
State Water Resources Control Board

D R A F T
UST Case Closure Summary
Mr. Benton C. Beckley (Petitioner)
Palm Springs Oil Station #1;
67-460 E. Palm Canyon Drive, Cathedral City, California (Site)

Summary:

The release from the subject Site was discovered during the removal of underground storage tanks (USTs) in 1996. The County of Riverside, Department of Environmental Health (County) staff denied the Petitioner's request for closure because assessment activities have not delineated the mass of petroleum hydrocarbons in soil. The County contends it is unknown whether benzene and other light-end hydrocarbons have migrated further downward or have naturally degraded and if petroleum hydrocarbons have migrated through fractured bedrock or cobbles and boulders to greater depths. The County asserts that closure is inappropriate because the threat to groundwater is unknown.¹

Residual petroleum hydrocarbons including tert-butyl alcohol (TBA) are present in deep soil beneath the Site and remain vertically undefined at approximately 85 feet above the first unconfined groundwater aquifer. Petroleum hydrocarbon concentrations including TBA in soil have degraded over time. Declining concentrations in vapor samples confirm that the residual petroleum mass has been reduced. The processes of diffusion and aerobic and anaerobic biodegradation will continue, allowing the residual petroleum mass to naturally attenuate over the course of decades to hundreds of years.

Land use at the Site is commercial bordered by commercial, residential, and an unlined storm-drain along the northern Site boundary. The Site is currently developed as a Payday Loans Center. Businesses and residents in the area are provided water from the local utility district. Three businesses that share the parcel above the petroleum releases rely on a septic-tank system for sewage disposal. A production well is located approximately 3,100 feet crossgradient and northeast of the Site.

Based on the facts in the record and the hydrologic and geologic conditions at the Site, the limited residual petroleum hydrocarbons, including TBA, that remain in soil do not represent a significant threat to public health, safety, or the environment. For these reasons, case closure is appropriate.

Background:

This UST Case Closure Summary has been prepared in support of a petition to the State Water Resources Control Board (State Water Board) for closure of the UST case at 67-460 E. Palm Canyon Drive, Cathedral City. All record owners of fee title for this Site as well as adjacent property owners and other interested parties have been notified of the recommendation for closure and were given the opportunity to provide comments.

¹ September 23, 2009 County Response to Petition.

Petitioner's Site is a former gasoline station. The Site is currently developed as a Payday Loans Center and shares the same parcel with a motel and a commercial office. The Site is bordered by commercial, residential, and an unlined storm-drain along the northern Site boundary. Businesses and residents in the area are provided water from the local utility district. The affected Site includes three commercial businesses that rely on a septic-tank system for sewage disposal.

The County contends it is unknown whether benzene and other light-end hydrocarbons have migrated further downward or have naturally degraded and whether petroleum releases have migrated through fractured bedrock or cobbles and boulders to greater depths. The County asserts that closure is inappropriate because the threat to groundwater is unknown.

Petitioner contends that Site conditions do not threaten public health, safety, or the environment and that the burden of additional corrective actions outweighs the need for those actions.

Case Information:

Site Name: Palm Springs Oil Station #1	Address: 67-460 E. Palm Canyon Drive, Cathedral City, 92234
Global ID: T0606500920	Petition Date: June 15, 2009
USTCUF Claim No: 14589	USTCUF Expenditures: \$83,157

Agency Information:

Agency Name: County of Riverside, Department of Environmental Health	Address: 4080 Lemon Street. 2 nd Floor, Riverside, 92501
Agency Case No: 961149	Number of Years Case Has Been Open: 14 years

Release Information:

USTs:

Tank No.	Size	Contents	Status	Date
1	5,000	Diesel	Removed	September 1996
2	5,000	Diesel	Removed	September 1996
3	10,000	Gasoline	Removed	September 1996
4	10,000	Gasoline	Removed	September 1996

- Discovery Date: November 20, 1996
- Affected Media: Deep soil; Impact to groundwater is unknown
- Source: Residual gasoline in deep coarse-grained soil
- Free Product: None reported
- Corrective Actions
 - September 1996 – Removal of four USTs
 - August 2000– Soil assessment
 - March 2003 – Soil assessment
 - March 2004 – Soil vapor extraction (SVE) test

Site Description/Conditions:

- Groundwater Basin: Indio Subbasin of the Upper Coachella Valley
- Beneficial Uses: Municipal (MUN), Agricultural (AGR), and Industrial (IND).
- Land Use: Commercial with paved parking lot.

- Septic System: A septic-tank system is used for sewage disposal.
- Distance to Nearest Supply Well: Production well approximately 3,100 feet.
- Groundwater Depth: Estimated depth is 170 feet below ground surface (bgs).
- Flow Direction in the Indio Subbasin: Southeast.
- Geology: Located near a northeastern toe of the Santa Rosa Mountains. Highly permeable alluvial deposits consisting of fine to coarse-grained sand with silt and varying amounts of gravel and cobbles or bedrock underlie the Site.
- Hydrology: Unsaturated deposits to approximately 91 feet bgs, the total depth explored; Recharge within the subbasin is infiltration of natural inflows from the San Gorgonio pass area; a groundwater replenishment program via the Coachella Valley Aqueduct; and tertiary treated wastewater. The Palm Springs Subarea is the forebay to the Indio Subbasin. Deep percolation of direct precipitation on the Palm Springs Subarea is considered negligible as it is consumed by evapotranspiration.²
- Estimate of Remaining Mass: Approximately 1,280 pounds of total petroleum hydrocarbons (TPH) as gasoline. Low levels of gasoline constituents likely remain in a narrow 60 feet column of soil beneath the Site between 25 and 85 feet bgs.
- Estimated Time to Meet Water Quality Objectives for all constituents: Decades to hundreds of years. Groundwater table at 170 feet bgs was not assessed. Threat to groundwater is unlikely.

Site History:

In 1996, four USTs were removed from two locations, northwest (two 5,000-gallon diesel) and central (two 1,000-gallon gasoline). Analytical results from soil samples indicated an impact by petroleum hydrocarbons. Hollow-stem auger and air-percussion rigs have been used to drill and collect samples for seven soil borings. A five-day SVE test was completed. Both types of drilling rigs met with refusal and thereby prevented assessment of soil below 91 feet bgs.

Contaminant Concentrations:

Over the course of corrective actions at the Site, concentrations of TPH as gasoline, TPH as diesel, benzene, toluene, ethyl-benzene and total xylenes (BTEX) and TBA have been reported in soil samples. Groundwater samples have not been collected beneath the Site.

TPH as diesel, and benzene concentrations in soil are non-detectable below 18 feet bgs. TPH as gasoline, toluene, ethyl-benzene, and TBA concentrations were found primarily between 40 and 75 feet bgs and decreased with depth down to 80 feet bgs. Total xylene concentrations were found primarily between 40 and 75 feet bgs and appear to have stabilized near 80 feet bgs.

The SVE test completed in March 2004 extracted approximately 28 pounds (4.5 gallons) of hydrocarbons during 110 hours of system operations. Hydrocarbon extraction rates decreased from an initial peak of 0.87 pound/hour during the first 40 hours to between 0.07 and 0.15 pound/hour for the remaining 70 hours of the test.

The small volume of volatile petroleum hydrocarbons extracted during the pilot test confirmed that the mass of hydrocarbons in soil is limited. The processes of diffusion and aerobic and

² Engineer's Report on Water Supply and Replenishment Assessment –
Lower Whitewater River Subbasin Area of Benefit, 2010-2011. Central Valley Water District, April 2010.

anaerobic biodegradation will continue, allowing the hydrocarbon mass to naturally attenuate for many decades to hundreds of years. Table 1 below provides a summary of soil analytical data recorded from the 2003 soil assessment.

Table 1: March 2003 Soil Assessment:

Sample	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)
B-2B-10	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-2B-15	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-2B-20	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-2B-25	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-2B-30	17	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-2B-35	2,200	<0.5	<0.5	3.2	98	<0.5	<5
B-2B-40	180	<0.005	0.0056	0.053	1.380	<0.005	410
B-2B-45	2,200	<1.3	<1.3	7.5	<137	<1.3	<13
B-2B-50	3,900	<1.3	2	76	197	<1.3	<13
B-2B-55	680	<0.13	<0.13	<0.13	1.5	<0.13	<0.13
B-2B-60	*	*	*	*	*	*	*
B-2B-65	*	*	*	*	*	*	*
B-2B-70	19	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-2B-75	3,200	<0.13	0.45	190	360	<0.13	<1.3
B-2B-80	*	*	*	*	*	*	*
B-2B-85	**	**	**	**	**	**	**
B-2B-90	**	**	**	**	**	**	**
B-3-10	0.6	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-15	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-20	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-25	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-30	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-35	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-40	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-45	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-50	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-55	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-60	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-65	*	*	*	*	*	*	*
B-3-70	*	*	*	*	*	*	*
B-3-75	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050

*No Recovery ** Sampler Refusal

Table 1 (Continued)

Sample	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)
B-3-80	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-3-85	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-10	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-15	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-20	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-25	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-30	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-35	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-40	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-45	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-50	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-55	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-4-60	*	*	*	*	*	*	*
B-4-65	*	*	*	*	*	*	*
B-4-70	*	*	*	*	*	*	*
B-5-10	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-15	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-20	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-25	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-30	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-35	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-40	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-45	<0.5	<0.005	0.0063	<0.005	<0.005	<0.005	<.050
B-5-50	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-55	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-60	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-65	*	*	*	*	*	*	*
B-5-70	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-75	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-80	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
B-5-85	<0.5	<0.005	<0.005	0.071	<0.005	<0.005	<.050
VEW-1-10	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
VEW-1-15	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
VEW-1-20	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
VEW-1-25	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
VEW-1-30	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<.050
VEW-1-35	800	<0.13	<0.13	0.13	9.1	<.013	<1.3
VEW-1-40	750	<0.25	<0.25	0.33	196	<0.25	<2.5

*No Recovery ** Sampler Refusal

Table 1 (Continued)

Sample	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)
VEW-1-45	850	<0.25	<0.25	<0.37	167	<0.25	<2.5
VEW-1-50	24	<0.13	<0.13	<0.13	2.3	<0.13	<1.3
VEW-1-55	91	<0.13	<0.13	<0.13	1.96	<0.13	<1.3
VEW-1-60	*	*	*	*	*	*	*
VEW-1-65	*	*	*	*	*	*	*
VEW-1-70	*	*	*	*	*	*	*
VEW-1-75	810	<0.25	<0.25	6.6	137	<0.25	<2.5
VEW-1-80	3,300	<0.13	<0.13	220	340	<1.3	<13

*No Recovery ** Sampler Refusal

Discussion:

The primary source of the release was removed during UST system removal activities in 1996. Residual petroleum hydrocarbons in soil remain in a narrow column of soil. Petroleum hydrocarbons were removed to the extent practical during SVE system operations in 2004. The Site is capped with asphalt. Effluent from the septic-tank system is most likely the only source of deep percolation near the Site.

1) Petroleum hydrocarbons have traveled less than 20 feet laterally from the UST release. Over the course of several corrective actions, samples have confirmed that impacted soil is limited to a narrow column of soil beneath the gasoline UST excavation.

2) SVE rates for hydrocarbons decreased from an initial peak of 0.87 pound/hour during the first 40 hours to between 0.07 and 0.15 pound/hour for the remaining 70 hours of the test. The small volume of volatile constituents extracted during the pilot test indicate that light-end hydrocarbons in soil are most likely below residual saturation levels and any existing petroleum constituents are limited in extent.

3) Depth to groundwater is estimated to be 170 feet bgs (85 feet below the residual soil contamination). Deep percolation of direct precipitation on the Palm Springs Subarea is considered negligible as precipitation in this arid region is consumed by evapotranspiration. The subject Site is capped with asphalt. Effluent from the septic-tank system is most likely the only source of deep percolation near the Site. Effluent from the nearby septic-tank leach field provides a nutrient rich bacterial environment which will assist in the natural attenuation of the residual petroleum mass.

Current and Anticipated Beneficial Uses: Groundwater in the Indio Subbasin of the Upper Coachella Valley is designated for MUN, AGR, and IND uses. Recharge within the Indio subbasin is infiltration of natural inflows from the San Gorgonio pass area; a groundwater replenishment program via the Coachella Valley Aqueduct; and tertiary treated wastewater. A production supply well is located approximately 3,100 feet northeast (crossgradient) of the Site.

The probability of petroleum hydrocarbons in soil reaching groundwater at 170 feet bgs is very low due to the processes of diffusion and aerobic and anaerobic biodegradation occurring at the Site.

Objections to Case Closure and Response:

The County contends that:

1. Assessment activities have not delineated contaminant mass in soil.

Response: Lateral and vertical delineation of the petroleum hydrocarbon mass beneath the diesel UST excavation is complete. Soil boring samples collected beneath the diesel UST excavation between 14 and 18 feet bgs in 2000 reported non detectable concentrations for all constituents. The lateral delineation of the petroleum release beneath the gasoline UST excavation is complete. Samples collected from borings B-3, B-4, B-5 and VEW-1 indicate that petroleum hydrocarbons have traveled less than 20 feet laterally from the UST release. The vertical delineation of the release has been adequately delineated. This conclusion is based on following observations; free product was not encountered, residual compounds were reported in a narrow column of soil; the highest concentrations in four out of six constituents were reported at 50 feet bgs or less. The minimal recovery of vapor during a SVE pilot test indicates the petroleum constituents are present in the subsurface below residual saturation levels.

2. It is unknown whether benzene and other light-end hydrocarbons have migrated further downward or have naturally degraded.

Response: The only residual concentration of benzene was reported at 14 feet bgs during the gasoline UST excavation in 1996. Concentrations of toluene and ethylbenzene peaked at 50 and 80 feet bgs respectively in 2000. Samples collected in 2003 indicate that concentrations of both constituents have decreased through processes of diffusion and aerobic and anaerobic biodegradation between sampling events.

Concentrations of total xylenes peaked at 360 mg/kg at 75 feet bgs in 2003. Samples collected 80 feet bgs in 2003 reported a slightly lower concentration indicating that concentrations of total xylenes had stabilized through processes of diffusion and aerobic and anaerobic biodegradation. It is unlikely that significantly higher concentrations of total xylenes would be encountered below 80 feet bgs.

3. It is unknown whether the petroleum release has migrated through fractured bedrock or cobbles and boulders to greater depths.

Response: The deepest on site soil boring B-2B was advanced to 91 feet bgs. Sampler refusal was noted at the bottom of the boring log. Geology between 72 and 91 feet bgs in this boring was described primarily as; medium dense, fine-to-coarse grained sand, overlying granitic bedrock at 91 feet bgs.

Well driller reports for two off-site water supply wells, installed approximately 600 feet northeast of the Site, describe subsurface geology between 85 and 93 feet bgs as primarily; coarse sand and gravel with boulders. Geology between 136 and 163 was described as; clay and fine to coarse sand with clay. Granitic bedrock conditions were not encountered in the two borings. The water supply wells were completed between 218 and 472 feet bgs. The geologic record supports the finding that boulders or bedrock were encountered beneath the petitioner's Site at 91 feet bgs.

Based on boring data, and the results of the SVE pilot test, it is unlikely that significant levels of petroleum hydrocarbons have migrated through 85 feet of the fine to coarse sand, gravel and boulders located below the deepest boring.

4. The threat to groundwater is unknown.

Response: As stated above; the Site is capped with asphalt and deep percolation of direct precipitation on the Palm Springs Subarea is considered negligible as nearly all precipitation is consumed by evapotranspiration. Free product was not encountered in any of the borings, residual petroleum hydrocarbon constituents were measured in a relatively narrow column of soil; the highest concentrations in four out of six petroleum constituents were detected at 50 feet bgs or less; processes of diffusion and aerobic and anaerobic biodegradation continue to degrade petroleum compounds.

For the above-mentioned reasons, further downward migration of the residual petroleum compounds encountered at 85 feet bgs to groundwater located at 170 feet bgs is unlikely. Even in the unlikely event that petroleum constituents have travelled an additional 85 feet to groundwater, the amounts and resulting impact will not threaten beneficial uses.

Closure:

Does corrective action performed ensure the protection of human health, safety and the environment? Yes

Are corrective actions and UST case closure consistent with State Water Board Resolution 92-49? Yes

Is achieving background water quality feasible?

Recharge within the subbasin is infiltration of natural inflows from the San Gorgonio pass area; a groundwater replenishment program via the Coachella Valley Aqueduct; and tertiary treated wastewater. The Palm Springs Subarea is the forebay to the Indio Subbasin. Deep percolation of direct precipitation on the Palm Springs Subarea is considered negligible as it is consumed by evapotranspiration.

The data support the concept that low levels of gasoline constituents likely remain in the soil beneath the gasoline UST excavation at 85 feet above groundwater and that fine to coarse sand, gravel, boulders, or bedrock restrict further assessment below 91 bgs. To remove all traces of residual petroleum constituents at the Site would require significant effort and cost and result in minimal benefit. In this case, the complete assessment of detectable traces of petroleum constituents has unreasonable technical and economic implications. To assess soils to 170 feet bgs would require using more robust drilling technologies, would be costly, and, would not likely reveal petroleum constituent contamination that is technically or economically feasible to remediate. It is unnecessary to require additional assessment at a Site where it is highly unlikely groundwater is affected and beneficial uses are not threatened. Thus, even if water quality may exceed background levels, it is infeasible to require additional assessment to determine the precise level of water quality present at the Site.

If achieving background water quality is not feasible, then will alternate cleanup level:

- **Be consistent with the maximum benefit to the people of the State?**
Yes. It is impossible to determine the precise level of water quality that will be attained as there is no evidence groundwater is impacted or will be impacted. Given the limited residual petroleum hydrocarbons that remain at the Site, however, and in light of all the factors discussed above, the minimal amounts of any residual petroleum constituents that may reach groundwater will not unreasonably affect present and anticipated beneficial uses of groundwater beyond the immediate vicinity of the Site of the UST excavation.
- **Unreasonably affect present and anticipated beneficial uses of water?**
No. If groundwater is impacted, the impact is minimal and will not unreasonably affect present or anticipated beneficial uses of water. Groundwater at the site is not currently used as a source of drinking water or for any other beneficial use. It is highly unlikely that the impacted groundwater will be used as a source of drinking water or for any other beneficial use in the foreseeable future because of the septic-tank system being operated near the Site.
- **Exceed water quality prescribed in applicable Basin Plan?**
No. 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 State Water Board Resolution 92-49, a Site may be closed if the basin plan requirements will be met within a reasonable time frame.

The approximate time period in which the requisite level of water quality will be met:

It is unlikely that water quality is affected by UST releases at the Site. Depth to groundwater is estimated to be 85 feet below the residual soil contamination. Deep percolation of direct precipitation on the Palm Springs Subarea is considered negligible as most precipitation is consumed by evapotranspiration. Effluent from the septic-tank system is most likely the only source of deep percolation near the Site.

Thus, even if groundwater is impacted by petroleum releases in a localized area, groundwater at the site is not used as a source of drinking water or for any other beneficial use. It is impossible to give a precise time frame in which water quality objectives will be met, however, given the site specific circumstances, and very low levels of petroleum constituents that may be present in groundwater, decades to hundreds of years is a reasonable period of potential impairment.

Have factors contained in Title 23 of the California Code of Regulations, Section 2550.4 been considered? Yes.

In approving an alternative level of water quality less stringent than background, the State Water Board has also considered the factors contained in California Code of Regulations, title 23, section 2550.4, subdivision (d). As discussed earlier, shallow groundwater is not present and impacts to groundwater in the Indio Subbasin at 170 feet bgs 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 hydrocarbons, 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 the 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 hydrocarbons; the hydrogeological characteristics of the Site and surrounding land; the quantity and quality of groundwater and direction of groundwater flow, the patterns of precipitation in the region, and the proximity of residual petroleum to surface waters.

Has the requisite level of water quality been met?


Water quality objectives, to the extent they have been exceeded for certain petroleum constituents, will be met in a reasonable period of time.

Summary and Conclusions:

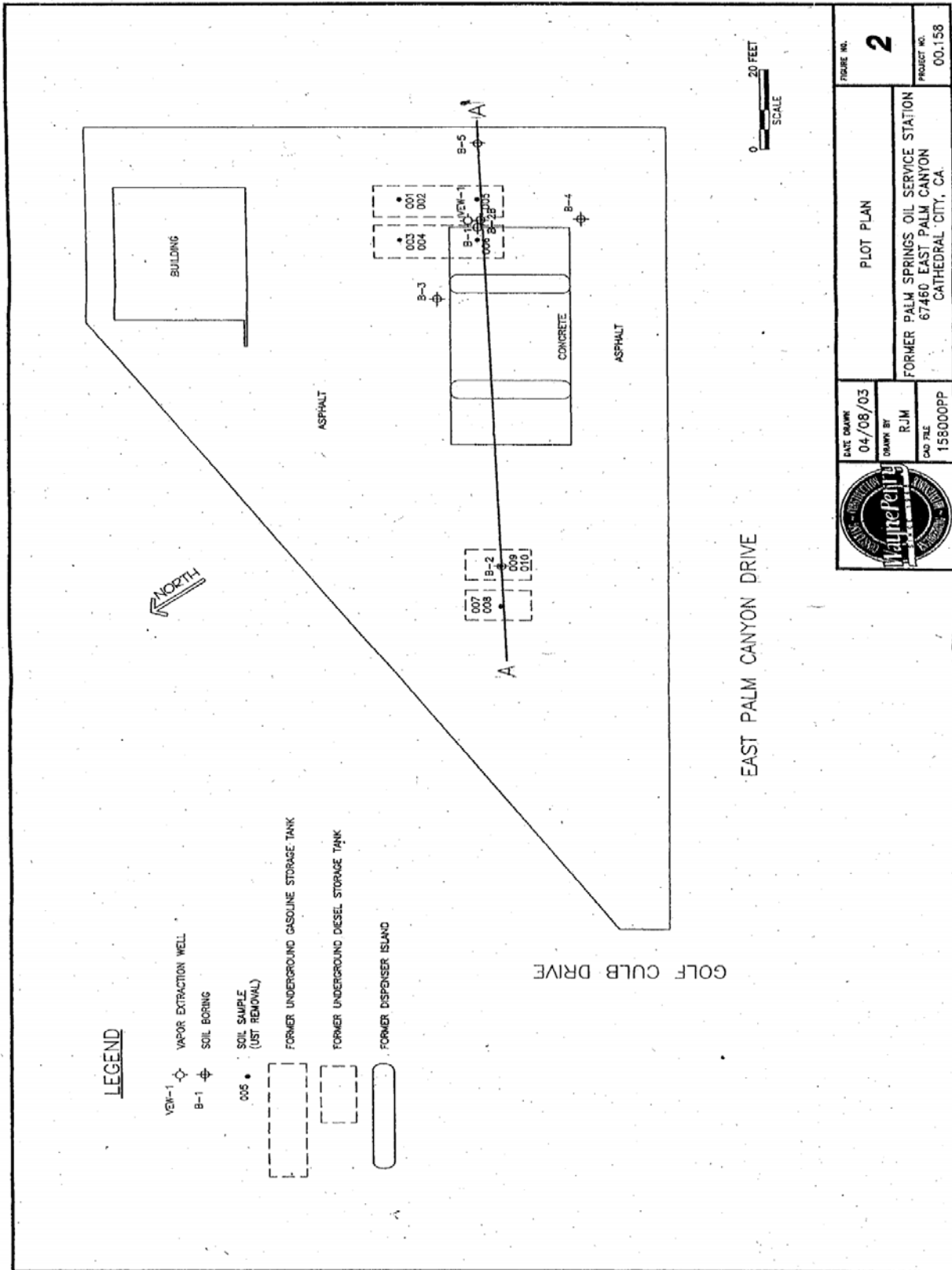
Although deep soil affected by the release from the former gasoline USTs exceeds the County soil action limits for UST cleanups for TPH as gasoline, toluene, ethyl-benzene, and total xylenes, petroleum hydrocarbons will be below action limits in a reasonable period of time. Even if groundwater is minimally affected by the release, it is highly unlikely that affected groundwater will be used as a source of drinking water or for other beneficial uses in the foreseeable future. To the extent water quality may exceed objectives for certain petroleum constituents, the impact will not unreasonably impair beneficial uses even if the period of impairment is decades to hundreds of years. Case closure is appropriate.

Prepared By: 
Benjamin Heningburg, PG#8130
Engineering Geologist

August 8, 2011
Date

Reviewed By: 
George Lockwood, PE#59556
Senior Water Resource Control Engineer

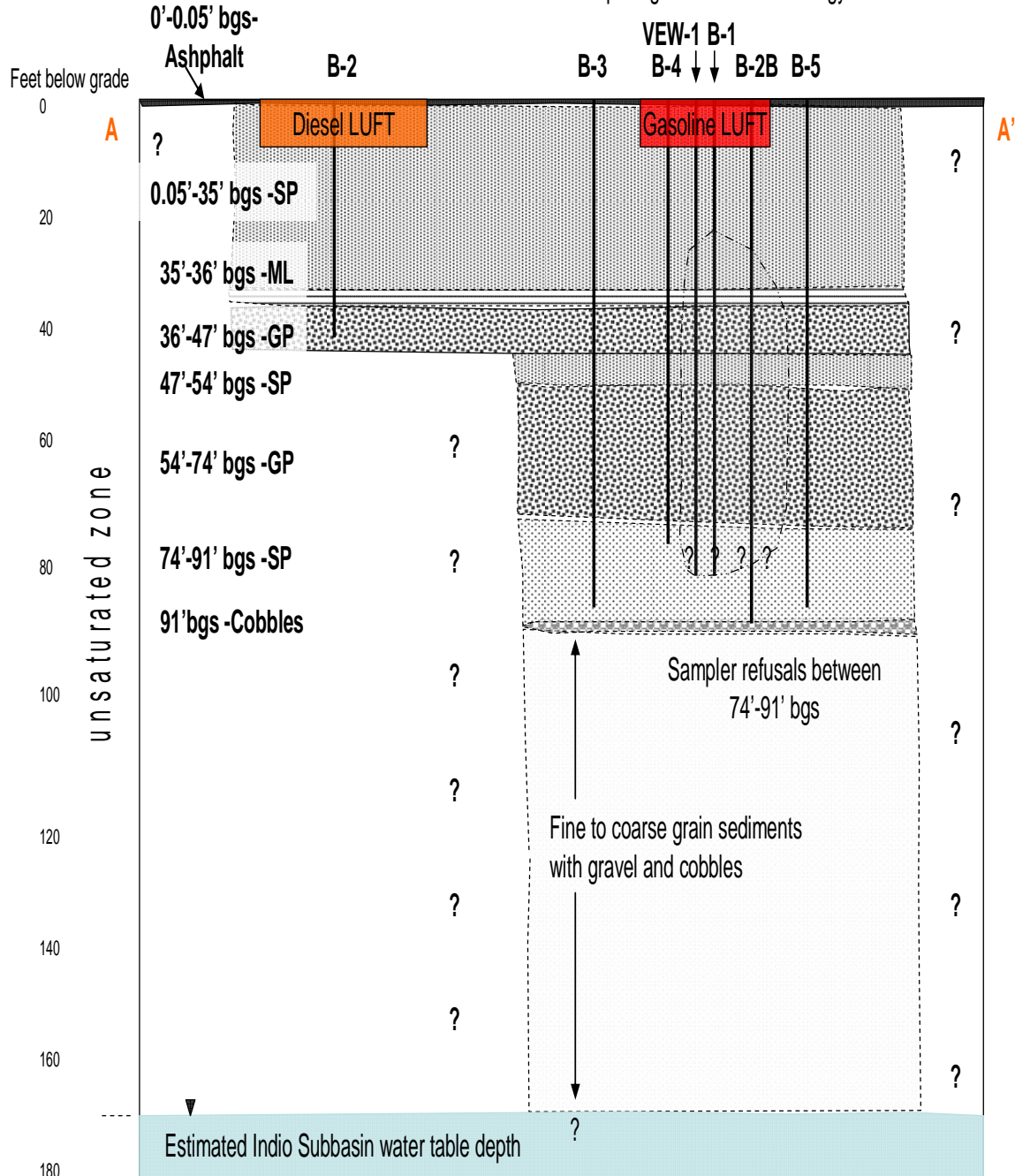
August 8, 2011
Date




	DATE DRAWN 04/08/03	FIGURE NO. 2
	DRAWN BY RJM	PROJECT NO. 00.158
CAD FILE 158000PP		
PLOT PLAN FORMER PALM SPRINGS OIL SERVICE STATION 67460 EAST PALM CANYON CATHEDRAL CITY, CA.		

Palm Springs Oil #1
67-460 East Palm Canyon Drive, Cathedral City

Residual Source Area and Generalized Cross-Section Depicting Sub-Surface Lithology



Horizontal scale: 25-feet 

Residual source area 