oversee investigations and cleanups. In the North Coast Region, if the site is located within Humboldt or Sonoma Counties, it may remain within the Public Health Departments' Local Oversight Program (LOP) for oversight of the investigation.

The Regional Water Board or the LOP will make an assessment of the responsible parties, and a preliminary evaluation of the threat to water quality posed by the discharge (release). If the assessment of the information indicates that there is no threat to water quality the case will be closed and no further action will be required.

For a UST release, a discharger (responsible party) is required under Chapter 16, Section 2724 to perform a soil and groundwater investigation if any of the following circumstances apply:

1. There is evidence that surface water or groundwater has been or may be affected by the discharge;
2. Free product is found at the site where the discharge occurred or in the surrounding area;
3. There is evidence that contaminated soils are or may be in contact with surface water or groundwater; or
4. The regulatory agency requests an investigation, based on the actual or potential effects of contaminated soil or groundwater on nearby surface water or groundwater resources or based on the increased risk of fire or explosion.

The steps in the cleanup and abatement of discharges are defined as

1. Preliminary Site Assessment Phase;
2. Soil and Water Investigation Phase;
3. Corrective Action Implementation Phase; and
4. Verification Monitoring Phase.

It should be noted that Section 2721(c) of Chapter 16 specifically states that:

“When acting as the regulatory agency, the Board or regional board shall take appropriate action pursuant to Division 7, commencing with Section 13000 of the California Water Code, to ensure that corrective action complies with the applicable policies for water quality control and applicable water quality control plans.”

Site Cleanup/Department of Defense

State Water Resource Control Board Resolution No. 92-49 “Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304” (No. 92-49) sets out the basic steps for Regional Water Board oversight of cleanups in California.

The steps in the cleanup and abatement of discharges are defined as:

1. Preliminary Site Assessment;
2. Soil and Water Investigation;

3. Proposal and selection of cleanup and abatement action;
4. Implementation of cleanup and abatement action; and
5. Monitoring.

Preliminary Site Assessment

The Preliminary Site Assessment is to confirm the discharge and the identity of the dischargers. Staff will also need to identify affected or threatened waters of the state and their beneficial uses. Also in the step is the collection of preliminary information on the nature and vertical and horizontal extent of the discharge. The media affected by the contamination may include soils, surface water, and/or groundwater.

Soil and Water Investigation

The soil and water investigation is where field work is completed to determine the source, nature, and extent of the discharge. This work generally requires the drilling of soil boring(s) and installation of monitoring well(s). This work is needed to determine the complete vertical and horizontal extent of the soil, surface water, and/or groundwater contamination resulting from a release. Air monitoring and soil vapor sampling may also be required depending on the type of contaminant discharged. This is usually an iterative process.

This step is also used to determine a cost-effective method of cleanup for the UST. The Discharger shall propose a Corrective Action Plan (CAP). Regional Water Board staff shall ensure that implementation of the CAP will adequately protect human health, safety, and the environment and will restore or protect current or potential beneficial uses of water. The CAP must include the following elements: 1) an assessment of the impacts, 2) a feasibility study to evaluate alternatives for remedying or mitigating the actual or potential adverse effect of the unauthorized release, 3) applicable cleanup levels.

Assessment of the impacts

An assessment of the impacts shall include, but not be limited to, the following:

- The physical and chemical characteristics of the hazardous substance or its constituents including their toxicity, persistence, and potential for migration in water, soil, and air;
- The hydrogeologic characteristics of the site and the surrounding area where the unauthorized release has migrated or may migrate;
- The proximity and quality of nearby surface water or groundwater, and the current and potential beneficial uses of these waters; and,
- The potential effects of residual contamination on nearby surface water and groundwater.

Feasibility Study

A feasibility study (FS) is required to evaluate alternatives for remedying or mitigating the actual or potential adverse effect of the unauthorized release. Each alternative shall be evaluated for cost-effectiveness, and the responsible party shall propose to implement the most cost-effective corrective action.

The feasibility study needs to include:

- Each recommended alternative shall be designed to mitigate nuisance conditions and risk of fire or explosion;
- For site where the unauthorized release affects or threatens water with current or potential beneficial uses designated in water quality control plans, the feasibility study shall also identify and evaluate at least two alternatives for restoring or protecting these beneficial uses.
- For sites where the unauthorized release affects or threatens waters with no current or potential beneficial uses designated in water quality control plans, the feasibility study shall identify at least one alternative to satisfy mitigation of nuisance conditions and risk of fire or explosions.

Applicable Cleanup Levels

Cleanup levels for groundwaters or surface waters, affected or threatened by the unauthorized release, shall comply with all applicable waste discharge requirements, state policies in water quality control plans, water quality control plans, Chapter 6.7 and the regulations promulgated thereto, and Article 4 of Chapter 6.75 of the Health and Safety Code. The cleanup levels shall meet the following requirements:

- For waters with current or potential beneficial uses for which narrative or numerical objectives have been designated in water quality control plans, the responsible party shall propose at least two alternatives to achieve these numerical objectives;
- For waters with current or potential beneficial uses for which no numerical objectives have been designated in water quality control plans, the responsible party shall recommend target cleanup levels for long-term corrective actions to the regulatory agency for concurrence. Target cleanup levels shall be based on the impact assessment.

Corrective Action Implementation

The Corrective Action Plan implementation phase consists of carrying out the cost-effective alternative for remediation or mitigation of the actual or potential adverse effects of the unauthorized release.

Upon concurrence with the CAP, or as directed by the regulatory agency, the responsible party shall implement the CAP. The responsible party shall monitor,

evaluate, and report the results of implementation of the CAP on a schedule agreed to by the regulatory agency.

In the interest of minimizing environmental contamination and promoting prompt cleanup, the responsible party may begin cleanup of soil and water after the CAP has been submitted and before it has received agency concurrence. Implementation of the CAP may begin sixty (60) calendar days after submittal, unless the responsible party is otherwise directed in writing by the regulatory agency. Before beginning this cleanup, the responsible party shall:

- Notify the regulatory agency of its intention to begin cleanup; and
- Comply with any conditions set by the regulatory agency, including mitigation of adverse consequences from cleanup activities; and
- The responsible party shall modify or suspend cleanup activities when directed to do so by the regulatory agency.

Verification Monitoring

The verification monitoring phase includes all activities required to verify implementation of the CAP and evaluate its effectiveness. This is completed through sampling or other monitoring of soil and/or water for such period of time and intervals agreed to by the regulatory agency. Using the monitoring results obtained and any other relevant data, the responsible party shall evaluate the effectiveness of the site work.

The responsible party shall submit monitoring data and an evaluation of the results of such monitoring in writing on a schedule and for a duration agreed to by the regulatory agency.

Public Participation

For each confirmed unauthorized release that requires a CAP, the regulatory agency shall inform the public of the proposed activities contained in the CAP. This notice shall include at least one of the following:

- Publication in a regulatory agency meeting agenda
- Public notice posted in a regulatory office
- Public notice in a local newspaper;
- Block advertisement
- A public service announcement;
- Letters to individual households; or
- Personal contact with the affected parties by regulatory agency staff.

Before concurring with a CAP, the regulatory agency may hold a public meeting when requested by any member of the public, if there is sufficient public interest on the proposed CAP.

Upon completion of corrective action, the regulatory agency shall file public notice, if both of the following conditions apply:

1. Implementation of the CAP does not achieve the cleanup levels established in the CAP; and
2. The regulatory agency does not intend to require additional corrective action except for monitoring.

The process is generally the same for the SCP. The CAP is called a Remedial Action Plan. There is no limit on the number of alternatives that can be evaluated in an FS. Resolution No. 92-49 also contains the requirements for establishing a containment zone when water quality can not be restored. The containment zone is defined as a specific portion of a water bearing zone unit where the Regional Water Board finds it is unreasonable to remediate to the level that achieves water quality objectives. The discharger is required to take all actions necessary to prevent the migration of pollutants beyond the boundaries of the containment zone in concentrations which exceed water quality objectives.

SWRCB Resolution

The State Water Resource Control Board issued Resolution No. 2009-0042 (Res. 42) on May 19, 2009. Res. 42 identified actions to improve administration of the FUND and the UST Cleanup Program. Staff were to immediately review all cases in the Petroleum UST Cleanup Program using the following general framework:

1. The order of the case reviews shall be determined by the Regional Water Boards and LOP agencies. Consideration should be given to reviewing first those cases with an active or suspended LOC with the FUND.
2. These case reviews shall at a minimum, include the following for each UST case:
 - a. Determination of whether or not the case is ready for closure.
 - b. If the case is not ready for closure, determination of the following:
 - i. The impediments to closure
 - ii. The specific environmental benefits of any additional work to be performed at the site.
 - iii. The existing sensitive receptors that are likely to be impacted by contamination at the site and the probable timeframe for those impacts to occur.
3. Each case review shall be made publically available on the State Water Board's GeoTracker web site within 30 days of when it is completed in a format acceptable to the Executive Director.
4. Regional Water Board and LOP agencies shall, within 90 days, close cases identified as ready for closure in the case review.
5. No new directives for additional corrective action shall be issued until all site reviews have been completed unless site-specific needs warrant otherwise.
6. The above listed tasks shall be accomplished within existing budgets and not later than June 30, 2010.
7. Regional Water Board and LOP agencies shall reduce quarterly monitoring requirements to semiannual or less frequent monitoring at all sites unless site-

specific needs warrant otherwise and shall notify all responsible parties of the new requirement no later than August 1, 2009. If more than semiannual monitoring is required for a case, the responsible party and State Water Board shall be notified of the rationale and the notice shall be posted on GeoTracker.

There are several reports on GeoTracker indicating our agency's performance with the case summaries and monitoring reduction. As of January 6, 2010, staff has completed 100% of the monitoring reductions and is 97% complete with the closure summaries.

Case Closure

In mid 2008, Regional Water Board staff identified the need to have standard format for staff's analysis of case closure requests.

On March 27, 2009, a *Fact Sheet* was distributed to all interested parties and posted on our web page that outlines the data necessary for a discharger to submit when requesting case closure. A copy is enclosed as Attachment 2.

There are four basic groups of sites that are evaluated for closure. They are defined as:

- Contamination in soil only
- Contamination in soil and contamination in groundwater or surface water is absent or below water quality objectives
- Contamination in soil and groundwater or surface water with low levels
- Contamination in soil and groundwater or surface water at moderate levels

In all of the above groups some information is critical. Sufficient work needs to be completed in order for the following to be document in the file:

- Identify the potential pollutants
- Adequate sampling and analysis for the known range of pollutants
- Identify the complete magnitude and extent of anything left behind
- Have a basic site conceptual model

Important variations for each site need to be considered that include:

- Contamination on-site or off-site;
- Groundwater and/or surface water contamination migrating or stable;
- Groundwater or surface water contamination levels decreasing or not;
- Likely land use changes; and
- Future Site modifications.

Soil Only Case

The North Coast Region has high rates of rainfall and shallow groundwater that is used for domestic purposes. This generally means that soil contamination cases are threatened discharges to groundwater or surface water. The first consideration is the removal or treatment of the contaminated soils. An evaluation is made to determine if all contaminated soils were properly removed and disposed at the appropriately permitted facility. Any contaminated soils to be left behind need to be evaluated for any future threat to waters of the State, human health, or the environment. Information on any future land use changes may be critical to evaluate. Sufficient sampling needs to be completed to determine that the contamination has not migrated to other properties or to a preferential pathway. Groundwater and/or surface water samples need to be collected to determine any impacts.

Contamination in Groundwater or Surface Water is Absent or Below Water Quality Objectives

This type of case represents the most straightforward circumstances leading to a fairly rapid closure. Groundwater and/or surface water is not impacted through the operation of a designed remediation system or a natural process. Beneficial uses of groundwater and/or surface water are not threatened by any residual soil contamination. The evaluation of any remaining soil contamination to determine the future risk of discharge to groundwater or surface water is needed. The possible health effects from soil contamination left in place also need to be addressed.

Contamination in Soil and Groundwater or Surface Water at Low Levels

Additional information on the trend analysis for a sufficient number of hydrologic cycles is critical. Drought conditions need to be evaluated. A more detailed site conceptual model is necessary. Specific determination of all sensitive receptors and uses of state waters is required. All source material removals or controls are completed. Contaminated groundwater and/or surface water are under remediation and will achieve water quality objectives within a reasonable length of time.

The determination of a “reasonable length of time” is complex. For the North Coast Region, due to higher rainfall and extensive shallow groundwater and surface water use for domestic and agricultural purposes, a time frame of centuries to achieve water quality objectives is not reasonable. In the past several years, municipalities have installed and are continuing to install additional groundwater wells due to water shortages. Many agricultural enterprises have installed wells for irrigation and other uses as surface water diversions are restricted. Businesses are installing heat exchange wells to off set rising heating costs that may create preferential pathways for contaminant migration.

In determining the reasonableness of any length of time, consideration of the loss of a beneficial use is critical. Typical questions at this stage are: Who is using the water and what will the loss of use mean to them? Is there an additional threat to a water user as the contaminated groundwater and/or surface water moves? Is the distance to a user

from the source area of sufficient magnitude that contaminated groundwater or surface water will not impact beneficial uses prior to the discharge being cleaned up?

Key factors to remember when establishing any time frame for the loss of a beneficial use may include: 1) is the solution permanent, 2) are there sufficient controls for site modifications or disturbance, 3) ongoing verification monitoring, and 4) deed restrictions required by law.

Another critical issue to consider depending on the type of contaminant is indoor air issues. Is the contamination of sufficient magnitude that off-gassing from soil or groundwater constitutes a threat to human health?

Closure of sites has always been a priority for Staff. Special emphasis has recently been placed on the UST sites. Staff continues to close sites in an expeditious manner, while still taking into consideration compliance with the statutes, regulations, and applicable policies, including Basin Plan requirements and action plans.