STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

ORDER: WQ 98 - 10 - UST

In the Matter of the Petition of
MARGO HAYES
for Review of Denial of
Petroleum Underground Storage Tank Site Closure
at
5775 Thornwood, Goleta, California.

BY THE BOARD:

Margo Hayes (petitioner) seeks review of the decision of the Santa Barbara County Environmental Health Department(County) to close petitioner's case involving an unauthorized release of petroleum at her site located at 5775 Thornwood, Goleta, California. For the reasons set forth below, this order determines that petitioner's case should be closed and no further action related to the release should be required.

I. STATUTORY, REGULATORY, AND FACTUAL BACKGROUND

Tank owners and operators who are eligible for reimbursement from the Underground Storage Tank (UST) Cleanup Fund can petition the Fund Manager for a review of their case if they feel the corrective action plan for their site has been satisfactorily implemented, but closure has not been granted (Health and Saf. Code, § 25299.39.2, subd. (b)).[1]

Several statutory and regulatory provisions provide the State Water Resources Control Board (SWRCB), Regional Water Quality Control Boards (RWQCBs), and local agencies with broad authority to require responsible parties to clean up a release from a petroleum UST (e.g., Health & Saf. Code, § 25299.37; Wat. Code, § 13304, subd. (a)). The County has been

[1] To the extent that the SWRCB may lack authority to review this petition pursuant to Health and Safety Code section 25299.39.2, subdivision (b) because the petitioner did not submit a corrective action plan for the site, the petition is being reviewed on the SWRCB's own motion pursuant to Health and Safety Code section 25297.1, subdivision (d) and SWRCB Resolution No. 88-23.

designated as an agency to participate in the local oversight program for the abatement of, and oversight of the abatement of, unauthorized releases of hazardous substances from USTs. (Health & Saf. Code, § 25297.1) The SWRCB has promulgated regulations specifying corrective action requirements for petroleum UST cases (Cal. Code of Regs., tit. 23, §§ 2720-2728). The regulations define corrective action as "any activity necessary to investigate and analyze the effects of an unauthorized release, propose a cost-effective plan to adequately protect human health, safety and the environment and to restore or protect current and potential beneficial uses of water, and implement and evaluate the effectiveness of the activity(ies)." (Cal. Code Regs., tit. 23, § 2720). Corrective action consists of one or more of the following phases: (1) preliminary site investigation, (2) soil and water investigation, (3) corrective action plan implementation, and (4) verification monitoring. (Cal. Code Regs., tit. 23, § 2722, subd. (a)).

The preliminary site assessment phase includes initial site investigation, initial abatement actions, initial site characterization and any interim remedial action. (Cal. Code Regs., tit. 23, § 2723, subd. (a)). Corrective action is complete at the conclusion of the preliminary site assessment phase, unless conditions warrant a soil and water investigation. A soil and water investigation is required if any of the following conditions exists: (1) There is evidence that surface water or groundwater has been or may be affected by the unauthorized release; (2) Free product is found at the site where the unauthorized release 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. (Cal. Code Regs., tit. 23, § 2724).

The purpose of a soil and water investigation is "to assess the nature and vertical and lateral extent of the unauthorized release and to determine a cost-effective method of cleanup." (Cal. Code of Regs., tit. 23, § 2725, subd. (a)).

SWRCB Resolution No. 92-49, *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304* also applies to petroleum UST cases. Resolution No. 92-49 directs the RWQCBs to ensure that water affected by an unauthorized release attains either background water quality or the best water quality which is reasonable if background water quality cannot be restored (SWRCB Resolution No. 92-49, III.G). Any alternative level of water quality less stringent than background must be consistent

with the maximum benefit to the people of the state, not unreasonably affect current and probable future beneficial use of affected water, and not result in water quality less than that prescribed in the water quality control plan for the basin within which the site is located (hereafter basin plan). (*Ibid.*)

Resolution No. 92-49 does not require, however, that the requisite level of water quality be met at the time of site closure. Even if the requisite level of water quality has not yet been attained, a site may be closed if the level will be attained within a reasonable period (SWRCB Resolution No. 92-49, III.A).

The Central Coast RWQCB Water Quality Control Plan (Basin Plan) designates existing and potential beneficial uses of groundwater in the Goleta Hydrologic subarea as municipal and domestic (MUN) supply, industrial supply, and agricultural supply (Central Coast RWQCB & SWRCB, Water Quality Control Plan, Central Coast Basin (1994) at p.II-1). The Basin Plan specifies a narrative taste and odor water quality objective as follows: "Groundwaters shall not contain taste or odor producing substances in concentrations that adversely affect beneficial uses." (Id. at p. III-14). The Basin Plan also contains the following narrative MUN water quality objective for chemical constituents: "Groundwaters shall not contain concentrations of organic chemicals in excess of the limiting concentrations set forth in California Code of Regulations, Title 22." (Id. at III-14).

With regard to the water quality objectives for organic chemicals, the State Department of Health Services (DHS) has set maximum contaminant levels (MCLs) for benzene, toluene, ethylbenzene, and xylene (BTEX) in drinking water of 1 ppb, 100 ppb, 680 ppb, and 1,750 ppb, respectively (Cal. Code of Regs., tit. 22, § 64444). Although DHS has not yet set an MCL for methyl tertiary butyl ether (MTBE), DHS has set an interim action level of 35 ppb (DHS Memorandum from Joseph P. Brown, Ph.D., Acting Chief, Water Toxicology Unit to Alexis M. Milea, P.E., Acting Supervisor, Standards and Technology Unit, Office of Drinking Water (February 19, 1991) at p. 2). DHS has more recently proposed a 5 ppb MTBE concentration as a secondary drinking water standard for taste and odor. The threshold odor concentration of commercial gasoline (measured as total petroleum hydrocarbon gasoline, or TPH-g) in water is commonly accepted to be 5 ppb, with 10 ppb giving a strong odor. The threshold odor concentration of commercial diesel (measured as TPH-d) in water is commonly accepted to be 100 ppb (SWRCB, Water Quality Criteria (2d ed. 1963) p. 230).

The following is a brief historical summary of petitioner's site at 5575 Thornwood Drive, Goleta California. The site is in an area of light industrial development about 0.9 mile north of the Pacific Ocean and 0.4 mile east of the Santa Barbara Airport. The site lies approximately 18 feet above mean sea level on the Goleta Plain. Groundwater in these alluvial deposits is first encountered less than 10 feet below ground surface (bgs). According to the United States Geological Survey (Water Supply Paper 1108, "Geology and Ground-Water Resources of the South-Coast Basins of Santa Barbara County" ,1951) the shallow water-bearing zone immediately underlying petitioner's site is hydraulically separated from deeper, artesian groundwater present in underlying alluvium.

Two gasoline USTs (1,000 and 500 gallons) were installed at the site in the early 1960's and removed about 1984, although details of this tank removal are not documented. In 1991 site investigation included 21 shallow borings (1.5 to 10 feet deep) and analysis of 7 soil samples. The investigation confirmed the presence of gasoline hydrocarbons in soil in the immediate vicinity of the former tank locations.

Petitioner installed four monitor wells in July 1993. Monitoring well MW-1 was sited at the location of the former USTs while the other three wells were positioned east (MW-3), northwest (MW-2), and southwest (MW-4). Each well is about 40 feet from the site of the former USTs. Initial groundwater samples indicated elevated concentrations of dissolved hydrocarbon constituents in MW-1, with BTEX at 370 ppb, 15,000 ppb, 2,600 ppb, and 26,000 ppb, respectively and dissolved TPH-g at 140,000 ppb. The other three monitoring wells were "non-detect" for all petroleum constituents, except for marginal "hits" of xylene (0.7 ppb) in MW-3 and (1.3 ppb) in MW-4, which are significantly below the 1,750 ppb MCL for xylene.

Subsequent sampling in December 1994 detected benzene (960 ppb), toluene (1,500 ppb), ethylbenzene (5,100 ppb), xylene (20,000 ppb), and TPH-g (72,000 ppb) in MW-1. Marginal "hits" of other consituents (i.e., xylene 3.2 ppb and ethyl benzene 0.5 ppb) were detected 40 feet away in MW-3, again below their respective MCLs of 1,750 ppb and 680 ppb. Additional sampling in March 1995 reconfirmed BTEX and TPH-g in MW-1 (200 ppb, 6,500 ppb, 3,500 ppb, 28,000 ppb, and 76,000 ppb, respectively). All other monitoring wells indicated "non-detects" for all constituents.

Most recently, July 1998 sampling confirmed that MTBE is "non-detect" in <u>all</u> monitoring wells, including MW-1. This most recent sampling also confirmed "non-detect" for

BTEX and TPH-g in the other three surrounding monitoring wells which are located within 40 feet of the original release. Meanwhile, detectable concentrations of residual petroleum constituents remain limited to MW-1 located at the site of the former USTs. Concentrations reported for MW-1 in July 1998 indicated benzene (86 ppb), toluene (4,100 ppb), ethylbenzene (2,600 ppb), xylene (20,000 ppb), and TPH-g (64,000 ppb).

In June 1995, the County agreed that the dissolved plume had been adequately defined and recommended excavation as the most economical approach to site remediation. Petitioner contended that limited residual petroleum constituents posed a "low risk" and that no active remediation was warranted. In June 1, 1996, petitioner appealed to the SWRCB UST program manager pursuant to Health and Safety Code §25297.1 alleging that County oversight charges for the billing period from July through December 1995 were "excessive and unreasonable" because the site was already shown to be "low risk" and that further active remediation was not warranted. After reviewing the pertinent technical facts in the case, the UST program manager concurred with petitioner, and those oversight charges against petitioner were dropped; however, the program manager did not have authority to close the case. Petitioner has petitioned the Cleanup Fund Manager to review the continued denial of site closure by the County.

II. CONTENTIONS AND FINDINGS

Contention: The petitioner contends her case should be closed because the localized residual concentrations of detectable petroleum constituents in shallow groundwater pose a "low risk" to public health and safety, the environment, and to current or probable future beneficial uses of water.

Findings: Petitioner's contention has merit. As explained below, the facts in the record support the finding that further corrective action is not necessary and that residual petroleum hydrocarbon constituents at petitioner's site do not pose a threat to human health and safety, or the environment, and do not adversely affect, or threaten to affect, current or probable future beneficial uses of water. In addition, the level of site cleanup is consistent with the maximum benefit to the people of the state and will meet the applicable objectives in the Central Coast RWQCB Basin Plan within a reasonable time frame.

The facts in the case indicate that the original source of the gasoline release was removed 14 years ago, that MTBE is "not detected", and that Basin Plan objectives for BTEX

and TPH-g in shallow groundwater are met less than 40 feet away from the former USTs. There is no evidence in the record to suggest that shallow groundwater in the vicinity of petitioner's site has been used in the past or is being used presently or that it will with any likelihood be used in the forseeable future for domestic or municipal supply. Indeed, according to the Goleta Water District, the nearest water supply well to the site is located about 1,400 feet east northeast of the site. The well is 223 feet deep and draws upon confined aquifers at depths of 140 feet and 167 feet. Hydrogeological studies by the United States Geological Survey furthermore indicate that these deeper water-bearing zones are hydraulically separated from the shallow groundwater in the Goleta area.

The facts in this particular case indicate that with no further regulatory action, residual detectable concentrations of TPH-g, benzene, toluene, ethylbenzene and xylene (BTEX) present in shallow groundwater and adsorbed to shallow soils are (and will remain) localized and will continue to attenuate naturally over time with no further corrective action. Given the demonstrated, ongoing natural attenuation of residual BTEX to date, it is evident that MCLs will be met for these constituents within a few decades or less. Nevertheless, concentrations of TPH-g in shallow groundwater in immediate contact with (albeit limited) residual TPH-g adsorbed to soils may remain above 5 ppb (the commonly accepted odor threshold for water) in a localized volume of surrounding groundwater for a significantly longer period of time. However, considering the absence of existing wells in close proximity to petitioner's site, the local hydrogeologic considerations, and standard well construction practices which mandate surface sanitary seals to preclude introduction of shallow groundwater such as encountered at petitioner's site, the limited, isolated scenario will not unreasonably affect existing or probable future beneficial uses.

To remove all traces of residual petroleum constituents (e.g. TPH-g above 5 ppb) at petitioner's site in the short-term would require additional, but feasible, excavation of soil in the area of the former USTs to depths of up to 10 feet. Thus, removal of approximately 500 cubic yards of affected soil would potentially eliminate a majority of residual, detectable petroleum concentrations. However, as discussed in this order, there would be little benefit to current or potential beneficial uses of the minimal area of groundwater that is not meeting water quality objectives for BTEX and TPH-g. In addition, if complete removal of detectable traces of petroleum constituents becomes the standard for UST corrective actions, the statewide technical

and economic implications will be enormous. For example, disposal of soils from comparable areas of excavation throughout the state would greatly impact already limited landfill space. In light of the minimal, if any, benefit of attaining further reductions in concentrations of BTEX and TPH-g at this site, the precedent that would be set by requiring additional excavation and the fact that beneficial uses are not threatened, attaining background water quality at petitioner's site is not feasible. It is impossible to determine the precise level of water quality that will be attained given the limited residual BTEX and TPH-g that remains at the site, but in light of all the factors discussed above, a level of water quality will be attained that is consistent with the maximum benefit to the people of the state.[2]

The final step in determining whether cleanup to a level of water quality less stringent than background is appropriate for this site requires a determination that the alternative level of water quality will not result in water quality less than that prescribed in the relevant basin plan. Pursuant to SWRCB Resolution No. 92-49, a site may be closed if the Basin Plan requirements will be met within a reasonable time frame.

In this particular case, as discussed above, TPH-g and BTEX in the shallow groundwater in immediate contact with the limited residual petroleum hydrocarbon constituents adsorbed to soils will likely remain above, and thus violate, the Basin Plan's objectives in a localized volume (i.e., the uppermost few feet of the shallow water-bearing zone within a radius of *less than* 40 feet) for a significant period of time. This time period could be anywhere from a few decades for BTEX to degrade below MCLs to hundreds of years for that limited volume of groundwater in immediate contact with longer chain, immobile residual petroleum constituents adsorbed to soils to meet the commonly accepted 5 ppb taste and odor threshold.

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[2] In approving an alternative level of water quality less stringent than background, the SWRCB has also considered the factors contained in California Code of Regulations, title 23, section 2550.4, subdivision (d). As discussed earlier, the adverse effect on shallow groundwater will be minimal and localized, and there will be no adverse effect on the groundwater contained in deeper aquifers, given the physical and chemical characteristics of petroleum constituents; the hydrogeological characteristics of the site and surrounding land; and the quantity of the groundwater and direction of the groundwater flow. In addition, the potential for adverse effects on beneficial uses of groundwater is low, in light of the proximity of groundwater supply wells; the current and potential future uses of groundwater in the area; the existing quality of groundwater; the potential for health risks caused by human exposure; the potential damage to wildlife, crops, vegetation, and physical structures; and the persistence and permanence of potential effects.

Finally, a level of water quality less stringent than background is unlikely to have any impact on surface water quality, in light of the volume and physical and chemical characteristics of petroleum constituents; the hydrogeological characteristics of the site and surrounding land; the quantity and quality of groundwater and the direction of groundwater flow; the patterns of precipitation in the region, and the proximity of residual petroleum to surface waters.

Nonetheless, during this time these residual concentrations in excess of Basin Plan objectives will not pose a threat to current or future beneficial uses. It is highly unlikely that petroleum hydrocarbon constituents detected in localized areas in the immediate area of the pre-1984 release will migrate substantially beyond the current limited spatial extent of *less than* 40 feet. Though the longer chain hydrocarbons comprising TPH-g biodegrade more slowly than certain petroleum constituents, such as benzene, they are also more recalcitrant (i.e., less volatile, less soluble and highly absorbent) and much less mobile. It is also highly unlikely that this particular very limited pocket of shallow groundwater will be used directly as a source of drinking water. Thus, the significant period of time that it will take for water quality in this limited area to meet all Basin Plan objectives is a reasonable time frame. Closure of the site, given the facts in this particular case, is appropriate.

III. SUMMARY AND CONCLUSION

1. There is no evidence of MTBE at this site.

2. Fourteen years after the release was stopped, groundwater meets Basin Plan objectives in less than 40 feet from the original release.

3. Petitioner's site is located in a commercial area.

4. The nearest water supply well is located more than 1,400 feet away and shallow groundwater immediately underlying petitioner's site is hydraulically separated from deeper, confined groundwater production zones.

5. Additional soil and water remediation at petitioner's site is not necessary as the site presents a low risk to human health, safety, and the environment.

6. The level of site cleanup, which included removal of the USTs in 1984 and groundwater monitoring over a five years, is consistent with the maximum benefit to the people of the state.

7. Given the adverse technical and economic implications statewide if further corrective action was required, and the minimal benefits, if any, that would be gained by further corrective action, it is not feasible to attain background water quality at petitioner's site.

8. Detectable concentrations of BTEX in shallow groundwater in contact with the limited weathered residual petroleum hydrocarbons adsorbed to soil particles may remain above

MCLs for another decade or more and thus violate the Basin Plan objectives in a very localized, small volume of surrounding groundwater for a number of years to come.

9. Detectable concentrations of TPH-g in shallow groundwater in contact with the limited weathered residual petroleum hydrocarbons adsorbed to soil particles will likely remain above 5 ppb (the commonly accepted odor threshold for drinking water) and thus violate the Basin Plan's narrative odor objective in a very localized, small volume of surrounding groundwater for anywhere from decades to hundreds of years.

10. The determination as to what constitutes a reasonable period of time to attain water quality objectives must be based on evaluation of all relevant factors, including but not limited to the extent and gravity of any threat to public health and the environment during the period required to meet Basin Plan objectives. Although the time required to attain objectives with respect to the 5 ppb odor threshold for TPH-g in this case may be more lengthy (e.g., decades to hundreds of years) than that for BTEX (a few decades or less), it is a reasonable period of time considering the facts of this particular case, including that there are no known drinking water wells within 1,400 feet of the site, that it is highly unlikely that petroleum constituents detected in localized areas in the immediate area of the pre-1984 release will migrate substantially beyond the current (*less than* 40 feet) limited spatial extent, and that it is highly unlikely that this particular very limited volume of shallow groundwater in this particular commercial area will be used directly as a source of drinking water in the foreseeable future.

11. Therefore, no further corrective action is necessary.

12. The above conclusions are based on the site-specific information relative to this particular case.

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IV. ORDER

IT IS THEREFORE ORDERED that petitioner's case be closed, and no further action related to the release be required. The UST Cleanup Fund Manager is directed to issue petitioner a closure letter consistent with Health and Safety Code section 25299.37, subdivision (h).

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on November 19, 1998.

AYE: John Caffrey
James M. Stubchaer
Marc Del Piero
Mary Jane Forster
John W. Brown

NO: None

ABSENT: None

ABSTAIN: None

Maureen Marché
Administrative Assistant to the Board