STATE OF CALIFORNIA—CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
3737 MAIN STREET, SUITE 500
RIVERSIDE, CA 92501-3339
PHONE: (909) 782-4130
FAX: (909) 781-6288

September 4, 1996

DRAFT

Memorandum

To: **Santa Ana Region Underground Storage Tank Local Oversight Program Agencies and Other Interested Parties**

Subject: **Regional Board Supplemental Guidance**
Clarification of Low-Risk Designation of Fuel Contaminated Sites

The following discussion is intended to provide assistance in the implementation of the interim guidance from the State Water Resources Control Board (SWRCB). Following the release of the Lawrence Livermore report, SWRCB directives urged that cleanup oversight agencies either close or shift from active remediation to monitoring at fuel sites which are considered "low-risk". On January 26, 1996, the Santa Ana Regional Water Quality Control Board (SA-RWQCB) approved local guidance regarding the regulation of leaking underground fuel tanks consistent with the SWRCB's interim guidance.

In summary, the report produced by the Lawrence Livermore National Laboratory suggested a greater use of passive bioremediation to reduce the levels of petroleum contaminants in the subsurface, an increased use of risk-based cleanup goals, and the modification of SWRCB policies to allow for the closure of sites at contaminant levels above background or Maximum Contaminant Levels.

A principal function of the Regional Water Quality Control Board's regulatory program is the maintenance of a water body's ability to support present and potential future beneficial uses. From a water quality maintenance perspective, the main goal of cleanup is the restoration of the beneficial uses of the water within a reasonable period of time (i.e., by the time the water has the probability of being used beneficially). The Regional Water Boards have flexibility in establishing timeframes so long as achievement of the objective occurs within a time period that is consistent with beneficial use patterns.

Within the Santa Ana Region, we have a large population base with a great current and future dependence on local sources of groundwater for drinking water supplies. This situation causes our policies to place a great emphasis on the protection and restoration of the groundwater in our region. Additionally, recent drinking water well sampling data in Orange County and elsewhere in Southern California demonstrate that the drinking water aquifers are threatened by chemical releases in the shallow portions of the aquifer. The potential cumulative effect of thousands of

releases from petroleum USTs throughout the Region poses a threat to the beneficial uses of the aquifers which warrants characterization and, where necessary, cleanup of these releases to the appropriate degree.

It is our position that, due to the above factors, remediation of petroleum release sites should be conducted where appropriate to reduce risks associated with the release. These risks may be in the form of threat to water quality, threat to public safety through either fire or vapor hazards, threat to public health through excessive lifetime cancer risk from benzene vapor, or as an ecological threat. In general, our approach to the cleanup of underground tank releases which overlie drinking water aquifers will be to effect the greatest degree of appropriate risk reduction economically achievable. Accompanying this approach is also the regulatory position that "low-risk" sites can be monitored to confirm degradation through natural processes. This applies to low levels of contamination as either the maximum levels ever seen at the site or as the levels which remain after an appropriate degree of remediation has been completed.

If the threat posed by the release is in the form of an explosive hazard or an acute threat to human health through exposure to vapors, remediation of this type of threat should be immediate and the primary goal of the responsible party. Subsequent to the evaluation of the immediate threat, the site conditions should be evaluated with respect to the threat to water quality or ecologic receptors.

Therefore, the attached guidance is an outline of the conditions which need to be satisfied for a particular site to be designated as a "low-risk" site. If you should have any questions as to how to apply this guidance document, please call Kenneth R. Williams, Chief of the Pollutant Investigation Section, at (909) 782-4496.

Sincerely,

DRAFT

Gerard J. Thibeault
Executive Officer

attachment: Low Risk Site Definition Guidance

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
3737 MAIN STREET, SUITE 500
RIVERSIDE, CA 92501-3339
PHONE: (909) 782-4130
FAX: (909) 781-6288

September 4, 1996

Santa Ana Regional Board Supplemental Guidance Clarification of Low-Risk Designation of Fuel Contaminated Site

Introduction

These revisions to existing cleanup procedures will incorporate an understanding that some sites may pose very little threat to either human health and safety, the underlying water quality or to ecologic receptors. In contrast, there are sites of higher risk that will require immediate action and active remediation to protect human health and safety and the environment. In general, we believe that remediation may be considered adequate and successful while leaving limited amounts of contaminants in place. Additionally, minimal levels of groundwater impacts may be responded to simply by monitoring for the anticipated reductions caused by natural processes.

The criteria for "low-risk" soils cases will be based on an assessment of the threat to water quality, due to the mobility of the hydrocarbon contamination. Therefore, the criteria for the definition of "low-risk" groundwater cases shall be along the following two lines:

1) areas underlain by aquifers with non-drinking water beneficial use designations, and

2) the potential for reduction of petroleum constituent concentrations to Maximum Contaminant Levels through passive biodegradation processes within a reasonable timeframe.

The first criterion will be designed to gauge the involvement of the affected groundwater in the recharge of drinking water aquifers. The main questions will generally be whether the site overlies either presently or potentially usable drinking water aquifers. In those areas not considered to recharge sources of drinking water, moderate levels of contamination left in-place will be tolerated after the release has been defined and the source material has been removed.

The second criterion for the definition of "low-risk" will be based on the recognition that low levels of contamination can be expected to diminish to levels within water quality objectives within a reasonable period of time due to the effects of natural processes. Monitoring of the chemical and hydrologic conditions at the site will be used to gauge the effectiveness of the remedial efforts and assess the progress of natural processes. It is assumed that subsurface conditions are highly variable and that there is always some uncertainty associated with site assessment activities.

Low Risk Soils Case

Definition:

1) **The leak has been stopped and ongoing sources of contamination have been removed or remediated.**

The tank or appurtenant structure that leaked must be repaired or permanently closed per Chapter 7, Section 2672 of the UST regulations.

Soil which contains sufficient mobile constituents (leachate, vapors or liquid flow) to seriously degrade groundwater quality or result in a significant threat to human health, safety or the environment should be considered a source. When appropriate, source removal should be performed to either remove or reduce the concentrations within the contaminated soils. An appropriate soil cleanup level would be one where the concentration of the leachate does not exceed the "leachate evaluation standards" for the contaminant of concern.

Source removal may take the form of soil excavation, free product removal, vapor extraction of the affected soil volume, or other measures intended to reduce the quantity of mobile hydrocarbon materials in the subsurface. Each site needs a determination of the cost-effectiveness of the various techniques for source reduction, taking into account the degree of risk reduction required, the soil types, amount of free product or mobile phase materials present, preferential pathways, and other factors which affect hydrocarbon movement.

To evaluate the mobility of the contamination within the soil column, one approach is through the use of empirical leaching tests. Leaching tests should be performed on multiple soil samples utilizing standard procedures (such as EPA Method 1311 - TCLP, modified, or Method 1312 - SPLP). Other acceptable approaches may include chemical migration modeling, preferably in combination with the results of TCLP or SPLP tests. Chemical migration models should account for the present distribution of fuel constituents, based on plausible initial conditions, using the same physical parameters used to project future contaminant migration. Thus, models should be able to account for contaminant distribution from the past to the present, as well as in the future. Soil models should be submitted to overseeing agency staff for acceptance.

Soil contamination which creates exposure to vapors or other hazardous conditions, and may be a threat to human health, safety or the environment should also be considered a source.

2) The site has been adequately characterized according to the requirements of the oversight agency.

The extent of the subsurface impact should be defined to the degree that is necessary to determine if the site poses a threat to human health, safety, or the environment or other nearby sensitive receptors. The degree of characterization of environmental contamination required must be sufficient to accurately and comprehensively demonstrate conditions at the site. The definition of environmental contamination to non-detect levels is not required at all sites.

The contaminants of concern (target analytes) should be appropriate to the release event and include BTEX, MTBE, and any other compounds which have physical qualities which would allow significant migration in the subsurface soil and/or ground water. The use of Total Petroleum Hydrocarbon (TPH) analysis should be used for gross definition of contaminant migration and not for the purposes of verifying regulatory compliance.

3) No groundwater impacts currently exist or are to occur at levels above applicable water quality objectives.

By definition, soils only cases do not have groundwater impacts. Verification of the presence or absence of ground water impacts may be a necessary aspect of the characterization phase of some soils only cases.

Unless designated not to be a source of drinking water, all ground water within the Santa Ana Region should be considered to be a potential source of drinking water. Applicable water quality objectives for the constituents of concern may be found in the Water Quality Control Plan for the Santa Ana Region.

4) The site presents no significant risk to human health and safety.

Significant risks to human health and safety include the creation of fire and explosion hazards from the migration and accumulation of fuel vapor into structures or subsurface utilities (e.g., storm drains, sewer systems, utility vaults, etc.). The mitigation of these risks would necessitate immediate or timely corrective actions, depending on the type and severity of the risk posed.

Site mitigation strategies which include elements of "Risk Based Corrective Action (RBCA) may provide an acceptable methodology to perform a tiered risk analysis of the threats to human health and to ecologic receptors from petroleum release sites. RBCA methodology usually incorporates elements of U. S. EPA risk assessment practices to determine non-site-specific (e.g., generic risk-based screening levels) and site specific cleanup levels that are protective of human health and environmental resources. The responsible party may wish to propose a RBCA approach for consideration by the regulatory agencies.

5) **The site presents no significant risk to the environment, in that no surface water or other sensitive receptors are likely to be impacted.**

If the site has a potential to significantly impact surface waters, wetlands or other sensitive receptors, it should not be considered low risk. RBCA methodologies have no specific guidance for evaluating environmental risk, although the basic framework is appropriate if site specific exposure pathways and ecological receptors are included.

Management Strategy

Low risk soils cases should be closed once it has been determined that site conditions conform to the above criteria.

Typically, this closure will follow an adequate degree of characterization and, if necessary, the performance of source removal activities. In areas without a drinking water beneficial use designation, human health and safety and ecologic concerns will be the determining factors. With the "low risk" site designation, further remediation is not required.

If the most sensitive permitted use (e.g., residential) is not protected by the site cleanup levels achieved at the site, then other forms of restrictions or notifications for the site may be appropriate. Such determinations should be made by the local land use permitting agency. If fuel contaminated soils are subsequently disturbed, additional remedial or mitigative measures may be appropriate at the site. A significant change of land use would prompt reevaluation of site status.

Low Risk Groundwater Cases

Definition:

1) **The leak has been stopped and ongoing sources, including free product, have been removed or remediated. (See Low Risk Soils Cases Definition #1).**

Free product shall be removed to the extent practicable per Chapter 5, Section 2655 of the UST regulations.

2) **The site has been adequately characterized. (See Low Risk Soils Cases Definition #2).**

3a) **The site does not overlie presently utilized or potential drinking water aquifers.**

For the purposes of defining "low risk" ground water cases only, areas which are underlain by aquifers with non-drinking water beneficial use designations are:

1. Areas seaward of the Eastern Branch of the Newport-Inglewood Fault Zone. (Please refer to the appropriate Alquist-Priolo Earthquake Fault Zone Map for the trace of this fault).

2. Areas overlying formational materials which do not recharge adjacent aquifer units or supply drinking water to individuals.

Due to the high degree of variability of threat from pollution and ground water utilization, areas of fractured bedrock will be handled on a case-by-case basis.

or

3b) **The concentration of the core portion of the contaminated groundwater either never exceeded or has been reduced to "low risk" threshold concentrations.**

Impacts to groundwater in which the concentration of the core of the plume are below the "low risk" threshold values (given below) are not considered to pose a significant risk to the current or future beneficial uses of the aquifer.

Constituent	MCLs	"Low risk" threshold
Benzene	1 ppb	250 ppb
Toluene	150 ppb	300 ppb
Ethylbenzene	680 ppb	680 ppb
Xylene	1750 ppb	1750 ppb

Passive biodegradation processes are anticipated to act to continuously reduce the contaminant concentrations over time. Impacts in excess of the "low risk" threshold values listed above will be monitored through chemical analysis of organic and inorganic parameters and physical measurements of the groundwater elevations.

The presence of other chemical constituents at a site (such as chlorinated solvents or methyl tertiary butyl ether (MTBE)) will result in a greater degree of regulatory concern and, thus, would not allow for the automatic designation of "low risk" for such a site.

4) No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.

5) The site presents no significant risk to human health.

6) The site presents no significant risk to the environment.

If the site has a potential to significantly impact beneficial uses of surface waters, wetlands, or other sensitive receptors, it shall not be considered appropriately designated as a "low-risk" site.

Management Strategy

In general, sites located in "low risk" groundwater areas may cease active remediation after obtaining agency approval. At sites designated as "low-risk", based on the threshold concentrations, remediation through natural attenuation (passive biodegradation, etc.) would be the preferred remedial option with respect to the protection of groundwater.

Monitoring of the contaminant concentrations and other chemical indicators of biological activity would be necessary to confirm the ongoing nature of these processes. As an inherent part of remediation through natural attenuation, long-term monitoring will be required to evaluate the efficiency of this mitigation strategy. The objectives of this monitoring would be to confirm contaminant mass removal, the adequacy and constancy of the rate of biologic degradation activity, and the consistency of hydrologic patterns.

The frequency of monitoring events and the number of monitoring points may be adjusted by the regulatory agencies after site characterization is completed. Quarterly groundwater monitoring may be appropriate in the early stages of the investigative or remedial phase when the extent of contamination, seasonal groundwater fluctuations, and other site-specific factors are being evaluated.

After these factors have been verified, the degree of monitoring may be reduced, either in terms of frequency of sampling events, the number of monitoring wells involved, or the suite of chemical analyses required. Monitoring would be concluded when either Maximum Contaiminant Levels have been achieved or wher rates of degradation have been clearly established and the achievement of Maximum Contaminant Levels can be predicted with an adeaquate degree of certainity.