



Sola Optical USA, Inc. Superfund Site

U.S. ENVIRONMENTAL PROTECTION AGENCY \$ REGION 9 \$ SAN FRANCISCO, CA \$ JANUARY 2007

EPA Proposes Amending the Clean-up Plan for Contaminated Groundwater

Proposed Plan at a Glance

The Problem

A groundwater extraction and treatment system began operating at the Sola Optical USA, Inc. Superfund Site in Petaluma, California in 1988. Expanded in 1992, the system was expected to restore the shallow groundwater to clean-up standards within 15-20 years, achieving that goal between 2007 and 2012. However, after several years the effectiveness of the extraction and treatment system appeared to stall with respect to certain contaminants, concentrations of which eventually stabilized at levels above the clean-up standards. In response to the diminishing value of the system, the responsible party and the United States Environmental Protection Agency (EPA) began to consider alternative methods for restoring groundwater quality. In the meantime, due to natural degradation processes the contamination levels dropped and clean-up levels have now been achieved for all but one contaminant which is still present in elevated concentrations at a single well on the site.

The Solution

EPA proposes to formally adopt Monitored Natural Attenuation (MNA) as the method for completing groundwater restoration. MNA is an approach that relies on natural processes, such as biodegradation, to attain the clean-up goals within a reasonable time frame. EPA also proposes to restrict use of the contaminated groundwater until the groundwater meets California's drinking water standard for the remaining contaminant, 1,1-DCA.

Your Comments

The public is invited to participate in the remedy selection process and to submit comments on the proposed amendment to the clean-up plan. Comments on this Proposed Plan are welcome, both during our public meeting and by writing to EPA (see back page for contact information). EPA will consider your comments in making our final clean-up decision, and written responses to any comments will be included in the final decision document.

Community Meeting

Wednesday, January 24, 2007

6:30 p.m. – 8:30 p.m.

**Petaluma Public Library, Meeting Room
100 Fairgrounds Drive
Petaluma, California**

Comment Period

**January 20, 2007 through
February 20, 2007**

Introduction

The Sola Optical USA, Inc. (Sola) Superfund Site (Site) is in Petaluma, California, at 1500 Cader Lane, just west of the intersection of Lakeville Highway and Interstate 101. From 1978 through 2001, Sola manufactured eyeglass lenses at the Site. When operations first began, Sola stored various solvents used in its manufacturing process in underground storage tanks at the Site. After discovering contamination in the groundwater near those tanks, Sola removed the tanks and has been responsible for cleaning up the remaining volatile organic compound (VOC) contamination ever since. The Sola Site was listed on the National Priorities List (or Superfund List) in February 1990.

The aquifer is used as the source of drinking water for the City of Petaluma. One of the City's groundwater extraction wells was located near the Sola Site, but it was not impacted by the contamination at the Sola Site. However, the well was shut down so as not to interfere with groundwater clean-up efforts.

In 1991, EPA decided that the groundwater treatment system Sola had been operating should be expanded. Sola complied and operated the expanded system for another six years. Eventually, however, the system became less and less effective, and Sola stopped operating it in 1997. Since then, the levels of contamination in the groundwater have continued to decline, and only one small area of contamination remains. EPA is now proposing to adopt a different approach to address the clean-up – or “remediation” – of that small area.

EPA selected the original clean-up plan and will select this proposed amendment in accordance with Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. § 117, and 40 C.F.R. § 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). EPA is the lead agency responsible for directing the CERCLA remediation process; the San Francisco Bay Regional Water Quality Control Board (Regional Board) is the support agency. This Proposed Plan is being coordinated with the Regional Board.

This Proposed Plan describes two alternative methods for achieving the clean-up standards at the Site. The Plan then identifies EPA’s preferred alternative, explains EPA’s rationale for this preference, and presents the key underlying facts. Further information can be found in the project’s publicly available Administrative Record. The public is invited to participate in the remedy amendment process and submit comments on the Proposed Plan.

Site Background

As noted above, Sola manufactured eyeglass lenses at the Site for over 20 years. Its facility was comprised of one manufacturing building and an adjoining administration office building. Six 1,000-gallon underground storage tanks (USTs) were located behind the north corner of the manufacturing facility. The tanks were used to store solvents such as 1,1,1-trichloroethane (1,1,1-TCA), acetone and methanol.

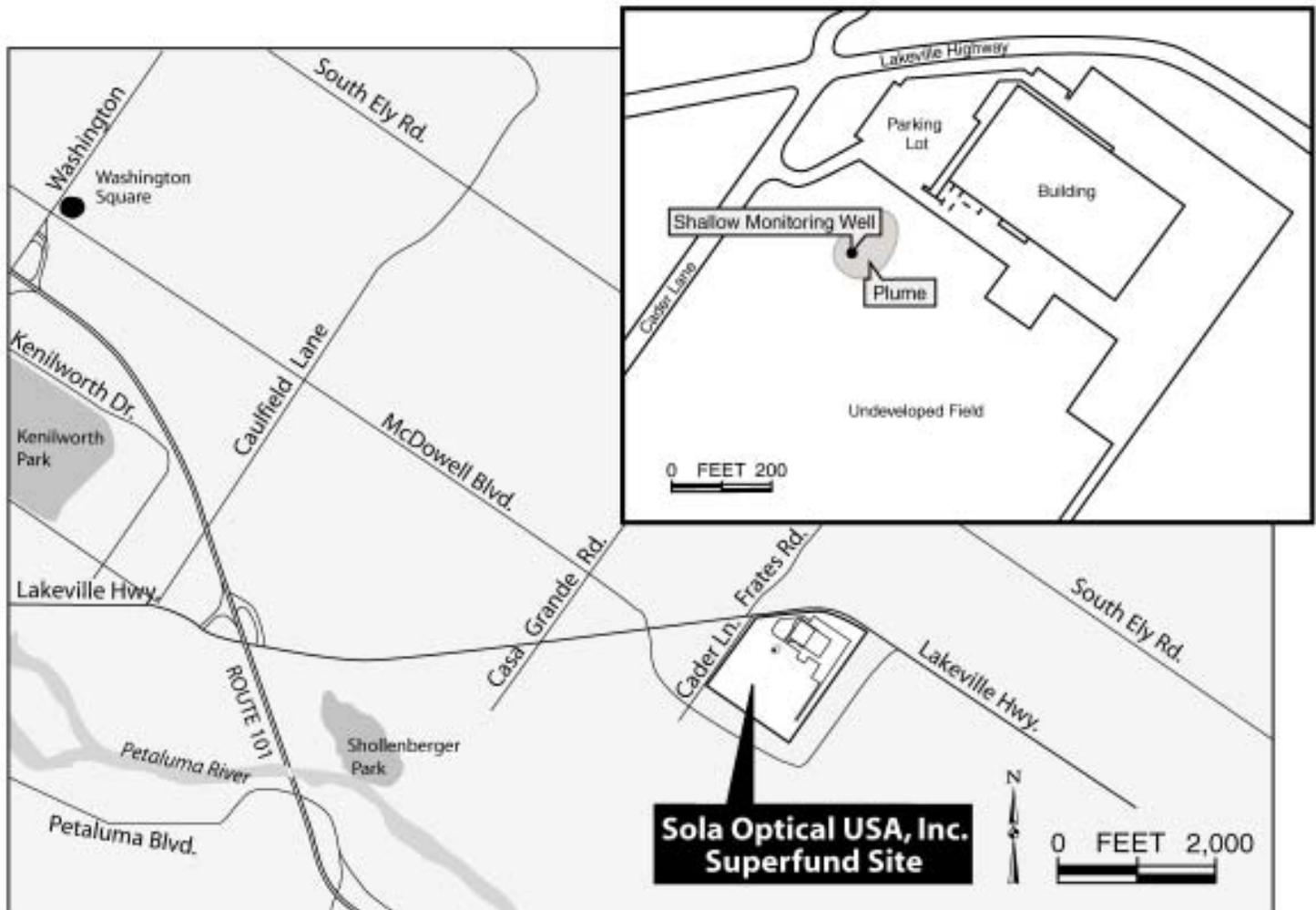


Figure 1: Sola Optical Superfund Site location

In 1982, Sola found low concentrations of VOC contamination in the groundwater beneath its property near the six USTs. In 1983, the Regional Board directed Sola to investigate the groundwater contamination at the Site. Sola identified the following chemicals in the groundwater: 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), methylene chloride, and 1,1,1-TCA. These chemicals appeared to have originated from the gravel surrounding the tank and adjacent soils. In 1985, Sola removed the six USTs, the surrounding gravel and several feet of soil from the sides and bottom of the excavation.

Further investigation revealed the extent of the groundwater contamination. In 1987, the Regional Board ordered Sola to construct and operate a groundwater extraction and treatment (GWET) system. The treated groundwater was discharged into Adobe Creek, just northwest of the Site, under a permit from the Regional Board. The GWET system operated from 1988 through 1997.

In 1989, EPA became the lead agency, and took charge of directing remedial activities at the Site. One step in that process was adding the Site to the National Priorities List, which occurred on February 21, 1990. Pursuant to an administrative order, Sola conducted further environmental sampling and completed a feasibility study of clean-up options in 1991. Based on that study and its own risk assessment, EPA issued a Record of Decision (ROD), which documented its determination that an expanded GWET system was the most appropriate method for remediating contamination at the Site. The enhanced GWET system consisted of the following elements:

- \$ Operation of the eight existing extraction wells
- \$ Construction and operation of two additional shallow extraction wells
- \$ Conversion of two existing monitoring wells to deep extraction wells
- \$ Construction and operation of additional piping for new and converted wells
- \$ On-site treatment and off-site discharge to either the nearby creek or to the City of Petaluma sewage treatment system.

The enhanced system began operating in 1992 and was expected to restore the shallow groundwater to clean-up standards within 15-20 years.

Initially, concentrations of VOC contamination at the Site decreased significantly. By 1997, however, the rate of contaminant reduction slowed to almost zero. Groundwater monitoring data at four wells showed that concentrations of two contaminants – 1,1-DCE and 1,1,-DCA – appeared to have stabilized at levels above the clean-up

standards. The extraction and treatment system was no longer effectively removing these low-level contaminants from the groundwater. At that point, Sola requested and received permission to shut off the GWET system. For the next two years, Sola sampled and analyzed the wells frequently to ensure that contaminant levels did not increase or “rebound.” When contaminant levels continued to slowly decline without extraction and treatment, Sola presented the data and technical analysis to EPA and received permission to decommission the GWET system. Sola continued to monitor the groundwater contamination biannually thereafter. In 2001, Sola analyzed the naturally occurring changes to the contamination that had been observed since the decommissioning of the extraction system. EPA approved the analysis in 2002.

Current Status of Cleanup

By 2002, only two wells reflected contamination above the clean-up standards: well E-5 and well W-27. Well E-5 showed concentrations of 1,1-DCE above the clean-up standard until 2004, when the level dropped below, and has consistently remained below, the standard. Well W-27 is now the only well that still shows concentrations above the standard for any contaminant. As of December 2006, the concentration of 1,1-DCA was 12 parts per billion, as compared to the clean-up standard of 5 parts per billion.

This is likely due to the fact that W-27 is directly down gradient from the location of the original contaminant release, and the last of the contaminants have slowly been released from the soils and flowed down to W-27. Groundwater data reflect that the contaminant concentrations in W-27 initially increased when the GWET system was decommissioned, but have since been declining steadily. For the past two years, the concentration of 1,1-DCA has declined from 22 parts per billion to 12 parts per billion, indicating that natural processes are reducing levels of contaminants. None of the other monitoring wells have detectable levels of any contamination above any of the other VOC clean-up standards. Based on this data, the area of remaining contamination appears to extend across one acre or less in the shallow aquifer.

Institutional Controls

Institutional controls are actions, such as legal controls, that help minimize the potential for human exposure to contamination at Superfund sites by ensuring appropriate land or resource use or restrictions. One common institutional control is a restrictive covenant which is an agreement, recorded with the county recorder’s office, whereby a land owner agrees to restrict the use of his or her property. In its 1991 health risk assessment, EPA recommended

that institutional controls be implemented at the Site to prevent any use of the contaminated groundwater for drinking water supplies before it is cleaned up to drinking water standards. The remedy selected in the 1991 ROD, however, did not include institutional controls. EPA now proposes to add institutional controls to the remedy.

Summary of Site Risks

In 1991, EPA prepared a risk assessment to evaluate the human health and environmental risks posed by contamination at the site.

Human Health Risks

A human health risk assessment begins by identifying the chemical contaminants that exist in the environment in sufficient quantities to cause a potential concern. Next, the assessment evaluates the pathways through which the chemicals can travel from the environment to humans. Then it estimates the duration of possible chemical exposure to humans. Finally, it uses all of this information to calculate a human health risk. This risk is presented in two parts, the carcinogenic effects (cancer-causing effects), and the non-carcinogenic effects (all other health effects besides cancer). The carcinogenic effect is shown in terms of an additional 1 in a million chance of contracting cancer, above the normal rate, from the chemical exposure. The non-carcinogenic effect is shown as a hazard quotient; values greater than 1 indicate that an effect on human health will occur, and less than 1 indicates that no effect will occur.

The 1991 risk assessment for the Site identified the following 12 volatile organic compounds as posing a potential concern at the Site: acetone, butanone, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, freon 113, 4-methyl-2-pentanone, tetrachloroethene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene. VOCs are extremely volatile, meaning they vaporize easily and thus constantly move from one medium to another, for example from soil to water or air.

The assessment established that the main pathway through which humans could be exposed to these chemicals is through their homes. If residents were to use groundwater for home use, they might drink the contaminated water or absorb it through their skin. Any flow of water from a faucet or showerhead could release contaminants into indoor air where residents might inhale them. The chemicals could also move into indoor air from the groundwater and soil beneath any homes in a process known as “vapor intrusion.” Note that this potential exposure is based on a

hypothetical future residential use. The Site is currently used for light industrial/commercial purposes, and the owners of the Site property do not plan any residential uses. Also, the existing plume of groundwater contamination does not extend below any residences, and no drinking water wells pump near the plume. The Site and the surrounding properties receive water from the City of Petaluma’s municipal water supply, which is not impacted by the site.

The assessment calculated that a person who lived in a house directly above the contamination and who was exposed to the resulting vapor intrusion all of his or her life would have an excess cancer risk of 9 in 1,000,000. The national average rate of cancer from all causes is 1 in 4. The calculated “excess” cancer risk means that if a million people were exposed to this amount of contamination for their lifetimes, there might be nine additional cases of cancer. The assessment concluded that a person would not experience any non-carcinogenic health effects.

The assessment also calculated that a person who used the contaminated groundwater as residential water supply over the course of his or her entire life would have an additional 1 in 10,000 risk of contracting cancer. The assessment concluded that this person would not experience any non-carcinogenic health effects.

Subsequent Risk Evaluation

Additional risk evaluations were conducted in 2005 as part of the Five-Year Review. EPA performed a screening level evaluation of the potential for remaining levels of contaminants to cause negative health effects either by entering commercial buildings via vapor intrusion or through human ingestion of home-grown produce.

To evaluate the potential risk of vapor intrusion, EPA compared the current groundwater contaminant concentrations to its published “Target Groundwater Concentrations” (Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, EPA OSWER, November 2002, Doc No. EPA530-D-02-004) and the Regional Board’s published “Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns” (Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater, Regional Board, February 2005). All current contaminant concentrations in the groundwater were found to be well below both the target and screening levels. On this basis, EPA determined that vapor intrusion does not pose a human health risk at this Site.

Opportunity for Public Comment

EPA will accept comments on this Proposed Plan from January 20, 2007 through February 20, 2007. During that period, written comments can be submitted to José García at EPA (see back page for contact information). Comments presented at the Proposed Plan Public Meeting, scheduled for January 24, 2007, will be recorded.

After EPA reviews public comments the Agency will formally announce the selected remedy in an amendment to the 1991 ROD (ROD Amendment). Responses to public comments will be included in the ROD Amendment. The selected remedy may differ from the preferred alternative in this plan as a result of public comments. EPA encourages the public to review the reports in the Administrative Record and comment on any of the alternatives presented in this Proposed Plan. A copy of the Administrative Record is located at the Petaluma Public Library, 100 Fairgrounds Drive, Petaluma, California, and at the EPA Region 9 office in San Francisco.

To evaluate the potential effects on gardens and home-grown fruits and vegetables, EPA examined other existing studies on the subject. Research demonstrates that volatile chemicals do not build up in the plant tissues even if contaminated groundwater beneath a garden manages to reach the plants and the chemicals are absorbed by the plants. When volatile chemicals move into plant leaves, they are released through the tiny openings in the plant leaves where gas exchange occurs and therefore do not accumulate. Studies have also shown that volatile chemicals taken up through plant roots tend to concentrate in the cells near the surface of the roots. For root vegetables such as beets, carrots and potatoes, these cells are typically lost during washing and peeling of the produce. Plants are also able to break down or degrade volatile chemicals. Thus, any such chemicals taken up by the 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 parts of the plant. In summary, existing studies indicated that uptake and accumulation of volatile chemicals in plants, and subsequent exposure to humans who eat them, would be minimal.

Ecological Risk

As part of the 1991 risk assessment, EPA also prepared an ecological risk assessment to evaluate possible impacts to the environment. The ecological assessment focused on possible impacts on the nearby creek, Adobe Creek. This creek is the closest surface water body to the Site. At the time of the assessment, a local group had launched a project to reintroduce anadromous steelhead trout to the creek.

EPA examined data from groundwater monitoring wells between the Sola facility and Adobe Creek. Based on this data, EPA determined that no contaminants were moving towards or had reached the creek. The assessment did determine that if the groundwater extraction system were not operating, contaminated groundwater from the Sola facility would flow in the direction of Adobe Creek. However, the contaminant concentrations in the groundwater beneath the Sola facility were not a concern because they were below federal surface water quality criteria for the protection of aquatic life.

Today, the Site is not much different than it was in 1991. The one area that has not yet attained the groundwater clean-up standard is located on the parcel adjacent to the original facility property. This parcel is currently an open field in the process of being developed for light industrial/commercial use. Approximately one-third of that property had been recently graded. The field has not otherwise changed since the time of the original risk assessment. No new ecological receptors were found at the Site.

Scope of This Action

This remedy addresses the small portion of the Site where contamination remains in the groundwater at concentrations exceeding the clean-up goal. Once the already-low levels of 1,1-DCA have been reduced to the drinking water standard, Site remediation will be complete, and the Site may be eligible for deletion from the Superfund List.

Description of Alternatives

The alternatives for completing remediation of this site are:

- (1) No Action;
- (2) Groundwater extraction, treatment, and off-site discharge, with institutional controls; and
- (3) Monitored natural attenuation with institutional controls.

Remedial Alternative 1 (RA-1)

RA-1 consists of no action being taken, not even monitoring. EPA is required to evaluate this option for comparison purposes.

Remedial Action Alternative 2 (RA-2)

RA-2 consists of most of the remedial action selected in the 1991 ROD (the GWET system) plus institutional controls. This alternative would require extracting groundwater from the shallow aquifer, treating it on-site and discharging it off-site into Adobe Creek. The original GWET system was dismantled in 1998, so it would need to be rebuilt if selected in this ROD Amendment. In addition, this alternative would require implementation of institutional controls at the Site. The current owners would be required to record restrictive covenants which would restrict use of the groundwater until it meets the California drinking water standard. The objective of this restriction would be to prevent uses of the groundwater that could result in unacceptable exposure of humans or the environment to the groundwater. This alternative would take an estimated 18 months to construct a new groundwater treatment system, and would take an estimated one to three years to attain the clean-up goal.

Remedial Action Alternative 3 (RA-3)

RA-3 consists of the same institutional controls proposed for RA-2 as well as adoption of monitored natural attenuation (MNA) as the method for achieving Site remediation goals. MNA is a clean-up approach that relies on natural processes to reduce contaminant concentrations and achieve clean-up objectives within a reasonable time frame, as compared to other more active methods. Natural attenuation includes a variety of physical, chemical or biological processes – such as dilution and chemical breakdown – that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume or concentration of contaminants in the



Figure 2: Diagram of EPA's 9 Remedy Criteria

groundwater. This alternative would take no additional time to construct since only the existing monitoring wells will be necessary. EPA estimates that this alternative will achieve the clean-up standards within one to three years.

Evaluation of Alternatives

The purpose of this analysis is to compare the remedial alternatives. This analysis examines the three remedial action alternatives using the nine evaluation criteria established in the National Contingency Plan, 40 CFR § 300.430(e)(9). The resulting strengths and weaknesses of the alternatives are then weighed to identify the alternative providing the best balance among the nine criteria. The nine criteria and the relative performance of the alternatives in relation to each criterion and each other are summarized in Table 1.

SOLA OPTICAL USA, INC. CLEAN-UP ALTERNATIVE EVALUATION TABLE

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
	No Action	Groundwater Extraction & Treatment, Institutional Controls	(PREFERRED) Monitored Natural Attenuation, Institutional Controls
Overall Protectiveness	○	●	●
Compliance with State and Federal Requirements (ARARs)	○	●	●
Long-term Effectiveness	●	●	●
Implementability	●	●	●
Short-term Effectiveness	○	●	●
Reduction of Toxicity, Mobility, or Volume by Treatment	●	●	●
Estimated Cost, Present Worth	\$0	\$572,000	\$149,000
State Agency Acceptance	The State has no comments on EPA's Proposed Plan and ROD Amendment.		
Community Acceptance	Community acceptance of the preferred alternatives will be evaluated after the public comment period.		

Table 1: Sola clean-up alternatives comparison

EPA's Preferred Alternative

After evaluating the clean-up options, EPA prefers monitored natural attenuation with institutional controls (RA-3) as the remedy that provides the best balance of the criteria. EPA expects RA-3 to satisfy the following statutory requirements of CERCLA, Section 121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify a waiver); (3) be cost-effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element. Once the clean-up standard for 1,1-DCA has been reached, EPA believes that no contamination above clean-up levels will remain onsite, and any use restrictions may be lifted.



Figure 3: Groundwater under treatment through natural attenuation. In natural attenuation, one mechanism at work is the break-down of contamination by natural bacteria in the ground, depicted conceptually in this figure.

For More Information

If you have questions or comments regarding the Sola Optical USA, Inc. Superfund Site, please contact:

Dante Rodriguez

Remedial Project Manager
U.S. EPA, Region 9
75 Hawthorne St. (SFD-7-1)
San Francisco, CA 94105
email: Rodriguez.dante@epa.gov
phone: (415) 972-3166
fax: (415) 947-3526

Jose Garcia

Community Involvement Coordinator
U.S. EPA, Region 9
75 Hawthorne St. (SFD-3)
San Francisco, CA 94105
email: garcia.jose@epa.gov
phone: (415) 972-3331
fax: (415) 947-3528

You may also call EPA's toll-free Superfund hotline and leave a message that will be forwarded to the appropriate EPA staff. The hotline number is 1-800-231-3075.



Site Repository

Petaluma Public Library

100 Fairgrounds Drive
Petaluma, California
(707) 763-9801

Hours: Tues-Wed 10:00 a.m. - 9:00 p.m.
Mon, Thurs-Sat 10:00 a.m. - 6:00 p.m.

EPA Superfund Records Center

95 Hawthorne St., 4th Floor
San Francisco, CA 94105
(415) 536-2000

Hours: Mon-Fri : 8 a.m. - 5 p.m.



For more site information visit the EPA Region 9 web page www.epa.gov/region09/waste/sfund/superfundsites.html, select "Site Overviews" and click on Sola Optical USA, Inc.

EPA Proposes Amending the Clean-up Plan for Contaminated Groundwater at Sola Optical USA, Inc. Superfund Site



Printed on 30% Postconsumer Recycled / Recyclable Paper

Una versión en español adentro

United States Environmental Protection Agency
Region 9
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
Attn: José García (SOLA 1/07)

FIRST-CLASS MAIL POSTAGE & FEES PAID U.S. EPA Permit No. G-35
--

*Official Business
Penalty for Private Use, \$300*

Address Service Requested