SOMA
ENVIRONMENTAL ENGINEERING, INC.
6620 Owens Drive, Suite A • Pleasanton, CA 94588
TEL (925)734-6400 • FAX (925)734-6401

May 25, 2011

Mr. Paresh Khatri
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: Work Plan Addendum for
3519 Castro Valley Boulevard, Castro Valley, California

Dear Mr. Khatri:

Thank you for your recent correspondence entitled, "Work Plan Addendum for Fuel Leak Case N. RO0000346 and GeoTracker Global ID T0600100920 [….]," dated May 12, 2011. In the above correspondence, Alameda County Environmental Health Department (ACEHD) informed SOMA that the report entitled, "Feasibility Study/Corrective Action Plan and Proposed Pilot Testing," dated March 11, 2011, was reviewed and that ACEHD did not oppose the proposed scope of work. ACEHD further stated that prior to implementation of the proposed work, submission of additional detail for the proposed air sparging (AS) was required, in the form of a brief work plan addendum providing further details about proposed AS pilot test.

In order to determine whether AS will be applicable to this site, on May 17, 2011, SOMA collected a field-filtered groundwater sample from well SOMA-7, located in the area of proposed remediation, to be analyzed for dissolved iron. Special consideration must be given if iron concentration is greater than 10 mg/L, but less than 20 mg/L, since periodic maintenance will be required for the permanently installed AS treatment system to remain operable. Sites with iron concentrations exceeding 20 mg/L will not be suitable for AS. Based on the laboratory analytical report to this work plan addendum, dissolved iron was detected at 3.7 mg/L, which is below the established trigger level of 10 mg/L, indicating that dissolved iron will not hinder the AS application at this site, therefore, SOMA will proceed with the proposed AS pilot testing.

The following sections provide detailed information about AS pilot testing, requested in the above-referenced ACEDH correspondence.

AIR SPARGING

The objectives of this pilot testing are as follows: to determine whether AS enhancement during multi-phase extraction (MPE) operation will increase MPE mass removal efficiency, and to collect sufficient data for use in evaluating AS effectiveness and in designing a full-scale treatment system, if feasible. The equipment that will be used to monitor pilot testing parameters will provide information necessary to make appropriate system adjustments and track remedial progress. The control equipment in the AS system will allow the flow and sparge pressure to be adjusted at each sparging well, as necessary. Control equipment typically includes flow control valves/regulators. Table 1, attached to this work plan addendum, summarizes anticipated parameters and their respective collection methods. A list of typical monitoring and control equipment that may be utilized during this proposed pilot testing is also attached. Figure 1 illustrates the typical AS pilot testing schematic.

Proposed pilot testing will be implemented in the following three phases:

1) The first phase of proposed MPE pilot testing (without application of AS) will establish the baseline vapor MPE well radius of influence, and intrinsic permeability of the unsaturated zone. During this phase, data will be collected as described in the earlier-referenced report of March 11, 2011.

2) The second limited AS phase of the test will be conducted with the sparging point operating at variable sparge pressures (e.g., 5 pounds per square inch-gauge [psig], 10 psig). The saturated zone requires pressures greater than the static water pressure (1 psi for every 2.3 ft of hydraulic head), and the head necessary to overcome capillary forces of the water in the soil pores near the injection point. A typical system will operate at approximately 10 to 15 psig, increased gradually as pertinent measurements are taken. The required baseline pressure during the pilot test will be equal to or just above the value necessary to overcome the sparging depth. The impact of any additional required pressure will be evaluated carefully in incremental steps, because excessive pressures may fracture the soils around the point of injection. It is essential that vapor equilibrium be obtained prior to changing the sparge rate or depth. During this phase of the test, data will be collected utilizing the following: monitoring point pressure gauge, compressor discharge flow gauge, photoionization detector (PID) readings at monitoring well, depth to water meter, and dissolved oxygen (DO) and CO_2 (in groundwater) probes at monitoring wells. Because isolated AS operation is not anticipated to last for an extended time period, monitoring readings pertaining to AS pilot testing will be taken every 30 minutes to an hour at minimum throughout AS operation (without MPE). Parameters will also be re-measured when operational changes are made. Parameters will also be recorded prior to MPE operation to document baseline site conditions (DO, CO_2, depth to water, etc.) No vapor sampling is anticipated during this phase of pilot testing, all parameters will be field collected.

3) The final phase of the pilot test will be the concurrent operation of the MPE pilot system and the AS system. During this test, the hydraulic gradient and volatile organic compound (VOC) concentrations in soil vapors extracted will be monitored until equilibrium is reached. The sparging air flow rate required to provide sufficient flow to enhance mass transfer is site-specific and will be determined via the pilot test. Typical air flow rates range from 1 to 25 standard cubic feet per minute (scfm) per injection well. This stage of the test will determine the optimum MPE system configuration (i.e., quantity and orientation

of wells) that will capture the sparged VOCs for various sparging rates. In addition, this stage of the test requires monitoring of VOC emissions, sparging pressure and flow rates, MPE vacuum and flow rates, monitoring well vapor concentrations, and dissolved constituent concentrations. During this test stage, combined MPE and AS data will be collected. Readings pertaining to AS pilot test will be taken daily at minimum, throughout the pilot test, in order to generate data of sufficient quality and quantity; sparge pressures and flow will be monitored periodically and readings pertaining to AS and MPE operation (vapor sampling for laboratory analysis, etc.) will coincide when feasible. If tracer gas is used (described below), its concentrations prior to and during pilot testing (in vapor stream) will be analyzed along with O_2, CO_2, N_2, CH_4 and VOC concentrations.

Since AS sometimes poses a risk of forcing contaminant vapors into utility conduits, buildings, and sewer lines (which may represent health risks or explosion hazards), no extended stand-alone (without MPE operation) AS testing will be performed at this time, the stand-alone AS will be limited to a few hours (½-day maximum). Potential areas of vapor accumulation were identified as former UST excavation areas, which were backfilled with drain rock up to 7 feet below ground surface (bgs), followed by 2 feet of native soil backfill and 2.5 feet of imported sandy fill and aggregate base to below concrete. The waste oil UST pit was partially backfilled with clean stockpiled gravel that was removed from the UST excavation, and backfilled to grade with imported materials. The proposed AS wells are located upgradient between approximately 10 and 13 feet from their respective extraction wells, and approximately 18 to 20 feet from the site building. OB-2 is located between approximately 7 and 9 feet from the former UST excavation areas.

Field logs summarizing all the collected data and name plate information from blower, pumps, and other equipment used during this AS testing, will be made part of the final report (sample field logs attached). It should be noted that because MPE and AS will be field tested, pilot testing duration is anticipated to be 7 to 10 days.

SOMA proposes evaluating the following engineering parameters during the proposed AS pilot test:

- Injection air pressure (vacuum)
- Injection flow rate (air/vapor)
- Mass removal efficiency
- Zone of influence

Injection Air Pressure:
Injection air pressure is significantly influenced by the depth of injection and the subsurface geology. The required baseline pressure during the pilot test will be equal to or just above the value necessary to overcome the sparging depth. The impact of any

additional required pressure will be evaluated carefully in incremental steps, because excessive pressures may fracture soils around the point of injection.

Injection Flow Rate:
The injection flow rate will need to provide an adequate percentage of air saturation within the zone of air distribution. The greater the sparging depth, the higher will be the flow rate necessary to achieve the air saturation. During concurrent operation of MPE and AS, the injection flow rate will coincide with the ability to recover the stripped contaminant vapors. At minimum, the airflow rate will be sufficient to promote significant volatilization rates and/or maintain dissolved oxygen levels greater than 2 mg/L.

Mass Removal Efficiency:
The mass removal efficiency will be measured by the net increase in contaminant levels in the effluent of the MPE system after initiation of the AS system. To evaluate the net increase in contaminant levels in the effluent, the field test will be conducted as a sequential test in phases. The MPE test will be performed until the extracted air reaches steady state conditions, and mass removal rates are established. An increase in the contaminant level during the concurrent MPE/AS operation, along with the duration of this anticipated spike would indicate the mass removal efficiency increase due to AS. The MPE/AS phase of the test will continue until stabilization in the effluent air stream is observed. Once stabilization is observed, the effect of pulsed sparging (during MPE/AS) on mass removal rates will be evaluated (Suthersan, 1999). Pulsed sparging should enhance the mass removal efficiency (due to created nonsteady-state conditions and enhanced groundwater mixing), and will likely involve one of two possible scenarios: 90 minutes of injection followed by 90 minutes of no injection, or 30 minutes of injection followed by 60 minutes of no injection. Groundwater level fluctuations during continuous and pulse sparging (mounding during injection and collapse after injection) will be closely monitored.

Zone of Influence:
Several options are available for evaluating the sparge zone of influence (ZOI) during AS pilot testing. ZOI is defined as the greatest distance from a sparging well at which sufficient sparge pressure and airflow can be induced to enhance the mass transfer of contaminants from the dissolved phase to the vapor phase. The ZOI of AS reaches roughly a conical shape during the steady state phase. The depth of injection will influence the injection pressure and the flow rate. The deeper the injection point is located, the greater the ZOI. Thus, more air will be required to provide a reasonable percentage of air saturation within the ZOI. Accordingly, sparging points will be positioned at the bottom of each AS sparge well. Wells that will be utilized during AS (OB-1 and OB-2) will have longer than desired well screens; to overcome this constraint, a jetting tool that will allow a depth-discrete air injection will be utilized. Figure 2, attached to this letter shows locations of proposed MPE and observation/AS wells. Because site groundwater contamination is mainly limited to the two hot spot areas in the southern area of the site (Figure 2), no other areas of the site will be

assessed for ZOI during this proposed AS pilot testing. Proposed AS wells are located upgradient between approximately 10 and 13 feet from their respective extraction wells.

ZOI data can help determine the quantity and spacing of any future sparging wells. Generally, ZOI can range from 5 feet for fine-grained soils to 100 feet for coarse-grained soils. At this site, it is anticipated that the effective ZOI is likely to be no more than 10 to 15 feet. Although due to composition of Shallow WBZ, this ZOI may be smaller.

Conventional pilot tests typically monitor changes in below values when evaluating ZOI:

- water levels in wells
- soil gas pressures
- DO levels
- presence and capture of tracer gases
- contaminant concentrations in soil gas

The following list outlines some options for evaluating AS effectiveness and sparge radius during pilot testing:

1. *Groundwater mounding:* The vertical component will cause a local rise in the water table, sometimes called water table mounding; it represents the amount of water displaced by injected air. Although mounding is also considered a design concern because it represents a driving force for lateral movement of groundwater and dissolved contaminants, and can therefore lead to spreading of the plume, it could be utilized during pilot testing to determine the AS ZOI. If AS is found to be effective at the site, pulsing sparging may be implemented to minimize the influence of air injection on migration and spreading of the contaminant plume. The magnitude of mounding depends on site conditions and the location of the observation wells relative to the sparge well. Mounding can vary from a negligible amount to several feet in magnitude. Observation of nearby monitoring wells (during non-MPE phase) will show any changes in groundwater elevations during AS testing implementation.

2. *Change in pressure:* This technique involves measuring any increase in the soil gas pressure above the water table due to escape of the injected air into the vadose zone. A differential pressure gauge will be used to obtain these data. However, it should be noted that the escaped air mayquickly equilibrate in the vadose zone, and may spread over a larger area than the zone of air distribution in the vadose zone.

3. *Measurement of the increase in DO levels and redox potentials:* Pre-pilot test measurements of above parameters will be compared to those obtained during AS testing to determine the ZOI. Once the AS reaches a well, DO levels will begin to increase at that radius. These parameters will be measured in monitoring wells using in situ field probes, since oxygen transfer could take place during sample collection and handling, which may skew analysis results. It

should be noted that increases in DO levels in the groundwater due to diffusion-limited transport of oxygen will be noticeable only during a long-term pilot study. In most cases, increased DO levels observed during short-duration pilot tests are due to air channels directly entering monitoring wells, rather than to overall changes in DO levels in the aquifer.

4. *Tracer gases:* This technology utilizes injection of helium gas as a tracer along with injected air. The baseline monitoring of the tracer gas concentration in observation well will be performed while the MPE system is off, to be compared to the tracer gas concentrations during the sparging/MPE stage (Figure 1 shows the typical tracer gas location on AS schematic during pilot testing). Sampling will be conducted using vacuum sampling pump at each monitoring point. This technique will also provide information on vapor flow paths and vapor recovery efficiencies during AS.

5. *Vapor concentration changes:* This parameter will be evaluated by comparing vapor concentrations obtained during MPE operation alone to those obtained during the MPE/AS combined operation.

Other methods exist that aid in determining ZOI during sparging; however, since availability, cost, and budget limitations influence pilot testing design, these methods were not considered to be cost-effective options for this site. Above parameters 1 thorough 5 are indicators of AS feasibility and performance and could be used in designing a full-scale system, if such is warranted by testing results. Therefore, it is suggested that as many parameters as possible be collected and compared to provide valuable insight on site-specific applicability of AS as a remediation technique. At minimum, existing site wells will be used to monitor both dissolved- and vapor-phase migration, to monitor for changes in DO, pressure changes, and to measure changes in the depth to the groundwater table surface, with an option for tracer gas injection during AS.

Please do not hesitate to call me at (925) 734-6400 if you have any questions or comments.

Sincerely,

REGISTERED PROFESSIONAL ENGINEER
MANSOUR SEPEHR
No. C042928
Exp. 3-31-12
CIVIL
STATE OF CALIFORNIA

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

cc: Mirazim Shakoori, Claimant

Attachments:
- Laboratory Analytical Report
- Table 1: AS Monitoring Parameters and Collection Methods
- Figure 1: Typical AS Pilot Test Schematic
- Figure 2: Map of Locations of Proposed Observation and Injection Points
- List of Typical AS Monitoring and Control Equipment
- Sample Field Logs

References:

Suthersan, S.S. "In Situ Air Sparging" *Remediation engineering: design concepts* Ed. Suthan S. Suthersan Boca Raton: CRC Press LLC, 1999.

United States Environmental Protection Agency. EPA 510-R-04-002 "How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers." May 2004.

PERJURY STATEMENT

Site Location: 3519 Castro Valley Boulevard, Castro Valley, CA

"I declare under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge".

Mirazim Shakoori
4313 Mansfield Drive
Danville, California 94506
Responsible Party

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 228030
ANALYTICAL REPORT

SOMA Environmental Engineering Inc.	Project : 2764
6620 Owens Dr.	Location : 3519 Castro Valley Blvd, Castro Valle
Pleasanton, CA 94588	Level : II

Sample ID	Lab ID
SOMA-7	228030-001

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: ______________________ Date: 05/18/2011
Project Manager

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**228030**
Client:	**SOMA Environmental Engineering Inc.**
Project:	**2764**
Location:	**3519 Castro Valley Blvd, Castro Valle**
Request Date:	**05/17/11**
Samples Received:	**05/17/11**

This data package contains sample and QC results for one water sample, requested for the above referenced project on 05/17/11. The sample was received cold and intact.

Metals (EPA 6010B):
No analytical problems were encountered.

CHAIN OF CUSTODY

Page 1 of 1

Curtis & Tompkins, Ltd
Analytical Laboratory Since 1878
2323 Fifth Street
Berkeley, CA 94710
(510)486-0900 Phone
(510)486-0532 Fax

LOGIN # ~~22783~~ 228030 VQ

Sampler: Lizzie Hightower

Project No: 2764

Report To: Joyce Bobek

Project Name: 3519 Castro Valley Blvd, Castro Valley

Company : SOMA Environmental

Turnaround Time: 24 Hour

Telephone: 925-734-6400

Fax: 925-734-6401

Analyses

Lab No.	Sample ID.	Sampling Date	Time	Matrix: Soil	Matrix: Water	Matrix: Waste		# of Containers	Preservative: HCL	Preservative: H_2SO_4	Preservative: HNO_3	Preservative: ICE		Total Dissolved Iron
	SOMA-7	5/17/11	2:50pm		*			500 mL Poly			*	*		*

Notes: **EDF OUTPUT REQUIRED**
Sample was field filtered

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
E. Hightower (signature)	5/17/11 15:30	Pat [signature]	5/17/11 1530

3 of 7

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

228030 VR

Login # ~~227830~~ Date Received 5/17/11 Number of coolers 1

Client SOMA Environmental Project 3519 Castro Valley Blvd, Castro Valley

Date Opened 5/17/11 By (print) Victoria Qureshi (sign) [signature]

Date Logged in ↓ By (print) ↓ (sign) ↓

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)

   Shipping info

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO

   How many Name Date

2B. Were custody seals intact upon arrival? YES NO (N/A)

3. Were custody papers dry and intact when received? (YES) NO

4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO

5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO

6. Indicate the packing in cooler: (if other, describe)

   ☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☒ None

   ☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation:

   Type of ice used: ☐ Wet ☐ Blue/Gel ☒ None Temp(°C)

   ☐ Samples Received on ice & cold without a temperature blank

   ☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)

   If YES, what time were they transferred to freezer?

9. Did all bottles arrive unbroken/unopened? (YES) NO

10. Are samples in the appropriate containers for indicated tests? (YES) NO

11. Are sample labels present, in good condition and complete? (YES) NO

12. Do the sample labels agree with custody papers? (YES) NO

13. Was sufficient amount of sample sent for tests requested? (YES) NO

14. Are the samples appropriately preserved? (YES) NO N/A

15. Did you check preservatives for all bottles for each sample? (YES) NO N/A

16. Did you document your preservative check (YES) NO N/A

17. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)

18. Was the client contacted concerning this sample delivery? YES (NO)

   If YES, Who was called? By Date:

COMMENTS

Curtis & Tompkins Sample Preservation for 228030

Sample	pH: <2	>12	Other
-001a	[X]	[ ]	______

Analyst: VQ
Date: 5/17/11

Curtis & Tompkins, Ltd.

Dissolved Iron

Lab #:	228030	Location:	3519 Castro Valley Blvd, Castro Valle
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 3010A
Project#:	2764	Analysis:	EPA 6010B
Analyte:	Iron	Batch#:	174889
Field ID:	SOMA-7	Sampled:	05/17/11
Matrix:	Filtrate	Received:	05/17/11
Units:	ug/L	Prepared:	05/18/11
Diln Fac:	1.000	Analyzed:	05/18/11

Type	Lab ID	Result	RL
SAMPLE	228030-001	3,700	100
BLANK	QC592177	ND	100

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Iron

Lab #:	228030	Location:	3519 Castro Valley Blvd, Castro Valle
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 3010A
Project#:	2764	Analysis:	EPA 6010B

Analyte:	Iron	Batch#:	174889
Field ID:	SOMA-7	Sampled:	05/17/11
MSS Lab ID:	228030-001	Received:	05/17/11
Matrix:	Filtrate	Prepared:	05/18/11
Units:	ug/L	Analyzed:	05/18/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC592178		1,000	1,009	101	74-120		
BSD	QC592179		1,000	1,046	105	74-120	4	20
MS	QC592180	3,651	1,000	4,673	102	62-125		
MSD	QC592181		1,000	4,791	114	62-125	2	29

RPD= Relative Percent Difference

Table 1

AS Monitoring Parameters and Collection Methods
3519 Castro Valley Blvd., Castro Valley

Parameter	Collection Method
Groundwater quality improvement	Obtaining periodic groundwater samples from monitoring wells after shutting down air injection
Dissolved oxygen levels/temperature	Field probes in the monitoring wells after shutting down air injection (flow cell to minimize volatilization and aeration)
Redox potential/pH	Field probes in the monitoring wells after shutting down air injection
Biodegradation byproducts such as CO2	Groundwater samples obtained with a flow-through cell
Soil gas concentrations	FID, or PID, or laboratory air samples
Soil gas pressure/vacuum	Pressure/vacuum gauge or manometer
Groundwater level	Water level meter
Injection well pressure	Pressure gauge or manometer
Soil vapor extraction well vacuum	Vacuum gauge or manometer
Injection well flow rate	Airflow meters
Soil vapor extraction flow rate	Airflow meters
Extraction vapor concentrations	FID, PID, explosimeter, field GC, or laboratory air samples
O2, CO2, N2, CH4 Concentrations	Laboratory analysis
Pulsing frequency	Timer

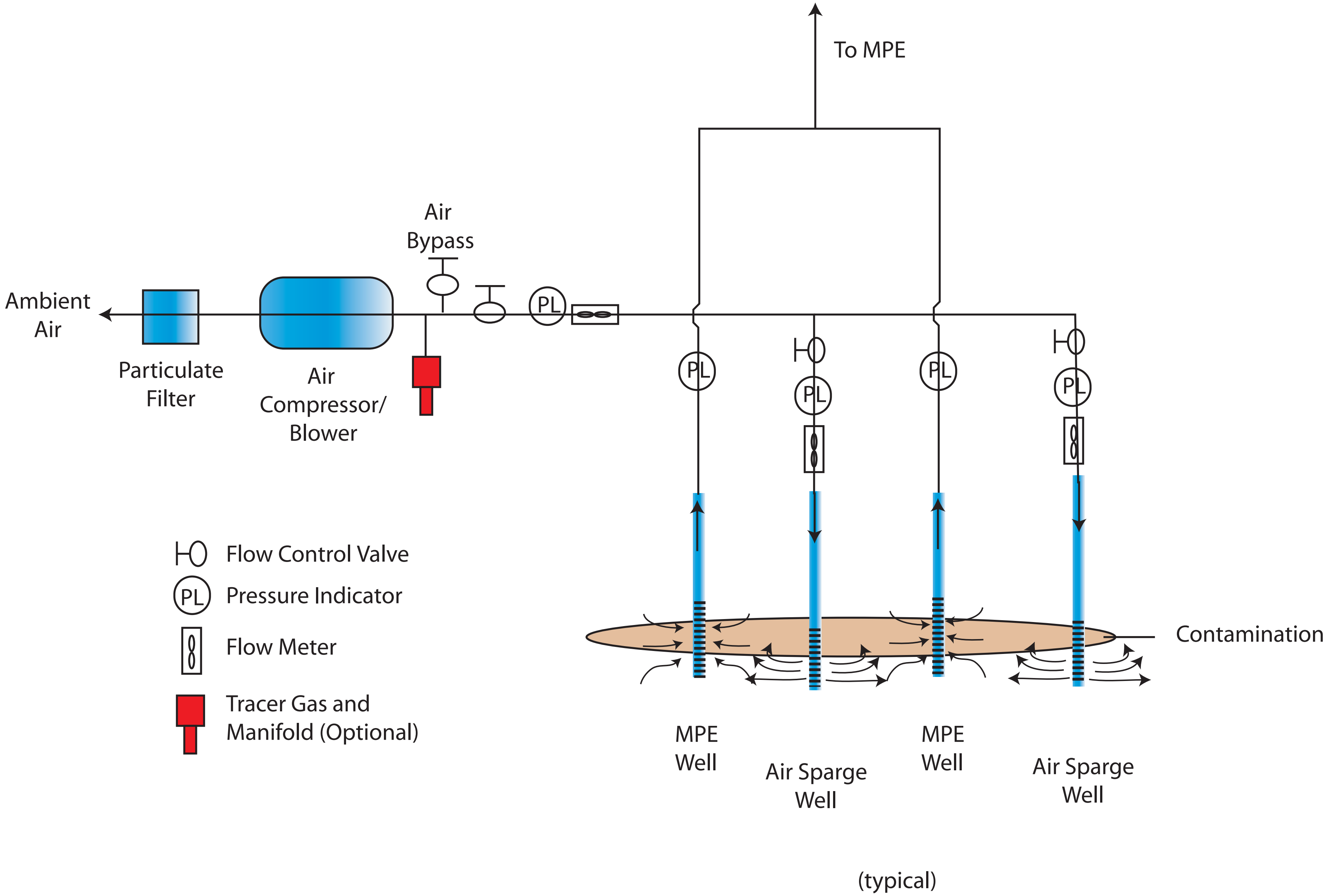
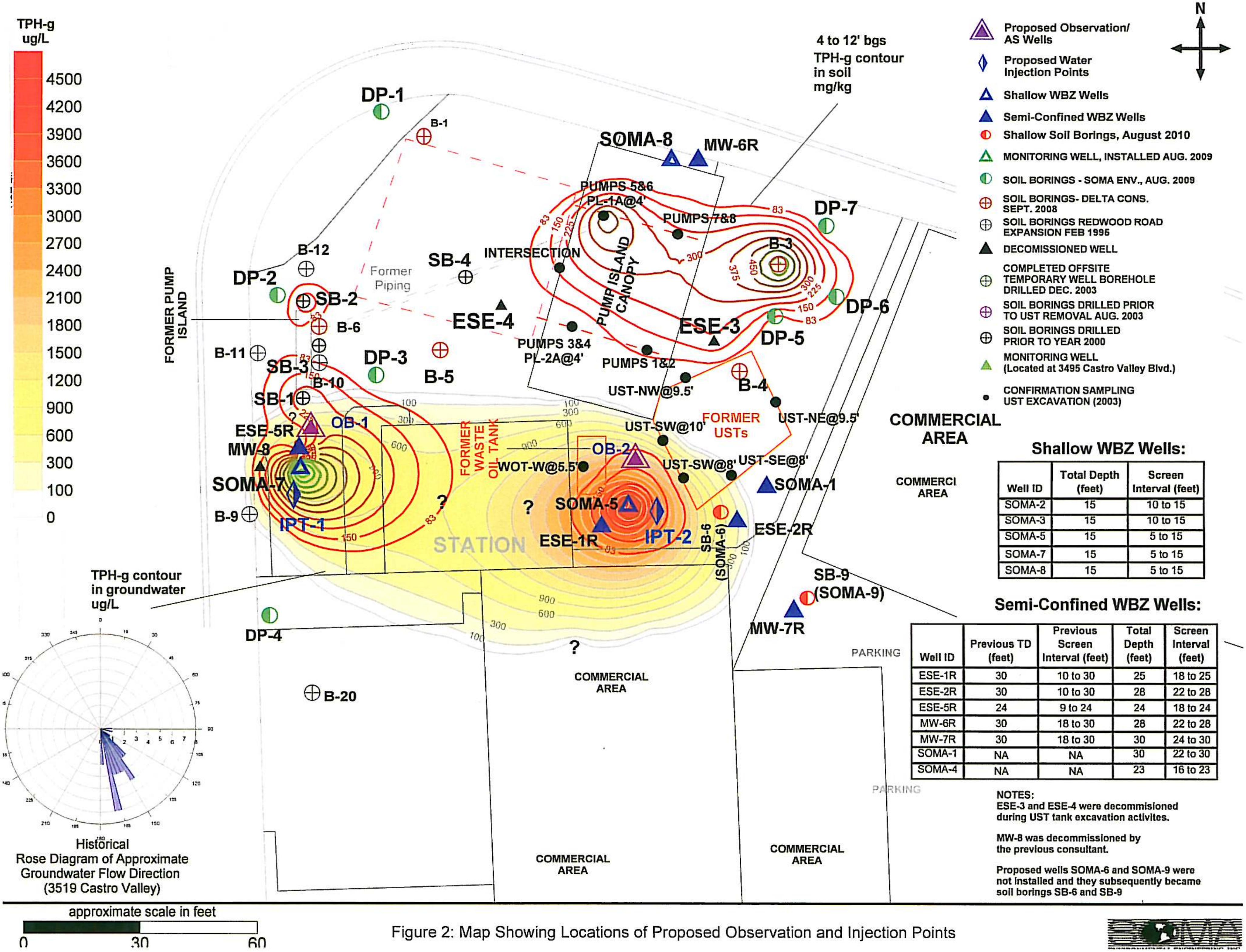


Figure 1: Typical Air Sparging Pilot Test Schematic

SOMA ENVIRONMENTAL ENGINEERING, INC.



Shallow WBZ Wells:

Well ID	Total Depth (feet)	Screen Interval (feet)
SOMA-2	15	10 to 15
SOMA-3	15	10 to 15
SOMA-5	15	5 to 15
SOMA-7	15	5 to 15
SOMA-8	15	5 to 15

Semi-Confined WBZ Wells:

Well ID	Previous TD (feet)	Previous Screen Interval (feet)	Total Depth (feet)	Screen Interval (feet)
ESE-1R	30	10 to 30	25	18 to 25
ESE-2R	30	10 to 30	28	22 to 28
ESE-5R	24	9 to 24	24	18 to 24
MW-6R	30	18 to 30	28	22 to 28
MW-7R	30	18 to 30	30	24 to 30
SOMA-1	NA	NA	30	22 to 30
SOMA-4	NA	NA	23	16 to 23

NOTES:
ESE-3 and ESE-4 were decommisioned during UST tank excavation activites.

MW-8 was decommissioned by the previous consultant.

Proposed wells SOMA-6 and SOMA-9 were not installed and they subsequently became soil borings SB-6 and SB-9

Figure 2: Map Showing Locations of Proposed Observation and Injection Points

TYPICAL
Air Sparge

Monitoring And Control Equipment

Monitoring Equipment	Location In System	Example Of Equipment
Flow meter	❍ At each injection and vapor extraction well head ❍ Manifold to blower ❍ Stack discharge	❍ Pitot tube ❍ In-line rotameter ❍ Orifice plate ❍ Venturi or flow tube
Pressure gauge	❍ At each injection and vapor extraction well head or manifold branch ❍ Before blower (before and after filters) ❍ Before and after vapor treatment	❍ Manometer ❍ Magnehelic gauge ❍ Vacuum gauge
Vapor or air sparge temperature sensor	❍ Manifold to blower ❍ Blower or compressor discharge (prior to vapor treatment)	❍ Bi-metal dial-type thermometer ❍ Thermocouple
Sampling port	❍ At each vapor extraction well head or manifold branch ❍ Manifold to blower ❍ Blower discharge	❍ Hose barb ❍ Septa fitting
Control Equipment		
Flow control valves/ regulators	❍ At each vapor extraction well head or manifold branch ❍ Dilution or bleed valve at manifold to blower ❍ At header to each sparge point	❍ Ball valve ❍ Gate valve ❍ Dilution/ambient air bleed valve ❍ Gate valve ❍ Dilution/ambient air bleed valve

Source: How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites. A Guide for Corrective Action Plan Reviewers, EPA May 2004

SAMPLE

AIR INJECTION POINT DATA

Air injection point #

Static Data

Screened interval (feet) to

Static Water Level (to 0.1 feet) date time

Dissolved oxygen (mg/l) date time

Test Data

Time Test Started:

Time	Air Flow Rate (Standard Cubic Feet per minute)	Pressure at Well-Head (inches H_2O)	Water Level* (to 0.1 ft.)

Attach additional sheets if necessary

SAMPLE

MONITORING POINT DATA

Monitoring point number
(Complete one table for each monitoring point)

Monitoring points may be monitoring wells or specially installed monitoring points.

Static Data

Screened interval (feet) to
Distance from injection point (feet)
Static water level (to 0.1 feet) date time
Dissolved oxygen (mg/l) date time method
Field screening measurement at well head (ppm) date time
Field instrument used (circle one): FID PID
Static pressure (inches H_2O) date time

Test Data

Time test started:

Time	Dissolved O_2 (mg/l)	Water Level (to 0.1 ft.)	Pressure (in. H_2O)	FID/PID	Notes	Visual Observations

Attach additional sheets if necessary.