

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

ORDER No. R2-2011-0030

ADOPTION OF FINAL SITE CLEANUP REQUIREMENTS AND RESCISSION OF  
ORDER No. R2-2007-0040 FOR:

APPLIED BIOSYSTEMS, LLC and  
JR REALTY #2, LLC

for the property located at

2690 CASEY AVENUE  
MOUNTAIN VIEW  
SANTA CLARA COUNTY

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

1. **Site Location:** The subject property (hereinafter Site) is located at 2690 Casey Avenue in Mountain View just north of Highway 101 (Figure 1). The 3.5 acre Site contains a 50,000 square-foot commercial/industrial building. The property is bordered by 1201 San Antonio Road and 2639 Terminal Boulevard to the north, Broderick Way to the east, Casey Avenue to the south, and San Antonio Road to the west (Figure 2). The Site is about 350 feet south of the seasonal ponds from the Shoreline Park, 1000 feet southeast of Charleston Slough (which is connected to San Francisco Bay), 1000 feet west of Shoreline Lake, and one mile south of San Francisco Bay. The local area is used primarily for commercial and industrial purposes, and for parkland.
2. **Site History:** The Site was vacant land prior to 1963 when the current building was constructed. Perkin-Elmer Corporation (Perkin-Elmer) operated a stainless steel vacuum pump systems manufacturing facility from 1963 to 1984. Perkin-Elmer's former facility had a machine shop, a waste storage area, an aluminum cleaning area, and outdoor chemical storage and treatment areas. Perkin-Elmer also operated a 1,000-gallon underground storage tank (UST) and several above ground storage tanks. Perkin-Elmer used tetrachloroethene (PCE), sodium hydroxide, ammonia, methanol, and various acid solutions in its operations (Safety Specialists, Inc., report, January 26, 1984). Perkin-Elmer stored PCE and other chemicals in a 1,000-gallon UST, several above ground storage tanks, and in 55-gallons drums. In 1998, Perkin-Elmer changed its name to PE Corporation (NY) and later merged with Applera Corporation (Applera). On July 1, 2008, Applera changed its name to Applied Biosystems, Inc. On November 21, 2008, Applied Biosystems, Inc., and Invitrogen Corporation by merger created Life Technologies Corporation. After the merger, Applied Biosystems, LLC, successor to Applied Biosystems Inc., has continued as a wholly owned subsidiary of

Life Technologies Corporation. From 1984 to 2001, Sun Microsystems (Sun) leased the Site. From mid 1884 through early 1989, Sun performed manufacturing and/or computer assembly on portions of the Site. After 1989, the property was used solely for office and storage purposes. The building was vacant from 2001 until 2006 but it is now occupied by Google. JR Realty #2, LLC, bought the property in 2001.

3. **Named Dischargers:** Applied Biosystems, LLC, is named as a discharger because of substantial evidence that it is a successor to Perkin-Elmer Corporation, which discharged pollutants to soil and groundwater at the Site, including chlorinated solvents from Perkin-Elmer's stainless steel vacuum pump systems manufacturing operations, the presence of these same pollutants in soil and groundwater, and because Applied Biosystems, LLC, had knowledge of the discharge or the activities that caused the discharge, and had the legal ability to prevent the discharge. Life Technologies Corporation is not named as a discharger in this order for the following reasons: the other named dischargers have adequate financial resources to comply with this order, the other named dischargers have complied with the prior order, and Life Technologies Corporation has requested that Applied Biosystems, LLC, a wholly owned subsidiary of Life Technologies Corporation, be named as a discharger instead. However, Life Technologies Corporation may be named in the future if these circumstances change.

JR Realty #2, LLC, the current landowner, is named as a discharger because it owned the Site after the time of the activity that resulted in the discharge, has knowledge of the discharge or the activities that caused the discharge, and has the legal ability to prevent 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 Regional Water Board will consider adding those parties' names to this order.

4. **Regulatory Status:** This Site was subject to Site Cleanup Requirements (Order No. R2-2007-0040) adopted on May 9, 2007.
5. **Site Hydrogeology:** The topography is relatively flat with a gentle slope towards the north. The Site is approximately 5 feet above mean seal level, and it appears to have been created by importing fill material on top of the historical Bay margin sediments. There are three discontinuous groundwater-bearing zones. The first is a perched zone located at the interface of the fill material and native clay at depths of approximately 12 - 15 feet below ground surface (bgs). The second is a shallow sand and gravel water-bearing zone from 20 - 24 feet bgs. The third is a deeper water-bearing zone consisting of sand and gravel encountered at depths between approximately 40 - 53 feet bgs. Groundwater occurs initially at approximately 20 - 24 feet bgs and rises to a level of about 11-12 feet bgs within 30 minutes, suggesting artesian conditions. This suggests that the shallow water-bearing zone is presently under confined or semi-confined conditions.

6. **Remedial Investigation:** Since 1999, several investigations were performed to determine the nature and extent of the contamination. These investigations have found significant concentrations of volatile organic compounds (VOCs) in soil, soil gas, and groundwater in two areas: the western side of the Site building and along the northern property line area. The contaminants consist primarily of tetrachloroethylene (PCE), and its breakdown products: trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2 DCE), and vinyl chloride.

Groundwater samples have been collected at the Site since 1999. The highest concentrations of VOCs detected during the 2010 sampling events were: 3,000 micrograms per liter ( $\mu\text{g/l}$ ) of PCE, 2,300 $\mu\text{g/l}$  of TCE, 1,500  $\mu\text{g/l}$  of cis-1,2-DCE, and 48  $\mu\text{g/l}$  of vinyl chloride. The groundwater plume is adequately defined, stable, and extends offsite to the north, approximately 350 feet. However, the northeastern corner of the plume limit needs additional groundwater monitoring wells for on-going monitoring.

Approximately 400 soil samples were collected at the Site. The highest concentrations of VOCs were detected at the two source areas. These two source areas are the western side of the Site building and the area along the northern property line between 2690 Casey Avenue and 1201 San Antonio Road. The maximum residual values of PCE and vinyl chloride remaining after the interim remedial actions, located under a PG&E pole along the northern property line, are 3,600 mg/kg and 0.82 mg/kg, respectively. The soil pollution is adequately defined, except the area under the western side of the onsite building.

Soil gas samples collected between three and eight feet below ground surface show two hot spots (concentrations  $>10,000 \mu\text{g/m}^3$ ): the northern side of the property line, to the northwest of the former drum storage area, and under the western portion of the Site building. The maximum residual soil gas concentrations detected after the interim remedial action are around the source areas, i.e., 16,000 micrograms per cubic meter ( $\mu\text{g/m}^3$ ) of PCE, 530,000  $\mu\text{g/m}^3$  of TCE, 760,000  $\mu\text{g/m}^3$  of cis-1,2-DCE, and 500,000  $\mu\text{g/m}^3$  of vinyl chloride. The maximum values detected under the 1201 San Antonio building are 10,000  $\mu\text{g/m}^3$  of cis-DCE and 64,000  $\mu\text{g/m}^3$  of vinyl chloride. The soil gas plume is adequately defined and extends offsite to the north approximately 70 feet from the property line.

Indoor air samples were collected inside of the onsite building to evaluate the vapor intrusion pathway to indoor air during five sampling events between August 2007 and November 2009. The maximum VOC levels in indoor air were 16  $\mu\text{g/m}^3$  of PCE and 9.9  $\mu\text{g/m}^3$  of TCE in the onsite building bathroom and 0.94  $\mu\text{g/m}^3$  of PCE and 0.76  $\mu\text{g/m}^3$  TCE in other building interior spaces. Indoor air samples were collected during a 2003 sampling event inside of 1201 San Antonio Road building. TCE was detected at a maximum level of 3.8  $\mu\text{g/m}^3$ .

7. **Interim Remedial Measures:** Interim remedial actions have primarily focused on the two source areas of the Site. In 1984, the former 1000 gallon UST located on the

western side of the building was excavated and hauled offsite. Two soil excavation programs were performed at the Site. In 2001, 941 tons of VOC contaminated soil were removed from the western side of the Site building. In 2008, 1,688 tons of VOC contaminated soil were removed from the area along the northern property line. In January 2011, modifications to the bathroom ventilation system were made and cracks and joints in the floor were sealed to prevent vapor intrusion. Soil, soil gas and groundwater remediation has not been completed at the Site, due to the constraints posed by the existing building which makes additional soil excavation infeasible at the present time due to inaccessibility. Additional soil remediation is needed to meet cleanup standards. Additional soil gas and groundwater remediation may be needed to meet cleanup standards and is identified as a contingent remedy in the Remedial Action Plan.

## 8. Environmental Risk Assessment:

- a. **Screening Levels:** A screening level environmental risk assessment was carried out to evaluate potential environmental concerns related to identified soil, soil gas, and groundwater impacts. Chemicals evaluated in the risk assessment include PCE, TCE, cis-1,2-DCE, and vinyl chloride, the primary chemicals of concern identified at the Site.

As part of the assessment, Site data were compared to Environmental Screening Levels (ESLs) compiled by Regional Water Board staff. The presence of chemicals at concentrations above the ESLs indicates that additional evaluation of potential threats to human health and the environment is warranted. Screening levels for groundwater address the following environmental concerns: 1) impacts to indoor air and 2) migration and impacts to aquatic habitats. Screening levels for soil address: 1) direct exposure, 2) leaching to groundwater, and 3) nuisance issues. Screening levels for soil gas address indoor air vapor intrusion concerns. Chemical-specific screening levels for other human health concerns (i.e., indoor-air and direct-exposure) are based on a target excess cancer risk of  $1 \times 10^{-6}$  for carcinogens and a target Hazard Quotient of 0.2 for noncarcinogens. Groundwater screening levels for the protection of aquatic habitats are based on promulgated surface water standards (or equivalent). The Regional Water Board considers a cumulative excess cancer risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  and a target Hazard Index of 1.0 to be generally acceptable for human health concerns at remediation sites. Soil screening levels for potential leaching concerns are intended to prevent impacts to groundwater above target groundwater goals (e.g., protection of aquatic habitats). Soil screening levels for nuisance concerns are intended to address potential odor and other aesthetic issues.

- b. **Soil Assessment:** As indicated in the table below, PCE and vinyl chloride exceeded their screening levels in soil for leaching potential with groundwater not a current drinking water resource. PCE also exceeded its screening level for gross contamination and human health (direct exposure – commercial/industrial land use).

Chemicals of Concern in Soil	Maximum Reported Concentration* (mg/kg)	Potential Direct Exposure	Gross Contamination	Potential Leaching to Groundwater
PCE	3,600	X	X	X
Vinyl Chloride	0.82			X

*Notes:* \* Maximum Reported Concentration is the soil concentration detected after the 2008 interim remedial action. An "X" indicates that respective ESL was exceeded.

- c. **Soil Gas Assessment:** As indicated in the table below, PCE, TCE, cis-1,2-DCE, and vinyl chloride exceeded their screening levels for potential vapor intrusion for commercial/industrial land use.

Chemicals of Concern in Soil Gas	Maximum Reported Concentration* ( $\mu\text{g}/\text{m}^3$ )	Potential Vapor Intrusion Concerns
PCE	16,000	X
TCE	530,000	X
Cis-1,2-DCE	760,000	X
Vinyl Chloride	500,000	X

*Notes:* \* Maximum Reported Concentration is the concentration detected during the November 2009 sampling event, after the 2008 interim remedial action. An "X" indicates that respective ESL was exceeded.

- d. **Groundwater Assessment:** As indicated in the table below, PCE and TCE levels, as observed in groundwater samples collected from Site monitoring wells in December 2010, exceed their screening levels in groundwater for potential aquatic habitat concerns.

Chemicals of Concern in Groundwater	Maximum Reported Concentration* ( $\mu\text{g}/\text{m}^3$ )	Potential Vapor Intrusion Concerns	Potential Aquatic Habitat Concerns
PCE	3,000		X
TCE	2,300		X

*Notes:* \* Maximum Reported Concentration is the maximum concentration detected in 2010. An "X" indicates that respective Environmental Screening Level was exceeded.

- e. **Indoor Air Assessment:** As indicated in the table below, PCE, TCE, cis-1,2-DCE and vinyl chloride levels exceed their screening levels in indoor air for commercial/industrial land use in the bathroom samples. The maximum detected concentration of PCE slightly exceeded its ESL and TCE, vinyl chloride and cis-1,2-DCE were below their respective ESLs in the main work area.

Chemicals of Concern in Indoor Air	Maximum Reported Concentration in Bathroom* ( $\mu\text{g}/\text{m}^3$ )	Potential Indoor Air Concern	Maximum Reported Concentration in Main Work Area* ( $\mu\text{g}/\text{m}^3$ )	Potential Indoor Air Concern
PCE	16	X	0.94	
TCE	9.9	X	0.76	
Vinyl Chloride	0.17	X	<0.0045	

*Notes:* \* Maximum Reported Concentration is the maximum concentration detected during the last five sampling events in the bathroom area and main work area, between 2007 and 2009. An "X" indicates that respective Environmental Screening Level was exceeded.

A human health risk assessment for indoor air was performed and the calculated risk was found to be  $1 \times 10^{-6}$ . The results concluded that no unacceptable health risks were identified to the current worker population based on the indoor air exposure.

- f. **Conclusions:** Additional soil remedial action is needed due to the potential risk to human health and the environment from PCE, TCE, cis-1,2-DCE, and vinyl chloride contamination at the Site. Additional soil vapor and groundwater remediation may be needed following implementation of the approved remedy, as discussed in Finding 10.
9. **Feasibility Study:** Applied Biosystems, LLC, submitted its revised *Remedial Action Plan (RAP)* Revision 3 on January 31, 2011. The RAP evaluated the following remedial options: (1) soil vapor extraction, (2) soil excavation, and (3) in-situ groundwater treatment.
10. **Remedial Action Plan:** The Applied Biosystems, LLC., RAP recommends soil excavation to address the VOC affected soils at the time the onsite building are demolished for Site redevelopment, and in-situ groundwater treatment as a contingent remedy, should it be needed at the time the soil excavation is performed. The implementation of the approved soil excavation remedy has been deferred due to access constraints imposed by the existing site building and the PG&E pole. Soil excavation

has proven to be an effective method of remediating VOC-affected soil, soil gas, and groundwater at the Site. On-going groundwater, soil gas, and indoor air monitoring activities would be used to assess protection of aquatic receptors and current and future commercial/industrial worker exposure. Residual VOC soil contamination remains around an electrical transmission pole along the northern property line and under the western side of the on-Site building. Asphalt/landscape covers and building foundation are placed on the ground surface above the area where elevated concentrations of VOCs remain in soil. The asphalt/landscape cover and the building foundation limit water infiltration and inhibit leaching of VOCs from soil to groundwater.

## 11. **Basis for Cleanup Standards and Action Levels**

- 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. 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.

- b. **Beneficial Uses:** The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Regional Water 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 Regional Water Board and approved by the State Water Resources Control Board, the Office of Administrative Law, and the U.S. EPA, 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 is brackish as shown by measured high specific conductance. Groundwater samples collected at the Site consistently exceeded the 5,000 micro Siemens per centimeter threshold for potable water. The two shallow water-yielding intervals underlying the Site do not sustain a yield above 200 gallons per day. Groundwater underlying and adjacent to the Site does not qualify as a potential source of drinking water.

The potential beneficial uses of groundwater underlying and adjacent to the Site include:

- a. Industrial process water supply
- b. Industrial service water supply
- c. Agricultural water supply
- d. Freshwater replenishment to surface waters

At present, the only known beneficial use of groundwater underlying the Site is freshwater replenishment.

The potential beneficial uses of the Charleston Slough located 1,000 feet north of the Site include:

- a. Groundwater recharge
- b. Water non-contact recreation
- c. Wildlife habitat
- d. Cold freshwater habitat
- e. Estuarine habitat
- f. Preservation of rare and endangered species

- c. **Basis for Groundwater Cleanup Standards:** The groundwater cleanup standards for the Site are intended to protect aquatic habitat and prevent vapor intrusion. Cleanup to this level will protect beneficial uses of groundwater and will result in acceptable residual risk to humans and ecological receptors. The cleanup standards include attenuation factors of 1.7 to 4.7 to account for migration of groundwater 1,000 feet before reaching surface water. Attenuation factors vary based on physical and chemical properties of each VOC. Groundwater cleanup standards are shown in section B.4 below.
- d. **Basis for Soil Cleanup Standards:** The shallow soil cleanup standards for the Site are based on a commercial/industrial direct exposure scenario. The deeper soil cleanup standards for the Site are intended to prevent leaching of contaminants to groundwater. Cleanup to this level will protect beneficial uses of groundwater and will result in acceptable residual risk to human and ecological receptors in a commercial/industrial use scenario. The soil cleanup standards are derived from Regional Water Board's ESLs, Tables B-2 and C-2. Shallow and deep soils cleanup standards are shown in section B.4 below.
- e. **Basis for Soil Gas Cleanup Standards:** The soil gas cleanup standards for the Site are intended to prevent vapor intrusion into commercial/industrial buildings and will result in acceptable residual risks to humans. The soil gas cleanup standards are based on Site specific soil physical parameters and US EPA revised inhalation risk assessment methodology for intrusion into a commercial/industrial building (US EPA, 2009). Soil gas cleanup standards are shown in section B.4 below.

- f. **Basis for Indoor Air Action Levels:** The indoor air action levels for the Site are based on the protection of human health under a commercial/industrial exposure scenario. The indoor air action levels are calculated based on U.S. EPA and Department of Toxic Substances Control guidelines. Indoor air action levels are shown in section B.4 below.
12. **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 nor 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 indicates that cleanup standards can be surpassed, the Regional Water Board may decide that further cleanup actions should be taken.
13. **Risk Management:** The Regional Water Board considers the following human health risks to be acceptable at remediation sites: a cumulative hazard index of 1.0 or less for non-carcinogens and a cumulative excess cancer risk of  $10^{-6}$  to  $10^{-4}$  or less for carcinogens. The environmental screening levels evaluation for this Site found contamination-related risks in excess of these acceptable levels. Active remediation will reduce these risks over time. However, risk management measures are needed at this Site until active remediation is completed to assure protection of human health.

The following risk management measures are needed at this Site:

- a. A Risk Management Plan is needed to address current and future potential exposure to soil, soil gas, and groundwater at concentrations above the cleanup standards. The Risk Management Plan will include the following items:
1. Protection of construction/utility/landscape worker who might disturb the subsurface through digging the existing VOC affected soils;
  2. Soil management to ensure that excavated soils are handled appropriately in accordance with local, state, and federal regulations, and that the known risks are communicated to the workers; and
  3. On-going indoor air monitoring activities would be used to assess current and future commercial/industrial worker exposure onsite and offsite;
  4. Implementation of mitigation measures if indoor air monitoring levels are found to be above the action levels in samples collected.

- b. If building demolition and additional soil cleanup does not occur over the next ten years, then a deed restriction will be needed. The deed restriction will notify future owners of sub-surface contamination and prohibit sensitive uses of the Site such as residences and daycare centers.
13. **Reuse or Disposal of Extracted Groundwater:** State 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.
14. **Basis for 13304 Order:** California Water Code Section 13304 authorizes the Regional Water Board to issue orders requiring dischargers to cleanup and abate waste where the dischargers have 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.
15. **Cost Recovery:** Pursuant to California Water Code Section 13304, the dischargers are hereby notified that the Regional Water Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Regional 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.
16. **CEQA:** The Regional Water Board, as lead agency for this project, prepared an Initial Study and draft Negative Declaration, which was circulated for public review in compliance with CEQA and applicable regulations. The Regional Water Board has considered the Negative Declaration, which reflects the independent judgment and analysis of the Regional Water Board, and finds based on substantial evidence in the record that the project poses no significant environmental impacts. The Negative Declaration was adopted by the Regional Water Board on May 11, 2011.
17. **Notification:** The Regional Water Board has notified the dischargers 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.
18. **Public Hearing:** The Water 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 dischargers (or their agents, successors, or assigns) shall cleanup 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. REMEDIAL ACTION PLAN, CLEANUP STANDARDS, AND ACTION LEVELS**

1. **Implement Remedial Action Plan:** The dischargers shall implement the remedial actions described in finding 10. The dischargers shall evaluate, propose, and implement additional remedial actions for soil and groundwater in accordance with tasks 4 and 5.

2. **Groundwater Cleanup Standards:** The following groundwater cleanup standards shall be met in all wells identified in the Self-Monitoring Program:

Constituent	Standard (µg/l)	Basis
PCE	360	Aquatic habitat (AH) protection
TCE	1,692	AH protection
Cis-1,2 DCE	1,711	AH protection
Vinyl Chloride	600	Vapor intrusion protection

3. **Shallow and Deeper Soil Cleanup Standards:** The following soil cleanup standards shall be met in all shallow and deeper soils, as appropriate based on depth, and shall be verified by collecting confirmatory soil samples.

Constituent	Standard (mg/kg) for Shallow Soils	Standard (mg/kg) for Deeper Soils
PCE	0.95	17
TCE	4.1	33

cis-1,2-DCE	22	18
Vinyl Chloride	0.047	0.66

*Note:* Shallow [less than 3 meters(m)] soil standards were derived for the protection of commercial / industrial receptor – direct exposure and deeper (more than 3 m) soil standards were derived to prevent leaching to groundwater.

4. **Soil Gas Cleanup Standards:** The following soil gas cleanup standards shall be met in all onsite soil gas and in all soil gas at properties impacted by discharges from the Site, and shall be verified by collecting confirmatory soil gas samples.

Constituent	Soil Gas Cleanup Standard ( $\mu\text{g}/\text{m}^3$ )	Basis
PCE	120	Site Specific
TCE	310	Site Specific
Cis-1,2-DCE	8,100	Site Specific
Vinyl Chloride	6.3	Site Specific

5. **Indoor Air Action Levels:** The following indoor air action levels shall be met in all onsite and offsite buildings impacted by discharges from the Site, and shall be verified by collecting confirmatory indoor air samples. Exceedences of these action levels shall trigger follow-up actions pursuant to the Risk Management Plan (below).

Constituent	Indoor Air Action levels ( $\mu\text{g}/\text{m}^3$ )	Basis
PCE	2.1	Site Specific
TCE	6.0	Site Specific
Cis-1,2-DCE	150	Site Specific
Vinyl Chloride	0.16	Site Specific

## C. TASKS

### 1. RISK MANAGEMENT PLAN

COMPLIANCE DATE: August 15, 2011

Submit a Risk Management Plan (RMP) acceptable to the Executive Officer to address current and future potential exposure to concentrations above the cleanup standards and the action levels. The RMP would include, but not be limited to, the protection of construction workers from exposure to VOC-affected soils, appropriate management of VOCs-affected soils, soil gas and/or groundwater, vapor intrusion mitigation measures, requirements for notification to the Regional Water Board of changes in Site conditions that may affect the currently evaluated exposure scenarios and appropriate assessment of those changes.

### 2. RISK MANAGEMENT PLAN IMPLEMENTATION REPORT

COMPLIANCE DATE: 30 days following the end of each calendar year

Submit a technical report acceptable to the Executive Officer documenting implementation of the Risk Management Plan proposed actions. The report should include a detailed comparison of Risk Management Plan elements and implementation actions taken. The report should provide a detailed discussion of any instances of implementation actions falling short of RMP requirements, including an assessment of any potential human health or environmental effects resulting from these shortfalls. The report may be combined with a self-monitoring report, provided that the report title clearly indicates its scope. The report may propose changes to the RMP, although those changes shall not take effect until approved by the Regional Water Board or the Executive Officer

### 3. WORKPLAN FOR WELL INSTALLATION

COMPLIANCE DATE: August 15, 2011

Submit a well installation workplan acceptable to the Executive Officer to install additional downgradient groundwater monitoring wells. The workplan should describe all significant implementation steps and should include an implementation schedule.

### 4. WELL INSTALLATION COMPLETION REPORT

COMPLIANCE DATE: December 15, 2011

Submit a well installation completion report (report) to the Executive Officer documenting the installation of additional downgradient groundwater monitoring wells. The report should describe all significant implementation

steps, initial results of groundwater sampling, and recommendations, if necessary.

5. **REMEDIAL ACTION PLAN (RAP) ADDENDUM**

COMPLIANCE DATE: 90 days before a redevelopment plan is sent to the City

Submit a RAP addendum acceptable to the Executive Officer. The RAP addendum will identify the planned future land use (commercial/industrial or residential). If planned future land use is residential it will also include proposed cleanup standards for this more sensitive land use. It will include a workplan for additional soil excavation in accordance with the RAP, with a focus on previously inaccessible areas shown to exceed applicable cleanup standards. It will evaluate whether the contingent groundwater remedy will be needed. If needed, it will include a workplan for remedy implementation. Otherwise, it will include a specific rationale for why the contingent groundwater remedy will not be needed, given planned land use, residual groundwater contaminant concentrations, and applicable cleanup standards. It will also include a health and safety plan to implement the additional remedial actions.

6. **RAP ADDENDUM COMPLETION REPORT**

COMPLIANCE DATE: 180 days after the approval of RAP Addendum

Submit a RAP Addendum Completion Report acceptable to the Executive Officer documenting completion of necessary tasks identified in the RAP Addendum. For ongoing actions, the report should present initial results on remedial action effectiveness (e.g., area of influence). Proposals for further modification may be included in annual reports (see Self-Monitoring Program).

7. **PROPOSED DEED RESTRICTION**

COMPLIANCE DATE: March 15, 2021

If future land use remains commercial/industrial, submit a proposed deed restriction acceptable to the Executive Officer whose goal is to limit on-site occupants' exposure to Site contaminants to acceptable levels. To that end, the draft deed restriction shall prohibit the use of shallow groundwater beneath the Site as a source of drinking water until cleanup standards are met, and prohibit sensitive uses of the Site such as residences and daycare centers. The proposed deed restriction shall name the Regional Water Board as a beneficiary and shall anticipate that the Regional Water Board will be a signatory.

8. **RECORDATION OF DEED RESTRICTION**

COMPLIANCE DATE: 60 days after Executive Officer approval

Submit a technical report acceptable to the Executive Officer documenting that the deed restriction has been duly signed by all parties and has been recorded with the appropriate County Recorder. The report shall include a copy of the recorded deed restriction.

9. **FIVE-YEAR STATUS REPORT**

COMPLIANCE DATE: May 15, 2016, and every five years thereafter

Submit a technical report acceptable to the Executive Officer evaluating the effectiveness of the remedial action 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 cleanup standards
- c. Comparison of anticipated versus actual costs of cleanup activities
- d. Performance data (e.g., chemical mass removed)
- e. Cost effectiveness data (e.g., cost per pound of contaminant removed)
- f. Summary of additional investigations (including results) and significant modifications to remediation actions
- g. Additional remedial actions proposed to meet cleanup standards including a 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.

10. **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 or enhanced bioremediation but wells retained), and significant system modification (e.g., major reduction in extraction/injection rates, closure of individual extraction or injection wells within network). The report should include the rationale for curtailment. Proposals for final closure should demonstrate that cleanup standards have been met, contaminant concentrations are stable, and contaminant migration potential is minimal.

11. **IMPLEMENTATION OF CURTAILMENT**

COMPLIANCE DATE: 60 days after Executive Officer approval of Task 10

Submit a technical report acceptable to the Executive Officer documenting completion of the tasks identified in Task 10.

12. **EVALUATION OF NEW HEALTH CRITERIA**

COMPLIANCE DATE: 90 days after required by Executive Officer

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

13. **EVALUATION OF NEW TECHNICAL INFORMATION**

COMPLIANCE DATE: 90 days after required by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating new technical information which bears on the approved remedial action 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 remedial action plan or cleanup standards.

14. **Delayed Compliance:** If the dischargers are delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the dischargers shall promptly notify the Executive Officer and the Regional 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 O&M:** The dischargers 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 dischargers shall be liable, pursuant to California Water Code Section 13304, to the Regional Water Board for all reasonable costs actually incurred by the Regional 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 dischargers 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 dischargers shall permit the Regional 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 dischargers.
  
5. **Self-Monitoring Program:** The dischargers 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 Regional Water Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Regional Water Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g. temperature).

8. **Document Distribution:** Electronic 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 Mountain View, Mr. Kevin Woodward  
[Kevin.woodward@mtview.city.ca.gov](mailto:Kevin.woodward@mtview.city.ca.gov)
  - b. Santa Clara Valley Water District, Mr. George Cook  
([gcook@valleywater.org](mailto:gcook@valleywater.org))

The Executive Officer may modify this distribution list as needed.

9. **Reporting of Changed Owner or Operator, or Land Use:** The dischargers shall file a technical report on any changes in Site occupancy, Site configuration or use, any planned demolition or renovation of the Site building, redevelopment of the Site, or changes in ownership associated with the Site 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 dischargers shall report such discharge to the Regional Water Board by calling (510) 622-2369 during regular office hours (Monday through Friday, 8:00 to 5:00).

A written report shall be filed with the Regional 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 supercedes and rescinds Order No. R2-2007-0040.
12. **Periodic SCR Review:** The Regional 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 May 11, 2011.

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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: Site Map  
Self-Monitoring Program

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

APPLIED BIOSYSTEMS, LLC and  
JR REALTY #2, LLC

for the property located at

2690 CASEY AVENUE  
MOUNTAIN VIEW  
SANTA CLARA COUNTY

1. **Authority and Purpose:** The Regional Water Board requires the technical reports identified in this Self-Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self-Monitoring Program is intended to document compliance with Regional Water Board Order No. R2-2011-0030 (site cleanup requirements).
2. **Monitoring:** The dischargers shall measure groundwater elevations annually in all monitoring wells, and shall collect and analyze representative samples of groundwater, soil gas, and indoor air according to the following table:

Well # and Sampling Point #	Sampling Frequency	Analyses
Groundwater Samples at MW-1, MW-3A, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-12, MW-13, GW-1, GW-2, GW-3, GW-4, GW-5, GW-6, MW-14, MW-15, MW-1D, MW-6D, MW-15D, and MW-16D	Annually	Volatile organic compounds (VOCs) – Method 8260 or equivalent
Groundwater Samples at MW-1, MW-3A, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-12, MW-13, GW-1, GW-2, GW-3, GW-4, GW-5, GW-6, MW-14, MW-15, MW-1D, MW-6D, MW-15D, and MW-16D	Bi-annually	Natural attenuation parameters (pH, methane, dissolved oxygen, carbon dioxide, oxidation-reduction potential, total alkalinity, manganese, methane, nitrate, sulfate, chloride, total iron, dissolved iron)
Indoor air samples at on-Site (2690 Casey Avenue) and off-Site (1201 San Antonio Road) Buildings	Semi-Annually	US EPA Method TO-15
Soil Gas Samples at SG-15, SG-16, SG-17, and SG-18	Semi-Annually	US EPA Method TO-15

The dischargers shall sample any new monitoring or injection wells quarterly and analyze groundwater samples for the same constituents as shown in the above table. The dischargers may propose changes in the above table; any proposed changes are subject to Executive Officer approval.

3. **Annual Monitoring Reports:** The dischargers shall submit annual monitoring reports to the Regional Water Board no later than 30 days following the end of each calendar year. The reports shall be submitted in electronic format to GeoTracker (<http://geotracker.waterboards.ca.gov>) and in paper format to the Regional Water Board office. The reports shall include:
  - a. **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 dischargers' 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.
  - b. **Groundwater Elevations:** Groundwater elevation data shall be presented in tabular form, and a groundwater elevation map should be prepared for each monitored water-bearing zone. Historical groundwater elevations shall be included.
  - c. **Groundwater, Soil Gas and Indoor Air Analyses:** Sampling data shall be presented in tabular form. Isoconcentration maps 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 sampling results shall be included. Supporting data, such as lab data sheets, need not be included (however, see record keeping - below).
  - d. **Groundwater Remediation Evaluation:** As applicable, the report should include the following for each water-bearing zone:
    1. Evaluate the spatial stability of the groundwater plume leading edge for the contaminants of concern using the isoconcentration maps included in the report.
    2. Describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases. Quantify the degree of contaminant concentrations variability between sampling events. The degree of variability may be estimated using statistical tests (e.g., variance, standard deviation, coefficient of variation, and/or interquartile range).

3. For each groundwater monitoring well, compute the percentage reduction of the contaminants of concern since inception of the remediation action taken.

The total percentage concentration reduction is:  $100 \times \left[ 1 - \left( \frac{C_r}{C_0} \right) \right]$  where  $C_r$  is

the contaminant concentration during the reported sampling period and  $C_0$  is the concentration at the start of the remediation action. Historical removal values shall be included.

4. Estimate the time  $t$  at which the concentration of the contaminants of concern will reach their respective groundwater cleanup standards in the water-bearing zone. This value is estimated using the following equation for

a first order rate:  $t = \frac{-\ln \left[ \frac{C_{goal}}{C_0} \right]}{K_{point}}$  where  $C_{goal}$  is the groundwater cleanup

standard (section B.2. of the accompanying Regional Water Board Order),  $C_0$  is the concentration at the start of the remediation action,  $K_{point}$  is the slope obtained from the best fitted curve of the natural log of the concentration vs. time graph. The monitoring well location where this value of  $t$  is computed should be the monitoring well with the highest concentration of the contaminant of concern from the most recent sampling dataset. Note that contaminant attenuation rates change over time and the results of the evaluation might not represent actual field conditions.

- e. **Mass Removal Results:** If applicable, the report shall include enhanced bioremediation results in tabular form, for each injection well and for the Site as a whole, expressed in mass of biostimulative mixtures injected and total groundwater volume remediated. The report shall also include contaminant removal results from other remediation systems (e.g., soil gas extraction), expressed in units of chemical mass. Historical mass removal results shall be included.
- f. **Status Report:** The annual report shall describe relevant work completed during the reporting period (e.g., Site investigation, remedial measures) and work planned for the following year.

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

6. **Other Reports:** The dischargers shall notify the Regional 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.

7. **Record Keeping:** The dischargers 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 Regional Water Board upon request.
8. **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 dischargers. 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.