CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

TO: Bruce H. Wolfe
Executive Officer

FROM: Mary Rose Cassa
Engineering Geologist

DATE: February 5, 2004

SIGNATURE: _____

SUBJECT: Supporting Information for Tentative Order to Amend Site Cleanup Requirements, Napa County Flood Control and Water Conservation District, Chevron Products Company, Bay Cities Oil Marketers, Inc., Dillingham Construction N.A., Inc., Texaco, Inc., Phillips Petroleum Company, ExxonMobil Oil Corporation, Exxon Mobil Corporation, Atlantic Richfield Company, Napa, Napa County - REVISED

CONCUR:

_____
Chuck Headlee
Toxics Cleanup Division Section Leader

_____
Stephen A. Hill
Toxics Cleanup Division Chief

This staff report explains the basis for the proposed Tentative Order amending Site Cleanup Requirements Order No. 01-066 to include additional dischargers for contamination at three properties. New data pertaining to contamination at the three properties reveals that the contamination is more extensive than staff previously thought when Order No. 01-066 was adopted. Additionally, the new data show the contamination previously known to exist on the three properties is not solely from off-site sources. Specifically, staff concludes that significant discharges occurred prior to excavation, for which the former owners/operators are responsible. The Tentative Order names the following additional parties as Dischargers where substantial evidence indicates that the parties discharged pollutants to soil and groundwater:

- ExxonMobil Oil Corporation, because it is the corporate successor to Mobil Oil Corporation ("Mobil") and Mercury Oil Company, the past owners and operators of the property and facilities formerly located at 415 Oil Company Road;
- Exxon Mobil Corporation, because it is the corporate successor to Exxon Company, U.S.A. ("Exxon"), the past owner and operator of the property and facilities formerly located at 385 Oil Company Road;
- Atlantic Richfield Company ("Arco"), because it is a past owner and operator of the property and facility formerly located at 100 Oil Company Road.

Background

The Napa River/Napa Creek Flood Protection Project includes widening the Napa River by excavating riverbank soils and constructing marsh plain and flood plain terraces that may extend as far as 250 feet inland in some areas. Construction is occurring in stages, eventually covering a seven-mile stretch, extending through and south of the City of Napa. Some of the planned

improvements are located within areas of historical industrial activity, and soil and groundwater contamination has been observed at some of the properties located within these areas. One such area is known as the Consolidated Remedial Action Area, located in an industrial/commercial area situated along the east side of the Napa River, south of the City of Napa's downtown area (Figure 1). As shown in Figure 1, the Consolidated Remedial Action Area extends from 7th Street in the north, to the Nord Vineyard in the south, and eastward to the existing Napa Valley Wine Train tracks between these points. The Napa River forms the western boundary of the Consolidated Remedial Action Area.

The four properties subject to Order No. 01-066 along with the three properties described in the Tentative Order are within the Consolidated Remedial Action Area (Table 1). The properties were used primarily for bulk fuel handling.

Table 1. Consolidated Remedial Action Area Properties

Parcel Designation	Address	Major Past Owner/Operator
NR-17*	301 River Street	Dillingham Construction N.A.
NR-18*	903 8th Street	Dillingham Construction N.A.
NR-19*	477 Oil Company Road	Bay Cities Oil Marketers Chevron Products Company
NR-33*	901 8th Street	Phillips Petroleum Company Texaco, Inc.
NR-20	415 Oil Company Road	Mobil Oil Company
NR-36	100 Oil Company Road	Atlantic Richfield Company
NR-37	385 Oil Company Road	Exxon Oil Company

*Pollutant Release Site identified in Order No. 01-066

The Board adopted site cleanup requirements for four sites located at 301 River Street, 477 Oil Company Road, 901 Eighth Street, and 903 Eighth Street in Napa (Napa County) on June 19, 2001 (see Figure 1 for location). Order No. 01-066 establishes cleanup criteria for soil and groundwater, approves the Remedial Action Plan, and requires (long-term) post-construction monitoring to determine if the remedial action has been effective in reducing the impacts to receptors. The Executive Officer approved amendments to that order on March 17, 2002 (Order No. R2-2002-0033), and December 20, 2002 (Order No. R2-2002-0128). These amendments revised the compliance dates for various tasks contained in Order No. 01-066.

Figure 2 is a conceptual cross section of the Consolidated Remedial Action area showing the flood plain and marsh plain terrace excavation levels in relation to pollution, ground surface, and zone of groundwater fluctuation (smear zone). The Chevron property (NR-19) is the source of substantial groundwater pollution, including floating product. Soil pollution within the smear zone is largely attributed to the Chevron source; however, contamination of soil in the vadose zone above the smear zone, which may be from local sources, may pose a threat of groundwater pollution.

Some of the other properties not subject to Order No. 01-066, but located within the Consolidated Remedial Action Area, including NR-20, NR-36, and NR-37, were known to be or suspected of being impacted with petroleum hydrocarbons or other contaminants as a result of past petroleum-handling operations (Figure 3). At the time Order No. 01-066 was adopted, insufficient information existed to conclude that discharges occurred on these properties;

consequently, neither they nor their past owners/operators were named in Order No. 01-066. However, Board staff expected that more detailed information would come to light via the flood control project excavation. Order No. 01-066 contains the provision to name additional dischargers (Finding 20), if additional information is submitted indicating that any other party(ies) caused or permitted any waste to be discharged to any of the four identified Pollutant Release Sites or other properties within the Consolidated Remedial Action Area where the waste entered or threatened to enter the waters of the State. The Board anticipated that such information might come to light as a result of construction and remedial action activities within the Consolidated Remedial Action Area. One difference between the old data and the new data is that access for subsurface sampling prior to excavation was limited by previously existing surface structures. Once the surface was cleared for excavation, access for sampling was unencumbered. The new information is summarized below. See Attachment 1 (Sampling Methodology) for a detailed description of how the samples were collected and analyzed.

Construction in the Consolidated Remedial Action Area has occurred in two phases. Phase 1 took place from July through December 2002, and included the former Exxon, Arco and Mobil properties, as well as the former Chevron property. Phase 2 began in September 2003, and will include the former Chevron, Texaco, and Dillingham properties. Pursuant to the Site Cleanup Requirements established in Order No. 01-066, "clean" soil with concentrations of total petroleum hydrocarbons (TPH) less than 93 milligrams per kilogram (mg/kg) is being placed at the nearby Gasser property for future residential development. In 2002, 175,505 cubic yards were excavated, and 54,624 cubic yards were determined to be unsuitable for reuse and were disposed of offsite at a Class II landfill. Most of the remainder was placed at the Gasser property, but some soil was used as backfill and to construct haul roads.

Basis for Determining Significance of Release and Potential Threat to Groundwater

For the purposes of determining if a "significant release" has occurred at a site, the numbers in Table 2 serve as a guide, and it can be argued that the presence of concentrations in soil above the soil leaching levels indicates a "significant release" has occurred. For gasoline, concentrations in excess of 400 mg/kg can leach to groundwater. For middle distillates, concentrations in excess of 500 mg/kg can leach to groundwater. For residual fuels, concentrations in excess of 1,000 mg/kg can leach to groundwater. In cases where the leaching concentrations are exceeded, Board staff generally requires further investigation to determine the extent of impacts and if remediation is required. In some cases, dischargers who are required to undertake remedial investigation pursuant to a Board order may be able to determine that site-specific risks to not warrant cleanup. Nevertheless, the discharger bears the responsibility for investigation and risk assessment.

Table 2. Soil Leaching Screening Levels for Protection of Groundwater (mg/kg)[a]

Constituent	Concentration (mg/kg)
TPH (gasoline)	400
TPH (middle distillates[b])	500
TPH (residual fuels[c])	1000

[a] Massachusetts Department of Environmental Protection (1997) and RWQCB (1990)
[b] Middle distillates are comparable to diesel fuel.
[c] Residual fuels are comparable to results expressed as "motor oil."

Based on fairly extensive soil and groundwater investigations and the data available in 2001 for the former Exxon, Arco, and Mobil properties, Board staff concluded that a *significant number* of soil samples from above the zone of groundwater fluctuation *did not exceed* the threshold concentrations listed in Table 2. Board staff *did not see a connection* between what at that time appeared to be minor vadose zone petroleum residuals and the extensive petroleum pollution encountered in the underlying saturated "smear" zone, other than being caused by pollution migrating from an offsite source. Consequently, Exxon, Arco, and Mobil were not named in Order No. 01-066.

Evidence to Support Naming Additional Dischargers

In March 2003, the Flood Control District submitted the Draft Summary Report of Phase 1 Remedial Action. This report contains data representing new information that significant pollution discharges to soil and groundwater have occurred at the former Exxon, Arco, and Mobil properties. The data are summarized in Figures 4-11. For the purposes of this discussion, "TPH" refers to total petroleum hydrocarbons in the middle distillates (diesel fuel) range, the most common constituent at the three properties.

In the following discussion, Layers 0, 1A and 1B correspond to the zone between the ground surface and the flood plain design elevation (typically 7 feet NGVD[1]). These layers are generally within the unsaturated vadose zone. It is likely that petroleum in the vadose zone is from site-related activities and did not migrate from offsite. Discharges to the surface or shallow subsurface (vadose zone) from site-related activities do not move very far laterally, whereas migration from offsite usually accompanies groundwater migration and is generally restricted to the zone of groundwater fluctuation. Layers 2A and 2B correspond to the zone between the flood plain design elevation and the marsh plain design elevation (0.7 feet NGVD). Layer 2A is generally in the vadose zone; Layer 2B is generally in the zone of groundwater fluctuation. Layer 3 corresponds to the zone below the marsh plain design elevation, and represents saturated soil that required overexcavation and backfilling to meet the cleanup criteria for the marsh plain surface. (See Attachment 1 for more detail about the soil layers.) Concentrations in the vadose zone that exceed soil-leaching concentrations may be expected to contribute to local groundwater contamination; however, the relative contribution from soil above the water table to the total amount of contamination in the groundwater cannot be determined.

In considering the following information, the reader should also understand that the subsurface is a three-dimensional "maze" that is highly heterogeneous. Leaching of soil contamination rarely

[1] National Geodetic Vertical Datum is a vertical geodetic datum, formerly called "mean sea level."

confines itself to a vertical column beneath the impacted area. The downward migration of petroleum contamination may follow a "stairstep" or "dendritic" route as it follows more porous and permeable layers and lenses.

NR-20 – Former Mobil Oil Co, 415 Oil Company Road: The site was used as a bulk fuel storage and transfer facility as early as 1927 and was owned at that time by Mercury Oil Company. Three large ASTs were present. In 1928, Mercury Oil Company's interest in the property was obtained in foreclosure by General Petroleum Corporation of California. In 1959, General Petroleum Corporation merged with Socony Mobil Oil Company, Inc., a predecessor of Mobil Oil Corporation. By 1973 a UST was also present. Mobil owned the property until at least 1978. By 1992, the site was owned by G. M. Edwards and being used as a storage facility for paving materials. The site was also used by Vintage Contractors, Inc. as a storage facility for special material and equipment used by the tenant to resurface tennis courts. Extensive investigation work performed pursuant to Board Order No. 96-131 failed to demonstrate that past operations at this site had resulted in any significant discharges, although isolated samples containing up to 12,000 mg/kg TPH were collected from ground surface to about 5 feet NGVD (about 8 feet below ground surface; above shallow groundwater). Little connection was found between high petroleum impacts to groundwater and the relatively isolated impacts of the overlying vadose zone (represented by four discrete samples with concentrations greater than 1,000 mg/kg). In March 2000, Board Order No. 96-131 was rescinded and a No Further Action Letter issued. Table 3 summarizes information available in 2001.

Table 3. 2001 Sample Data for NR-20 – Discrete Samples (Remedial Action Plan, 2001)

Layer	Elevation (ft NGVD)	Number of Samples	Number of Samples by Concentration Range (mg/kg)[a]			
			ND (<10)	10-499	500-999	≥ 1,000
0 and 1A	Ground surface to 10	15	9	5	1	0
1B	10 to 7	15	9	6	0	0
2A	7 to 4	27	17	6	0	4
2B[b]	4 to 0.7	32	4	15	1	12
3	0.7 to -4.3	24	13	9	1	1

[a] Total TPH

[b] In smear zone; part of shallow groundwater zone (shaded)

The new information reveals the following:

- Figures 3 and 4: Surface releases (138-1530 mg/kg) in the vicinity of former gasoline/diesel/heating oil above-ground storage tanks (ASTs) that were owned or used by Mobil or its predecessor companies; contiguous with similar concentrations in Layer 1B and "significantly impacted"[2] soil in Layer 2A.
- Cross Section A-A' (Figure 8): "Significantly impacted" soil and concentrations up to 1370 mg/kg at surface (in the vicinity of former 25,000-gallon and 15,900-gallon ASTs that were owned or used by Mobil or its predecessor companies). Contiguous cells of "significantly impacted" soil to groundwater.

[2] For the purposes of this report, "significantly impacted" refers to soil that, based on odor or appearance, was considered to be contaminated above the reuse criteria and was not subjected to laboratory analysis. The actual concentration of TPH in these samples is not known, and would be expected to vary, depending on the TPH constituents. For the most part, however, it is reasonable to expect that such soils pose a nuisance and, at a minimum, a potential threat of leaching to groundwater.

- Cross Section B-B' (Figure 9): Concentrations up to 1530 mg/kg at the surface in the vicinity of a former 21,000-gallon diesel AST that was owned and/or used by Mobil or its predecessor companies. Contiguous cells with measurable or observable impacts from surface to Layer 2B/groundwater zone.

Table 4 summarizes the new information for NR-20. This information indicates that the contamination is associated with former structures that were owned or used by Mobil or its predecessor companies for bulk fuel storage and transfer activities and serves as evidence to support naming Mobil as a discharger. Activities by successor owners/operators of NR-20 included storage of paving materials and tennis-court resurfacing material and are not likely to have contributed substantially to onsite petroleum releases.

Table 4. Summary of New Information for NR-20 – Composite Samples

Layer	Elevation (ft NGVD)	Number of Samples	Number of Samples by Concentration Range (mg/kg) [a]			
			ND (<10)	10-499	500-999	≥ 1,000[b]
0 and 1A	Ground surface to 10	30	6	18	3	3
1B	10 to 7	30	17	12	0	1
2A	7 to 4	31	15	9	1	6
2B[c]	4 to 0.7	34	5	7	3	19
3[d]	0.7 to -4.3	32	N/A	N/A	N/A	N/A

[a] Total TPH from the Draft Summary Report
[b] Includes field-rejected sample grids. Based on visible staining or odor, these grids were considered contaminated and not subjected to laboratory analysis.
[c] In smear zone; part of shallow groundwater zone (shaded)
[d] Zone of overexcavation. No analysis performed because soil was obviously impacted.

NR-36 – Former Arco Oil Terminal, 100 Oil Company Road: In 1925 the site was owned by the Richfield Oil Co., who operated a bulk oil distribution facility until 1973. Seven ASTs stored gasoline, diesel fuel, and heating oil. By 1974 the site was sold and all tanks were removed. As of 1975, the site was occupied by Johnson's Roofing Company. A series of soil and groundwater investigations demonstrated that groundwater was significantly impacted on the property, but discharges to surface and subsurface soils appeared to be very low, and were not considered to be at levels consistent with being the cause of the high levels of groundwater pollution found there. Further, Arco's consultant provided data showing preferential migrations pathways in the subsurface, suggesting the groundwater pollution source was located at 477 Oil Company Road. Given this information, Board staff issued a No Further Action letter on October 12, 2000. Table 5 summarizes the information available in 2001.

Table 5. 2001 Sample Data for NR-36 – Discrete Samples (Remedial Action Plan, 2001)

Layer	Elevation (ft NGVD)	Number of Samples	Number of Samples by Concentration Range (mg/kg) [a]			
			ND (<10)	10-499	500-999	≥ 1,000
0 and 1A	Ground surface to 10	1	0	1	0	0
1B	10 to 7	12	10	2	0	0
2A	7 to 4	7	2	5	0	0
2B[b]	4 to 0.7	8	2	3	1	2
3	0.7 to -4.3	2	0	1	0	1

[a] Total TPH
[b] In smear zone; part of shallow groundwater zone (shaded)

The new information reveals the following:

- Figures 3 and 4: Concentrations up to 1200 mg/kg in surface soil near a former "truck loading rack." Similar concentrations continue to depth. Concentration of 996 mg/kg at the landward end of a former pier. These locations are consistent with Arcos bulk oil distribution activities.
- Cross Section A-A' (Figure 8): Measurable concentrations at the surface, in the vicinity of a former structures that were owned or used by Arco, including "truck unloading area," 20,000-gallon ASTs, and pump house; measurable concentrations in Layer 1B; up to 1146 mg/kg in Layer 2A; contiguous with "significantly impacted" soil in Layer 2B/groundwater zone.
- Cross Section B-B' (Figure 9): 66 to 1200 mg/kg at the surface; contiguous cells with 136 to 700 mg/kg from surface to Layer 2B/groundwater zone beneath the "truck loading rack;" contiguous with 570 mg/kg in Layer 2A on NR-36.
- Cross Section C-C' (Figure 10): Measurable or observable impacts from surface to groundwater; "significantly impacted" in Layer 2A is contiguous with "significantly impacted" in Layer 2B.

Table 6 summarizes the new information for NR-36. This information indicates that the contamination is associated with former structures that were owned or used by Arco for bulk oil distribution activities and serves as evidence to support naming Arco as a discharger. The successor owner/operator of NR-36 was a roofing company that is not likely to have contributed substantially to onsite petroleum releases.

Table 6. Summary of New Information for NR-36 – Composite Samples

Layer	Elevation (ft NGVD)	Number of Samples	Number of Samples by Concentration Range (mg/kg) [a]			
			ND (<10)	10-499	500-999	≥ 1,000[b]
0 and 1A	Ground surface to 10	39	13	24	1	1
1B	10 to 7	39	17	22	0	0
2A	7 to 4	40	26	9	1	4
2B[c]	4 to 0.7	44	9	7	1	27
3[d]	0.7 to -4.3	24	N/A	N/A	N/A	N/A

[a] Total TPH from the Draft Summary Report
[b] Includes field-rejected sample grids. Based on visible staining or odor, these grids were considered contaminated and not subjected to laboratory analysis.
[c] In smear zone; part of shallow groundwater zone (shaded)
[d] Zone of overexcavation. No analysis performed because soil was obviously impacted.

NR-37 – Former Exxon Oil Terminal, 385 Oil Company Road: From 1934 to 1967 the site was owned by the Standard Oil Company and operated as a bulk fuel storage and distribution facility. From 1967 to 1973, the site was owned by the Humble Oil and Refining Company. In January 1973 Humble changed its name to Exxon Company, U.S.A. The site was sold later in 1973 to Bill and Delores Long, who operated a roofing company at the site. From 1980 to 1989 a UST was also located on the site. Soil samples from more than one investigation indicated low concentrations or non-detect for petroleum hydrocarbons. On October 3, 1996, Board staff issued a No Further Action letter for the site, concluding that the presence of elevated concentrations of petroleum hydrocarbons at depth, detected as a result of a February 2000 investigation, "might be attributable to off-site sources." Table 7 summarizes the information available in 2001.

Table 7. 2001 Sample Data – Discrete Samples (Remedial Action Plan, 2001)

Layer	Elevation (ft NGVD)	Number of Samples	Number of Samples by Concentration Range (mg/kg)[a]			
			ND (<10)	10-499	500-999	≥ 1,000
0 and 1A	Ground surface to 10	3	3	0	0	0
1B	10 to 7	5	5	0	0	0
2A	7 to 4	4	3	1	0	0
2B[b]	4 to 0.7	4	3	1	0	0
3	0.7 to -4.3	1	1	0	0	0

[a] Total TPH

[b] In smear zone; part of shallow groundwater zone (shaded)

The new information reveals the following:

- Figures 3 and 4: 2700 mg/kg in surface soil at the landward end of a former pier. Widespread surface contamination elsewhere; does not appear to be associated with storage structures.
- Cross Section A-A' (Figure 8): Concentrations of 470 to 1100 mg/kg in Layers 1A and 1B; contiguous with concentrations up to 1640 mg/kg in Layer 2B/groundwater zone.
- Cross Section B-B' (Figure 9): Contiguous cells with measurable or observable impacts from surface to Layer 2B/groundwater zone.
- Cross Section C-C' (Figure 10): Measurable concentrations in Layer 1A/1B (in the vicinity of former "ASTs") appear connected to 1340 mg/kg in Layer 2A (contiguous with 1660 mg/kg in Layer 2B).
- Cross Section D-D' (Figure 11): 3190 mg/kg in Layer 2A is contiguous with cells with measurable concentrations.

Table 8 summarizes the new information for NR-37. This information indicates that contamination is present that is related to fuel handling activities of Exxon/Humble, and serves as evidence to support naming Exxon as a discharger. The successor owners/operators of NR-37 included a roofing company and landscape services company, which are not likely to have contributed substantially to onsite petroleum releases.

Table 8. Summary of New Information for NR-37 – Composite Samples

Layer	Elevation (ft NGVD)	Number of Samples	Number of Samples by Concentration Range (mg/kg)[a]			
			ND (<10)	10-499	500-999	≥ 1,000[b]
0 and 1A	Ground surface to 10	46	6	36	2	2
1B	10 to 7	46	15	29	1	1
2A	7 to 4	47	32	12	1	2
2B[c]	4 to 0.7	48	21	13	3	11
3[d]	0.7 to -4.3	13	N/A	N/A	N/A	N/A

[a] Total TPH from the Draft Summary Report
[b] Includes field-rejected sample grids. Based on visible staining or odor, these grids were considered contaminated and not subjected to laboratory analysis.
[c] In smear zone; part of shallow groundwater zone (shaded)
[d] Zone of overexcavation. No analysis performed because soil was obviously impacted.

Comments From Potential Responsible Parties

While considering the new information and the potential to name additional Dischargers, Board staff received letters and telephone calls from representatives for ExxonMobil[3] and Arco. Arguments presented on behalf of ExxonMobil included (1) absence of data indicating significant new information, (2) legal issues concerning responsibility of ExxonMobil, and (3) RWQCB should not name dischargers for action which has been completed. Arguments presented on behalf of Arco included (1) excavation is largely complete and (2) cost-recovery and allocation proceedings are pending (mediation took place in October; the trial is set for May 2004). Responses are summarized below:

- NR-20 – Former Mobil Oil Co, 415 Oil Company Road: Order No. 00-019, which rescinded Order No. 96-131, included the following: "The results of the subsurface investigation indicated that groundwater (smear zone) beneath the property has been impacted by off-site releases. The results also indicated that soil in the vadose zone has been impacted by on site releases to such a minor degree that remedial actions are not required. … Based on data that are on file with this office the residual pollutants in the vadose zone are stabilized and contained and are not of sufficient concentrations to pose a threat to water quality objectives. All piping systems and other appurtenant structures including the five above ground storage tanks, have been removed." The new information reveals the presence of surface releases (138-1530 mg/kg and "significantly impacted") that are contiguous with similar concentrations at depth and extend to the zone of groundwater fluctuation. These releases are in proximity to former structure associated with Mobil's past operations at the site.

  When the Board staff issued the NFA letter to Mobil, the Board was aware of the District's planned acquisition of the property, and its planned excavation activities associated with the Napa Flood Control Project. In fact, the NFA letter specifically referred to the Project, and included the following: "… should new evidence be uncovered that a major discharge did occur as a result of Mobil's past operations,

[3] "ExxonMobil" is the collective term for ExxonMobil Oil Corporation (successor to Mobil Oil Corporation) and Exxon Mobil Corporation (successor to Exxon Company, U.S.A).

particularly during the course of construction work related to the future Napa Flood Control Project at this site, the Board will reopen this case and will hold Mobil Oil Company responsible for any additional investigation and cleanup that may be required as a result of that discharge." The new data provide a basis to conclude that TPH in soil above the water table was discharged during the time Mobil owned or used the site for bulk fuel storage and poses a threat to groundwater quality. The relative contribution from soil above the water table to the total amount of contamination in the groundwater cannot be determined. Further, appropriate soil management is part of the cleanup.

- NR-37 – Former Exxon Oil Terminal, 385 Oil Company Road: The pier for oil deliveries is absent in 1966 and 1975 aerial photographs, which bracket the period that Humble Oil and Refining Company owned and operated the facility. However, this does not rule out the possibility of receiving and delivering fuel by tanker truck and railroad.

  When Board staff issued the No Further Action letter dated October 23, 1996, Board staff did not have sufficient information to hold Exxon responsible for groundwater impact on the property. This determination was upheld in a July 21, 2000 letter, in which Board Staff stated that the former Mobil plant and former Exxon terminal would not be included in the proposed SCRs. The new data provide a basis to conclude that TPH in soil above the water table is related to Exxon's activities at the site and poses a threat to groundwater quality. The relative contribution from soil above the water table to the total amount of contamination in the groundwater cannot be determined. Further, appropriate soil management is part of the cleanup.

- Successor activities: Activities by successor owner/operators of the three properties included storage of paving materials and tennis-court resurfacing material (NR-20), roofing companies (NR-36 and NR-37), and a landscape services company (NR-37). Board staff does not believe that any of these activities was likely to have contributed substantially to the pervasive soil contamination that has been documented at the properties.

  The district has conducted numerous assessments and physical evaluations of the subject properties, including trenching and excavation. Stockpiled soils were placed on plastic and covered with plastic, pending analysis and disposal. Board staff does not believe the District's soil removal and stockpiling activities are sufficient to have created the observed impacts.

- Basis for determining significance of release: The new data provide a basis to conclude that TPH in soil above the water table was discharged during the time Mobil (or one of its predecessor companies) and Exxon owned or used the sites for bulk fuel handling and poses a threat to groundwater quality. The relative contribution from soil above the water table to the total amount of contamination in the groundwater cannot be determined. Further, the contaminated soil at the surface posed a threat to surface water quality during flood events.

- State Board Order 92-13 (Wenwest): State Board Order 92-13 has limited, if any, application in this case. In Wenwest, the State Board held it was inappropriate to name as a responsible party Wendy's International, which purchased contaminated property

specifically for the purpose of conveying it to a franchisee, owned the property for a brief time (four months), and, among other factors, had nothing to with the activity that caused the discharge. This case is very different from Wenwest. Here, Exxon's and Mobil's ownership were not brief and there is evidence that their activities caused discharges of pollutants. This evidence includes documented elevated concentrations of TPH in the vadose zone in proximity to former fuel storage structures that were owned or used by Mobil or its predecessor companies and is related to Exxon's fuel handling activities.

- State Board Order 2002-0021 (Mohammadian): State Board Order 2002-21 dealt with the criteria for removing a responsible party from a Cleanup and Abatement Order and has limited application here. Further, that case was decided after Board staff issued the No Further Action letters to Exxon, Arco, and Mobil. There is no basis to conclude that once a closure letter is issued, the responsible cannot be held liable anymore. In the case of the Exxon, Arco, and Mobil properties, despite the NFA letters, there is new evidence of contamination remaining at the sites (at levels that are higher than previously known) for which ExxonMobil and Arco are responsible, and they should be named as dischargers.

- Water Code Section 13304(f): Water Code 13304(f) section holds that 13304 does not create a liability for acts before 1/1/81, provided that such act were legal. An unpermitted discharge of waste to waters of the state even prior to 1981 was not legal.

- Cleanup status: The cleanup is not complete; Order No. 01-066 requires ongoing monitoring (Task 5, Post-Construction Monitoring Plan). If adequate cleanup is not demonstrated by monitoring, additional cleanup may be required. Task 9, Post-Construction Contingency Plan, requires specific responses to problems identified as a result of residual contamination causing or threatening adverse effects on beneficial uses in the project area.

- Pending mediation/litigation: The Board has no guarantee that the outcome of the proceedings will achieve the desired result of formally naming responsible parties. The amendment should not be delayed, pending resolution of the mediation/litigation.

Recommendation

Name ExxonMobil Oil Corporation as a Discharger because it is the corporate successor to Mobil Oil Corporation ("Mobil") and Mercury Oil Company, the past owners and operators of the property and facilities formerly located at 415 Oil Company Road, where substantial evidence, cited in this report, indicates that Mobil discharged pollutants to soil and/or groundwater.

Name Exxon Mobil Corporation as a Discharger because it is the corporate successor to Exxon Company, U.S.A. ("Exxon"), the past owner and operator of the property and facilities formerly located at 385 Oil Company Road, where substantial evidence, cited in this report, indicates that Exxon discharged pollutants to soil and/or groundwater.

Name Atlantic Richfield Company ("Arco") as a Discharger because it is a past owner and operator of the property and facility formerly located at 100 Oil Company Road where

substantial evidence, cited in this report, indicates that it discharged pollutants to soil and/or groundwater.

Figures

1. Napa River Flood Protection Project Site Boundary Map
2. Conceptual Cross Section for the Consolidated Remedial Action Area
3. Former Oil Terminal Structures and Cross Section Locations
4. TPH Soil Characterization – Phase 1 / Layer 1A
5. TPH Soil Characterization – Phase 1 / Layer 1B
6. TPH Soil Characterization – Phase 1 / Layer 2A
7. TPH Soil Characterization – Phase 1 / Layer 2B
8. Phase 1 Excavation Results – Cross Section A-A'
9. Phase 1 Excavation Results – Cross Section B-B'
10. Phase 1 Excavation Results – Cross Section C-C'
11. Phase 1 Excavation Results – Cross Section D-D'

Attachments

1. Sampling Methodology

Figures 1-11

Attachment 1 - Sampling Methodology

The soil sampling was conducted using composite sampling of grid-cell "cubes" of soil to evaluate the concentrations of chemicals of concern in soils to be excavated. The information was used to help determine if excavated soil could be reused at the nearby Gasser Site, or if off-site disposal was required. The methodology does not lend itself to identifying discrete layers or lenses of contamination, or to specific identification of source areas. The results for a given grid cell may represent contamination in a layer or lens that is only partly within that cell (composite results may be biased low; results are effectively an average for that cell).

Four-into-one composite samples were collected at a frequency of one per 100 cubic yards (cy) in impacted areas, and one per 200 cy in non-impacted areas. The 25-foot by 30-foot grid square was selected to facilitate several aspects of the sampling program. This grid square size accommodates an approximate 200-cy volume for soil lift thicknesses of 6.0 to 7.5 feet, which is a typical lift thickness of both Layer 1 and Layer 2. The 200-cy soil volume accommodates the volume-based sampling frequencies required for characterizing soil for reuse at the Gasser site (either requiring one or two composite samples depending on whether collected in an impacted area or not).

As shown in Figure A-1, Layer 1 corresponds to the zone between the ground surface and the flood plain design elevation (typically 7 feet NGVD). Layer 2 corresponds to the zone between the flood plain design elevation and the marsh plain design elevation (0.7 feet NGVD). The grid area also accommodates the square-footage-based sampling frequencies of the soil cleanup confirmation samples at the design elevations and in areas of over-excavation. The sample layers were further divided for sampling purposes into Layers 1A and 1B, and Layers 2A and 2B, representing the upper and lower approximately 3 feet, respectively, in each of Layers 1 and 2. In addition, all soils in Layer 1 above an elevation of 14 feet NGVD were identified as Layer 0. One 4-into-1 composite sample was also collected from Layer 0 for every approximately 100 cy. Some samples from adjacent partial grids along the riverbank were combined for characterization purposes as long as the total soil quantity represented by the samples was not greater than 100 or 200 cy, depending on the area being sampled.

Each grid cell represents approximately 100 cy of soil for each 3-foot layer. The soil samples in each grid were obtained directly from a backhoe bucket in 2-inch diameter by 6-inch long brass or stainless steel sample tubes, which were sealed with Teflon tape and caps at each end, labeled, and placed on ice pending delivery to the laboratory for compositing and analysis

Analyses for total petroleum hydrocarbons (comprising dozens of individual chemicals; commonly referred to as TPH) group these chemicals according to their carbon chain length and volatility into the following common mixtures: TPH-gasoline (TPHg); TPH-diesel (TPHd), and TPH-motor oil (TPHmo). TPHg is measured using a "purgeable" method. TPHd and TPHmo are measured using an "extractable" method.

TPH-purgeable analysis is applicable to the determination of volatile petroleum products in environmental media using a purge and trap technique. TPH-extractable analysis is applicable to the determination of semivolatile to nonvolatile petroleum fuel products in environmental media using a solvent extract or an ultrasonic extraction procedure. Both analyses are performed in

accordance with the procedures specified in Appendix D of the State of California Leaking Underground Fuel Tank Field Manual: Guidelines for Site Assessment, Cleanup, and Underground Storage Tank Closure (State Water Resources Control Board, 1989) and in EPA Method 8015A. For TPH-extractables, the extract is passed through silica gel, which extracts the vegetable oil fractions, leaving the petroleum fraction. This technique avoids detections of naturally-occurring biogenic compounds that may be in soil or water and could interfere with the accurate identification and quantitation of petroleum hydrocarbons. All samples analyzed for TPH-d and TPH-mo at the off-site, fixed laboratory were cleaned using this technique.

The on-site mobile laboratory could not efficiently perform the cleanup procedure on all samples under field conditions. To investigate the effects of performing the cleanup procedure on sample results, the on-site mobile laboratory performed a project-specific study. The purpose was to determine the range of sample results that would potentially change from greater than project action limits to less than project action limits by removing the biogenic hydrocarbons from the sample matrix using silica gel cleanup. The results of the study showed that when initial sample results (before silica gel cleanup) ranged from the project action limit to two times the project action limit, six out of nine sample results were reduced to less than the project action limit after reanalysis using the cleanup procedure. No samples with initial results (before cleanup) greater than two times the project action limit were reduced to less than the project action limit after reanalysis using the cleanup procedure.

To maintain the required sample throughput, the results of the project-specific study were used to develop the following protocol:

- Samples initially analyzed for TPHd and TPHmo without performing silica gel cleanup that had results <u>below the project action limit</u> did not require further reanalysis using the cleanup technique
- Samples initially analyzed for TPHd and TPHmo without performing silica gel cleanup that had results <u>greater than the project action limit, but not more than two times the project action limit</u> would be reanalyzed using silica gel cleanup in order to obtain more accurate results.
- Samples initially analyzed for TPHd and TPHmo without performing silica gel cleanup that had results <u>greater than two times the project action limit</u> were not reanalyzed using silica gel cleanup because reanalysis would not change a project decision

Soil in some grid layers, based on odor or visible staining, was considered to be contaminated above the Gasser reuse criteria ("significantly impacted") and was not subjected to laboratory analysis. The actual concentration of TPH in these samples is not known, and would be expected to vary, depending on the TPH constituents. For the most part, however, it is reasonable to expect that such soils pose a nuisance and, at a minimum, a potential threat of leaching to groundwater.

Comparison to Earlier Sampling Methods

The soil data that were acquired before Order No. 01-066 was issued were based on "conventional" methods of environmental site investigation. These methods involved obtaining bore-hole samples by hollow-stem auger drilling or direct-push hydraulic methods. Both

methods yield a one- or two-dimensional glimpse below the ground surface. A conventional 6-inch sample tube yields information about a volume of soil that is about 2 inches wide and 6 inches long (38 cubic inches). Due to the inherent heterogeneous nature of soil and sediment, the specific piece of the core that is analyzed may or may not represent the entire 38-cubic-inch sample, and the 38-cubic-inch sample may or may not represent the volume of soil in the vicinity of the bore hole. Continuous cores of three feet or more in length help to evaluate the vertical component of the subsurface, but only discrete samples are selected for analysis and are, thus, similar to the more common 6-inch sample tube. The advantage of continuous cores is that they allow for visual observation of the vertical component of the subsurface. Nevertheless, subsurface sampling using conventional methods provides an incomplete picture, and does not allow evaluation of "connectedness" of contamination that may have a horizontal or sub-vertical component.

The sampling methods used during the Phase 1 excavation, on the other hand, allow visual observation of soil in the back-hoe bucket (several cubic feet), as well as the observation of the excavation (a three-dimensional view). The composite sample that is analyzed represents the volume of soil in the grid-cell cube, and is likely biased low due to the heterogeneous distribution of soil types (clay, sand, silt) and TPH. Consequently, analytical results from composite samples suggest that one of the samples comprising the composite could be very high while the remainder of the samples comprising the composite could be quite low.