UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

Responsiveness Summary
Sola Optical USA, Inc. Deletion from NPL

Docket ID No. EPA-HQ-SFUND-1990-0010

Introduction

A Notice of Intent to Delete for the Sola Optical USA, Inc. Superfund Site was published in the Federal Register on July 24, 2013 (Vol. 78, No. 142, page 44512). The publication of this notice was intended to inform the public that EPA planned to delete the Site from the National Priorities List, and provide a 30-day public comment period on the proposed deletion. The closing date for comments on the Notice of Intent to Delete was August 23, 2013. One set of written comments containing 15 comments was received (these comments are available in the Information Repositories); therefore EPA has prepared this Responsiveness Summary. In addition, all public comments were considered in EPA's final decision to delete the Site from the NPL.

Responsiveness Summary

The Responsiveness Summary has been prepared to provide responses to comments submitted to EPA during the 30-day public comment period regarding the Notice of Intent to Delete (Federal Register Vol. 78, No. 142, page 44512) of the Sola Optical USA, Inc. Superfund Site. The original comments are summarized below and available at http://www.regulations.gov, Docket ID No. EPA-HQ-SFUND-1990-0010, with the support materials under document type "Public Submissions", and at the information repositories at the following addresses:

Superfund Records Center
95 Hawthorne St., Room 403
Mail Stop SFD-7C
San Francisco, CA 94105

Petaluma Public Library
100 Fairgrounds Drive
Petaluma CA 94952

Signature

10/22/13
Dated:

Jared Blumenfeld
Regional Administrator,
Region 9

Comments were received from one commenter, as follows:

1. Review of the CD on file at the Petaluma City Library did not appear to contain a document for the Site Conceptual Model. Please provide an electronic copy or link to this document. If it is contained on the CD, please provide the name and date of the report.

RESPONSE: The Site Conceptual Model (SCM) has been documented in the following three reports: (1) *"Remedial Investigation Report, Sola Optical USA, Inc., Petaluma, California"* **(Levine Fricke, 1990)**; (2) *"Public Health Risk Assessment, Sola Optical USA, Inc. Site"* **(CH2M Hill, 1991)**; and (3) *"Evaluation of Monitored Natural Attenuation as a Remedy to Meet Remedial Action Objectives, Sola Optical USA, Inc., Site Petaluma, California"* **(Levine Fricke, 2001).**

The site's hydrogeologic setting, and the nature, extent, fate and transport of chemicals of concern (COCs) are described in Sections 2.0 through 5.0 of the Remedial Investigation report. The fate and transport of chemicals of concern is also discussed in the Public Health Risk Assessment (Section 2.5). Key components of the site conceptual model also are depicted in the Evaluation of Monitored Natural Attenuation report (Figure 4, *"Site Conceptual Model Showing Natural Attenuation Processes"*). These reports have been uploaded to the EPA website.

2. It did not appear that vinyl chloride was reported in the tables of the ground water monitoring reports, but was probably reported (as ND?) in laboratory data. Was vinyl chloride ever reported above laboratory minimum detection levels at the site? Can you provide the document that would contain all historical vinyl chloride analytical data, table preferred? Also, final degradation of TCE and TCA would produce ethene and hydro chloride. What are the results for those chemicals?

RESPONSE: Vinyl chloride was never detected above the laboratory minimum detection levels. Ethene and hydro chloride were not reported by the lab analyses used in the site investigations.

The August 31, 2012, groundwater monitoring report **(Arcadis, 2012)**, included in the deletion docket, shows all the detected constituents from 1997 through 2012. Constituents detected but not shown in separate columns are presented in the Notes section at the end of the table. The April 4, 2001, Evaluation of Monitored Natural Attenuation report **(Levine Fricke, 2001)**, posted on the site webpage, shows all the detected constituents from the beginning of site response activities through the date of the report. This report also presents the detected constituents that are not shown in separate columns, in the Notes section at the end of the table.

3. It is my understanding that ground water extraction and treatment combined with monitored natural attenuation (MNA) were the only remediation techniques used at the site. However, MNA is used to observe the degradation of a chemical of concern over time, not the possible migration of the chemical away from an observation point and usually not just one monitoring point. I believe well W-27 was the last water sampling monitoring point remaining on the site. It is screened at 9 to 20 feet. <u>So, it appears that the first encountered ground water zone for a product in its free state that is heavier or more dense than water is the only location for MNA.</u> The final location for MNA at one solitary well does not seem adequate. Please comment.

RESPONSE: The lateral and vertical extent of COCs was delineated through the RI process that included several phases of soil-gas, soil and groundwater investigations, as presented in the RI Report **(Levine Fricke, 1990)**. Ground water quality was monitored using a total of 46 monitoring wells that were

installed at depths of up 240 feet bgs **(Levine Fricke, 1992a)**. Through the course of remediation and monitoring, several wells that were historically below detection limits, or demonstrated results below detection for at least two years, were abandoned in order to streamline the monitoring process.

After the natural attenuation monitoring plan was implemented in 2002, the monitoring well network consisted of three wells monitored semi-annually and an additional four wells monitored annually (total of 7 wells) **(Levine Fricke, 2002b)**. Based on historical data collected across the entire network of 45 wells, this network of wells was sufficient to monitor the groundwater remediation at all depths. The monitoring network continued to scale back over time as wells achieved and sustained the clean-up level. During the latter years of the clean-up, only one monitoring well remained above the clean-up level. That last well has now demonstrated consistent achievement of the clean-up level for over two years. EPA has determined that the clean-up levels have been achieved and maintained throughout the formerly contaminated area.

It is also important to note that non-aqueous phase liquid (NAPL) was not encountered at this site. Rather, COCs entered into the groundwater in the dissolved phase. In the dissolved phase, VOCs do not exhibit density driven vertical migration apart from the aqueous solution. Rather, the vertical extent of VOCs in groundwater at this site was driven by natural and pumping-induced vertical gradients in the groundwater.

Finally, MNA was selected as a remedy at the site based on its protectiveness of human health and the environment. Potential migration of COCs away from monitoring points was considered in selection of the remedy. Data from the network of downgradient wells showed, however, that concentrations decreased to below MCLs, even after the pump and treat system was turned off. That data presented compelling evidence that MNA was potentially effective. The fact that the downgradient wells showed a lack of migration while the source area wells were showing decreasing trends, supported selection and approval of MNA as the remedy.

4. The concentration trends presented in the Final Closure document dated April 2013 show that ground water extraction and treatment did not affect 1,1-DCA concentrations in well W-27. In fact, concentrations went up during treatment and stayed above MCL when the treatment system was shut down. If MNA was occurring, would you not expect for additional DCA/DCE daughter products to be produced? What are the concentrations for all the potential daughter products during the MNA period? Were the daughter products routinely analyzed and reported in all the zones of the well network during the historical record of these wells? Are ambient bacterial quantities and type sufficient for breakdown of these solvents?

RESPONSE: As described in the Evaluation of Monitored Natural Attenuation Report **(Levine Fricke, 2001)**, there are several mechanisms that contributed to natural attenuation of COCs in groundwater at this site, including mixing, sorption, dispersion, volatilization, and abiotic and biotic degradation. Only these last two processes would be expected to produce degradation by-products, including chloroethane, acetate, vinyl chloride and ethene. As mentioned above, vinyl chloride was not detected above reporting limits, and the other potential breakdown products were not monitored. Rather, the steady decline in contaminant concentrations over time, combined with data from a large well network that confirmed a stable to decreasing extent of COCs, was taken as a primary line of evidence to evaluate the effectiveness of MNA as a remedy. The concentrations of both 1,1-DCA and 1,1-DCE declined to below the clean-up level with the data displaying clear trends.

Biological assessments (bacterial counts, etc.) were not conducted in groundwater at the site, based on the following:

- The primary line of evidence (decreasing concentration trends and reduced plume extent) indicated that natural attenuation was occurring
- The mechanisms for natural attenuation were mostly abiotic

The concentrations of VOCs were sufficiently low that, even if some of the attenuation mechanisms were biologically mediated, one would not expect to see the influence of the VOCs on the aquifer bacteria populations.

5. The concentrations for 1,1-DCE for well W-27 also has an interesting trend. The concentrations rise during treatment and reach a near peak when the system is shut off. Then, the concentrations decrease when the treatment system was turned off, almost as if the treatment system was causing the increased concentrations. Well W-27 is screened at 9 to 20 feet. Where did the dissolved 1,1-DCE and 1,-DCA go? Did they degrade? Then to what? Did they migrate? Where? Vertically or laterally? Could the remedial pumping caused the deeper dissolved constituents to be 'pushed' away from the pumping zones?

RESPONSE: Well W-27, like other shallow wells in that portion of the site, was screened within a very fine-grained clay interval of the formation. As a result, groundwater extraction did not have a direct influence on the water level or COC concentration in that well. Rather, groundwater extraction focused on pumping from more permeable intervals to contain VOC migration.

As discussed above, several processes likely contributed to the natural attenuation of COCs beneath the site including mixing, sorption, dispersion, volatilization, and abiotic and biotic degradation. Based on the very low COC concentrations detected, it is unlikely that biodegradation was a significant contributor to the overall attenuation of the COCs.

6. Where exactly was the discharge point in Adobe Creek for the ground water treatment system? Was there any violations of their discharge?

RESPONSE: The as-built drawings show that the effluent from the groundwater treatment system went directly into the storm drain at the edge of the former Sola facility property **(Levine Fricke, 1992b)**. We could not locate further detail regarding the location where the storm drain enters Adobe Creek.

The annual monitoring reports contain no indication that the discharge limits were ever violated.

7. What is the mass of the contaminants removed? What is the estimated mass of contaminants remaining?

RESPONSE: The mass of contaminants removed was estimated as part of an evaluation conducted in 1996 pursuant to a request for a technical impracticability waiver for the site **(Levine Fricke, 1996)**. In that evaluation, the flow rate and concentration of COCs in the influent to the treatment system was used to calculate that 11 pounds of COCs had been removed by the treatment system.

No estimate was made of the total mass removed through the end of the monitored natural attenuation phase. It should be noted that EPA did not place any importance on the mass removed calculation performed in 1996, nor did EPA see any need to estimate mass removed through the end of the cleanup. EPA relied upon monitoring of the groundwater to determine when the clean-up levels had been achieved.

8. What is the historical record, including current status of the Stero well; City well and Sola well? What was the pathway for the contaminants to reach these wells?

RESPONSE: The historical records of the Stero well, Crandell well, City Station 5 well, and Sola-City well can be summarized as follows:

(1) Stero well. Sola and Stero reached an agreement for Stero to use city water instead of well water in April 1990. The pumping system was removed from the well on May 8, 1990 **(Levine Fricke, 1990, Section 1.3.2.4).**
(2) Crandell well. Sola and the owner reached an agreement for the property to use city water instead of well water. Sola arranged for well abandonment, which was conducted on October 5, 1990, by Weeks Drilling and Pump of Sebastapol, CA, under the oversight of a geologist from Levin-Fricke and under permit by Sonoma County **(Levine Fricke, 1990, Section 1.3.2.4).**
(3) City Station 5 well. In October 1989, Sola and the City entered an agreement to keep the well closed until the City was satisfied that no further investigation was needed and there was no threat of drawing contamination into the well. The agreement stipulated that the City could operate the well for specifically defined periods of time for sampling or during natural disasters **(CH2M Hill, 1991, p.2-4; EPA, 2005, Table 2-1)**. In June 1988, the City ceased operation of the Station 5 well **(EPA, 2005, Table 2-1)**. Later, Sola and the City established an agreement to replace the Station 5 well with a comparable water supply well and to abandon the well **(Levine Fricke, 2001, Section 3.5.2)**.
(4) Sola-City well. Sola and the City entered an agreement to keep the well closed until the City is satisfied that no further investigation was needed and there was no threat of drawing contamination into the well. The agreement stipulated that the City could operate the well for specifically defined periods of time for sampling or during natural disasters **(CH2M Hill, 1991, p.2-4)**. Later, the City abandoned the well **(Levine Fricke, 2001, Section 3.5.2)**.

During early investigations, pump tests were performed on the City Station 5 well in order to investigate potential contaminant migration pathways were the well to be operated. Groundwater elevations in several monitoring wells throughout the COC plume were measured using pressure transducers. It was observed that the pumping from the City Station 5 well resulted in inducing downward gradients and pulling dissolved contaminants downward and over to the well, even though the Station 5 well is cross-gradient from the contamination **(Levine Fricke, 1990, Section 1.3.3.2 and Appendix B; Levine Fricke, 1988)**.

The Sola-City well is upgradient of the groundwater contamination but still on the former Sola facility property. The Stero well is down and slightly cross-gradient from the groundwater contamination, approximately 1000 feet from the Sola facility. The Crandell well is downgradient from the groundwater contamination, approximately 1500 feet from the Sola facility.

9. There appears to be no record of the screen depth of the Stero well. Was this information obtained?

RESPONSE: This information was not obtained. Based on the administrative control enacted on that well, and the lack of VOC detections in the vicinity of that well, this information was not a necessary component of the site conceptual model.

10. I believe it was reported that the minor concentrations of contaminants found in the City well were not recurring. If the contaminants actually reached the City well, what was the exact pathway attributed? If the cone of depression of the active City well was the cause as was reported, where are the ground water elevation maps to support this theory?

RESPONSE: The response to comment #8 describes how pump tests were used to determine the hydraulic pathway that the contamination took to reach the Station 5 well. The pathway caused by the influence of the pumping is depicted in the pump test report cited in the response.

11. The City well has a very large screen interval (340 feet from 180 to 520 feet), which cause a dilution factor if the contaminant plume entered the screens of the well. Was this considered?

RESPONSE: The location, depth, screened interval and pumping rates for the City well were all considered in developing the site conceptual model and the potential pathway for COCs to migrate from the site to the well. 1,1-DCE was detected at concentrations up to 23 ppb at a depth of approximately 160 feet bgs at well LF-13, located between the plume and the Sola City well. Groundwater elevation data collected during pumping of the City well (described above) confirmed that groundwater flow was from the site toward the Sola City well in deep groundwater while the City well was pumping. The low and intermittent detections of 1,1-DCE at the Sola City well reflect the long screen and dilution effects of the Sola city well on concentrations at the well head.

12. I recall reading that an upward vertical gradient was reported in the middle and upper zones, while a downward vertical gradient was reported in the deep zone. Since TCA and DCE are DNAPLs in their free product state, wouldn't downward gradients in the deep zone increase the level of concern that there may be a diving plume at the site?

RESPONSE: As described above, non-aqueous phase liquid (NAPL) was not encountered at this site. Rather, COCs entered into groundwater in dissolved phase. In dissolved phase, VOCs do not exhibit density driven vertical migration apart from the aqueous solution. Rather, the vertical extent of VOCs in groundwater at this site was driven by natural and pumping-induced vertical gradients in the groundwater. The vertical extent of COCs resulting from these downward gradients was delineated with installation of deep (up to 230 feet bgs) wells.

13. It does not appear that there was lateral assessment beyond the City, Stero or Sola well? Is that correct?

RESPONSE: The lateral and vertical extent of COCs in groundwater was established with an extensive well network as presented in the RI Report. As shown on that report, the extent of groundwater with COCs above MCLs was delineated to be within the footprint of the Sola property. As a result, there was no need to extend the investigation beyond the City, Stero or Sola wells.

14. There does not appear to be a deep well network of three or more wells to provide a ground water gradient flow estimate. Deep wells LF-15 and LF-27 did not share any part of their screen depth, while LF-12 and LF-15 share only three feet. Were these wells screened in the same lithological strata?

RESPONSE: The three deep wells are screened in similar strata, and are screened at a sufficiently similar depth to allow for characterization of groundwater flow direction. As described in the RI Report, site lithology is does not consist of discrete, laterally continuous strata. Rather, sediments below

approximately 100 feet beneath the surface of the former Sola facility property consist primarily of clay, with intermittent intervals of coarser-grained materials. Each of these wells was screened across these more permeable materials at similar elevations. The elevations of the screened intervals for these wells (180-200 LF-12, 180-190 LF-15, and 194-214 LF-27) are sufficiently similar to allow for grouping the resulting elevations into the same depth interval.

15. Will the Institutional Control (IC) established with the County PRMD remain on file for future well permitting on these parcels after the site is de-listed?

RESPONSE: Upon deletion of the site from the National Priorities List, EPA will inform the County PRMD that EPA considers the groundwater to have achieved all cleanup goals, and that EPA would not consider it necessary to continue maintaining institutional controls at the site. It would be up the County whether they want to dispense with the control.

REFERENCES

1988. Levine Fricke. *Results of Hydraulic Testing of Sediments in the Vicinity of the Sola Optical USA Inc. Facility, Petaluma, California.* January.

1990. Levine Fricke. *Remedial Investigation Report, Sola Optical USA, Inc., Petaluma, California.* December 3.

1991. CH2M Hill. *Public Health Risk Assessment, Sola Optical USA, Inc. Site.* April 1.

1991. *Combined Monthly Status Reports of RI/FS Activities During April 1991 and Annual Ground-Water Monitoring Report, Sola Optical USA, Inc. Site, Petaluma, California.* May 15.

1991. Levine Fricke. *Feasibility Study Report, Sola Optical USA, Inc. Site.* June 10.

1992a. Levine Fricke. *Draft Remedial Design Remedial Action Workplan, Sola Optical USA, Inc., Petaluma, California.* February 10.

1992b. Levine Fricke. *Plans, Ground-Water Extraction System Expansion.* April.

1996. Levine Fricke*. Request for A Technical Impracticability Waiver, Sola Optical USA, Inc. Site, Petaluma, California.* November 22.

2000. Levine Fricke. Letter from Scott Seyfried, Levine Fricke, to Holly Hadlock, EPA. Sola will provide EPA a report documenting technical rationale for MNA remedy. October 11.

2001. Levine Fricke. *Evaluation of Monitored Natural Attenuation as a Remedy to Meet Remedial Action Objectives, Sola Optical USA, Inc., Site, Petaluma, California.* April 4.

2001. U.S. Environmental Protection Agency (EPA). Letter from Holly Hadlock, EPA, to Roman Starno, Sola. Response to report entitled *"Evaluation of Monitored Natural Attenuation as a Remedy to Meet Remedial Action Objectives, Sola Optical USA, Inc. Site, Petaluma, California."* November 5.

2002a. Levine Fricke. Letter from Scott Seyfried, Levine Fricke, to Holly Hadlock, EPA. Response to Comments and Addendum to the Monitored Natural Attenuation Evaluation Report, Sola Optical USA Inc. Site, Petaluma, California. April 16.

2002. U.S. Environmental Protection Agency (EPA). Letter from Holly Hadlock, EPA, to Roman Starno, Sola. Reviewed Sola's Response to Comments and Addendum to MNA Evaluation Report, approves request. September 20.

2002b. Levine Fricke. Letter from Larry Lapuyade, Levine Fricke, to Holly Hadlock, EPA. Work Plan to Implement Monitored Natural Attenuation as a Remedial Measure at the Former Sola Optical U.S.A. Facility, 1500 Cader Lane, Petaluma, California. October 22.

2005. U.S. Environmental Protection Agency (EPA). Second Five-Year Review Report for the Sola Optical USA, Inc. Superfund Site, Sonoma County, California. September.

2012. Arcadis. Letter from Scott Seyfried, Arcadis, to Dante Rodriguez, EPA. Groundwater Monitoring Report, July through December 2012, Former Sola Optical U.S.A, Inc., Facility, 1500 Cader Lane, Petaluma, California. August 31.