7.0 Technical Assessment

This section evaluates the functioning of the remedy as intended, the current status of assumptions and new information affecting the remedy.

7.1 Functioning of the Remedy as Intended by Decision Documents

Is the remedy functioning as intended by the decision document?

The remedy has almost completely met the ROD objective. The objective was to restore the groundwater to its beneficial use by reducing the contamination levels to below State and Federal drinking water standards (MCLs). This reduction would result in eliminating the potential risk to human health from exposure to the groundwater. Levels of 1,1-DCE and 1,1,1-TCA have decreased to below the standards at all locations on-site. Concentrations of 1,1-DCA have decreased to below the MCL at all Site wells except one, well W-27.

The ROD objective was to be met using a groundwater extraction and treatment system to capture and restore the groundwater; it was expected to take 15 to 20 years to achieve the clean-up standards. The system achieved the clean-up standards for all but four wells in 10 years. An MNA approach was then evaluated for implementation to address these four wells. In the ensuing seven years since the extraction and treatment system was ceased, MNA has been occurring. Contaminant concentrations have declined to MCL levels for all chemicals in all wells except for 1,1-DCA in one well, where the concentration decrease has not occurred within the timeframe initially estimated.

A final evaluation of MNA approach should be done based on all the data gathered to date, to ascertain whether any enhancements would be appropriate. The ROD can then be amended to incorporate this into the remedy.

7.2 Current Validity of Assumptions Used During Remedy Selection

Are the exposure assumptions, toxicity data, clean-up levels, and remedial action objectives used at the time of the remedy selection still valid?

The assumptions made at the time of remedy selection, including exposure pathways, are generally unchanged. The risk assessment had calculated the risk to potential receptors assuming a residential exposure scenario. The land-use at the site at the time of the risk assessment was commercial, and has remained as such. However, this exposure assumption is more conservative than the current land-use, so the exposure assumptions and subsequent clean-up standards remain protective of human health.

During this five-year review, the assumptions concerning COC exposure and toxicity data and changes in remedial action objectives were evaluated. No current or potential changes have been identified during this five-year review process.

The risk assessment conducted for the Sola Site did not evaluate a homegrown produce pathway or an indoor air pathway for on-site workers and potential future residents. As part of this five-year review, a screening-level review was conducted and is presented in this section to evaluate these pathways. The review determined that the home-grown produce and indoor air pathways do not pose a risk.

7.2.1 Regulatory Review

This section provides a review of ARARs and other standards to be considered (TBCs) for the selected remedy at the Sola Superfund Site.

Section 121(d) of CERCLA requires that remedial actions implemented at CERCLA sites meet any federal or more stringent state environmental standards, requirements, criteria, or limitations determined to be ARARs.

Applicable requirements are those clean-up standards, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA site. A requirement is applicable if the jurisdictional prerequisites of the environmental standard show a direct correspondence when objectively compared with the conditions at the site.

If a requirement is not legally applicable, the requirement is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those clean-up standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations sufficiently similar to the circumstances of the proposed response action and are well-suited to the conditions of the site. The criteria for determining relevance and appropriateness are listed in 40 CFR 300.400(g)(2).

Pursuant to EPA guidance, ARARs generally are classified into three categories: chemical-specific, location-specific, and action-specific requirements. These classification categories were developed to help identify ARARs, some of which do not fall precisely into one group or another. These categories of ARARs are defined below:

- **Chemical-specific ARARs** include those laws and requirements that regulate the release to the environment of materials possessing certain chemical or physical characteristics or containing specified chemical compounds. These requirements generally set health- or risk-based concentration limits or discharge limitations for specific hazardous substances.

- **Location-specific ARARs** are those requirements that relate to the geographical or physical position of the site. These requirements may limit the placement of remedial action and may impose additional constraints on the clean-up action. For example, location-specific ARARs may refer to activities in the vicinity of wetlands, endangered species habitat, or areas of historical or cultural significance.

- **Action-specific ARARs** are requirements that apply to specific actions associated with site remediation. Action-specific ARARs often define acceptable handling, treatment,

and disposal procedures for hazardous substances. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy.

A requirement may not meet the definition of ARAR as described above, but still may be useful in determining whether to take action at a site or to what degree action is necessary. This can be particularly true when there are no ARARs for a site, action, or contaminant. Such requirements are called "to be considered" (TBC) criteria and are defined at 40 CFR 300.400(g)(3). Chemical-specific TBC requirements are applied in the absence of ARARs. TBCs are non-promulgated advisories or guidance issued by federal or state government. TBCs are considered together with ARARs to establish the required level of clean-up for protection of health or the environment at a particular site.

7.2.2 Five-Year Review of ARARs

The ARARs reviewed for this five-year review are those contained in the 1991 ROD.

The ARARs presented in the September 1991 ROD were reviewed for any changes, additions or deletions.

Chemical-specific ARARs

A summary of chemical-specific ARARs is provided in Table 7-1. The specific regulations cited for each ARAR contained in Table 7-1 were reviewed for changes since the 1991 ROD. The current versions of the California Code of Regulations (CCR), Title 22 were reviewed to ensure all information was current.

Groundwater clean-up goals for 1,1-DCA and 1,1-DCE based on federal and state criteria were not updated from the values contained in the 1991 ROD. No ARARs were identified that are more stringent than the current clean-up levels for 1,1-DCA and 1,1-DCE.

Summary of Potentially Significant Changes

The ARARs established in the 1991 ROD do not require revision to ensure the protectiveness of current remedial actions or to comply with new state or federal requirements.

7.2.3 Evaluation of Previously Unidentified Exposure Pathways: Home-grown Produce and Vapor Intrusion

The risk assessment conducted for the Sola Site did not evaluate a homegrown produce pathway for potential future residents or an indoor air pathway for on-site workers and potential future residents. A screening-level review is presented in this section to evaluate these pathways. The home-grown produce and indoor air pathways are shown to not pose a risk.

Home-grown Produce

Potential future residents whose homes would be over the Sola Site VOC groundwater plume might grow gardens. The potential for fruits and vegetables grown in these gardens to be affected by the contaminants in the groundwater is evaluated below.

Research demonstrates that if VOCs in groundwater beneath a garden manage to reach the plants and if the chemicals are then absorbed by the plants, the VOCs do not accumulate in

plant tissues (Davis et al. 1998). When VOCs are translocated to plant leaves, they may volatilize through the stomata, the tiny openings in the plant leaves where gas exchange occurs (Vroblesky et al., 1999). Volatilization of VOCs has been measured in greenhouse studies, but is minimal in outdoor studies because VOCs diffuse readily in the open air and are often degraded in the sunlight.

Studies have also shown that VOCs taken up through a plant's root system tend to concentrate in the cells near the surface of the roots (Augustin 1994). In root vegetables such as beets, carrots, and potatoes, these cells are typically lost during washing and peeling of the produce. In above-ground fruits and vegetables (e.g., tomatoes, lettuce, squash, etc.), the roots are not consumed.

Plants are also able to break down or degrade VOCs. Consequently, VOCs taken up by plants may be present temporarily in the roots and stems of the plant, but are much less likely to be present in the leaves or other above-ground, potentially edible parts of the plant (Newman et al. 1997).

In summary, the literature review indicates that uptake and accumulation of VOCs in plants and subsequent exposure by home gardeners and their families are likely to be low.

Vapor Intrusion

Primary VOCs that have been detected in groundwater at the Sola Site include: 1,1,1-trichloroethane; 1,1-dichloroethylene; 1,1-dichloroethane; methylene chloride; 1,2-dichloroethane; trichloroethylene; and Freon 113. For each of these VOCs (except Freon 113), USEPA has published target groundwater concentrations and the SFRWQCB has published Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns. These target and screening levels are higher than the EPA protectiveness criteria (MCLs), which are the criteria selected by the ROD for groundwater at this Site. Table 7-1 shows Site concentrations, MCLs, target groundwater concentrations and the groundwater environmental screening levels (ESLs). Since Site VOC concentrations are well below both the target and screening levels, the vapor intrusion pathway is not of concern at this Site at this time.

Therefore, the exposure assumptions, toxicity data, clean-up levels, and remedial action objectives used at the time of the remedy selection are still valid.

TABLE 7-1
Groundwater Concentrations, MCLs, Target Groundwater Concentrations and Groundwater ESLs for Vapor Intrusion into Residential Buildings
Sola Optical USA, Inc. Second Five-Year Review Report
Sonoma County, CA

Chemicals Detected in Groundwater at Sola Optical Superfund Site	Site Concentrations Detected October 2003 to May 2005 (µg/L)	CDHS Primary MCL (µg/L)	Target Groundwater Concentration (µg/L)[a]	SFRWQCB Groundwater Screening Levels (µg/L)[b]
1,1,1-Trichloroethane	ND	200	3,100	130,000 – 520,000
1,1-Dichloroethylene	6.9	6	190	6,300 – 26,000
1,1-Dichloroethane	20	5	2,200	1,000 – 3,500
Methylene chloride	ND	5	58	2,400 – 7,000
1,2-Dichloroethane	ND	0.5	23	200 – 490
Trichloroethylene	ND	5	53	530 – 2,000
Freon 113	ND	1.2	1,500	NA

Notes:

a)Target Groundwater Concentration to Target Indoor Air Concentration Where the Soil Gas to Indoor Air Attenuation Factor = 0.001 and Partitioning Across the Water Table Obeys Henry's Law C_{gw} taken from USEPA OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance, November 2002)

b) SFRWQCB Groundwater Screening Levels for Vapor Intrusion into Residential Buildings, includes range of concentrations representing high to low vadose zone soil permeability

7.3 Recent Information Affecting the Remedy

Has any other information come to light that could call into question the protectiveness of the remedy?

7.3.1 Groundwater Contamination

Since the time of the cessation and dismantling of the groundwater extraction and treatment system in 1997, contaminant concentrations in the groundwater may have rebounded in a limited area. The data showed that concentrations of 1,1-DCA in groundwater at well W-27 initially increased after the extraction was discontinued and have remained relatively stable between 15 and 20 µg/L since that time. The data indicate that VOCs may be trapped in the fine-grained sediments beneath the Site and may be acting as a continuing source of contamination to the groundwater. This would be the contamination that we have been detecting since 1997.

Well W-27 was installed in 1987, and 1,1-DCA concentrations in the well decreased significantly during active remediation until stabilizing at levels just above the MCL (stabilized at 15 µg/L; the MCL is 5 µg/L). Current concentrations exceed the MCL at

concentrations of 20 µg/L, as measured in November 2004 and May 2005. The MNA proposal (LFR 2001) predicted that concentrations of 1,1-DCA in this well would decrease to below the MCL by 2006. It now appears very unlikely that the clean-up level for 1,1-DCA will be achieved in 2006. Contingency wells described in the April 2001 report *Evaluation of Natural Attenuation as a Remedy to Meet Remedial Action Objectives* (LFR 2001) were to be used for expanded groundwater monitoring and /or groundwater remediation, if natural attenuation failed to perform as indicated. However, these eight contingency wells are not available because they have been abandoned.

7.3.2 Risk Assessment

In assessing the potential risks to human health and the environment, twelve VOCs were identified as chemicals of potential concern. The assumption in the Health Risk Assessment was based on the assumed residential use of groundwater. The potential exposure pathways for the chemicals of potential concern were groundwater, soil, and soil gas (EPA 1991), and the routes of exposure included ingestion of drinking water, dermal contact via showering, and inhalation of VOCs while showering. According to the 1993 ATSDR Public Health Assessment, an indoor-air model for potential exposure of on-site workers to compounds volatilizing from contaminated groundwater and soil and accumulating within the Sola facility was being developed. However, no documentation was found to indicate the study was ever conducted or presenting the results. Therefore, this five-year review conducted a screening level evaluation of this pathway, presented in Section 7.2.3. It concluded that a vapor intrusion exposure pathway is not a concern for this Site.

At the time of the risk assessment, only the workers from the Sola facility were considered to potentially be at risk. Today, the one area that has not attained the clean-up standard is located on the 11-acre parcel adjacent to the original facility property, which is being developed. No documentation was available discussing the time-frame of the development, or any health studies conducted indicating the appropriateness of the land-use.

During the Site visit, limited landscaping was observed at the facility, with most of the property being covered with asphalt or the actual buildings. The adjacent property was observed to be an open field in the process of being developed. Approximately one third of that property had been recently graded. The field had not changed since the time of the original Site risk assessment, until just recently. It appears that no new habitat had developed at this part of the Site since the original risk assessment, and that any existing habitat is being displaced by the current development.

7.3.3 Institutional Controls

No institutional controls were identified or selected in the ROD, and contaminant concentrations in the groundwater remain above the MCL clean-up goal for 1,1-DCA at one well. The Site contaminant levels are therefore above the level needed for unrestricted use. Thus, some form of institutional controls is needed at this Site.

The governmental institutional controls that currently exist are a network developed between the County Permit and Resource Management Department, the County Department of Environmental Health, and the SFRWQCB. If a party was to attempt to drill a well on the Sola Site or near the Site, they would have to apply for a permit from the

County Permit and Resource Management Department. The County Permit and Resource Management Department would contact the County Department of Environmental Health to see if the site is contaminated. The County Department of Environmental Health has a list of UST sites and also uses Geotracker. The Sola Site is listed on Geotracker and identified as under the jurisdiction of the SFRWQCB. The County Department of Environmental Health would therefore connect with the SFRWQCB. The SFRWQCB would review the permit application and would make suggestions to the County Permit and Resource Management Department regarding the installation of the well. Suggestions would include restrictions on the well if they deem it safe to install one. There are no formal programs or guidelines they follow to make decisions on wells (CH2M HILL 2005b). There is, however, a regulation that the County Permit and Resource Management Department follows which requires wells to be sealed for the first 50 ft bgs (EPA 2005b).

There is no deed restriction currently on the Site preventing wells from being drilled within a range of the Site or providing restrictions such as the type of well or depth allowed. It appears that a well could potentially be given a permit at or near the Sola Site, depending on the decision-making by the County and SFRWQCB. The Site is listed on Geotracker as a SLIC site – (Spills, Leaks, and Industrial Clean-up Site), but no information exists on Geotracker about the type of contamination, land-use restrictions, or its status as an NPL site.

8.0 Issues and Recommendations

This section presents the conclusions and recommendations from the five-year review. Where follow-up action is required, the follow-up action to be conducted and the proposed date for completion are described. The following issues and recommendations were identified:

Issue #1

The concentration of 1,1-dichloroethane (1,1-DCA) in one well continues to exceed the clean-up standard (MCL) of 5 µg/L. It is estimated that this remaining contamination covers, at the most, one half acre of the shallow aquifer. The data shows the concentrations in this well (W-27) are fluctuating between about 15 and 20 µg/L. The most recent samplings (November 2004 and May 2005) both showed the concentration to be 20 µg/L. Whereas it was expected that Monitored Natural Attenuation (MNA) would decrease the concentrations of 1,1-DCA in this well to below the MCL by 2006, it does not appear that the standard will be achieved in that timeframe. Contingency wells described in the April 2001 report "Evaluation of Natural Attenuation as a Remedy to Meet Remedial Action Objectives" (LFR 2001) were to be used for expanded groundwater monitoring if needed, to determine the final success of MNA. However, the eight contingency wells are not available because they have been abandoned.

Recommendation

A continuing review of the MNA performance data should be conducted, including assessing possible enhancements to the MNA system to reduce contaminant levels to achieve the clean-up standard. At a minimum, additional monitoring and reporting is recommended in 2006, including assessing the adequacy of the existing monitoring well network. If any additional monitoring wells are needed, they should be installed.

Issue #2

Monitored Natural Attenuation (MNA) has been proposed and implemented as an interim measure at the site, but the ROD has not been amended yet to reflect the use of MNA to achieve the remaining clean-up needed.

Recommendation

After assessing possible enhancements to the MNA system, prepare a ROD Amendment or Explanation of Significant Differences (ESD) to reflect any remedy changes. A ROD Amendment process would include an opportunity for public review and comment, whereas an ESD would not necessitate it.

Issue #3

The ROD did not include institutional controls, and contamination still exists in the groundwater above the level that would allow for unrestricted use. Currently, no drinking water wells are installed within the area of contamination. Existing governmental controls consist of County well permitting procedures that involve checking environmental databases for contaminated sites and coordinating with the SFRWQCB. There are also

County regulations that require wells to be sealed for the top 50 feet. There is new commercial construction on the portion of the Site where the non-compliant groundwater exists.

Recommendation

Identify and select in a ROD Amendment or ESD, institutional controls to limit use of groundwater at the site until clean-up goals are achieved. The ROD Amendment process should include assessing the adequacy of the existing governmental controls. The ROD amendment would need to specify the types of institutional controls being selected, and whether the clean-up standards are appropriate for current land-use zoning. Evaluate the potential for the current commercial development to result in exposure to the remaining contamination and reflect those findings in the institutional controls that are selected. Implement and monitor the selected institutional controls.

Table 8-1 presents a summary of the issues, recommendations and follow-up actions pertaining to this five-year review report.

TABLE 8-1
Summary Table of Issues, Recommendations and Follow-Up Actions
Sola Optical USA, Inc. Second Five-Year Review Report
Sonoma County, CA

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
The current concentration of 1,1-DCA in groundwater in one monitoring well (W-27) exceeds the MCL of 5 µg/L. The contingency monitoring wells have been abandoned.	a. Continue to monitor and review the MNA performance data. Assess possible enhancements to the MNA system to help it achieve the clean-up standard. b. Assess adequacy of existing monitoring well network. If additional wells are needed, install them.	Sola Optical USA Inc.	EPA	Spring 2006	N	Y
MNA has been implemented at the Site but the ROD has not yet been amended to reflect the change.	a. After assessing possible enhancements to the MNA system, amend the ROD or do ESD to reflect any remedy changes.	EPA	--	Autumn 2006	N	Y
The ROD did not include institutional controls, and contamination still exists in the groundwater above the level that would allow for unrestricted use. There is new commercial construction on the portion of the Site where the non-compliant groundwater exists.	a. Assess the adequacy of the existing governmental controls. Identify, and select in a ROD amendment or ESD, institutional controls to limit use of groundwater at the site until clean-up goals are achieved. b. Evaluate the potential for the current commercial development to result in exposure to the remaining contamination and reflect those findings in the institutional controls that are selected. c. Implement and monitor the selected institutional controls.	EPA	--	Autumn 2006	N	Y

9.0 Protectiveness Statement

The remedy at the Sola Site currently protects human health and the environment because the groundwater contamination has been reduced below drinking water standards (MCLs) in all but a very limited area around one well, and no exposure pathways to the remaining contamination exist. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure long-term protectiveness:

- EPA must identify and select institutional controls in a decision document, then monitor the effectiveness of these controls that will be relied upon to prevent use of the groundwater that still exceeds the clean-up standard.
- The groundwater clean-up standard for 1,1-DCA must be attained in well W-27.

Next 5-Year Review

The Sola site will continue to have five-year reviews in the future until the residual contamination in the groundwater at the site achieves the clean-up standard. The next five-year review will be conducted in 2010.

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Appendix A
Documents Reviewed

APPENDIX A

Documents Reviewed

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Appendix B
Five-Year Review Site Inspection Checklist

APPENDIX B

Five-Year Review Site Inspection Checklist

TABLE B-1
Site Inspection Team Roster
Site Inspection- May 5, 2005
Sola Optical USA, Inc. Second Five-Year Review Report
Sonoma County, CA

Name	Title	Affiliation
Dante Rodriguez	Remedial Project Manager	US Environmental Protection Agency Region IX
Larry P. Lapuyade	Senior Project Geologist	Levine Fricke
J. Scott Seyfried	Principal Hydrogeologist	Levine Fricke
Caroline Ziegler	Project Manager	CH2M HILL Oakland Office
Melissa Diamant	Task Manager	CH2M HILL Oakland Office

Five-Year Review Site Inspection Checklist
Sola Optical USA, Inc. Superfund Site

I. SITE INFORMATION (Applicable)	
Site name: Sola Optical USA, Inc.	**Date of inspection:** 05/05/05
Location and Region: Petaluma, CA, Region IX	**EPA ID:** CAD981171523
Agency, office, or company leading the five-year review: EPA Region IX	**Weather/temperature:** Sunny – approximately 70 degrees F.

Remedy Includes: (Check all that apply)

Landfill cover/containment
Access controls
X Institutional controls
Groundwater pump and treatment
Surface water collection and treatment
X Other: Monitored Natural Attenuation

Attachments: X Inspection team roster attached [in report] X Site map attached [in report]

II. INTERVIEWS (Not Applicable)

1. **O&M site manager**

Name Title Date

Interviewed Phone No
Problems, suggestions;

NOTE: All referenced attachments can be found in Five-Year Review Report.

2. **O&M staff**

Name Title Date

Interviewed Phone No.
Problems, suggestions

3. **Local regulatory authorities and responsible agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency

Contact

Name Title Date Phone No.

Problems; suggestions

Agency

Contact

Name Title Date Phone No.

Problems; suggestions

4. **Other interviews** (optional)

III. ONSITE DOCUMENTS AND RECORDS VERIFIED (Applicable)

1. **O&M Documents**

O&M manual	x Readily available	x Up to date
As-built drawings	x Readily available	x Up to date
Maintenance logs	x Readily available	x Up to date

Remarks

2. **Site-Specific Health and Safety Plan** x Readily available x Up to date

Contingency plan/emergency response plan x Readily available x Up to date

Remarks _____.

3. **O&M and OSHA Training Records** Readily available Up to date X N/A

Remarks

4. **Permits and Service Agreements**

Air discharge permit	Readily available	Up to date	X N/A
Effluent discharge	Readily available	Up to date	X N/A
Waste disposal, POTW	Readily available	Up to date	X N/A
Other permits _____	Readily available	Up to date	X N/A

Remarks

5.	**Gas Generation Records** Remarks	Readily available	Up to date	X N/A
6.	**Settlement Monument Records** Remarks	Readily available	Up to date	X N/A
7.	**Groundwater Monitoring Records** Remarks	X Readily available	X Up to date	N/A
8.	**Leachate Extraction Records** Remarks	Readily available	Up to date	X N/A
9.	**Discharge Compliance Records** Air Water (effluent) Remarks	 Readily available Readily available	 Up to date Up to date	 X N/A X N/A
10.	**Daily Access/Security Logs** Remarks	Readily available	Up to date	X N/A

IV. O&M COSTS (Applicable)

1. **O&M Organization**

State in-house — Contractor for State
PRP in-house — X Contractor for PRP
Other

2. **O&M Cost Records**

X Readily available — X Up to date
Funding mechanism/agreement in place — X NA
Original O&M cost estimate N/A — Breakdown attached

Total annual cost by year for review period if available

	Date	Date	Total cost	
From	2004	To 2005	Approx. $20,000	Breakdown attached
From		To		Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons:

No unusually high O&M.

V. ACCESS AND INSTITUTIONAL CONTROLS (Applicable)

A. Fencing

1. **Fencing** Location shown on site map x Gates secured N/A
Remarks: Fencing was located around the eleven auxiliary acres. The gates were secured.

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A
Remarks: Signs indicating construction on the eleven auxiliary acres were present.

C. Institutional Controls

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented Yes x No N/A
Site conditions imply ICs not being fully enforced Yes x No N/A

Type of monitoring (e.g., self-reporting, drive by) none
Frequency: none
Responsible party/agency__none_____

Contact
Name Title Date Phone No.

Reporting is up-to-date Yes No x N/A
Reports are verified by the lead agency Yes No x N/A

Specific requirements in deed or decision documents have been met Yes No x N/A
Violations have been reported Yes No x N/A
Other problems or suggestions: Report attached

2. **Adequacy** ICs are adequate x ICs are inadequate N/A
Remarks Currently there are ICs to keep the existing wells (Crandell Well, Station #5 Well, City of Petaluma Well, and Stero Well) out of use, but nothing to prevent future wells from being developed in the area. W-27 is currently seeing concentrations of 1,1-DCA above its MCL; therefore, an IC to prevent new wells in the area is necessary.

D. General

1. **Vandalism/trespassing** Location shown on site map x No vandalism evident
Remarks

2. **Land use changes onsite** N/A
Remarks
Ownership has changed. Also, the eleven auxiliary acres are currently being graded for future commercial development.

3. **Land use changes offsite** x N/A
Remarks

VI. GENERAL SITE CONDITIONS (Applicable)

A. Roads Applicable

1. **Roads** **x** Location shown on site map x Roads adequate N/A
Remarks

B. Other Site Conditions

Remarks

VII. LANDFILL COVERS (Not Applicable)

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
Areal extent_____ Depth
Remarks

2. **Cracks** Location shown on site map Cracking not evident
Lengths _____ Widths_____ Depth
Remarks

3. **Erosion** Location shown on site map Erosion not evident
Areal extent_____ Depth
Remarks

4. **Holes** Location shown on site map Holes not evident
Areal extent_____ Depth
Remarks

5. **Vegetative Cover** Grass Cover properly established No signs of stress
Trees/Shrubs (indicate size and locations on a diagram)
Remarks _____

6.	**Alternative Cover** (armored rock, concrete, etc.) N/A Remarks
7.	**Bulges** Location shown on site map Bulges not evident Areal extent_____ Height Remarks
8.	**Wet Area/Water Damage** Wet areas/water damage not evident Wet areas Location shown on site map Areal extent Ponding Location shown on site map Areal extent Seeps Location shown on site map Areal extent Soft subgrade Location shown on site map Areal extent Remarks
9.	**Slope Instability** Slides Location shown on site map No evidence of slope instability Areal extent Remarks
B. Benches	Applicable N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)
1.	**Flows Bypass Bench** Location shown on site map N/A or okay Remarks
2.	**Bench Breached** Location shown on site map N/A or okay Remarks
3.	Bench Overtopped Location shown on site map N/A or okay Remarks
C. Letdown Channels	Applicable N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)
1.	**Settlement** Location shown on site map No evidence of settlement Areal extent_____ Depth Remarks

2. **Material Degradation** Location shown on site map No evidence of degradation
Material type_____ Areal extent
Remarks

3. **Erosion** Location shown on site map No evidence of erosion
Areal extent_____ Depth
Remarks_____

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent_____ Depth
Remarks

5. **Obstruction** Type_____ No obstruction
Location shown on site map Areal extent
Size
Remarks

6. **Excessive Vegetative Growth** Type
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent
Remarks

D. Cover Penetrations Applicable N/A

1. **Gas Vents** Active Passive
Properly secured/located Functioning Routinely sampled Good condition
Evidence of leakage at penetration
Remarks

2. **Gas Monitoring Probes**
Properly secured/located Functioning Routinely sampled Good condition
Evidence of leakage at penetration
Remarks

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/located Functioning Routinely sampled Good condition
Evidence of leakage at penetration
Remarks

4. **Leachate Extraction Wells**
Properly secured/located Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs O&M N/A
Remarks

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks

E. Gas Collection and Treatment Applicable N/A

1. **Gas Treatment Facilities**
Flaring Thermal destruction Collection for reuse
Good condition Needs O&M
Remarks

2. **Gas Collection Wells, Manifolds and Piping**
Good condition Needs O&M
Remarks

3. **Gas Treatment Facilities** (e.g., gas monitoring of adjacent homes or buildings)
Good condition Needs O&M N/A
Remarks

F. Cover Drainage Layer Applicable N/A

1. **Outlet Pipes Inspected** Functioning N/A
Remarks

2. **Outlet Rock Inspected** Functioning N/A
Remarks

G. Detention/Sedimentation Ponds Applicable N/A

1. **Siltation** Areal extent_____ Depth_____ N/A
Siltation not evident
Remarks

2. **Erosion** Areal extent_____ Depth
Erosion not evident
Remarks

3. **Outlet Works** Functioning N/A
Remarks

4.	**Dam**	Functioning	N/A
	Remarks		

H. Retaining Walls	Applicable	N/A	
1.	**Deformations**	Location shown on site map	Deformation not evident
	Horizontal displacement_____		Vertical displacement
	Rotational displacement_____		
	Remarks		
2.	Degradation	Location shown on site map	Degradation not evident
	Remarks		

I. Perimeter Ditches/Off-Site Discharge	Applicable	N/A	
1.	**Siltation**	Location shown on site map	Siltation not evident
	Areal extent_____	Depth	
	Remarks		
2.	**Vegetative Growth**	Location shown on site map	N/A
		Vegetation does not impede flow	
	Areal extent_____	Type	
	Remarks		
3.	**Erosion**	Location shown on site map	Erosion not evident
	Areal extent_____	Depth	
	Remarks		
4.	**Discharge Structure**	Functioning	N/A
	Remarks		

VIII. VERTICAL BARRIER WALLS (Not Applicable)

1. **Settlement** Location shown on site map Settlement not evident
   Areal extent_____ Depth
   Remarks

2. **Performance Monitoring** Type of monitoring
   Performance not monitored
   Frequency_____ Evidence of breaching
   Head differential
   Remarks

IX. GROUNDWATER/SURFACE WATER REMEDIES (Applicable)

A. Groundwater Extraction Wells, Pumps, and Pipelines x Not Applicable

1. **Pumps, Wellhead Plumbing, and Electrical**
   Good condition All required wells located Needs O&M N/A
   Remarks
   _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs O&M N/A
   Remarks
   _____

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided N/A
   Remarks
   _____

B. Surface Water Collection Structures, Pumps, and Pipelines x Not Applicable

1. **Collection Structures, Pumps, and Electrical**
   Good condition Needs O&M
   Remarks
   _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs O&M
   Remarks

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks

C. Treatment System x Not Applicable

1. **Treatment Train** (Check components that apply)
   Metals removal Oil/water separation Bioremediation
   Air stripping Carbon adsorbers
   Filters
   Additive (e.g., chelation agent, flocculent)
   Good condition Needs O&M
   Sampling ports properly marked and functional
   Sampling/maintenance log displayed and up to date
   Equipment properly identified
   Quantity of groundwater treated annually
   Quantity of surface water treated annually
   Remarks

2. **Electrical Enclosures and Panels** (properly rated and functional)
   N/A Good condition Needs O&M
   Remarks

3. **Tanks, Vaults, Storage Vessels**
   N/A
   Remarks

4. Discharge Structure and Appurtenances
   Good condition Needs O&M
   Remarks

5. **Treatment Building(s) – support building**
   N/A Good condition (especially roof and doorways) Needs repair
   Chemicals and equipment properly stored
   Remarks

6. Monitoring Wells (pump and treatment remedy)
   Properly secured/locked Functioning Routinely sampled Good condition
   All required wells located Needs O&M N/A
   Remarks

D. Monitored Natural Attenuation x Applicable

1. **Monitoring Wells** (natural attenuation remedy)
   x Properly secured/locked x Functioning x Routinely sampled x Good condition
   All required wells located Needs O&M
   Remarks: Drove by wells E-3 and E-4 which appeared to be in good condition.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

According to the ROD, the objective of the remedy is to restore the groundwater to its beneficial use, which for this site is drinking water. The objective was to be met with a groundwater monitoring program to assure capture and demonstrate restoration, operation of extraction wells for 15 to 20 years, and treatment of the extracted groundwater. Correspondence between Sola's consultants and the EPA described the transition away from the ROD recommended groundwater extraction to monitored natural attenuation in only eight years. This was agreed upon by both parties but the ROD had never been amended to state as such.

Currently, the remedy is monitored natural attenuation. Levine-Fricke monitors and reports the data for a handful of wells in the shallow zone.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Monitoring is the only activity that occurs on-site. Therefore O&M is limited.

C.	Early Indicators of Potential Remedy Failure
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. Currently, there are no issues with the O&M.

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Monitoring has been continually optimized in the past with reductions in the number of wells that are sampled. At this time, W-27 contains concentrations of 1,1-DCA above its MCL. Four wells are monitored for VOCs which include E-3, E-5, W-25, and W-27.

Appendix C
Site Inspection Photographs

Photograph 1: Westward View from the parking lot between the former Sola Building and the eleven auxillary acres.

Photograph 2: Former UST Location.

Photograph 3: Former GWET Location.

Photograph 4: Well E-3.

Photograph 5: Fence surrounding and access gate to RNM auxillary eleven acres.

Photograph 6: Signs indicating the RNM Development.

Photograph 7: RNM activities on the eleven auxillary acres.

Photograph 8: Grading on the RNM eleven auxillary acres.

Photograph 9: Southeast View of the eleven auxillary acres.

Photograph 10: New occupants of the Sola Building – Petaluma Poultry.