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FREE PRODUCT INVESTIGATION REPORT
FORMER GLOVATORIUM FACILITY
3815 BROADWAY
OAKLAND, CALIFORNIA

November 19, 2002

Project 2512

Prepared for:

Smiland and Khachigian

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Los Angeles, California 90071-2004

Prepared by:

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November 19, 2002

Mr. Scott Seery, CHMM
Alameda County Department of
Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Project: 01-2512

Subject: Site Located at 3815 Broadway, Oakland, California
Former Glovatorium Facility

Dear Mr. Seery:

Enclosed for your review is a copy of SOMA's "Free Product Investigation Report" for the subject property.

Thank you for your time in reviewing our report. Please do not hesitate to call me at (925) 244-6600, if you have any questions or comments.

Sincerely,

Mansour Sepehr, Ph.D.,P.E.
Principal Hydrogeologist

Enclosure

cc: Mr. Stuart Depper, Clean Tech Machinery w/enclosure
Mr. Albert M. Cohen, Smiland & Khachigian w/enclosure
Ms. Betty Graham, Regional Water Quality Control Board w/enclosure
Dr. Bruce Page, Bruce W. Page Consulting w/enclosure

CERTIFICATION

This report has been prepared by SOMA Environmental Engineering, Inc. for Smiland & Khachigian, to comply with the Alameda County Department of Environmental Health's requirements for delineation and removal of free product from the subsurface and to provide information necessary to defend claims brought against the owners by Earl Thompson and Grace Johnson.

Mansour Sepehr, Ph.D., P.E.
Principal Hydrogeologist

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1.0 INTRODUCTION

This report has been prepared by SOMA Environmental Engineering, Inc. (SOMA) for the Law Offices of Smiland and Khachigian on behalf of their client, the owners of the former Glovatorium. The site is the former Glovatorium property located at 3815 Broadway Avenue, Oakland, California (the "Site"), as shown in Figure 1. The Site is located in an area consisting primarily of commercial and residential land uses. This report will be submitted to the Alameda County Department of Environmental Health (ACDEH) to comply with their requirements of free product delineation and removal to the extent practicable as set forth in the California Regional Water Quality Control Board's (RWQCB) Interim Guidance Document dated November 1995 for Site closure.

This report summarizes the results of free product discovery, the investigation of the current horizontal extent of free product at the Site and removal efforts required for the Site's closure.

In the past, the sporadic presence of free product or sheen has been reported in groundwater monitoring reports at different groundwater monitoring wells such as B-2, B-3, B-7, B-8, B-9 and B-8. These wells are located inside the Glovatorium building. The maximum reported thickness of the free product in the B wells was approximately 2.1 feet which was reported inside monitoring well B-8 on October 18, 2001 during a groundwater monitoring event.

In October 2001 SOMA installed four additional groundwater monitoring wells, SOMA-2 through SOMA-5, inside the Glovatorium building to evaluate the Site's hydrogeology and chemical plume beneath the Site. Approximately, two months after the installation of monitoring well SOMA-4, in early 2002, significant thickness of free product (up to 8.5 feet) was discovered in SOMA-4. SOMA-4 is a 2-inch diameter shallow groundwater monitoring well with a total depth of 20 feet; the screen interval is between 10 and 20 feet below ground surface (bgs).

After observing the presence of a significant thickness of free product inside SOMA-4, SOMA initiated an extensive field investigation and remedial activities to delineate the extent of free product and remove free product from SOMA-4. This report describes the field investigation and remedial activities and the current extent of free product beneath the Site.

2.0 FIELD INVESTIGATION

On March 28, 2002, SOMA drilled nine hydropunches (HP-1 through HP-9) for the following purposes:

1. To evaluate the extent of free product in the subsurface;
2. To determine whether or not there is another undiscovered underground storage tank (USTs) inside the building; and
3. To evaluate water quality conditions, especially with respect to Tetrachloroethene (PCE) beneath the former dry-cleaning machines.

Hydropunches (HP-1, HP-2, HP-5, HP-8 and HP-9) were drilled to a total depth of 20 feet to evaluate the extent of free product in close proximity of SOMA-4 and B-8. HP-3 and HP-4 were drilled to 7 feet bgs to evaluate whether or not there are any undiscovered USTs. These hydropunches could not be drilled deeper due to accessibility problems inside the building. HP-6 and HP-7 were drilled to a total depth of 20 feet in order to evaluate the presence of PCE in the groundwater beneath the former dry cleaning machines. Figure 2 shows the location of the hydropunches.

Due to the fine-grained nature of the subsurface sediments, during the drilling operation no groundwater or free product was encountered. Therefore, SOMA's field staff installed a temporary ¾ inch diameter PVC casing inside each hydropunch hole for later inspection/monitoring of free product, if any. At each hydropunch location, the PVC casing was 20 feet long. The lower 10-foot portion of the casing was perforated while the upper 10-foot portion was blank.

On April 4, 2002, SOMA's field crew visited the Site and measured depth to product and groundwater inside the hydropunches. Data indicated that depth to groundwater occurs at 7.5 to 9.5 feet below surface, well above the perforated interval of the temporary PVC casing. During this visit the thickness of free product ranged between 0.0 and 0.7 feet. The maximum product thickness was observed in HP-5.

On April 10, 2002, SOMA's staff increased the perforated interval of the temporary casing in HP-1, HP-2, HP-5, HP-8 and HP-9 from 10 to 15 feet. As such, the casing perforations started at 5 feet bgs at those locations. This was done to ensure the flow of free product into the casing.

On April 10 and 29, 2002, SOMA's staff measured depth to water and product inside the hydropunches and the selected B series wells. Table 1 shows the measured product thickness at each hydropunch location and B wells. As Table 1 shows the maximum product thickness was reported in SOMA-4 and HP-5.

HP-3 and HP-4, due to physical constraints, could not be advanced more than 7 feet bgs. However, no undiscovered USTs were encountered at those locations. On April 5, 2002 groundwater samples were collected from HP-6 and HP-7 and delivered to Curtis & Tompkins Analytical Laboratories for analyses. The results of the laboratory analyses on groundwater samples collected from HP-6 and HP-7 are presented in Table 2.

The results of the April 2002 subsurface investigation did not reveal the extent of free product beneath the Site. This was due to the high watertable elevations as a result of excessive rainfall events in early 2002. However, the data was sufficient to indicate that there is still free product present, which was encountered in SOMA-4 (3.2 feet), HP-5 (1.25 feet), B-8 and B-3 (0.15 feet). Due to physical constraints, the extent of free product, especially around SOMA-4, could not be defined. However, SOMA recommended the following action

items for Site closure through the RBCA process; it is required to eliminate free product to an extent practicable.

1. The Installation of a product removal canister inside SOMA-4;
2. Once the water levels have receded, conducting an additional free product investigation for complete delineation of the free product extent in the subsurface.

On July 5, 2002, SOMA's staff measured free product thickness in SOMA-4 and nearby shallow wells B-2, B-3, B-9, and B-8. Table 1 shows data since April 2002 measurements. The data indicates the product thickness is increasing. For instance, product thickness in B-3 and B-8 at the end of April 2002 were 0.15 and 0.10 feet, respectively. Currently, the product thickness inside B-3 and B-8 are 0.75 and 0.27 feet, respectively. The increase in product thickness could be attributed to the onset of a dry season and a decline in the groundwater elevations.

On June 11, 2002, SOMA installed a Durham Geo-Enterprise Model TR-254 passive skimmer in SOMA-4 and commenced free product removal on a weekly basis. SOMA's field crew also used a bailer to remove any measurable free product, from the well, after disposing of the free product in the canister. The volume of removed free product is tabulated in Table 3. As Table 3 shows a total of 19.75 gallons of free product has been removed since the installation of the skimmer. This action was necessary in order to obtain closure under the RBCA process.

In the April 2002 subsurface investigation, due to the high groundwater elevations, the extent of free product could not be delineated. In July 2002, SOMA proposed an additional subsurface investigation to the ACDEH in order to delineate the extent of free product in the subsurface. The proposed investigation included drilling six hydropunches, primarily around SOMA-4 and B-8, where elevated levels of free product has been encountered.

On October 1, 2002, SOMA drilled six hydropunches as proposed to the ACDEH. Figure 2 shows the locations of all hydropunches (HP-11 through HP-16), and B wells where the free product was reported in the past. During the previous investigation no hydropunches were placed south of SOMA-4, which contains a significant amount of free product. In conducting the current investigation more hydropunches were placed to the south and in the vicinity of other locations where free product has been detected.

The depths of these hydropunches range between 11.45 and 13.85 feet. Like the previous hydropunches no groundwater was encountered during or after the drilling of these hydropunches. To allow water or product to accumulate inside the hydropunches a temporary ¾ inch diameter PVC casing was installed inside the hydropunches. To allow water or product to easily enter the temporary PVC casings, the perforations of the temporary casing was from 5 feet bgs, which was well above the recorded depth to water in all hydropunch locations. After installing the temporary casing inside each hydropunch, depth to water or product inside the newly installed hydropunches, B wells and SOMA-4 were monitored on a weekly basis for the next 4 weeks. Table 1 shows the reported product thickness inside the hydropunches, B wells and SOMA-4 at different times.

3.0 RESULTS

The current subsurface investigation revealed the potential extent of free product at the Site. Given the fact that the current investigation was conducted in the middle of a dry period the reported free product thickness could be considered maximum. To evaluate the horizontal extent of free product, the previous and recent hydropunch data on free product thickness along with product thickness measurements from B wells and SOMA-4 were compiled. The data were used to plot a product thickness contour map of the Site. As Figure 3 shows there are two distinct free product plumes inside the Glovatorium building. The first plume

is generally located around SOMA-4 and HP-5. The second free product plume is a small and isolated plume and is generally located around B-8. The maximum free product thickness was observed in SOMA-4. As discussed earlier, a passive free product removal canister was installed in SOMA-4 in June 2002.

Currently, free product is being removed from SOMA-4 on a weekly basis. To date a total of 19.75 gallons of free product has been removed from SOMA-4. SOMA will continue removing free product from SOMA-4 until the entire product is removed to the extent practicable, which is consistent with the RBCA process.

Figures and Tables

Figure 1: Site vicinity map.

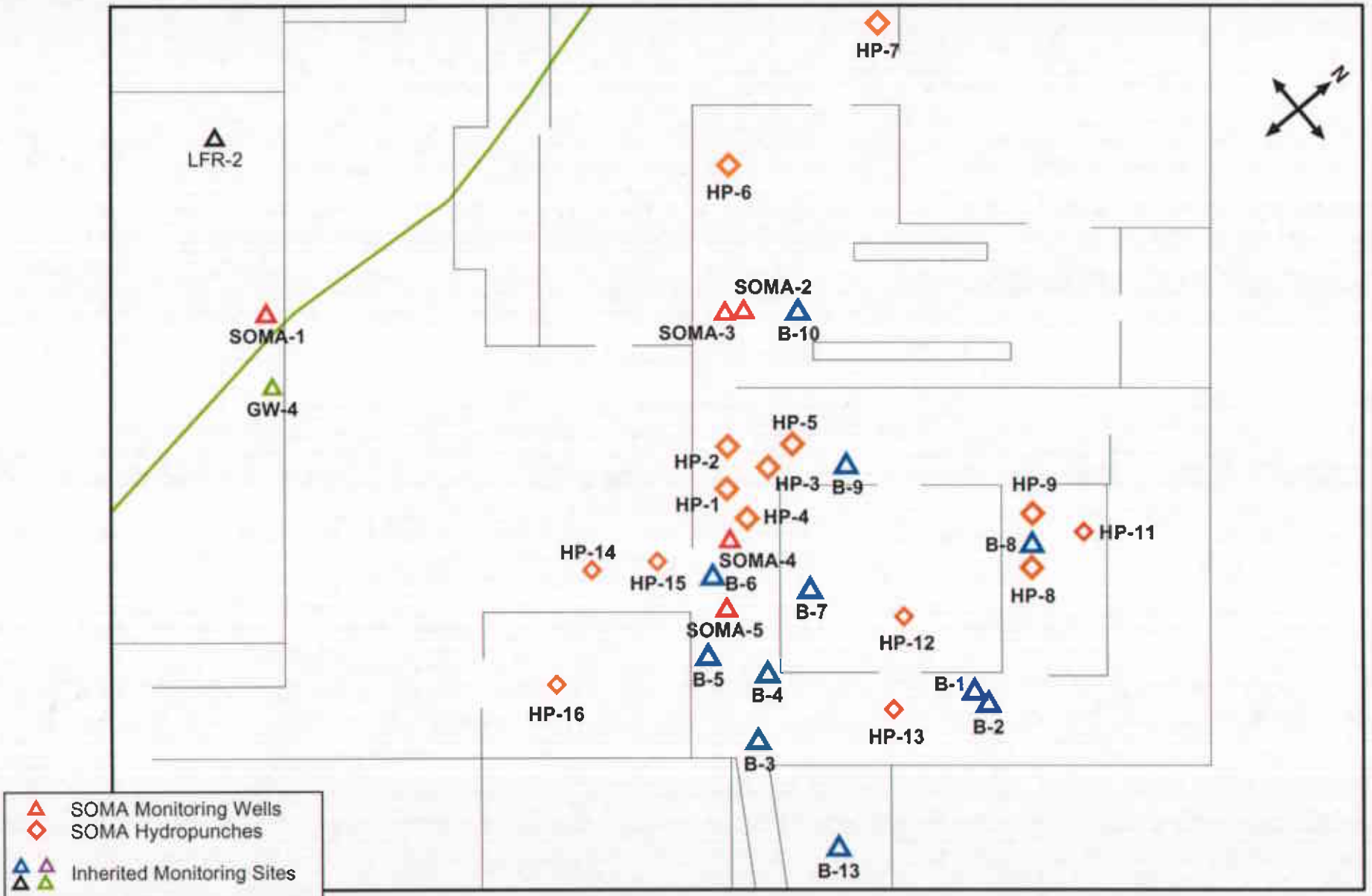

Figure 2: Location of SOMA monitoring wells, SOMA hydropunches, and inherited monitoring locations within the former Glovatorium building.

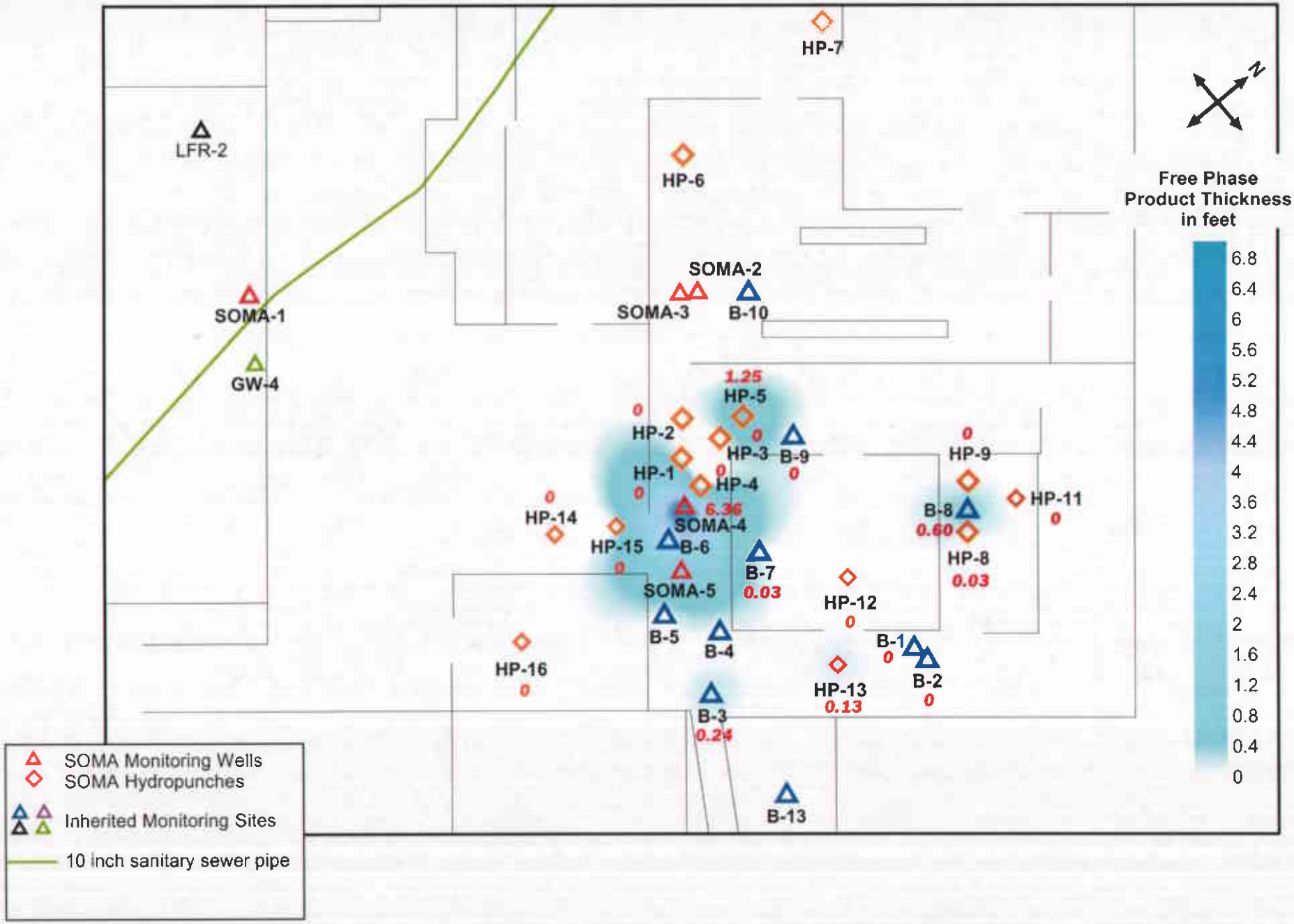

Figure 3: Contour map of free phase product thickness in feet.
Oct. 8, 2002.

Table 1: Free Product Thickness Measurements at Former Glovatorium Site,\ 3815 Broadway Oakland, California

Date	Well	Depth to F.P. ft	Depth To Water ft	Thickness of F.P. ft
4/4/02	HP1	ND	8.14	0.00
	HP2	8.09	8.10	0.01
	HP5	8.80	9.50	0.70
	HP8	9.33	9.34	0.01
	HP9	ND	7.50	0.00
4/10/02	SOMA 4	9.58	12.45	2.87
	B8	8.09	8.22	0.13
	B9	ND	8.00	0.00
	B3	7.15	7.27	0.12
	B2	ND	7.95	0.00
	HP1	ND	8.56	0.00
	HP2	ND	8.36	0.00
	HP5	9.25	10.28	1.03
	HP8	9.77	9.80	0.03
	HP9	ND	8.15	0.00
4/29/02	SOMA 4	9.80	13.00	3.20
	B8	8.45	8.55	0.10
	B9	ND	8.30	0.00
	B3	7.42	7.57	0.15
	B2	ND	7.40	0.00
	HP1	ND	8.40	0.00
	HP2	ND	8.80	0.00
	HP5	8.45	9.70	1.25
	HP8	ND	10.15	0.00
	HP9	ND	8.60	0.00
7/5/02	SOMA 4	11.55	11.80	0.25
	B8	9.0	9.27	0.27
	B9	ND	8.6	0.0
	B3	7.91	8.66	0.75
	B2	ND	7.9	0.0
8/16/02	SOMA 4*	NM	NM	13.20
	B8	NM	NM	NM
	B9	NM	NM	NM
	B3	NM	NM	NM
	B2	NM	NM	NM
8/23/02	SOMA 4*	NM	NM	10.35
	B8	NM	NM	NM
	B9	ND	9	0.00
	B3	NM	NM	NM
	B2	NM	NM	NM
8/30/02	SOMA -4*	10.90	16.32	5.42
	B13	ND	8.9	0.00
	B10	ND	9.16	0.00
	B9	ND	8.97	0.00
	B8	ND	9.4	0.00
	B7	ND	8.59	0.00
	B3	ND	8.33	0.00

	B2	ND	8.4	0.00
9/10/02	SOMA -4*	10.26	16.75	6.49
	B9	ND	8.98	0.00
	B8	ND	9.72	0.00
	SOMA-2	ND	9.16	0.00
	SOMA-3	ND	11.95	0.00
10/3/02	SOMA -4*	11.65	16.95	5.30
	B-2	ND	8.55	0.00
	B-3	8.75	9.1	0.35
	B-8	9.64	10.4	0.76
	B-9	ND	9.33	0.00
	HP-11	ND	11.85	0.00
	HP-12	ND	3.85	0.00
	HP-13	8.25	8.42	0.17
	HP-14	ND	9.35	0.00
	HP-15	ND	ND	0.00
	HP-16	ND	9.6	0.00
10/8/02	SOMA -4*	10.75	17.11	6.36
	B-2	ND	8.51	0.00
	B-3	8.73	8.97	0.24
	B-7	8.72	8.75	0.03
	B-8	9.68	10.28	0.60
	HP-11	ND	10.22	0.00
	HP-12	ND	6.05	0.00
	HP-13	8.35	8.48	0.13
	HP-14	ND	9.28	0.00
	HP-15	ND	13.67	0.00
	HP-16	ND	8.55	0.00
10/14/02	SOMA -4*	10.53	17.51	6.98
	B-2	ND	8.65	0.00
	B-3	8.76	9.03	0.27
	B-7	8.78	8.82	0.04
	B-8	9.69	10.3	0.61
	B-9	ND	9.15	0.00
	HP-11	ND	9.33	0.00
	HP-12	ND	7.99	0.00
	HP-13	8.42	8.48	0.06
	HP-14	ND	9.31	0.00
	HP-15	ND	12.82	0.00
	HP-16	ND	8.58	0.00

* Free Product thickness based on volume of free product removed divided by casing volume per linear foot
NM: Not Measured with groundwater interface probe
ND: Free Product not detected with groundwater interface probe

NOTES:
Wells HP-1 through HP-9 decommissioned by sealing with neat cement on April 29, 2002
SOMA 4 collecting free product with passive skimmer since June 11, 2002

Table 2: Results of Laboaratory Analyses on HP-6 and 7
Former Glovatorium 3815 Broadway
Oakland, California

Sample Location	Date	cis-1,2 DCE	TCE	PCE	Propylbenzene	1,3,5- Tri-Metylbenzene	1,2,4-Tri Metylbenzene
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
HP-6	4-Apr-02	5400	320	320	<200	<200	<200
HP-7	4-Apr-02	120	26	320	20	43	18

Table-3. Free Product Removal from Monitoring Well SOMA-4 at the Glovatorium Site, 3815 Broadway, Oakland California

Date	Volume gal	Remarks
6/11/02	-	Skimmer was installed in SOMA-4
6/13/02	2	Skimmer was full, also used bailer
6/20/02	1.5	Skimmer was full, also used bailer
6/28/02	1	Skimmer was full, also used bailer
7/3/02	0.75	Skimmer was full, also used bailer
8/16/02	2.25	Skimmer was full, also used bailer
8/23/02	2.00	Skimmer was full, also used bailer
8/30/02	2.00	Skimmer was full, also used bailer
9/10/02	2.25	Skimmer was full, also used bailer
9/19/02	1.25	Skimmer was full, also used bailer
9/27/02	1.25	Skimmer was full, also used bailer
10/14/02	3.50	Skimmer was full, also used bailer
TOTAL	**19.75**	