STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

STAFF SUMMARY REPORT – Cherie McCaulou
MEETING DATE: January 14, 2009

ITEM: 6.A

SUBJECT: **Hexion Specialty Chemicals, Inc., for the property located at 41100 Boyce Road, Fremont, Alameda County**- Adoption of Final Site Cleanup Requirements

CHRONOLOGY: September 1991 - Site Cleanup Requirements adopted
June 2005 - Amendment to Site Cleanup Requirements

DISCUSSION: Hexion Specialty Chemicals (formerly Borden Chemical) is a large producer of binder, adhesive, coating, and ink resins for industrial applications. It has operated at its current location in Fremont since 1960 (see Appendix A for location map and site layout). Historic spills and leaks have impacted soil and shallow groundwater beneath the site. The deeper Newark Aquifer has not been impacted, and impacts do not extend offsite. The primary chemicals of concern include trichloroethene, tetrachloroethene, cis-1,2-dichloroethene, 1,1,1-trichloroethane, 1,1-dichloroethene, vinyl chloride, diesel, methanol, and formaldehyde.

Hexion's proposed cleanup plan includes the following:

- A shallow groundwater extraction and treatment system operating continuously in the solvent plume area using eight to twelve wells, and batch extraction with one or more wells in the diesel/methanol plume area. Operation of this system is necessary to prevent off-site migration of chlorinated volatile organic compounds. Periodically, the system will be evaluated and modified to allow for testing and alternative configurations needed to implement in-situ remedial strategies proposed in subsequent phases.

- Soil excavation to remove 500 to 1,000 cubic yards of solvent-impacted soil in Hexion's former drum storage area and resin warehouse loading dock area. The need for excavation of soil in the methanol/diesel plume area will be evaluated.

- Enhanced biological remediation to destroy solvents in groundwater by using in-place natural processes. Pilot testing will be conducted initially, followed by full-scale design.

The Revised Tentative Order (Appendix A) requires Hexion to implement its cleanup plan and sets cleanup standards for soil, soil gas, and groundwater that are protective of human health and the environment. It also requires a deed restriction in order to notify any future site owners of sub-surface contamination, prohibit residential land use, and prohibit the use of groundwater beneath the site as a source of drinking water until cleanup standards are met.

We circulated a tentative order for review to Hexion and interested parties. We received written comments from the Alameda County Water District and e-mailed comments from Arcadis on behalf of Hexion (Appendix B). We prepared a "response to comments" that addresses all the comments (Appendix C), and we revised the tentative order as appropriate. All parties are in support of the cleanup methods proposed in the Revised Tentative Order. The District had minor editorial comments, and requested four wells be added to the Self-Monitoring Plan (SMP) and that additional characterization address groundwater as well as soil. The Revised Tentative Order includes the addition of four wells to the SMP and accepts most of the District's editorial comments. The Board or the Executive Officer can modify the SMP (including the number of wells to be monitored) in future as site conditions change.

We expect this item to remain uncontested.

RECOMMEN-
DATION: Adopt the Revised Tentative Order

File No.: 01S0259 (CCM)
Appendices: A – Revised Tentative Order
B – Correspondence
C – Response to Comments

Appendix A – Revised Tentative Order

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

REVISED TENTATIVE ORDER

**FINAL SITE CLEANUP REQUIREMENTS
AND RESCISSION OF ORDER NO. R2-2005-0024 FOR:**

HEXION SPECIALTY CHEMICALS, INC.

for the property located at

**41100 BOYCE ROAD
FREMONT, ALAMEDA COUNTY**

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter Board or Water Board), finds that:

1. **Site Location**: The Hexion property (the "Site") is a generally flat 30-acre parcel located at 41100 Boyce Road, Fremont, Alameda County. The Site lies about 6.5 miles south of Highway 84, one mile west of Highway 880, and 2.5 miles east of the San Francisco Bay (Figure 1). The nearest tidal water body is the Mowry Slough located almost one mile southwest, downgradient, and 20 feet lower in elevation than the ground surface at the Site. A county flood control channel is located on the south-southeast side of the property. Land use in the vicinity of the Site is industrial and commercial, and the Site is zoned for industrial use. Southern Pacific Railroad parallels the Site to the southeast and rail spurs are used by the facility for delivery of process chemicals. Commercial and industrial facilities are located across Boyce Road and to the northeast behind the Site. A home construction materials manufacturer, Certainteed, is adjacent to the Site on the northwest.

2. **Site History**: Hexion (formerly Borden Chemical) has operated the facility at the Site since 1960, and the layout has not changed significantly. All areas of the Site are currently occupied by Hexion. Existing major structures include a formaldehyde plant, a formaldehyde resin processing plant, three warehouses, an administrative office building, a lab and maintenance shop, several truck loading facilities, cooling towers, rail lines, and above ground storage tanks. The adhesives warehouse that operated until 1988 and the ink plant that operated until 1982 are both currently vacant. A former drum storage area is located adjacent to the adhesives warehouse. Figure 2 shows the existing Site layout.

   A wide range of process-chemical compounds and mixtures including formaldehyde, phenol-formaldehyde resins, urea-formaldehyde resins, alcohol, methanol, chlorinated and non-chlorinated organic solvents, ketones, glycols and diesel have been stored, used, and handled at the Site.

Shallow groundwater monitoring began in 1977 as part of Waste Discharge Requirements specified in Order No. 77-51. Groundwater contamination was first documented in 1983, when toluene was detected at up to 20 parts per million in groundwater in the excavation immediately following the removal of underground storage tanks (USTs) at the ink manufacturing facility (Groundwater Technology, Inc., July 1992). In 1987, an acetone product loss triggered the installation of monitoring wells in another UST area. Ensuing field investigations directed by the Water Board detected chemicals in soil and groundwater across the Site from UST chemical releases, surface spills, and pipeline leaks. Releases and surface spillage at the former USTs are believed to be the major sources of impact to the subsurface. To date, eleven areas of concern have been defined as representing the areas of historical impact, as shown in Figure 2, Site Plan and listed below:

Areas of Concern Soil and Groundwater	Primary Chemicals	Grouping for Remediation
Area A – former USTs AT-1, AT-2, AT-3, AT-4, & RT-45	Methyl Ethyl Ketone Acetone	Area 1 – Volatile Organic Compound (VOC) Plume Area
Area B – former USTs AT-14 & AT-19, former adhesives warehouse	Benzene	
Area C – former USTs AT-20, AT-21 & AT-22, former resin warehouse area	VOCs	
Area D – heat transfer shed	PCBs	
Area E – spill spot	VOCs	
Area F– diesel line leak	Diesel Fuel	Area 2 – Diesel/Methanol Plume Area
Area G – methanol pump site leak	Methanol	
Area H – former ink manufacturing & petroleum UST area	Metals (lead, chromium) Diesel Fuel	
Area I – urea unloading area	Nitrates	Area 3 – New VOC Plume Area
Area J – drum storage area	VOCS	
Area K – drum storage area	VOCs	

3. **Named Discharger**: Hexion Specialty Chemicals, Inc., is named as a discharger because it (through its subsidiary company Borden Chemical Inc.) is the current owner and operator of the property on which there is a discharge of pollutants, it has knowledge of the discharge or the activities that caused the discharge, and it has the legal ability to control the discharge.

   If additional information is submitted indicating that other parties caused or permitted any waste to be discharged on the Site where it entered or could have entered waters of the State, the Board will consider adding those parties' names to this order.

4. **Regulatory Status:** The Site has been subject to the following Board Orders:

    a. Site Cleanup Requirements Order No. R2-2005-0024 adopted June 17, 2005, amending Order 91-134.
    b. Site Cleanup Requirements Order No. 91-134 adopted September 18, 1991.
    c. NPDES General Permit Order No. 94-087 adopted on July 20, 1994.
    d. Waste Discharge Requirements Order Nos. 77-51 and 87-03.

5. **Site Hydrogeology**: Regionally, the Site is within the Niles Subarea groundwater basin. The Niles alluvial fan or "cone" is the predominant physiographic feature of the basin. The Niles Subarea extends southward and westward under the San Francisco Bay and consists of a series of flat-lying aquifers separated by clay aquitards. The top of the upper aquifer, the Newark Aquifer, occurs about 55 feet below ground surface (bgs) at the Site.

    The subsurface lithology at the Site has been described as consisting of two distinct units. The Newark Aquitard extends from ground surface to between approximately 50 and 60 feet bgs and is comprised of fine grained clay known as Bay Mud and discontinuous layers of coarse grained sediments (silt and sand). Shallow groundwater is encountered between 3 and 10 feet bgs within the aquitard, is influenced by rainfall and localized conditions, and generally flows southwest with a hydraulic gradient of 0.001 to 0.002. The Newark Aquifer is confined and encountered between 52 and 54 feet, and has a slight upward vertical gradient during the majority of the year. This aquifer typically flows to the southwest with a hydraulic gradient of 0.002. Water quality within the Newark Aquifer has been affected by salt water intrusion and is considered brackish. Tidal influences have no or very little effect on the movement of contaminants at the Site (SL Ross, May 2007).

6. **Remedial Investigation**: The Site has been investigated with completion of 121 borings, 57 wells for monitoring and pumping (28 are extraction sumps/wells); collection of 978 groundwater samples, 177 soil samples, 20-soil-gas samples, eight indoor air samples, and two ambient air samples. Work performed to date has included soil, soil gas, groundwater, and indoor air investigations, groundwater extraction and treatment, aquifer testing, tidal influence studies, a monitored natural attenuation study, and two human health risk assessments.

    Affected media at the Site include soil, soil vapor, shallow groundwater, and indoor air. Shallow soil is affected in three source areas: the resin warehouse loading dock (Area 1), an area north of cooling tower #3 in the vicinity of the former diesel fuel and former methanol storage tanks and pipelines (Area 2), and the former drum storage area and urea off-loading area (Area 3). Deeper soil is affected beneath the source areas and down gradient of the source areas where affected groundwater has transported chemicals. Soil vapor is affected in the source areas and immediately above the chlorinated VOC plume. Shallow onsite groundwater is impacted by VOCs beneath and downgradient of the source areas in the vicinity of the resin and adhesives warehouses (Area 1). Diesel fuel and methanol have impacted shallow groundwater in the vicinity of the storage tanks and pipelines on the southeastern side of the facility (Area 2).

The VOC and diesel/methanol plumes remain onsite and have not impacted the underlying Newark Aquifer. Groundwater monitoring and semi-annual reporting is conducted in accordance with the Self-Monitoring Program.

Historical data and investigative findings are summarized in the report titled *Technical Summary and Data Gap Work Plan* (October 2005). Recent data and investigative findings are presented in the reports titled *Data Gap Investigation Report* (November 2006), *Revised Draft Remedial Action Plan* (May 2007), and *Final Remedial Action Plan* (RAP; January 2008). The *Human Health Risk Assessment* (HHRA) dated May 2007 identified the following chemicals of concern (COCs) and maximum concentrations.

Chemicals of Concern	Ground Water (µg/l)	Soil (mg/kg)	Soil Vapor (µg/m3)	Indoor Air (µg/m3)
1,1,1-Trichloroethane (1,1,1,-TCA)	**20,000**	**9.2**	**13,000,000**	3.1
Trichloroethene (TCE)	**6,800**	**100**	**2,160,000**	---
1,1-Dichloroethane (1,1-DCA)	**5,300**	**1.3**	**2,190,000**	---
1,1-Dichloroethene (1,1-DCE)	**8,800**	**5.8**	**5,330,000**	---
Cis-1,2-Dichloroethene (cis-1,2-DCE)	**37,000**	**8.2**	**3,020,000**	---
Vinyl Chloride	**720**	**0.25**	**3,710,000**	---
1,2-Dichloroethane (1,2-DCA)	**78**	**0.034**	---	**0.23**
1,1,2-Trichloroethane (1,1,2-TCA)	**53**	0.010	---	---
Trans-1,2-Dichloroethene (trans 1,2-DCE)	6.6	---	**87,300**	---
Tetrachloroethene (PCE)	40	---	**17,000**	0.46
1,4-Dioxane	---	---	**55,400**	12
TPH-Diesel	**610,000**	5,600	---	---
Formaldehyde	**190,000**	6.2	---	---
Methanol	**39,000,000**	40,000	---	---
Polychlorinated Bi-phenols (PCBs) Arochlor -1232	**2.7**	170	---	---
Benzene	90	0.0421	**306**	**0.93**
Toluene	12	**9.1**	145	7.5
Acetone	1,400	---	---	---
Ethylbenzene	58	---	---	---
Chloroform	2.6	0.097	---	---
Chloroethane	150	0.35	**771,000**	---
Chloromethane	---	7	**16,400**	1.1
Napthlalene	1.4	---	**3,080**	---
1,2,4-trimethylbenzene	---	---	**30**	2.9
1,3,5-trimethylbenzene	1.4	---	**11**	1.5
Isopropanol	---	---	**20**	1.9
Carbon Tetrachloride	---	---	---	**0.54**

Note: Data collected during 2005 and 2006. Bolded values exceed risk benchmarks. The symbol --- denotes chemical data not available in Human Health Risk Assessment Addendum Report, May 2007, MWH.

7. **Adjacent Sites:** Potential offsite source areas were evaluated by reviewing historic Site information, regional information on groundwater quality and wells logs within a ¾ mile

radius of the Site. Although two offsite properties that used or released VOCs were identified, it is unlikely that any offsite sources have impacted the groundwater beneath the Site, based on groundwater flow directions, contaminants of concern and groundwater concentration maps.

8. **Interim Remedial Measures**: Site closure activities have included closure of a 0.83-acre lined evaporation impoundment used for waste sludge containing resins, inorganic salts, formaldehyde, and phenol and urea compounds; closure of three other smaller lined impoundments used for sludge drying and storage prior to offsite disposal; removal of eleven USTs; in-place closure of one UST; and removal of water and oil sumps.

   Interim remedial measures have included: removal of polychlorinated biphenol (PCB) impacted soil and groundwater near the heat transfer shed, groundwater extraction near well B-8 for the acetone and methyl ethyl ketone spill, groundwater extraction near well B-7 for the chlorinated solvent spill, and cleanup of diesel. As an interim remedial measure, a groundwater extraction and treatment system comprised of 26 extraction wells was installed in the three known source areas at the Site (Area 1). The extraction system in the VOC plume area operated from June 1994 until September 2000 when it was shut down to facilitate data collection to demonstrate that natural attenuation processes were occurring. In the methanol plume area (Area 2), groundwater treatment by batch extraction and removal of methanol continued until 2001 when it was also discontinued. The volume of groundwater extracted and contaminant mass removed are summarized below:

   - 39,049,468 gallons of groundwater extracted, treated through the bioreactor discharged to the Union City Sanitary District sanitary sewer.
   - 964 pounds of VOCs removed through bioreactor treatment.
   - 42,031 pounds of methanol and diesel fuel removed through bioreactor treatment.
   - 350,000 pounds of methanol recovered and recycled through batch extraction and distillation.

   The extraction systems were effective at mass removal and plume migration control. Between 2000 and 2003 while the system was shut-down, the VOC plume began migrating towards the southwestern property boundary.

   In February 2008, the groundwater extraction system in the VOC plume area was restarted in batch operation to prevent offsite migration. Recovered groundwater was retained in an onsite tank pending approval from the Sanitary District. The discharge application was approved on March 25, 2008, and the system has operated continuously since July 11, 2008. Currently, eight wells are in operation to provide containment of VOC-affected groundwater, with four additional wells equipped with pumps that can be started if needed to augment groundwater containment. Eleven wells are installed in the

diesel/ methanol plume area, and batch extraction in selected wells is planned to resume. As specified in the *Final Remedial Action Plan* (Arcadis, January 2008), selected extraction wells may be shut down periodically for testing, to focus extraction efforts at specific wells, or to implement other final remedial actions at the Site.

9. **Environmental Risk Assessment**: The discharger submitted two Site-specific human health risk assessments (HHRAs). The most recent, *HHRA Addendum Report, Final May 2007* (MWH), evaluated potential exposure to current and future industrial workers and Site visitors. The data used to evaluate potential human health risks was collected in 2005 and 2006, during data gap investigations.

    a. **Methods**: Construction workers were evaluated qualitatively assuming risks to Site industrial workers is greater over 25 years of employment at the facility versus the brief time a construction worker would come in contact with Site media. Potentially significant exposure media include shallow soil (<10 feet bgs), soil vapor, indoor air, and groundwater. Potential soil exposure pathways include direct contact pathways (i.e., incidental ingestion and dermal contact with soil); inhalation of particulates derived from soil; and inhalation of volatiles derived from soil. Potential exposure pathways for soil vapor include vapor intrusion to indoor air and subsequent inhalation exposures by industrial workers and Site visitors. Current and future industrial workers and Site visitors may be exposed to volatile chemicals in indoor air. Consistent with the designated beneficial uses of groundwater within the vicinity of the Site, shallow groundwater was evaluated for potential potable uses by future industrial workers. Groundwater exposure pathways that were evaluated in the human health risk assessment include ingestion, dermal contact while showering and inhalation of volatiles while showering. The risk assessment did not consider the risk pathway to terrestrial ecological receptors via contact or exposure to soil, nor did it consider pathways involving aquatic receptors or leaching of contaminants to groundwater, in order to protect the Newark Aquifer.

    b. **Soil Assessment**: A total of 43 shallow soil samples (less than 10 feet bgs) were collected and analyzed for VOCs using Method 8260B. The COCs or contaminants of concern identified for shallow soil included 1,1,1-TCA and TCE; the degradation products 1,1,-DCA, 1,1-DCE, 1,2-DCA, cis-1,2-DCE and vinyl chloride; and toluene. The COCs identified in deeper soil greater than 10 feet bgs included TCE, 1,1-DCA, 1,1-DCE, and 1,2-DCA. The risk assessment concluded that the carcinogenic risk and non-carcinogenic hazard index (HI) estimates for current/future industrial workers were 5E-06 and 0.2, respectively. The corresponding carcinogenic risk and non-carcinogenic HI estimates for current/future Site visitors were 2E-06 and 0.4, respectively. The primary risk driver was TCE, measured at a maximum of 100 mg/kg in Soil Boring SB-03. These carcinogenic risk and non-carcinogenic HI estimates are within the United States Environmental Protection Agency's acceptable cancer risk range of 1E-06 to 1E-04 and non-cancer HI criterion of 1.

c. **Soil Vapor Assessment**: A total of ten soil vapor samples were collected at 4 to 4.5 feet bgs and analyzed for VOCs by Method TO-15, semi-volatile organic compounds (SVOCs) by Method TO-15, and poly aromatic hydrocarbons (PAHs) by Method TO-13. The risk assessment concluded the carcinogenic risk and non-carcinogenic HI estimates for the Former Resin Warehouse were 6E-03 and 9, respectively, attributable to maximum concentrations of 1,1-DCA, 1,1-DCE, chloroethane, cis-1,2-DCE, TCE and vinyl chloride measured in soil vapor. Carcinogenic risk and non-carcinogenic HI estimates for Sample SCS-7 collected near the Former Lab were 3E-04 and 0.7, respectively, attributable to maximum concentrations of TCE and vinyl chloride measured in soil vapor. These carcinogenic risk and non-carcinogenic HI estimates exceed the United States Environmental Protection Agency's acceptable cancer risk range of 1E-06 to 1E-04 and non-cancer HI criterion of 1.

d. **Indoor Air:** A total of ten air samples were collected from within four buildings and at two outdoor ambient air locations and analyzed for VOCs by Method TO-15. The indoor air sampling results were grouped according to the building from which they were collected to evaluate potential industrial worker exposures associated with inhalation of VOCs in indoor air. COCs identified in indoor air were limited to benzene, carbon tetrachloride, chloromethane, 1,2-DCA and 1,4-dioxane. The risk assessment concluded that all risk and hazard estimates associated with the current/future industrial worker exposures to VOCs in indoor air were within the United States Environmental Protection Agency's acceptable cancer risk range of 1E-06 to 1E-04, and non-cancer HI criterion of 1. The carcinogenic risk and non-carcinogenic HI estimates for the Former Resin Warehouse were 3E-05 and 0.2, respectively, and were attributable to maximum concentrations of benzene, carbon tetrachloride, and 1,4-dioxane measured in indoor air 1,1-DCA, 1,1-DCE, chloroethane, cis-1,2-DCE, TCE and vinyl chloride measured in indoor air. Carcinogenic risk and non-carcinogenic HI estimates for the Former Adhesives Warehouse were 1E-05 and 0.2, respectively, and were attributable to maximum concentrations of 1,2-DCA, benzene, and carbon tetrachloride measured in indoor air.

e. **Groundwater Assessment**: A total of 88 shallow groundwater samples were collected from the Newark Aquitard. The COCs identified for shallow groundwater included: chloroethane, methylene chloride, 1,1,1-TCA, 1,1,2-TCA and TCE, the degradation products 1,1,-DCA, 1,1-DCE, 1,2-DCA, cis-1,2-DCE and vinyl chloride; petroleum hydrocarbons (i.e., benzene, ethylbenzene, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, n-propylbenzene and TPH-diesel); formaldehyde; methanol; and Arochlor-1232 (PCBs). No COCs were identified for the Newark Aquifer. The risk assessment concluded the cumulative carcinogenic risk and non-carcinogenic HI for potential future industrial workers exposed to groundwater were 8E-03 and 1,073, respectively. These carcinogenic risk and non-carcinogenic hazard estimates are in excess of United States Environmental Protection Agency's acceptable cancer risk range of 1E-06 to 1E-04, and non-cancer HI criterion of 1. Carcinogenic risk estimates in excess of 1E-

04 were primarily attributable to chlorinated VOCs (vinyl chloride, 1,1,2-TCA, 1,1-DCA, chloroethane, 1,2-DCA and TCE), benzene, and Arochlor-1232. Non-carcinogenic hazard estimates in excess of 1 were primarily attributable to methanol, TPH-diesel, Arochlo-1232, cis-1,2-DCE, and formaldehyde.

f. **Conclusions:** The Board considers the following risks to be acceptable at remediation sites: a cumulative HI of 1.0 or less for non-carcinogens, and for carcinogens a cumulative excess cancer risk of 1E-06 or less.

The risk assessment concluded that shallow groundwater and soil vapor exceeded the acceptable cancer risk range of 1E-06 to 1E-04, and non-cancer HI criterion of 1 for industrial sites. Due to excessive risk that will be present at the Site pending full remediation, institutional constraints are appropriate to limit onsite exposure to acceptable levels. Institutional constraints include a deed restriction that notifies future owners of sub-surface contamination, prohibits residential land uses, and prohibits the use of shallow zone groundwater and Newark Aquifer groundwater as a source of drinking water until cleanup standards are met, and a risk management plan (RMP) to mitigate risks associated with residual chemicals in soil and groundwater during current conditions, future development, and completion of final remedial actions.

10. **Feasibility Study**: Multiple Feasibility Study/Remedial Action Plans (FS/RAPs) have been submitted for the Site, dating back to August 1999 and May 2007. The most recent feasibility study or technology screening was presented in a report titled *Revised Draft Cleanup Standards and Revised Draft Remedial Action Plan Conceptual Addendum* (November 2007, Arcadis). Following the initial screening process, seven technologies were selected as potentially viable strategies at the Site to address the COCs in shallow soil and groundwater within the relatively impermeable Newark Aquitard. These technologies included monitored natural attenuation, excavation, soil vapor extraction, in-situ thermal desorption, groundwater extraction and treatment, enhanced reductive dechlorination, and permeable reactive barrier. These identified technologies were screened using the criteria of effectiveness, implementability, and relative cost.

11. **Remedial Action Plan**: Multiple Remedial Action Plans have been submitted for the Site. Most recently, *the Revised Final RAP,* dated January 2008, proposes a phased remedial strategy that incorporates existing infrastructure, source area mass removal, and in-situ methods leading to well documented monitored natural attenuation (MNA). The preferred remedial alternative includes the following elements:

- A shallow groundwater extraction and treatment system operating continuously in the VOC plume area using eight to twelve wells, and batch extraction with one or more wells in the diesel methanol plume area.

- Soil excavation to remove 500 to 900 cubic yards of VOC impacted soil in the former drum storage area and 75 cubic yards of VOC impacted soil in the resin warehouse loading dock area. Excavation is intended to remove only unsaturated

soils in the vadose zone, since saturated soils will be addressed with groundwater remediation.

- Evaluation of current soil conditions in the methanol/diesel plume Area 2 to determine if chemicals of concern in soil are below cleanup standards. The evaluation will determine the need for additional excavation or bioremediation in Area 2 which may exceed the cleanup standards.

- Implementation of enhanced reductive dechlorination (ERD) technology in the VOC plume area through the injection of carbon sources such as molasses and whey. Initially, pilot testing will be conducted. Successful pilot test results will lead to the implementation of a full-scale ERD remediation system. Unsuccessful results will lead to an alternative proposal for active remediation in the VOCs plume area. If warranted, limited sub-slab venting beneath the resin warehouse will be performed to mitigate vapor intrusion of vapor phase by-products of enhanced bioremediation. If necessary, a network of diagonal extraction points will be installed around the perimeter of the resin warehouse to extend beneath the building. Upon installation of the extraction points, a venting pilot test will be completed to determine the required ventilation and whether off-gas treatment will be necessary.

Implementing the remedial strategy in phases allows for data collection and testing necessary for efficient implementation and optimization of the remedy as Site conditions change throughout the process. Due to inherent hydrogeological and geochemical heterogeneities over the project area and the innovative nature of ERD, successful pilot demonstration of the technology is required prior to full-scale implementation. All pilot-scale and full-scale activities will be performed in accordance with technology-specific work plans which will be submitted to the Water Board for review and approval prior to field implementation.

This Order specifies tasks for each phase, provides for additional wells in the Self-Monitoring Program (SMP), and sets cleanup standards for soil, soil vapor and groundwater, in place of proposed alternate cleanup standards. Monitoring wells are identified in the SMP. It will be necessary to identify compliance points for soil vapor monitoring and include those in the SMP. Subsurface soil vapor concentration will be evaluated following the completion of the shallow soil remediation.

The 2008 Final RAP incorporates a Risk Management Plan (RMP) developed for the Site and presented in the May 2007 Revised Draft RAP report. The procedures specified in the RMP are intended to mitigate risks to the environment and to worker and Site-user health and safety as it relates to the presence of elevated concentrations of chlorinated VOCs, diesel fuel and methanol in soil and groundwater at the Site. The presence of these compounds pose soil management and potential health and safety issues to be addressed as part of the Site remediation activities and thereafter until cleanup standards are met. The RMP objectives are to minimize exposure of chemicals to construction workers at the Site, nearby residents and/or pedestrians, and future users of the Site.

12. **Groundwater Management:** Alameda County Water District (ACWD) currently has three primary sources of water supply: (1) the State Water Project (SWP), (2) the San Francisco Public Utilities Commission, and (3) local runoff from the Alameda Creek watershed. Local runoff and SWP water received for groundwater recharge are percolated into the Niles Cone Groundwater Basin through recharge in Alameda Creek itself and through recharge ponds within the Quarry Lakes Regional Recreational Area and adjacent areas. This percolated water is subsequently recovered through groundwater production wells and provided as potable supply to ACWD's customers. ACWD provides potable water to a population of over 327,000 in the Cities of Fremont, Newark, and Union City. The ACWD-managed groundwater basin includes the following physiographic units identified by the Department of Water Resources: the Niles Cone Groundwater Basin and its affiliates (Dry Creek Cone, Mission Alluvial Apron, Mission Upland, Warm Springs Alluvial Apron) and the portion of the Bay Plain situated between the Niles Cone and San Francisco Bay.

    The groundwater basin is effectively divided into two general sub-basins by the Hayward Fault, which acts as a lateral barrier to groundwater flow. In the "Above Hayward Fault" sub-basin on the eastern side of the Hayward Fault, a single aquifer extends from ground surface to bedrock, without significant intervening aquitards. In the "Below Hayward Fault" sub-basin on the western side of the Hayward Fault, there are four regional aquifers separated by intervening aquitards. By order of depth, these aquifers are the Newark Aquifer, Centerville Aquifer, Fremont Aquifer and Deep Aquifer. The Centerville and Fremont aquifers are commonly conceptualized as a single unit, referred to as the Centerville-Fremont Aquifer.

    In the Above Hayward Fault sub-basin, groundwater is fresh. In the Newark Aquifer, groundwater is fresh in the eastern part of the Below Hayward Fault sub-basin, and transitions into brackish groundwater in the western portion. Brackish groundwater also exists in the deeper aquifer layers over various areas within the sub-basin. The brackish groundwater is a result of seawater intrusion from the adjacent San Francisco Bay due to historical pumping practices. Since the 1960's, ACWD has managed the groundwater basin to prevent any additional seawater intrusion.

    Potable water production occurs at the Mowry and Peralta-Tyson Wellfields. In 1974, the District initiated its Aquifer Reclamation Program to restore water quality in the groundwater basin by removing the saline water trapped in the aquifer system. Nine wells are utilized for reclamation pumping: three in the Newark Aquifer, five in the Centerville-Fremont Aquifer, and one in the Deep Aquifer. Historically, these wells were used to pump brackish water to San Francisco Bay via flood control channels. Approximately 9,900 acre-feet was pumped from all ARP wells during fiscal year 2006-2007. Since November 2003, much of the water pumped from the Aquifer Reclamation Program wells is treated at the Newark Desalination Facility for distribution to ACWD's customers. This facility treats up to 5 million gallons per day utilizing reverse osmosis to remove salts and other impurities from the brackish groundwater. Production from the

facility is expected to double to 10 MGD by 2010, with two additional Centerville-Fremont wells serving as brackish groundwater sources.

The quality of groundwater in the basin is improved as recharge water replaces the pumped brackish groundwater. ARP pumping also prevents the plume of brackish water in the Centerville-Fremont and Deep Aquifers from further migrating toward the Mowry Wellfield. Five other wells that were Salinity Barrier Project (SBP) wells are now considered part of the Aquifer Reclamation Program.

ACWD has completed a one-year pilot test of its pumping facility at SBP Wells A and B, which are both ideally positioned to be operated as Aquifer Reclamation Project wells. The Site is located one mile east of SBP Well A. Full operation of one or more of the SBP wells could begin any time when the piezometric levels in the Newark Aquifer are high enough that brackish water could be pumped out of the basin, as indicated by ACWD's modeling efforts.

In the current mode of operation, the Aquifer Reclamation Program wells do not affect water levels or the groundwater gradient at the Site. However, operation of the SBP wells or installation of new production wells in the vicinity of the Site could affect the groundwater gradient at the Site. It is possible that groundwater extraction at ACWD facilities in the vicinity of the Site could lower the piezometric surface in the Newark Aquifer, causing a downward hydraulic gradient from the Shallow Zone groundwater. This change could accelerate the migration of VOCs in shallow groundwater, both laterally and vertically. If significant VOC concentrations migrate to the SBP wells, then ACWD may be required to treat groundwater pumped from the SBP wells prior to discharging it to surface waters or using it for beneficial use.

Because ACWD plans relative to the SBP wells are currently being developed, assessment of risk to the SBP wells is not warranted at this time. A risk evaluation will be needed as soon as ACWD decides to proceed with operation of SBP Well A, B, or C, or any future ACWD water well screened in the Newark Aquifer and located less than 2 miles from the Site. Hexion must not wait for commencement of operation but must initiate the risk evaluation as soon as ACWD notifies Hexion that it has decided to operate one or more of the wells noted above. In evaluating this risk, Hexion will need to consider all chemicals of concern at the Site that could interfere with ACWD's ability to use (e.g., as a supply to the Newark Desalination Facility) or dispose of the extracted groundwater, as applicable.

13. **Basis for Cleanup Standards**

a. **General:** State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and

anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. The previously-cited cleanup plan confirms the Board's initial conclusion that background levels of water quality cannot be restored. This order and its requirements are consistent with Resolution No. 68-16.

State Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This Order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

Potential impact to human health due to exposure to contaminants in soil and groundwater has been the primary concern for the Site and has therefore been considered in selecting soil and groundwater cleanup standards, in addition to protection of groundwater resources.

b. **Beneficial Uses:** The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Board, U.S. EPA, and the Office of Administrative Law where required.

Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region, with limited exceptions for areas of high TDS, low yield, or naturally-high contaminant levels. Groundwater underlying and adjacent to the Site qualifies as a potential source of drinking water.

The Basin Plan designates the following potential beneficial uses of groundwater underlying and adjacent to the Site:

- Municipal and domestic water supply
- Industrial process water supply
- Industrial service water supply
- Agricultural water supply

Freshwater replenishment to surface water via an unlined flood control channel may be a potential beneficial use. If a linkage is demonstrated between the flood control channel and shallow groundwater at the Site, the following beneficial uses may also apply:

- Water contact and non-contact recreation
- Wildlife habitat
- Cold freshwater and warm freshwater habitat
- Fish migration and spawning
- Estuarine habitat

c. **Basis for Groundwater Cleanup Standards**: The cleanup standards for the Shallow Zone groundwater and Newark Aquifer underlying the Site are based on applicable water quality objectives, which are the State of California maximum contaminant levels (MCLs) or federal MCLs for contaminants with no California MCL. The most stringent drinking water standard is used for chemicals with multiple drinking water standards (i.e., California Primary MCL, California Secondary MCL, Federal Primary MCL, Federal Secondary MCL, etc.). Cleanup to this level will result in acceptable risk to human health and aquatic habitats. The cleanup standard for diesel is based on the taste and odor threshold. In the absence of Environmental Screening Levels (ESLs) or MCLs for methanol and formaldehyde, the February 2008 US EPA Preliminary Remediation Goals are used.

d. **Basis for Soil Cleanup Standards:** In the absence of acceptable Site-specific alternate cleanup standards, the cleanup standards for soil are based on the Tier 1 ESLs for shallow soil where groundwater is a potential source of drinking water under commercial/industrial land use scenarios (San Francisco Bay Regional Water Quality Control Board, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, May 2008). Soil cleanup standards for the Site are intended to protect human health by controlling potential impacts from direct exposure and to minimize potential leaching of chemicals from the unsaturated zone and subsequent impacts on groundwater. For the purposes of this Order, the unsaturated zone is defined as the zone above the water table's lowest historical or seasonal levels, as documented or anticipated. In the absence of ESLs for methanol and formaldehyde, the US EPA Preliminary Remediation Goals are used.

e. **Basis for Soil Gas Cleanup Standards:** In the absence of soil gas data, the cleanup standards for soil gas are also based on the Tier 1 ESLs. Soil gas cleanup standards for the Site are intended to protect human health by controlling potential impacts from vapor intrusion. In the absence of ESLs for methanol and formaldehyde, the US EPA Preliminary Remediation Goals are used.

14. **Future Changes to Cleanup Standards**: The goal of this remedial action is to restore the beneficial uses of groundwater underlying and adjacent to the Site. Results from other sites suggest that full restoration of beneficial uses to groundwater as a result of active remediation at this Site may not be possible. If full restoration of beneficial uses is not technologically or economically achievable within a reasonable period of time, then the discharger may request modification to the cleanup standards or establishment of a containment zone, a limited groundwater pollution zone where water quality objectives are exceeded. Conversely, if new technical information obtained from pilot studies or full-scale remediation at the Site indicates that remediation action levels or cleanup standards can be surpassed, the Board may decide that further cleanup actions should be taken.

15. **Reuse or Disposal of Extracted Groundwater:** Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if

it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.

16. **Basis for 13304 Order:** California Water Code Section 13304 authorizes the Board to issue orders requiring a discharger to cleanup and abate waste where the discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance.

17. **Cost Recovery:** Pursuant to California Water Code Section 13304, the discharger is hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action required by this order.

18. **CEQA:** This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.

19. **Notification:** The Board has notified the discharger and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup requirements for the discharge, and has provided them with an opportunity to submit their written comments.

20. **Public Hearing:** The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger (or its agents, successors, or assigns) shall clean up and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.

2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of wastes or hazardous substances are prohibited.

B. CLEANUP PLAN, CLEANUP STANDARDS

1. **Implement Cleanup Plan:** The discharger shall implement the 2008 Final RAP described in Finding 11.

2. **Cleanup Standards for Soil, Soil Gas, and Groundwater**: The soil and soil gas cleanup standards shown below shall be met throughout the unsaturated zone at the Site. For the purposes of this Order, the unsaturated zone is defined as the zone above the water table's lowest historical or seasonal levels, as documented or anticipated. The cleanup levels shall be confirmed with confirmatory soil and soil gas samples prior to curtailment of the Remedial Action Plan described in Finding 11. The groundwater cleanup standards shown below shall be met in all wells throughout the area of impacted groundwater, including but not limited to all groundwater impacted wells identified in the Self-Monitoring Program.

Chemicals of Concern	Groundwater Cleanup Standard[1] (µg/L)	Soil Cleanup Standard[2] (mg/kg)	Soil Gas Cleanup Standard[3] (µg/m^3)
1,1,1-trichloroethane	200	7.8	1,300,000
1,1,2-trichloroethane	5.0	0.07	510
1,1-dichloroethane	5.0	0.20	5,100
1,2-dichloroethane	0.5	0.0045	310
Trichloroethene	5.0	0.46	4,100
1,1-dichloroethene	6.0	1.0	120,000
cis-1,2-dichloroethene	6.0	0.19	20,000
Trans-1,2-dichloroethene	10	0.67	41,000
Vinyl Chloride	0.5	0.047	100
Benzene	1.0	0.044	280
TPH – Diesel	100[4]	83	29,000
Chloroethane	12	0.85	58,000
Chloromethane	140	6.4	53,000
1,4-Dioxane	3.0	0.0018	---
Polychlorinated bi-phenols	0.5	0.74	---
Methylene Chloride	5.0	0.077	17,000
Methanol	18,000[5]	310,000[6]	18,000[7]
Formaldehyde	7,300[5]	120,000[6]	0.94[7]

Notes:
[1] The basis for the cleanup standard is drinking water, except where noted.
[2] The basis for the cleanup standard is direct contact or leaching to groundwater, except where noted.
[3] The basis for the cleanup standard is indoor air-industrial/commercial, except where noted.
[4] The basis for the cleanup standard is taste and odor threshold.
[5] US EPA Preliminary Remediation Goal for tap water.
[6] US EPA Preliminary Remediation Goal for industrial soil.
[7] US EPA Preliminary Remediation Goal for industrial indoor air.

C. TASKS

1. **GROUNDWATER EXTRACTION AND TREATMENT SYSTEM OPERATION (AREA 1)**

COMPLIANCE DATE: February 14, 2009 and annually until curtailment.

Submit a technical report acceptable to the Executive Officer that documents the expansion, modification and start up of the groundwater extraction system currently operating in the VOC impacted area as specified in section 4.1.1 of the RAP. The report shall present the results on system effectiveness (e.g., capture zone or area of influence). Proposals for further system expansion or modification may be included in annual reports (see Self-Monitoring Program).

2. **WORKPLAN FOR BATCH GROUNDWATER EXTRACTION FOR REMEDIATION OF DIESEL/METHANOL AREA (AREA 2)**

COMPLIANCE DATE: February 14, 2009

Submit a work plan acceptable to the Executive Officer to implement batch extraction of groundwater for the diesel/methanol area. As specified in section 4.1.2 of the RAP, it is anticipated that two or more wells will be used for batch extractions on a monthly to quarterly basis. The work plan shall specify the details, including the schedule, treatment and disposal methods for this technology, and proposed remediation target levels.

3. **PROPOSED INSTITUTIONAL CONSTRAINTS (SITE-WIDE)**

COMPLIANCE DATE: April 1, 2009

Submit a technical report acceptable to the Executive Officer documenting procedures to be used by the discharger, and future owners and associated occupants of the Site, to prevent or minimize human exposure to soil and groundwater contamination prior to meeting cleanup standards, and after meeting cleanup standards if cleanup will not attain unrestricted use levels. Such procedures shall include a deed restriction that notifies future owners of sub-surface contamination, prohibits residential land uses, and prohibits the use of shallow zone groundwater and Newark Aquifer groundwater as a source of drinking water until cleanup standards are met. A risk management plan has been prepared for the Site (Revised Draft RAP, May 2007), and shall be incorporated into the deed restriction to mitigate risks associated with residual chemicals in soil and groundwater during current conditions, future development, and completion of final remedial actions.

4. **IMPLEMENTATION OF INSTITUTIONAL CONSTRAINTS (SITE-WIDE)**

COMPLIANCE DATE: 180 days after Executive Officer approval of Task 3

Submit a technical report acceptable to the Executive Officer documenting that the approved institutional constraints have been implemented.

5. **DATA GAP AND PRE-REMEDIATION INVESTIGATION WORKPLAN (AREAS 1, 2, AND 3)**

COMPLIANCE DATE: July 1, 2009

Submit a workplan acceptable to the Executive Officer to update VOC and diesel data to further define the limits of remediation areas where concentrations exceed the cleanup standards, as noted in sections 4.1, 4.1.3, 4.1.4 and 4.1.5 of the Final RAP. Implementation of the proposed scope of work should lead to a revised site conceptual model, and collection of data needed to optimize remediation of VOCs using in-situ enhanced reductive dechlorination (ERD) technology. The work plan should specify investigation methods, and shall include the following:

a. Define the vertical and lateral extent of diesel and VOC pollution in shallow soil, and identify any remaining suspected sources;
b. Delineate the extent of planned shallow vadose zone soil excavations;
c. Collect geochemistry data as needed to design the ERD system effectively;
d. Recommend a remedial strategy for the former 6,000-gallon diesel tank and diesel pipeline areas;
e. Facilitate design of injection systems through hydraulic testing and tracer injections as deemed necessary;
f. Specify locations and methods for soil vapor monitoring (see Self-Monitoring Plan); and,
g. Specify investigation methods and a proposed time schedule (see Self-Monitoring Plan).

6. **COMPLETION OF DATA GAP AND PRE-REMEDIATION INVESTIGATION (AREAS 1, 2, AND 3)**

COMPLIANCE DATE: 120 days after Executive Officer approval of the workplan in Task 5.

Submit a technical report acceptable to the Executive Officer presenting the results of the data gap and pre-remediation investigation and documenting completion of necessary tasks identified in the Task 5 workplan. The technical report should identify source(s) of pollution, and define the vertical and lateral extent of pollution down to concentrations at or below typical cleanup standards for shallow soil.

7. **WORK PLAN FOR SOIL REMEDIATION, PILOT TESTING FOR ERD TREATMENT OF SHALLOW GROUNDWATER, AND WELL INSTALLATION (AREAS 1, 2, AND 3)**

COMPLIANCE DATE: 120 days after Executive Officer approval of the workplan in Task 5.

Submit a work plan acceptable to the Executive Officer for implementation of soil remediation (sections 4.1.3, 4.1.4, 4.1.5 and Figure 7 of RAP); installation of injection wells and additional monitoring wells for ERD; and performance of pilot testing for ERD (section 4.1.6 and Figure 12 of the RAP). The work plan shall include monitoring points of compliance for soil vapor, and specify a proposed time schedule.

8. **IMPLEMENTATION OF BATCH GROUNDWATER EXTRACTION FOR REMEDIATION OF DIESEL/METHANOL AREA (AREA 2)**

COMPLIANCE DATE: February 14, 2010

Submit a technical report acceptable to the Executive Officer documenting completion of the implemented steps identified in the Task 2, including: the results of the full-scale batch extractions for treatment of the diesel/methanol impacted Shallow Zone groundwater at the Site; any modifications to the approved full-scale remediation plan; and an assessment on the effectiveness of the remediation action to meet the cleanup standards. At a minimum, the report shall (1) evaluate the effectiveness of the implemented batch extractions following one year of active remediation, and (2) propose supplemental action, if required, to meet the cleanup standards.

9. **COMPLETION OF SHALLOW SOIL REMEDIATION, WELL INSTALLATION, AND PILOT TESTING AND WORKPLAN FOR FULL-SCALE REMEDIATION TO CLEAN UP SHALLOW GROUNDWATER (AREAS 1, 2, AND 3)**

COMPLIANCE DATE: 13 months after Executive Officer approval of the work plan in Task 7.

Submit a technical report acceptable to the Executive Officer presenting the results of the ERD pilot test for VOC plume treatment and documenting completion of necessary tasks identified in the Task 7. The report shall include a work plan for the full-scale ERD remediation of VOCs in shallow zone groundwater at the Site, and remediation target goals. In the event that the ERD pilot testing indicates that ERD is not an appropriate strategy, an alternate strategy shall be proposed.

10. **IMPLEMENTATION AND ASSESSMENT OF FINAL REMEDIAL MEASURES FOR SHALLOW GROUNDWATER – (AREAS 1, 2, AND 3)**

COMPLIANCE DATE: February 14, 2012

Submit a technical report acceptable to the Executive Officer documenting completion of the implemented steps identified in Tasks 1, 2 and 8. The report shall include: the results of the full-scale remediation for the Shallow Zone groundwater at the Site; any modifications to the approved full-scale remediation plan; and an assessment of the effectiveness of the remediation action to meet the cleanup standards. At a minimum, the report shall evaluate the effectiveness of the remediation for all areas of the Site (i.e., impacted by VOCs, methonal/diesel, etc.) following two years of active remediation. The report shall propose supplemental action (i.e., Monitored Natural Attenuation), if required, to meet the cleanup standards.

11. FIVE-YEAR STATUS REPORT

COMPLIANCE DATE: February 14, 2014 and every five years thereafter until clean-up standards are met.

Submit a technical report acceptable to the Executive Officer evaluating the effectiveness of the approved cleanup plan. The report should include:

a. Summary of effectiveness in controlling contaminant migration and protecting human health and the environment.
b. Comparison of contaminant concentration trends with the corresponding remediation action levels and cleanup standards.
c. Comparison of anticipated versus actual costs of cleanup activities.
d. Performance data (e.g., groundwater volume extracted, chemical mass removed, mass removed per million gallons extracted).
e. Cost effectiveness data (e.g., cost per pound of contaminant removed).
f. Summary of additional investigations (including results) and significant modifications to remediation systems.
g. Additional remedial actions proposed to meet the corresponding remediation action levels and cleanup standards (if applicable) including time schedule.

If cleanup standards have not been met and are not projected to be met within a reasonable time, the report should assess the technical practicability of meeting cleanup standards and may propose an alternative cleanup strategy.

12. PROPOSED CURTAILMENT

COMPLIANCE DATE: 60 days prior to proposed curtailment

Submit a technical report acceptable to the Executive Officer containing a proposal to curtail remediation. Curtailment includes system closure (e.g., well abandonment), system suspension (e.g., cease extraction but wells retained), and significant system modification (e.g., major reduction in extraction rates, closure of individual extraction wells within extraction network). The report should include the rationale for curtailment. Proposals for final closure should demonstrate that remediation action levels and cleanup

standards have been met, contaminant concentrations are stable, and contaminant migration potential is minimal. If a request for curtailment is made prior to achieving all remedial action goals, the curtailment report must justify why further cleanup is not economically and technically feasible with the currently adopted remedial alternative.

13. **IMPLEMENTATION OF CURTAILMENT**

COMPLIANCE DATE: 60 days after Executive Officer approval

Submit a technical report acceptable to the Executive Officer documenting completion of the tasks identified in the Task 12 technical report.

14. **WORKPLAN FOR ALTERNATE CLEANUP PLAN (CONTINGENCY PLAN)**

COMPLIANCE DATE: 90 days after requested by Executive Officer

Submit a work plan acceptable to the Executive Officer for implementation of an alternate cleanup plan in the event that the remedial activities specified in Tasks 1,2, and 8 do not achieve cleanup standards.

15. **IMPLEMENTATION OF ALTERNATIVE CLEANUP METHOD**

COMPLIANCE DATE: 180 days after Executive Officer approval

Submit a technical report acceptable to the Executive Officer documenting completion of necessary tasks identified in the Task 14 work plan.

16. **EVALUATION OF NEW HEALTH CRITERIA**

COMPLIANCE DATE: 90 days after request by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating the effect on the approved cleanup plan of revising one or more cleanup standards in response to revision of drinking water standards, maximum contaminant levels, or other health-based criteria.

17. **EVALUATION OF NEW TECHNICAL INFORMATION**

COMPLIANCE DATE: 90 days after request by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating new technical information which bears on the approved cleanup plan and cleanup standards for this Site. In the case of a new cleanup technology, the report should evaluate the technology using the same criteria used in the feasibility study. Such technical reports shall not be requested unless the Executive Officer determines that the new information is reasonably likely to warrant a revision in the approved cleanup plan or cleanup standards.

18. **REVISED RISK ASSESSMENT**

COMPLIANCE DATE: 90 days after request by Executive Officer

Submit a revised risk assessment report acceptable to the Executive Officer following the notification from ACWD of its decision to proceed with operation of any water well screened in the Newark Aquifer and located less than 2 miles from the Site, including but not limited to SBP Wells A, B, or C, as detailed in Finding 12, Groundwater Management. As a result of this risk assessment and upon approval of the Executive Officer, any revised cleanup standards shall take effect.

19. **DELAYED COMPLIANCE**

If the discharger is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the discharger shall promptly notify the Executive Officer, and the Water Board may consider revision to this Order.

D. PROVISIONS

1. **No Nuisance**: The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).

2. **Good Operation & Maintenance**: The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.

3. **Cost Recovery**: The discharger shall be liable, pursuant to California Water Code Section 13304, to the Water Board for all reasonable costs actually incurred by the Water Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the discharger over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.

4. **Access to Site and Records**: In accordance with California Water Code Section 13267(c), the discharger shall permit the Water Board or its authorized representative:

    a. Entry upon premises in which any pollution source exists, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
    b. Access to copy any records required to be kept under the requirements of this Order.
    c. Inspection of any monitoring or remediation facilities installed in response to this Order.
    d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.

5. **Self-Monitoring Program**: The discharger shall comply with the Self-Monitoring Program as attached to this Order and as may be amended by the Executive Officer.

6. **Contractor / Consultant Qualifications**: All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.

7. **Lab Qualifications**: All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Water Board using approved EPA methods and appropriate laboratory detection limits for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Water Board review. This provision does not apply to analyses that can only reasonably be performed onsite (e.g., temperature).

8. **Document Distribution**: Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:

   a. City of Newark Fire Department (Hazardous Materials Division)
   b. Alameda County Water District (Groundwater Resources Division)
   c. Department of Toxic Substances Control (Corrective Action Branch)
   [The Executive Officer may modify this distribution list as needed]

9. **Reporting of Changed Owner or Operator**: The discharger shall file a technical report on any changes in Site occupancy or ownership associated with the property described in this Order.

10. **Reporting of Hazardous Substance Release**: If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the discharger shall report such discharge to the Water Board by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 to 5:00). A written report shall be filed with the Water Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified. This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

11. **Rescission of Existing Order**: This Order supersedes and rescinds Site Cleanup Requirements Order R2-2005-0024.

12. **Periodic SCR Review**: The Water Board will review this Order periodically and may revise it when necessary.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on _____, 2009.

_____
Bruce H. Wolfe
Executive Officer

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FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

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Attachments: Self-Monitoring Program
Site Location Map (Figure 1)
Site Plan (Figure 2)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

HEXION SPECIALTY CHEMICALS, INC.

for the property located at

41100 BOYCE ROAD
FREMONT, ALAMEDA COUNTY

1. Authority and Purpose: The Water Board requires the technical reports required in this Self-Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self-Monitoring Program is intended to document compliance with Water Board Order No. R2-2009-00XX (Site Cleanup Requirements).

2. Monitoring: The discharger shall measure groundwater elevations semi-annually in all monitoring wells, and shall collect and analyze representative groundwater samples according to the table on the following page. In addition to groundwater monitoring, collection of soil gas samples from permanent soil vapor monitoring points shall be conducted to evaluate VOC concentration trends and identify potential adverse impacts to indoor air.

   The discharger shall sample any new monitoring or extraction wells semi-annually thereafter and analyze groundwater samples for the same constituents as shown in the following table. The discharger may propose changes in the table; any proposed changes are subject to Executive Officer approval.

3. Semi-Annual Monitoring Reports: The discharger shall submit semi-annual monitoring reports to the Water Board no later than 45 days following the end of the semi-annual period (e.g., report for July through December period due January 31 and January through June period due July 31). The first semi-annual monitoring report shall be due on July 31, 2009. The reports shall include:

   - Transmittal Letter: The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall be signed by the discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

   - Groundwater Elevations: Groundwater elevation data will be collected semiannually and shall be presented in tabular form, and a groundwater elevation map should be prepared for each monitored water-bearing zone with at least 3 data points. Historical groundwater elevations shall be included in the second semi-annual report each year.

Well No.	Water Bearing Zone	Analyses by EPA Method	Sampling Frequency	Comments
B-2	Shallow	VOCs by 8260B	Semiannual	Truck loading area, crossgradient plume margin (VOC & Diesel).
		Formaldehyde by 8315A	Annual	
B-4	Shallow	VOCs by 8260B	Semiannual	Crossgradient of VOC plume, down gradient of diesel/methanol plume.
		Methanol, TPH-D by 8015B	Annual	
B-5	Shallow	VOCs by 8260B	Quarterly	Downgradient VOC plume margin. At Office area.
B-24	Deep	VOCs by 8260B	Quarterly	Near B-20, downgradient VOC plume margin.
B-20	Shallow	VOCs by 8260B	Quarterly	Near B-24, downgradient VOC plume margin.
B-25	Shallow	VOCs by 8260B	Quarterly	Downgradient plume margin at Office.
GB-7/GEW-03	Shallow	VOCs by 8260B	Semiannual	VOC plume centerline at Office. Planned extraction well.
GEW-14	Shallow	VOCs by 8260B	Semiannual	VOC Plume Centerline at Resin Warehouse. Planned extraction well.
NW-3	Newark	VOCs by 8260B	Quarterly	Downgradient plume margin at Office.
GEW-17	Shallow	Formaldehyde by 8315A	Annual	Crossgradient diesel/methanol plume. Planned extraction well.
		Methanol by 8015B		
GEW-19	Shallow	Formaldehyde by 8315A	Annual	Diesel/Methanol plume margin, Methanol Plant area.
		TPH-D by 8015B		
GEW-23	Shallow	Methanol, TPH-D by 8015B	Annual	Diesel/Methanol plume margin. Former Diesel Tanks. Planned extraction well.
NW-1	Newark	VOCs by 8260B	Biennial	Upgradient sentinel well at property line.
B-14	Shallow	Methanol/TPH-D - 8015B	Biennial	Crossgradient sentinel well at corner of property line at Boyce Road.
NW-2	Newark	VOCs by 8260B	Biennial	Sentinel Well at Boyce Road.
B-22	Shallow	VOCs by 8260B	Quarterly	Downgradient sentinel well, VOC plume.
B-8	Shallow	VOCs by 8260B	Annual	Plume margin, near ES-1 and ES-2.
B-9	Shallow	VOCs by 8260B	Annual	VOC Plume centerline at Adhesives Warehouse.

Well No.	Water Bearing Zone	Analyses by EPA Method	Sampling Frequency	Comments
EW-1/ GEW-12	Shallow	VOCs by 8260B, PCBs	Annual	VOC plume centerline between Adhesives & Resin Warehouse. Planned extraction well.
B-11	Shallow	VOCs by 8260B	Annual	Crossgradient VOC plume margin.
B-12	Shallow	VOCs by 8260B	Annual	Upgradient VOC plume margin, ground water mound, Urea Off-Loading area.
B-15A	Deeper	VOCs by 8260B	Annual	Near B-23, upgradient VOC plume margin, Resin Warehouse area.
B-21	Shallow	VOCs by 8260B	Annual	Upgradient VOC plume margin.
B-23	Shalllow	VOCs by 8260B	Annual	Near B15A, but screened in the shallow zone and upgradient of VOC plume margin, Resin Warehouse.
GEW-1	Shallow	VOCs by 8260B	Annual	VOC plume centerline at Adhesives Warehouse.
GEW -18	Shallow	Formaldehyde by 8315A, TPH-D by 8015B, Methanol by 8015	Annual	Downgradient of diesel plume, Methanol Plan area.
GEW- 25	Shallow	Formaldehyde by 8315A, TPH-D by 8015B, Methanol by 8015	Annual	Diesel/Methanol plume margin, Cooling Tower area.

- Groundwater Analyses: Laboratory analytical methods shall use low detection limits (less than or equal to cleanup standards), unless sample dilution is necessary. Groundwater sampling data shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key contaminants for each monitored water-bearing zone, as appropriate. The report shall indicate the analytical method used, the detection limits obtained for each reported constituent, and a summary of QA/QC data. Historical groundwater sampling results shall be included in the second semi-annual report each year. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases. Supporting data, such as lab data sheets, need not be included (however, see record keeping - below).

- Soil Vapor Analysis: Laboratory analytical methods shall use low detection limits (less than or equal to cleanup standards), unless sample dilution is necessary, and shall include Method TO-15 for VOCs and SVOCs, and TO-13 for PAHs. Soil gas data (recent and historical) shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key compounds, as appropriate. The report shall indicate the analytical method used, the detection limits obtained for each reported constituent, and a summary of QA/QC data. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases.

- Field Analyses: All groundwater samples will be analyzed in the field for pH, dissolved oxygen (DO), electrical conductance (EC), temperature, oxidation-reduction potential (ORP), and turbidity.

4. MNA Monitoring: In the future and upon completion of active remediation, groundwater monitoring for MNA will include he following parameters:

   - Ferrous iron, manganese, carbon dioxide, and sulfide by Hach DR/850
   - Nitrate-nitrite by EPA Method 353.2
   - Sulfate by EPA Method 300.0
   - Alkalinity by EPA Method 310.1
   - Total dissolved solids by EPA Method 160.1
   - Total organic carbon by EPA Method 415.1
   - Methane, ethane, and ethene
   - Field measurement of pH, dissolved oxygen (DO), electrical conductance (EC), temperature, oxidation-reduction potential (ORP), and turbidity for all wells where low-flow sampling is implemented.

5. Groundwater Extraction: If applicable, the report shall include groundwater extraction results in tabular form, for each extraction well and for the Site as a whole, expressed in gallons per minute and total groundwater volume for the period. The report shall also include contaminant removal results, from groundwater extraction wells and from other remediation systems (e.g., soil vapor extraction), expressed in units of chemical mass per day and mass for the period. Historical mass removal results shall be included in the annual report.

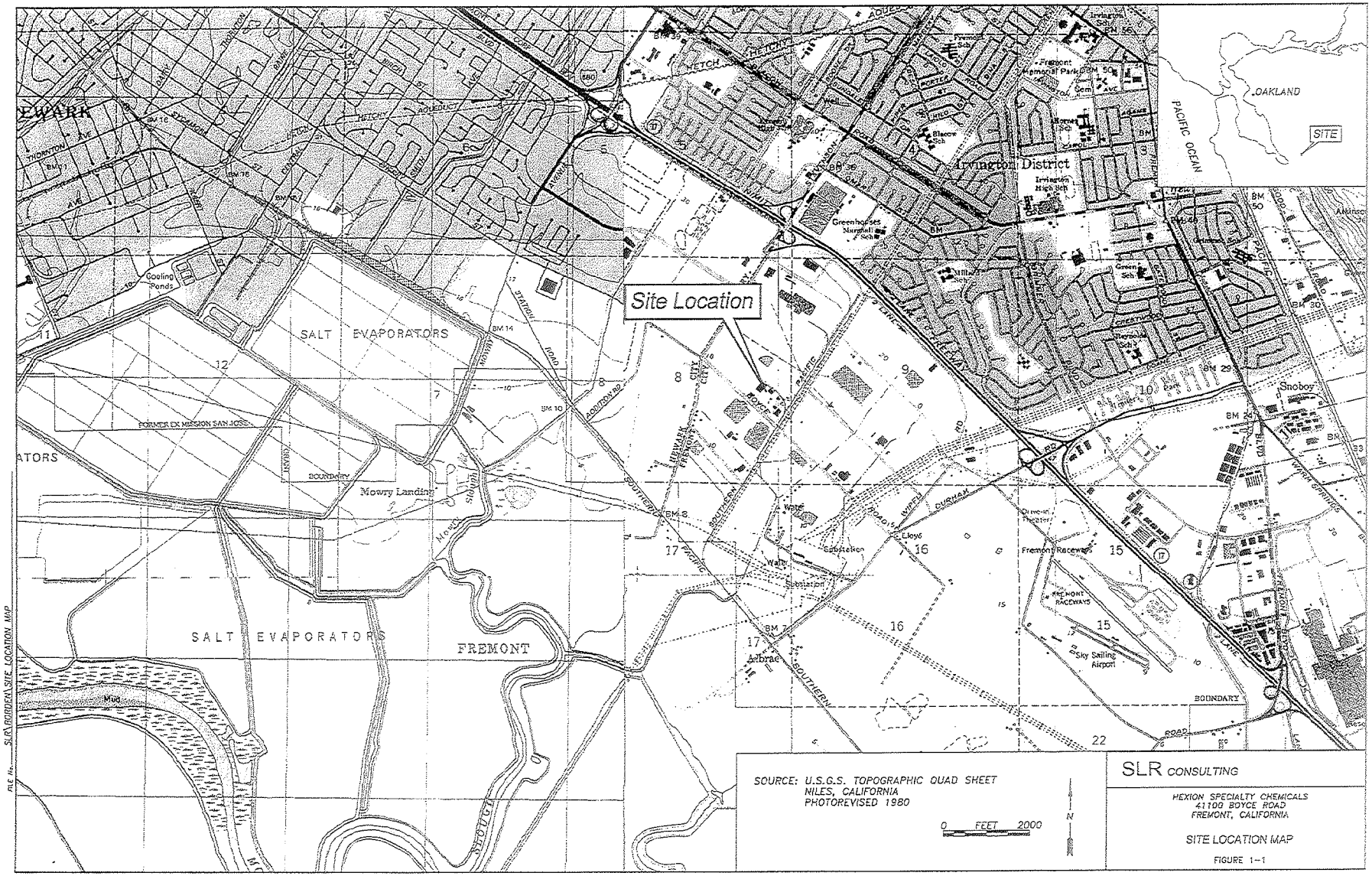
6. Status Report: The semi-annual report shall describe relevant work completed during the reporting period (e.g., site investigation, interim remedial measures) and work planned for the following period.

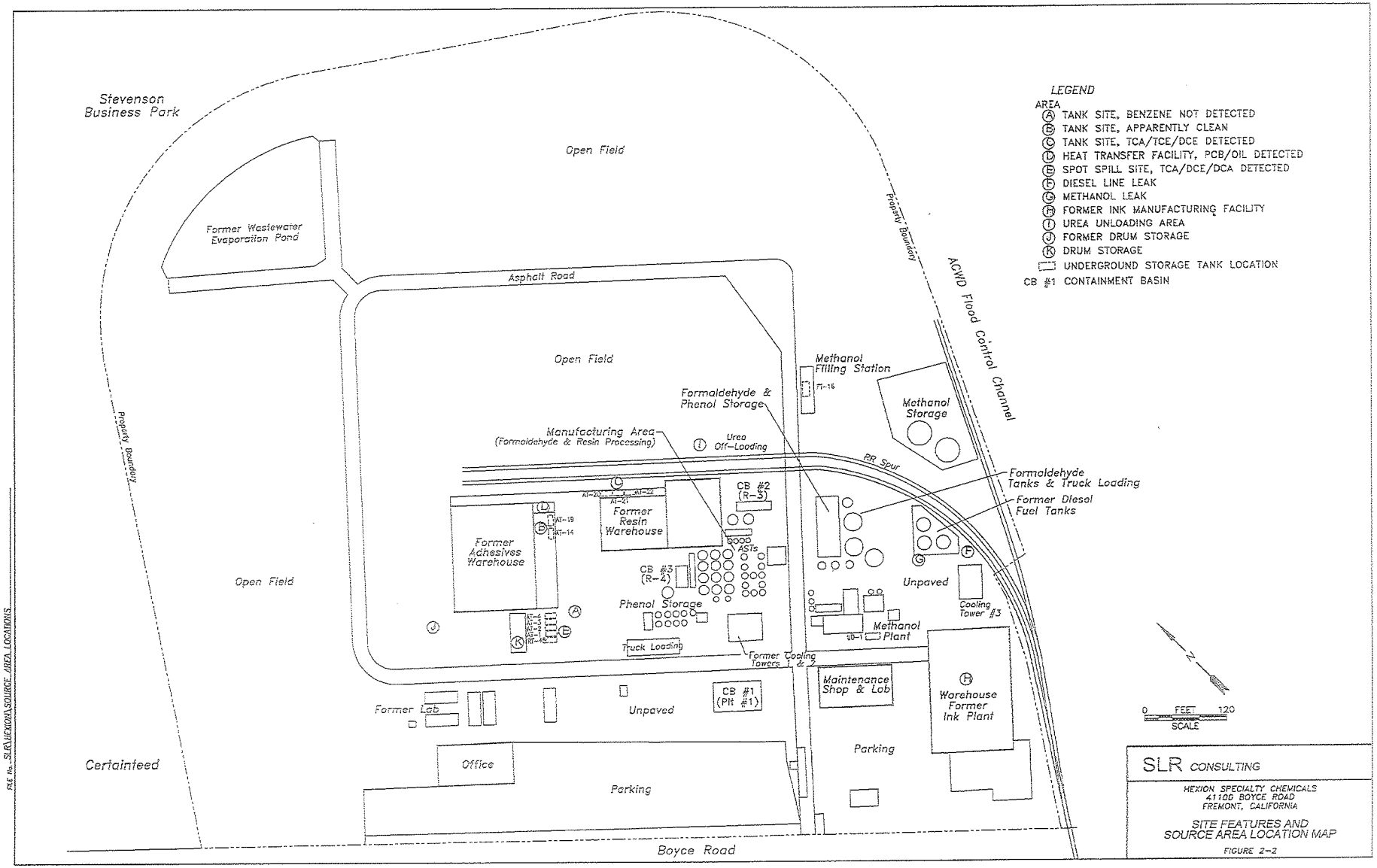
7. Violation Reports: If the discharger violates requirements in the Site Cleanup Requirements, then the discharger shall notify the Water Board office by telephone as soon as practicable once the discharger has knowledge of the violation. Water Board staff may, depending on violation severity, require the discharger to submit a separate technical report on the violation within five working days of telephone notification.

8. Other Reports: The discharger shall notify the Water Board in writing prior to any site activities, such as construction or underground tank removal, which have the potential to cause further migration of contaminants or which would provide new opportunities for site investigation.

9. Record Keeping: The discharger or his/her agent shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of six years after origination and shall make them available to the Water Board upon request.

10. SMP Revisions: Revisions to the Self-Monitoring Program may be ordered by the Executive Officer, either on his/her own initiative or at the request of the discharger. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.


Site Location
SALT EVAPORATORS
SALT EVAPORATORS
FREMONT
Irvington District
OAKLAND
PACIFIC OCEAN
SITE
Mowry Landing
Mud
Cooling Ponds
Fremont Raceways
Sky Sailing Airport
BOUNDARY
SOURCE: U.S.G.S. TOPOGRAPHIC QUAD SHEET
NILES, CALIFORNIA
PHOTOREVISED 1980
0 FEET 2000
N
SLR CONSULTING
HEXION SPECIALTY CHEMICALS
41100 BOYCE ROAD
FREMONT, CALIFORNIA
SITE LOCATION MAP
FIGURE 1-1
FILE No. — SLR\BORDEN\SITE LOCATION MAP



FILE No. SLR\HEXION\SOURCE_AREA_LOCATIONS

SLR CONSULTING

HEXION SPECIALTY CHEMICALS
41100 BOYCE ROAD
FREMONT, CALIFORNIA

SITE FEATURES AND SOURCE AREA LOCATION MAP

FIGURE 2-2

Appendix B – Correspondence

ALAMEDA COUNTY WATER DISTRICT

DIRECTORS
JOHN H. WEED
President
JAMES G. GUNTHER
Vice President
JUDY C. HUANG
MARTIN L. KOLLER
ARTHUR LAMPERT

43885 SOUTH GRIMMER BOULEVARD • P.O. BOX 5110, FREMONT, CALIFORNIA 94537-5110
(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

MANAGEMENT
PAUL PIRAINO
General Manager
WILBERT LIGH
Finance Manager/Treasurer
ROBERT SHAVER
Engineering Manager
WALTER L. WADLOW
Operations Manager

December 16, 2008

Ms. Cherie McCaulou
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Dear Ms. McCaulou:

Subject: Comments on the Tentative Site Cleanup Requirements for the Hexion Specialty Chemicals (formerly Borden Packaging) 41100 Boyce Road, Fremont, Alameda County (ACWD Site #24)

The Alameda County Water District (ACWD) appreciates the opportunity to comment on the Tentative Site Cleanup Requirements (SCR) for the Hexion Specialty Chemicals (formerly Borden Packaging), located at 41100 Boyce Road, Fremont, prepared by the Regional Water Quality Control Board (Regional Board). Summarized in the following paragraphs are our comments to the SCR. Specific pages in the SCR are referenced to in our comments for easier review.

1. Page 3, Section 6. Remedial Investigation: The SCR indicates that "The Site has been thoroughly investigated with completion of..." which implies that no further investigation is necessary. However, under Section C. TASKS (5 and 7) on pages 16 and 17, the SCR requires submittal of a work plan for additional subsurface investigation, which seems contradictory. The word "thoroughly" should be removed from the first sentence under the Section 6- Remedial Investigation.

2. Page 4, Section 6. Remedial Investigation: The SCR lists chemicals of concern (COCs) and their concentrations in a table. However, it is not clear whether the concentrations are the historical maximum or current maximum.

3. Page 12, Section 13 – Basis for Cleanup Standards, b. Beneficial Uses: The SCR lists potential beneficial uses of groundwater underlying and adjacent to the site as:

   - Municipal and domestic water supply
   - Industrial process water supply

- Industrial service water supply
- Agricultural water supply

Freshwater replenishment to surface water should be considered for the list above. An unlined open flood control channel paralleling the site on the South drains into Mowry Slough, a tidal tributary to South San Francisco Bay. A potential linkage between the flood control channel and shallow groundwater may exist and further studies may be needed to determine the communication between groundwater and surface water. Therefore, if the study confirms that the linkage between the flood control and the groundwater exists, the existing and potential beneficial uses of the Mowry Slough should be included in the SCR, as follows:

- Water contact and non-contact recreation
- Wildlife habitat
- Cold freshwater and warm freshwater habitat
- Fish migration and spawning
- Estuarine habitat

4. Page 12, Section 13 – Basis for Cleanup Standards, c. Basis for Groundwater Cleanup Standards: (i.e., Primary MCL, Secondary MCL, California MCL, Federal MCL, etc.) should be replaced with (i.e., California Primary MCL, California Secondary MCL, Federal Primary MCL, Federal Secondary MCL, etc.).

5. Page 15, Section B. CLEANUP PLAN, CLEANUP STANDARDS, 2. Cleanup Standards for Soil, Soil Gas, and Groundwater: See attached COCs cleanup standards table for minor typographical errors.

6. Page 16, Section C. TASKS, 5. DATA GAP AND PRE-REMEDIATION INVESTIGATION WORKPLAN (AREAS 1, 2, AND 3): The work plan should also require the definition of the lateral and vertical extent of VOCs and diesel pollution in groundwater.

7. Page 17, Section C. TASKS, 6. COMPLETION OF DATA GAP AND PRE-REMEDIATION INVESTIGATION (AREAS 1, 2, AND 3): The SCR requires a technical report documenting completion of tasks identified in the Task 5 work plan and the SCR states, "The technical report should identify source(s) of pollution, and define the vertical and lateral extent of pollution down to concentrations at or below typical cleanup standards for shallow soil." The SCR, in addition to soil, should also include the same requirements for groundwater in the Shallow Zone and Newark Aquifer.

8. Self-Monitoring Program, Page 2: The following additional groundwater monitoring wells should be included in the self monitoring program:

Well No.	Water Bearing Zone	Analyses by EPA Method	Sampling Frequency	Comments
B23	Shallow	VOCs by 8260B	Semiannual	Near B15A (B15A is screened in the deeper zone and B23 is screened in the shallow zone) up-gradient of VOC plume margin, Resin Warehouse
GEW-1	Shallow	VOCs by 8260B	Semiannual	VOC plume centerline at Adhesives Warehouse
GEW-18	Shallow	Formaldehyde by 8315A	Semiannual	Down-gradient of diesel plume, Methanol Plant Area
		TPH-D by 8015B		
		Methanol by 8015		
GEW-25	Shallow	Formaldehyde by 8315A	Semiannual	Diesel/Methanol plume margin, Cooling Tower Area
		TPH-D by 8015B		
		Methanol by 8015		

9. Self-Monitoring Program, Pages 2 and 3: See attached self monitoring program table for minor typographical errors.

We thank the Regional Board for this opportunity to comment and for careful consideration of the concerns expressed above. Should you have any questions or wish to discuss the comments in this letter, please contact M. Selim Zeyrek at (510) 668-4491 or Thomas Berkins, the Groundwater Protection Program Coordinator, at (510) 668-4442.

Sincerely,

Steven D. Inn

Steven D. Inn
Groundwater Resources Manager

sz/tf
Enclosures
cc: Jay Swardenski, City of Fremont Fire Department
Rick Springer, Hexion Specialty Chemicals

or anticipated. The cleanup levels shall be confirmed with confirmatory soil and soil gas samples prior to curtailment of the Remedial Action Plan described in Finding 11. The groundwater cleanup standards shown below shall be met in all wells throughout the area of impacted groundwater, including but not limited to all groundwater impacted wells identified in the Self-Monitoring Program.

Chemicals of Concern	Groundwater Cleanup Standard[1] (µg/L)	Soil Cleanup Standard[2] (mg/kg)	Soil Gas Cleanup Standard[3] (µg/m^3)
1,1,1-trichloroethane	200	7.8	1,300,000
1,1,2-trichloroethane	5.0	0.07	510
1,1-dichloroethane	5.0	0.20	5,100
1,2-dichloroethane	0.5	0.0045	310
Trichloroethene	5.0	0.46	4,100
1,1-dichloroethene	6.0	1.0	120,000
cis-1,2-dichloroethene	6.0	0.19	20,000
Trans-1,2-dichloroethene	10	0.67	41,000
Vinyl Chloride	0.5	0.047	100
Benzene	1.0	0.044	280
TPH – Diesel	100[4]	83	29,000
Chloroethane	~~120~~ 12	0.85	58,000
Chloromethane	~~180~~ 140	6.4	53,000
1,4-Dioxane	3.0	0.0018	---
Polychlorinated bi-phenols	~~0.5~~ 0.014	0.74	---
Methylene Chloride	5.0	0.077	17,000
Methanol	18,000[5]	310,000[6]	18,000[7]
Formaldehyde	7,300[5]	120,000[6]	0.94[7]

Notes:
[1] The basis for the cleanup standard is drinking water, except where noted.
[2] The basis for the cleanup standard is direct contact or leaching to groundwater, except where noted.
[3] The basis for the cleanup standard is indoor air-industrial/commercial, except where noted.
[4] The basis for the cleanup standard is taste and odor threshold.
[5] US EPA Preliminary Remediation Goal for tap water.
[6] US EPA Preliminary Remediation Goal for industrial soil.
[7] US EPA Preliminary Remediation Goal for industrial indoor air.

C. TASKS

1. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM OPERATION (AREA 1)

COMPLIANCE DATE: February 14, 2009 and annually until curtailment.

Submit a technical report acceptable to the Executive Officer that documents the expansion, modification and start up of the groundwater extraction system currently operating in the VOC impacted area as specified in section 4.1.1 of the

* 0.5 = drinking water std. - OK
0.014 = aquatic life std. CM

Well No.	Water Bearing Zone	~~Sampling Frequency &~~ Analyses by EPA Method	Sampling Frequency	Comments
B-2	Shallow	VOCs by 8260B	Semiannual	Truck loading area, crossgradient plume margin (VOC & Diesel)
		Formaldehyde by 8315A	Annual	
B-4	Shallow	VOCs by 8260B	Semiannual	Crossgradient of VOC plume, down gradient of diesel/methanol plume.
		Methanol, TPH-D by 8015B	Annual	
B-5	Shallow	VOCs by 8260B	Quarterly	Downgradient VOC plume margin. At Office area
B-24	Deep	VOCs by 8260B	Quarterly	Near B-20, downgradient VOC plume margin.
B-20	Shallow	VOCs by 8260B	Quarterly	Near B-24, downgradient VOC plume margin.
B-25	Shallow	VOCs by 8260B	Quarterly	Downgradient plume margin at Office.
GB-7/GEW-03	Shallow	VOCs by 8260B	Semiannual	VOC plume centerline at Office. Planned extraction well
GEW-14	Shallow	VOCs by 8260B	Semiannual	VOC Plume Centerline at Resin Warehouse. Planned extraction well.
NW-3	Newark	VOCs by 8260B	Quarterly	Downgradient plume margin at Office.
GEW-17	Shallow	Formaldehyde by 8315A	Annual	Crossgradient diesel/methanol plume. Planned extraction well.
		Methanol by 8015B		
GEW-19	Shallow	Formaldehyde by 8315A	Annual	Diesel/Methanol plume margin, Methanol Plant area.
		TPH-D by 8015B		
GEW-23	Shallow	Methanol, TPH-D by 8015B	Annual	Diesel/Methanol plume margin. Former Diesel Tanks. Planned extraction well.
NW-1	Newark	VOCs by 8260B	Biennial	Upgradient sentinel well at property line.
B-14	Shallow	Methanol/TPH-D - 8015B	Biennial	Crossgradient sentinel well at corner of property line at Boyce Road.
NW-2	Newark	VOCs by 8260B	Biennial	Sentinel Well at Boyce Road
B-22	Shallow	VOCs by 8260B	Quarterly	Downgradient sentinel well, VOC plume.
B-8	Shallow	VOCs by 8260B	Annual	Plume margin, near ES-1 and ES-2.
B-9	Shallow	VOCs by 8260B	Annual	VOC Plume centerline at Adhesives Warehouse.

Well No.	Water Bearing Zone	Analyses by EPA Method	Sampling Frequency	Comments
EW-1/ GEW-12	Shallow	VOCs by 8260B, PCBs	Annual	VOC plume centerline between Adhesives & Resin Warehouse. Planned extraction well.
B-11	~~Annual~~	VOCs by 8260B	Annual	Crossgradient VOC plume margin
B-12	Shallow	VOCs by 8260B	Annual	Upgradient VOC plume margin, ground water mound, Urea Off-Loading area
B-15A	~~Shallow~~	VOCs by 8260B	Annual	Near B-23, upgradient VOC plume margin, Resin Warehouse area.
B-21	Shallow	VOCs by 8260B	Annual	Upgradient VOC plume margin/

- Groundwater Analyses: Laboratory analytical methods shall use low detection limits (less than or equal to cleanup standards), unless sample dilution is necessary. Groundwater sampling data shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key contaminants for each monitored water-bearing zone, as appropriate. The report shall indicate the analytical method used, detection limits obtained for each reported constituent, and a summary of QA/QC data. Historical groundwater sampling results shall be included in the second semi-annual report each year. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases. Supporting data, such as lab data sheets, need not be included (however, see record keeping - below).

- Soil Vapor Analysis: Laboratory analytical methods shall use low detection limits (less than or equal to cleanup standards), unless sample dilution is necessary, and shall include Method TO-15 for VOCs and SVOCs, and TO-13 for PAHs. Soil gas data (recent and historical) shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key compounds, as appropriate. The report shall indicate the analytical method used, detection limits obtained for each reported constituent, and a summary of QA/QC data. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases.

- Field Analyses: All groundwater samples will be analyzed in the field for pH, dissolved oxygen (DO), electrical conductance (EC), temperature, oxidation-reduction potential (ORP), and turbidity.

4. MNA Monitoring: In the future and upon completion of active remediation, groundwater monitoring for MNA will include he following parameters:

   - Ferrous iron, manganese, carbon dioxide, and sulfide by Hach DR/850
   - Nitrate-nitrite by EPA Method 353.2
   - Sulfate by EPA Method 300.0
   - Alkalinity by EPA Method 310.1

From: "Golla, Bill" <Bill.Golla@arcadis-us.com>
To: Cherie MCcaulou <CMccaulou@waterboards.ca.gov>
CC: "andrea.perez@hexion.com" <andrea.perez@hexion.com>, "Maehr, Jeremie" <J...
Date: 12/22/2008 12:18 PM
Subject: FW: Hexion - Public Comments
Attachments: ACWD Comments - Hexion TO.pdf

Cherie,

I do not believe Hexion has any more comments on the order. However, I have read ACWD comments and have the following 2 comments.

* Per our previous conversations/email, I believe the additional wells to be monitored is redundant and excessive.

* The proposed investigation (Section C, Task 5&6) is to define the extents of the shallow soil excavation, perform some injection testing, and collect some groundwater geochemistry data. Delineation of COCs in groundwater should not be include in this investigation.

Thanks,
Bill

-----Original Message-----
From: Cherie MCcaulou [mailto:CMccaulou@waterboards.ca.gov]
Sent: Friday, December 19, 2008 2:50 PM
To: Golla, Bill
Subject: Hexion - Public Comments

Hello Bill - attached are the only comments I received for the Hexion, Boyce Road, Fremont, site. ACWD's comments on the Tentative Order are minor, however, they are requesting a few more wells for monitoring. I'll be preparing the Staff Summary Report and the Response to Comments today.I'll consider adding the wells. Please review and get back to me (today if possible). Thanks, Cherie

P.S. Are you submitting additional comments?

Sincerely,

Cherie McCaulou
Engineering Geologist
San Francisco Bay Regional Water Quality Control Board cmccaulou@waterboards.ca.gov
510-622-2342

Appendix C – Response to Comments

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

INTERNAL STAFF REPORT

TO: Bruce H. Wolfe
Executive Officer

DATE: December 24, 2008
FILE NO. 01S0259 (CCM)

FROM: Cherie McCaulou
Engineering Geologist

SUBJECT: Response to Comments on the Tentative Order for Final Site Cleanup Requirements, for Hexion Specialty Chemicals, Inc., 41100 Boyce Road, Fremont, Alameda County

On November 19, 2008, Water Board staff provided an administrative draft of the Tentative Order (TO) to Hexion for comment. We circulated the TO to Hexion and interested parties for comment on November 24, 2008. We received comments on the TO from Alameda County Water District (the District) in a letter dated December 16, 2008. Hexion had no comments on the TO, but responded to the District's letter in a December 22, 2008, email. Comments from each party are summarized below together with our response.

Alameda County Water District Comments

1. Comment: Make several editorial changes for clarity (District comments 1, 2, 4, 5, 9)

   Response: We revised the TO to incorporate the suggested editorial changes.

2. Comment: Include four additional wells in the self-monitoring program (SMP) - wells B23, GEW-1, GEW-18, GEW-25 – to better monitor the effects of site cleanup on groundwater quality (District comment 8).

   Response: We agree, and the four wells have been added to the SMP.

3. Comment: Consider adding "freshwater replenishment to surface waters" to the list of beneficial uses of shallow groundwater at the site, since the shallow groundwater may "daylight" in a flood control channel tributary to Mowry Slough. Similarly, consider adding the relevant beneficial uses of Mowry Slough (District comment 3).

   Response: We generally agree. We have modified the TO to add "freshwater replenishment" and the Mowry Slough beneficial uses as possible beneficial uses.

However, further studies would be needed to demonstrate the linkage between shallow groundwater and the flood control channel before we would add these beneficial uses in the Basin Plan. As a practical matter, the addition of these beneficial uses would not affect the cleanup standards in the TO or the cleanup plan.

4. Comment: Add language to Tasks 5 and 6 of the TO, to require the delineation of chemicals of concern (COCs) in groundwater (District comments 6 and 7).

   Response: We disagree. The purpose of Tasks 5 and 6 is to help design remedial soil excavation limits, not to delineate the extent of the COCs in groundwater. The extent of COCs in groundwater is already adequately defined.

Hexion Specialty Chemicals, Inc.

1. Comment: We object to the District's request for additional wells in the SMP, on the basis that is redundant and excessive.

   Response: We disagree. We generally would want to see more groundwater monitoring during the active cleanup phase, particularly when there is a change in system operation as will be happening at this site. The District's request is reasonable in this light. We are willing to adjust the monitoring schedule in future, based on data trends.

2. Comment: We object to the District's comment that would require delineation of COCs in groundwater, since the objective of Tasks 5 and 6 is to define the extent of shallow soil excavation.

   Response: We agree (see item 4 above).