CITY OF RICHMOND

Pt. Molate Community Advisory Committee

Monday, August 20, 2012 6:30 PM

Multi-Purpose Room, 440 Civic Center Plaza

Members:

Bruce Beyaert
Vice-Chair

Otheree Christian

Joan Garrett
Chair

Dorothy Gilbert

Toni Hanna

Jim Hite

Jeanne Kortz

Eduardo Martinez

Steven Rosing

Rod Satre

Charles T. Smith

Nina G. Smith

Pam Stello

Mary H. Sundance

Eileen Whitty

AGENDA

1. **Call to Order** (1 min.)

2. **Roll Call** (1 min.)

3. **Welcome and Meeting Procedures** (1 min.)

Individuals who would like to address the committee on matters not listed on the agenda may do so under Open Forum. Please file a speaker's card with the note taker prior to the commencement of Open Forum. Individuals who want to comment on an individual item, please file a speaker's card before the item is called. The standard amount of time for each speaker will be three minutes.

At 8:30 PM, any items remaining on the agenda that require immediate attention may be taken out of turn, as necessary. All other items will be continued to another or the following committee meeting in order to make fair and attentive decisions. This meeting adjourns at 9:00 PM. The meeting may be extended by a majority vote of the committee.

4. **Agenda Review and Adoption** (2 min.)
   The order in which items will be heard may be adjusted at this time. In addition, items may be removed from or placed on the Consent Calendar at this time.

5. **Announcements through the Chair** (5 min.)
   a. Baykeeper Announcement
   b. Auto-resignation – Joe Puleo

6. **Open Forum** (3 minutes per person limit)

7. **Presentations, Discussion & Action Items** (20 min.)
   a. Update on Site 3 FS/RAP and Evaluation of Thermal Desorption – Beyaert (5 min.)
   b. Cosco-Busan Fund Status – Murray (15 min.)

8. **Staff Reports** (5 min.)
   Following discussion of each item, the Committee may vote to make recommendations to staff or to the City Council.
   a. Committee Log for PMCAC inquiries to staff, contractors – Murray (5 min.)

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9. Consent Calendar (2 min.)

Items on the consent calendar are considered matters requiring little or no discussion and will be acted upon in one motion

a. APPROVE - PMCAC meeting minutes of July 16, 2012

10. Future Agenda Items (5 min.)

11. City Council Liaison Reports (10 min.)

a. Report by Councilmember/Mayor McLaughlin regarding recent issues in Richmond relevant to the Advisory Committee. – Jeff Shoji (5 min.)

b. PMCAC appointment status. – Jeff Shoji (5 min.)

12. Chair and Sub-Committee Reports (45 min.)

Following discussion of each item, the Committee may vote to make recommendations to staff or to the City Council.

a. Clean-Up and Restoration (30 min.)

1. Review July, 2012 Terraphase Monthly Remediation Report
2. Summary of August 3 Semi-Annual Wet Season Groundwater Monitoring Report
3. Summary of August 8 Well Abandonment Work Plan
4. Summary of August 13 Soil Gas Survey Data for Site 3

b. Outreach Sub-committee (10 min.)

c. Grant Development Sub-committee (5 min.)

13. Adjournment

Scheduled Meetings:

Committee Meeting, September 17, 2012 6:30pm

This meeting is held in a building that is accessible to people with disabilities. Persons with disabilities, who require auxiliary aids of services using city facilities, services or programs or would like information of the city's compliance with the American Disabilities Act (ADA) of 1990, contact: Rochelle Monk, City of Richmond (510) 620-6511 (voice).

Pt. Molate Community Advisory Committee Staff Liaison Contact: Craig K. Murray (510) 307-8140, craig_murray@ci.richmond.ca.us. Agenda and minute information on the PMCAC can be found on the City Clerk's web location: http://ca-richmond2.civicplus.com/index.aspx?NID=2442

PMCAC Repository Information is available at: https://docs.google.com/open?id=0B9WXrZeb-_72MzVkZWQ1ZDQtNWIwNC00ZjE4LTgxYjctOTQyMDk4Y2FjNDYw

Craig Murray

From: Bruce Beyaert [pointsanpablo@earthlink.net]
Sent: Wednesday, August 15, 2012 4:02 PM
To: joan@vbsi.com
Cc: Craig Murray
Subject: PMCAC agenda packet: Volunteer with Baykeeper This Fall
Attachments: BaykeeperPtMolateCleanup081512.pdf; ATT20114.htm

Craig,
Please put the attached in agenda packet for Monday PMCAC the item at http://baykeeper.org/blog/removing-toxic-debris-point-molate on Baykeeper Pt. Molate cleanup, so that I may announce and refer to it. Thanks!
Bruce

Bruce Beyaert
pointsanpablo@earthlink.net
phone/fax 510-235-2835

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Removing Toxic Debris from Point Molate

POSTED AUGUST 1, 2012 BY IAN WREN
http://baykeeper.org/blog/removing-toxic-debris-point-molate

With help from volunteers, Baykeeper will soon begin a new project to remove up to 125 tons of toxic debris polluting the San Francisco Bay shoreline and waters around Point Molate in Richmond.

The debris includes hundreds of pilings contaminated with creosote, a cancer-causing wood preservative that poses a threat to both wildlife and people. Also slated to be removed are trash and parts of a derelict pier that have floated ashore.

In late September through mid-October, Baykeeper and volunteers will remove all debris that can be taken out by hand. Heavy machinery will be used to haul away the rest.

Removal of the pilings will result in the safe disposal of toxic creosote. In addition, the project will restore shoreline habitat for the benefit of wildlife and people, and improve sub-tidal habitat for eelgrass and other sensitive species that have been disturbed by the ongoing pollution.

We hope the debris removal will make the beach safer and cleaner, and also help facilitate the re-opening of a former city park at Point Molate. In 2001 the city of Richmond was forced to close the park due to lack of funds for basic maintenance and cleanup. Baykeeper is working with Richmond officials and Citizens for a Sustainable Point Molate to ensure the project is consistent with the community's vision for the area.

Baykeeper is able to take on the debris removal with a grant we were recently awarded from the National Oceanic and Atmospheric Administration (NOAA).

To accomplish this cleanup, Baykeeper is partnering with the Coalition for a Sustainable Point Molate and other Richmond volunteers. We can use help from volunteers who can lift at least 40 pounds. If you're interested, please contact Ian Wren, (ian@baykeeper.org).

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<AGENDA Pt Molate CAC August 20 2012.doc>
From: "Kirk Shellum" <kirk@nerglobal.com>
Date: July 24, 2012 7:18:12 AM PDT
To: "'Bruce Beyaert'" <pointsanpablo@earthlink.net>
Cc: "Nick Platts" <nick@nerglobal.com>, <dn@nerglobal.com>, <warren@nerglobal.com>
Subject: RE: Thermal Desorption Point Molate

Good Morning Bruce:

The following discussion will provide you with a good idea of how we can remediate weathered bunker fuel within our thermal treatment unit at temperatures that appear lower than boiling points of certain constituents.

When we started in thermal treatment we expected the same issue you have eluded to. As we moved into flare pit treatment, but after some experience realized we were reaching each end of the gas chromatograph range, rather than just extracting light ends and leaving heavy ends. As we were pondering this, a petroleum engineer commented this is the same as a frac tower. The organic matrix more or less goes to vapour in a single body, and separation only occurs on the condensation cool-down side of process.

True, as the GC hump moves to the right and peaks higher, a higher temperature is needed, but the stainless kiln employed handles the necessary temperature to achieve extraction of the majority of contaminant even in the broad spectrum of organics left at old crude oil production facilities. If the contaminant matrix were only C60+ compounds, the issue would require incineration at a certain point in order to achieve thermal destruction, but that is not the case with the broad spectrum present. As a note, the GC hump of residual contaminant will mirror the GC hump in the pre-process data, but the overall GC line will be lower from one end to the other with extraction occurring across the spectrum.

Also, the peak soil temperature occurs prior to discharge. By the time the soil flows through the outlet where the first measurement is possible, it is past it's high point in the system that occurs while the soil is still subject to the radiant heat in the combustion zone. The discharge temperatures NER works at are ones developed from the experience of routinely processing contaminants with much of the spectrum in the C60+ range, in most cases there have been compounds with individual boiling points considerably higher than the measured discharge temperature, but extraction still occurs via vaporization as a single body.

It is also for these reasons that a mid-stream baghouse can be an issue with condensation issues when processing high-boiling point compounds. It is for this reason we recommend the hot plant configuration TDU with baghouse post-oxidizer to avoid baghouse condensation issues.

Attached, please find a letter written by Nicholas Platts, Ph.D. Environmental Chemist & Scientific Advisor on staff at NER. His letter will describe in detail the answers to your questions.

Let me thank you in advance for your attention to this information. We look forward to an opportunity to provide a bid on the upcoming project. If you have any questions or concerns, please contact me directly.

Kirk Shellum
President NER, USA
Nelson Environmental Remediation USA, Ltd.
"Clean Dirt, No Doubt!"
(612) 869 – 1636, Office
(612) 325 – 0079, Mobile
kirk@nerglobal.com
www.nerglobal.com

7A 1

From: Bruce Beyaert [mailto:pointsanpablo@earthlink.net]
Sent: Thursday, July 19, 2012 11:44 PM
To: Kirk Shellum
Cc: Joan Garrett; Rod Satre; Bill Carson; Craig Murray
Subject: Thermal Desorption

Kirk,

Thanks very much for phoning today to follow up on NER's presentation during the June 18 meeting of the Point Molate Community Advisory Committee (PMCAC). The committee greatly appreciated Mr. Nelson's presentation and followed up with the attached letter to the City Manager and others recommending careful evaluation of mobile thermal desorption economics, permitting, etc. as offering considerable promise for substantially reducing Site 3 cleanup costs.

A concern was raised during the July 16 PMCAC meeting as to the termperature levels that the NER mobile thermal desorption unit is capable of, and whether or not they are adequate to desorb highly weathered bunker fuel for subsequent oxidation. The attached TDU tech spec. sheet from NER's web site indicates that the first stage direct fired rotary drum thermal extraction unit operates ***up to*** only 900 F. This seems inadequate to me as a chemical engineer experienced in planning and design of petroleum refineries. After distilling off heavy gas oil for cracking, "fresh" bunker fuel contains residuum boiling ***well above*** 1,000 to 1,050 F.

This issue bears on the allowed concentration of contaminants of concern remaining on soil put back in the ground after treatment. The RWQCB draft **TECHNICAL REFERENCE DOCUMENT** at http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/groundwater/reuse_guidance-oct06.pdf recommends less than 100 mg TPH/Kg soil for gasoline and middle distillate contaminated soil. This guidance is not intended to address reuse of soils impacted with other common types of heavy petroleum products/wastes which may contain significant amounts of polynuclear aromatic hydrocarbons — stating that evaluation of soil impacted with heavy petroleum hydrocarbons or other contaminants for reuse should be based on a more complete assessment of potential constituents and exposure concerns. This introduces considerable uncertainty regarding use of mobile thermal desorption and indicates the need for a significant negotiation on the required level of TPHs that NER would have to produce so that the treated soil could actually put back in the ground.

It would be very helpful to have NER's thoughts on the issues raised above, i.e. the ability of your technology to desorb TPHs to soil concentration levels acceptable to the RWQCB.

Meanwhile, I understand that Terraphase will be working with the RWQCB to reach agreement on the volumes of soil to be excavated and to be treated at Site 3. This is an essential precursor to completing the required Feasibility Study (FS). Bill Carson has agreed that thermal desorption should be fully evaluated in the FS, including the the issues raised above, ancillary environmental issues, permitting changes, etc.

Bruce

Bruce Beyaert, PMCAC Vice Chair
pointsanpablo@earthlink.net
phone/fax 510-235-2835

7A2

Clean Dirt,
No Doubt!

Nelson Environmental
Remediation Ltd.

July 23, 2012

Mr. Bruce Beyaert, (Vice Chair)
PMCAC

Re: Point Molate Thermal Treatment &Temperature Ranges Adequate to Desorb Highly-Weathered Bunker Fuel.

Dear Mr. Beyaert,

Thank you for your e-mail of July 19th.

Following NER's presentation (June 18th) to the Point Molate Community Advisory Committee (PMCAC), and with the Committee having sent a letter to the City Manager and others recommending careful evaluation of mobile thermal desorption economics, permitting, *etc.*, as likely offering considerable promise for substantially reducing Site 3 cleanup costs, NER understands that a concern was raised during last week's (July 16th) PMCAC meeting regarding the temperature levels that the mobile thermal desorption unit (TDU) is ordinarily operated at; NER understands that the question being asked is whether the customary operational temperature range would be adequate to desorb highly-weathered bunker fuel for subsequent thermal oxidation, given that the first stage direct-fired rotary drum thermal desorption unit typically operates up to *ca.* 900 °F (*ca.* 500 °C), whereas bunker fuel residua boil at temperatures in excess of 1,000 °F. NER is pleased to provide the following response (below) to this entirely reasonable and thoughtful question.

In general, if a soil's contaminated by chemical species which will volatilize essentially *en masse* on moderate heating (up to say around 650-950 °F, at ~1 atm), then the TD process can successfully address the client's environmental liabilities respecting the contaminants-of-concern, producing soil cleaned to well-below the appropriate and respective regulatory tiered criterion levels, and where this 'clean dirt' can then certainly go back into the finished (*i.e.*, analytically confirmed 'clean walls, clean floor') excavation, towards the site's ultimate reclamation. It's both interesting and important to note here that, appertaining to the successful treatment of PHC-contaminated soils by the TD method, the removal of PHCs (and other chemical compounds) with data-table boiling-points (customarily quoted as thermodynamic data for the pure compound, ordinarily at 1.0 atm) that are actually above the operating (soil-discharge) temperature setting chosen (*i.e.*, during the 'ramp-up' optimization that's routinely performed at the start of each job) for the TDU on each particular jobsite, that these compounds' removal is nonetheless ordinarily found to be achieved in practice, thanks to the phenomenon of molecular entrainment (which can profitably be thought of at least as a form of solvation) within the rapidly desorbing flux of lower boiling-point molecules (*i.e.*, those chemical species whose pure-compound thermodynamic boiling-points, at 1.0 atm, are indeed below the operating temperature actually settled upon for the particular job at hand); and where, also, it's important to note that the input soil's own moisture-content (*i.e.*, its % H_2O) plays an important role in this matter as well, in terms of the flux of rapidly volatilizing water molecules which can effectively be viewed analogously to the centuries-old chemical technique of steam-distillation (which has typically been employed for the non-destructive thermal extraction of natural products,

particularly essential oils, from plant materials). Again with special regard to heavy-end PHCs, it can also be appreciated that the petroleum industry's earliest (*ca.* 1936) commercial heterogeneous catalytic cracking of heavier PHC fractions routinely employed hot, dry, anoxic conditions, together with clay minerals as their first-generation inorganic heterogeneous cracking catalysts. Hot, dry, anoxic conditions, plus soil inorganics (frequently including clay and silt minerals, of course), certainly do exist inside the TDU, particularly at the proximal end of the rotary desorber drum, just prior to aqueous quenching and rapid post-treatment aerial oxidative exposure. Thus the chemical possibility of in-process heterogeneous catalytic cracking of heavy-end PHCs exists within the TDU, depending on the site-specific soil mineralogy, while straight dark-thermal (*i.e.,* non-catalytic) cracking of long-chain alkanes will also play a part in the degradative breakdown of heavy-end PHCs inside the TDU's main drum, particularly at the proximal end of the rotary desorption unit. Such degradation products (*i.e.,* the HC products of cracking, these being both saturated and unsaturated) would of course have volatilization temperatures lower than their uncracked PHC (generally saturated) parent molecules, and would thus be fully expected to more easily removed by TD.

Regarding the second question raised, that concerning polynuclear aromatic compounds (PNAs), NER can absolutely assure the Committee that the thermal desorption technique is quite capable of addressing soil remediation for each of the EPA's nominated polycyclic aromatic hydrocarbon (PAH) species; indeed, even our smallest TDU plant (*i.e.,* the RS-20 unit) has been able to achieve the tightest environmental regulatory criteria respecting PAHs in cleanup jobs involving crude oil.

Further, by way of trying to be helpful to the Committee and to the FS, NER is pleased to provide the following supplementary information for the Committee's interest and reference.

From an insurer's and other stakeholders' perspectives, it's generally true that only an *ex situ* method of site soil remediation can provide the absolute certainty at having actually seen, with one's own eyes, through open excavation, precisely where the plume's 'tendrils' have gone sub-surface, thus providing a satisfying assurance to all concerned (and particularly for the professional persons signing-off on the site's eventual reclamation certification) that the remedial job has in fact been completed.

From a sustainability perspective, once the job's finished and the TDU's demobilized from the site, the client/consultant can certainly take credit in front of the regulator and other interested parties (*e.g.,* landowners, farmers, *etc.*) for having saved the soil and by having thus acted responsibly towards preserving: (*i.*) the site's ecological mineral ion providences and availabilities (*i.e.,* the chemical speciations and ratios of site-native available inorganics); (*ii.*) the native inorganic pH-buffering capacity of the soil; and (*iii.*) the maintenance of local microbial growth surfaces (*i.e.,* the ecologically-appropriate mineral supports for site-native biofilm regeneration, and hence biological growth through restoration of the native microbiota and consortia upon (re)inoculation from the surroundings).

Performing thermal treatment at low to moderate temperatures ensures, of course, that in general there are no irreversible chemical changes being wrought upon the mineral components of the soil's inorganic base, since by not having had to expose the soil to typical incineration temperature levels, generally no irreversible metamorphic-type inorganic changes can occur.

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Ordinarily in TD soil treatment, there are two common reversible (*i.e.,* on a reasonable kinetic timeframe of days/weeks/months) inorganic/mineralogic chemical changes that can occur in-process: (*i.*) decarbonisations of carbonate minerals (*i.e.,* metal oxides produced through the entropically-driven loss of CO_2 as a volatile from thermally-excursioned parent metal carbonate salts); and (*ii.*) oxolations between condensation-proximate silanol and other M-OH groups (*i.e.,* bridging oxide ions produced through the entropically-driven loss of H_2O as a volatile during the thermal condensations of neighboring pendant hydroxy ligands).

For all of these reasons, the keeping of a soil on site (*i.e.,* rather than consigning it untreated to a landfill) is precisely what educated, ecologically-aware, and sustainability-minded persons and organizations are quite deliberately and rightly opting for these days, and the TD approach is thus popular among environmental consultants, companies, and regulators, based on its proven reliability to achieve the certainty of 'clean dirt' via low-temperature thermal desorption treatment (LTTD). Soil mineral bases are, of course, increasingly being conscionably appreciated as long-evolved resources that simply shouldn't be being allowed to be 'disposed of' for convenience's sake at a landfill if that soil could in fact be saved (for the sake of ecology / agriculture / forestry / future generations) by an economically-viable remediation strategy, such as TD.

We're certainly pleased to hear that Bill Carson has agreed that the technique of thermal desorption should be fully evaluated in the course of the present Feasibility Study, including the issues raised above, ancillary environmental issues, permitting changes, *etc.*

NER welcomes any further questions or concerns regarding our soil remediation technology, and we're confident in the ability of our technology to desorb TPHs and PAHs down to residual soil concentration levels that would be acceptable to the RWQCB.

Sincerely,

Electronic Transmission No Signature

Nicholas Platts, Ph.D.
Environmental Chemist & Scientific Advisor

C: Darryl Nelson (CEO)
File

7A5

Craig Murray

From: TRAC [tracbaytrail@earthlink.net]
Sent: Wednesday, August 01, 2012 10:57 AM
To: TRAC
Subject: Richmond Funds Bay Trail Gap Closures!

Friends of the Bay Trail in Richmond,

Last night the Richmond City Council voted unanimously to appropriate $489,000 from its Cosco Busan oil spill settlement funds to complete funding for closing two gaps in the Ferry Point Loop of the San Francisco Bay Trail. Profound thanks for the 78 supportive emails sent to the City Council by residents from throughout Richmond, as well as those residing in Albany, Berkeley, Oakland, El Sobrante, San Pablo and even San Francisco.

The Plunge Bay Trail gap received $254,000 while the gap between Shipyard 3 Trail and Brickyard Cove Rd. was awarded $235,000. The challenge of putting together the other $323,000 of funding for building these trail sections is illustrated by the diverse sources, i.e. ABAG Bay Trail Project Prop. 84 grant, East Bay Regional Park District Measure WW Local Grant, State Coastal Conservancy grant from BCDC in lieu public access for Eagle Rock Aggregates project, Point Richmond Gateway Foundation grant, and TRAC's Cox Conserves Hero Award from TV Channel 2.

Construction bids should be advertised shortly with trail opening celebrations this year for not only these two trails, but also closure of the gap between Dornan Drive and the western side of Brickyard Landing condos. This represents 0.73 miles of the 10.8 miles of Bay Trail gaps remaining in Richmond. Click Here for details on each of these projects.

The City Council agonized over how to allocate the remaining $180,000 of Cosco Busan funds between rehabilitating old Bay Trail sections in Marina Bay versus restoring public access to the City's closed Point Molate Beach Park. The final decision was to appropriate $154,000 to reopen Point Molate Beach with the remaining $26,000 used to provide fishing access on Point Molate pier if feasible. It appears that the latter funds would go to rehabilitating Marina Bay trail sections if it isn't feasible to allow fishing on the pier.

Bruce

Bruce Beyaert, TRAC Chair
tracbaytrail@earthlink.net
phone/fax 510-235-2835

Websites >>
TRAC: http://www.pointrichmond.com/baytrail/
City of Richmond Bay Trail: http://www.ci.richmond.ca.us/TRAC
Richmond Bay Trail Slideshows:
http://sfbaytrailinrichmond.shutterfly.com/pictures/5
Richmond Convention & Visitors Bureau:
http://www.explorerichmondca.com/baytrail.htm

7B1

Craig Murray

From: Chris Chamberlain
Sent: Wednesday, August 15, 2012 12:57 PM
To: Craig Murray
Cc: Yader Bermudez
Subject: Re: COSCO Funds - Pt Molate Pier, Beach Park

Councilman Bates has requested the item be placed back on the agenda for September 11th. I believe it is smart to wait until the item is again cleared by council. Once that happens I will reach out to the trustees to ensure their support of the proposed allocations and then we can begin the actual allocations.

Chris Chamberlain
Parks and Landscaping Supt.
City of Richmond, Ca
(510)231-3073

On Aug 15, 2012, at 12:11 PM, "Craig Murray" <Craig_Murray@ci.richmond.ca.us> wrote:

> Yader
> Chris
>
> PMCAC Vice Chair Beyaert asked if you can provide summary of subject status.
> I can report out for you if you like &/or include written response in the Board Packet.
> PMCAC Mtg. is Mon. 8/20 and per Brown Act I will need to final & run & post Agenda by Fri.8/17.
>
> Thanks.
>
> Craig K. Murray, SR/WA
> Development Project Manager II
> *City of Richmond As Successor Agency to the Richmond Community Redevelopment Agency (CORASATTRCRA)*
> 440 Civic Center Plaza, 2nd Floor
> Richmond, CA 94804-1630
> 510-307-8140
> 510-307-8188 direct
> 510-307-8149 fax

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PMCAC Inquiry Register and Tracking

Item	Description	Requester	Submitted On	Submitted To	Assigned To	Dept.	Subject	Response Delivere	Response Summary	Status
1	Request direct interface to Finance dept. for providing ongoing financial updates	Garrett	11/29/2011	Mayor	Jim Goins	Finance	FINANCE	12/5/2011	Andrea Miller assigned as finance dept. liaison	Closed
2	Request posting of .mp3 files of PMCAC meeting transcripts to PMCAC web page	Garrett		KCRT			MINUTES	2/28/2012	KCRT has posted .mp3 files of PMCAC meeting audio transcripts on City's web site	Closed
3	RLO - Applicability of clause 720 in Remediation Agreement to PMCAC	Garrett	12/19/2011	C. Murray	B. Goodmiller	Legal	FINANCE			Open
4	Determination of who at City receives copies of monthly reports required under Cost Cap Insurance Policy	Beyaert	12/19/2011	C. Murray		City Mgr.	COMPLIANCE	1/30/2012	Answer: Monthly reports are sent to Bill Lindsay, Bruce Goodmiller and Craig Murray. PMCAC will also be copied	Closed
5	Secure copies of the quarterly remediation progress reports submitted by Upstream as per Section 301 (A) (3) of the Remediation Agreement: **Section 301. Performance and Funding Obligations of Developer (A) (3)** *Developer shall make reasonable progress toward performing Environmental. CLARIFY IF THIS OBLIGATION IS SATISFIED WITH THE MONTHLY ACTIVITY REPORTS, Services and shall provide quarterly progress reports to the City.*	Beyaert	1/4/2012	C. Murray		City Mgr.	COMPLIANCE			Open
6	Submit proposed agenda to Terraphase for 1/10/12 meeting with the PMCAC C&R Sub-committee	Beyaert	1/4/2012	C. Murray	B. Goodmiller	City Mgr.	REMEDIATION	1/5/2012	Proposed agenda approved	Closed
7	Request copies of back-up invoices for all charges to Navy Grant Fund by Terraphase and Arcadis	Garrett	1/4/2012	A. Miller		Finance	FINANCE	Some invoices received on 3/15/2012	Information provided by LaShonda Wilson	Closed
8	RLO - Must every document, spreadsheet, .ppt, image, etc. that is displayed/used in support of individual agenda items on the PMCAC agenda be included in the agenda packet? And must that agenda packet (whether containing all of the used/portrayed materials or not) be posted by the same deadline as the deadline for posting of PMCAC meeting agendas?	Garrett	1/13/2012	C. Murray		Legal	BROWN ACT			Open
9	Secure copies of monthly remediation status reports submitted by Terraphase/Arcadis since inception	Garrett	1/13/2012	C. Murray		City Mgr.	REMEDIATION	1/25/2012	Terraphase monthly remediation reports will be sent to all PMCAC members and posted on PMCAC repository	Closed
10	Secure copies of all **drafts** of proposed plans, studies, surveys, and other submissions required by the Water Board - as submitted by Terraphase/Arcadis/Upstream	Beyaert	1/13/2012	C. Murray		City Mgr.	REMEDIATION			Open

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11	Request from Terraphase a , *rough & conservotive* estimate of the size and number of trucks, and no. of truck trips/day required for removing contaminated soil from Pt. Molate, as well as same for hauling clean replacement soil, and any anticipated additional costs involved with trucking out of Pt. Molate via proposed detour during Scofield deck replacement of traveling westbound across S.R./Richmond bridge and returning eastbound.	Beyaert	1/13/2012	C. Murray		City Mgr.	REMEDIATION	2/10/2012	Information supplied by Terraphase to CalTrans	Closed
12	Interpretation of Upstream obligations if any under item 6 contained in Appendix II of the FEIR as cited: *6. Program Management* *Upstream will provide overall project management including but not limited to subcontractor procurement and management, monthly progress reporting, monthly Clean-up Cost Progress Reports to the Insurer, real time schedule and budget tracking, assist in public outreach and public meetings, maintenance of a public repository of environmental documentation, site field office, site equipment storage, and financial project management.*	Garrett	1/13/2012	C.Murray		Legal	COMPLIANCE			Open
13	Secure full details of sums paid and purpose for additional $1.1M of charges associated with the cost cap insurance premium above and beyond the initial $3M premium	Beyaert	1/20/2012	C. Murray			REMEDIATION	3/13/2012	Invoices for additional premiums were provided.	Closed
14	Secure copy of the presentation given by Terraphase to C&R 5-C on 1/10/12 as initially prepared for a city council study session on plans for compliance with the December water board order.	Garrett	1/20/2012	C. Murray	W. Carson		COMPLIANCE	4/12/2012	Copy of Presentation received and posted to Repository	Closed
15	Provide all documents contained in the bibliography on pages 8-10 of the January 2012 Monthly Remediation Status Report	Garrett	2/16/2012	C. Murray	W. Carson		COMPLIANCE	4/12/2012	Several appendices received and posted to Repository. Some appendices from 2011 and earlier remain outstanding	Partially Open
16	Provide copy of Maze & Assoc. audit of Pt. Molate from Dec 2010 and copy of 2011 annual audit as required under terms of the Navy transfer	Garrett	3/21/2012	C. Murray	L. Wilson		FINANCE			Open
17	Provide copy of Polution Liability Ins. Policy #G24889658001 from Alliant Insurance Services	Garrett	3/21/2012	C. Murray	R. Kain	Risk	INSURANCE	4/6/2012	Policy provided and posted to Repository	Closed
18	Copy of Appendices to 12/19/11 Draft Investigation Restoration Site 3 Feasiblity Study/Remedial Action Plan (FS/RAP) submitted to RWQCB by Terraphase	Beyaert	3/21/2012	C. Murray	W. Carson		REMEDIATION	4/12/2012	Appendices received and posted to Repository	Closed
19	Copy of Draft of the Internal Review of the proposed Fact Sheet as required by RWQCB for Site 3 FS/RAP	Beyaert	3/21/2012	C. Murray	W. Carson		REMEDIATION			Open
20	Copy of Proposed draft plan for RWQCB Order Task #2: Management of soils and groundwater as required by RWQCB by March 15, 2012	Beyaert	3/21/2012	C. Murray	W. Carson		REMEDIATION	4/12/2012	GW and soil fuel level plans received and posted to Repository	Closed
21	Draft of internal review of proposed wetlands mitigation and monitoring plan	Beyaert	3/21/2012	C. Murray	W. Carson		REMEDIATION			Open

22	Copy of 2011 annual UST closure monitoring report submitted to RWQCB.	Beyaert	3/21/2012	C. Murray	W. Carson		REMEDIATION	4/12/2012	2011 Annual UST Monitoring reprot received and posted to repository	Closed
23	Site 4 Drum Lot 2 Interim Remedial Action Plan approved by RWQCB.	Beyaert	3/21/2012	C. Murray	W. Carson		REMEDIATION	4/12/2012	Received copies of RWQCB's Notes on proposed plan. Final approval remains.	Closed
24	RLO - Clarify city's obligations under section 710 of the ETCA: Section 710. Change of Circumstances Each party will promptly notify the other party of any legal impediment, change of circumstances, pending litigation, or any other event or condition that may adversely affect such party's ability to perform this Agreement.	Garrett	3/27/2012	C. Murray	B. Goodmiller	Legal	COMPLIANCE			Open
25	Copies of recently provided billings from Terraphase indicate that the "total authorized budget" for Terraphase engineering for Pt. Molate was $498,200 on 1/30/11, $1,290,918 on7/5/11 and $2,036,188 on 12/16/11. Please clarify if this is simply a total sum of billing amounts to date or an actual budget number. If the latter, please advise process for establishing the budget, and amending the budget, as well as budget numbers for 2012 through 2014.	Puleo	3/22/2012	C. Murray	A. Miller	Finance	FINANCE			Open
26	Payments to Arcadis per the escrow account detail as of 1/31/12 total $392,512.40. We have received copies of Arcadis invoice totalling $164,990. Please provide copies of invoices for the remaining $227,612.40.	Puleo	3/22/2012	C. Murray	A. Miller	Finance	FINANCE			Open
27	We have received a copy of the work product detail associated with Acardis invoice #0341250 in the amount of $59,744.78 dated 9/21/10. Please provide work product detail for all other Arcadis invoices.	Puleo	3/22/2012	C. Murray	A. Miller	Finance	FINANCE			Open
28	PMCAC has been supplied copies of Terraphase invoices #110,111,112,and 113 totalling $37,142. Please supply copies of all other Terraphase Invoices	Puleo	3/22/2012	C. Murray	A. Miller	Finance	FINANCE			Closed
29	Arcadis billed $30,579.43 under Invoice 0344586 for preparation of an FS/RAP for Site 3. Terraphase has been budgeted $77,000 for this same task and has charged $50,993 under their invoices 137 and 144 for the same task. What is the authorized budget for developing an FS/RAP for site 3.	Garrett	3/27/2012	C. Murray	A. Miller	Finance	FINANCE			Open
30	Provide FY 2013 Pt. Molate Budget (general fund vs. escrow fund)	Garrett	7/13/2012	C. Murray	A. Miller	Finance	FINANCE			Open
31	Provide copies of all Morrison Foerster invoices	Garrett	7/13/2012	C. Murray	L. Wilson and A. Miller	Finance	FINANCE			Open
	Items outstanding for >30 days are indicated in									
	Items newly added since last submission of tracker are indicated in									
	Indicates status as partially complete									

BA 3

City of Richmond – POINT MOLATE COMMUNITY ADVISORY COMMITTEE

Multi-Purpose Room
440 CIVIC CENTER PLAZA

PROPOSED MINUTES
MONDAY, July 16, 2012, 6:30 PM

1. **CALL TO ORDER**
Chair Garrett called the meeting to order at 6:32 p.m.

2. **ROLL CALL**

Present:	Committee Members Beyaert, Christian, Garrett, Gilbert, Hanna (6:49), Hite, Kortz, Martinez (7:12), Rosing (6:36), Satre, Smith, N., Stello, Sundance and Whitty.
Absent:	Committee Members Puleo, Smith C..
Staff Present:	Craig K. Murray, Staff Liaison.

3. **WELCOME AND MEETING PROCEDURES**
Garrett welcomed audience, explained meeting procedures, and discussed the Speaker Card process.

4. **AGENDA REVIEW AND ADOPTION**
Garrett reviewed Agenda items and briefed PMCAC on the Agenda order. Whitty then motioned to approve the Agenda, Stello seconded. Passed unanimously.

5. **ANNOUNCEMENTS THROUGH THE CHAIR**
Garrett announced that Steven Clark is auto resigned. Garrett noted a $496,000. MTC Grant for South Richmond Priority Area and CAG has been working with MTC and getting involvement with DTSC. Beyaert announced City Council voted to proceed with trail design to Pt Molate and also announced a Greenbelt Alliance hike at Pt Molate to be held on August 18.

6. **OPEN FORUM**
Cordell Hindler spoke to Pt. Molate being a good site for a Hotel, Restaurant and a Coffee Shop to bring in more jobs for the youth of the City.

7. **PRESENTATIONS, DISCUSSION & ACTION ITEMS**

A. Presentation of full project remediation cost projections and annualized budget/expense projections for proposed remediation of all sites at Pt. Molate.

Bill Carson of Terraphase provided a Power Point presentation of the remediation budget. Carson indicated that everything should be reflected in budget other than some small electrical and Nichols Consulting Engineers costs. Carson announced that $23M under budget so far and $22M is the estimate to get to end game and projection is to be $300,000. under budget. Carson announced that certain items are not insured such as underground tank monitoring and regulatory oversight and legal and that this budget was originally prepared in 2006. Carson mentioned that $300,000. was set aside for long term monitoring. Garrett indicated the need to balance this budget with other Pt Molate budgets and determine other non-remediation costs. Carson answered questions on budget needs for specific locations such as IR Site 3 and provided comments on Thermal Desorption such as lead in the soil will not be destroyed in this particular process and the clean over burden not addressed in the Thermal Desorption firm's proposal. Carson confirmed that the client, the City, will have the maximum flexibility being Multi-Family residential at this IR Site 3 with current remediation activities planned for in the budget.

Garrett requested Terraphase, through its client City authorization, to provide this budget by next month and cautioned that it is in the City's interest and Insurance Policy endorsement to monitor the budgets. Carson reflected that he only started developing the budget spreadsheet in the last few months. Carson received

questions on other locations and budget items and reviewed a Water Board inquiry if old petroleum spills could become anaerobic and turn into methane and hydrogen sulfide.

B. Presentation of draft proposed Pt. Molate annual report to Bruce Goodmiller by PMCAC as a whole.

Garrett reviewed process with Committee and noted that Bruce Goodmiller is the assigned Project Manager per the resolution for the PMCAC and noted that Goodmiller can review this at a future point. Garrett discussed purpose of this document and that this is way to show and summarize annual activities and for City Council to show if PMCAC is in or out of line of Committee expectations. Garrett summarized the Table of Contents in proposed draft and compared to standard items in other Committee reports. Garrett noted that there are two budgets one with Navy escrow funds for remediation and the Operating General Fund Budget and noted no Operating Budget items noted in FY12-13 budget.

C. Scrum: Outreach Calendar/Program and funding – PMCAC as a whole.

Garrett indicated that this Scrum was originated by Committee Member Sundance to explore ideas for PMCAC to raise operating funds with realization of current state of City funding and to specifically seek grant monies to pay for various things such as Planning and Outreach. Garrett called for Public Speaker first. Public Speaker Cordell Hindler noted on this item that the East Bay Center for Arts can help based on their experience obtaining grants to help students, to use their location as a fundraiser and also to get Chevron to help with general planning. Open forum was conducted. Committee Members expressed their ideas as they had written.

8. STAFF REPORTS

A. Committee Log for PMCAC inquiries to staff, contractors

Garrett noted that there are two new items to place in the inquiry tracker. Garrett noted that certain items still haven't been received such as FY 13 budget and Morrison-Foerster invoices and RLOs are six months old and LaShonda is on Family Leave until the Fall. Discussion that a Committee member could track items and there were no volunteers.

9. CONSENT CALENDAR

Beyaert motioned to approve the Consent Calendar and June 18, 2012 minutes, Martinez seconded. Passed unanimously.

10. FUTURE AGENDA ITEMS

Garrett called for future agenda items. Items discussed included the Draft Annual Plan, Speaker Michael Boland, Edit the Outreach Brochure, and Annual Building Inspection Report. Hanna volunteered to open a PMCAC@gmail.com site for Brochure comments.

11. CITY COUNCIL LIAISON REPORTS

Murray reported that the Mayor contacted Chair, Staff that she was ill and would not be able to attend. Murray provided report on Federal Court litigation.

9A2

12. CHAIR AND SUB-COMMITTEE REPORTS

a. Clean Up and Restoration: Satre discussed the DTSC pilot study award and felt that Richmond would not be a contender but something to keep in mind. This could be of interest with an interim use. Satre indicated a need to identify an end game to qualify for this DTSC study.

b. Community Outreach: Sundance reported that outreach was performed at Park Plaza at Easter Hill Church monthly Neighborhood Council meeting. Rosing indicated that he can place brochures at Rosie the Riveter museum and Outreach Committee offered to revisit Park Plaza. Garrett stated to encourage anyone interested to apply for PMCAC since we have four open seats and no applications. Sundance indicated that this Committee will be presenting at the Iron Triangle Neighborhood Council meeting in August.

c. Grant Development Sub-Committee: Stello reported that there is a Wells Fargo and national Fish and Wildlife Grant that may be of interest but a non-profit would need to apply. Stello requested that other members send list of other non-profit contact information because most of the grants are for non-profits. Stello reported that Moore Foundation Grant up to $2M relating to SF Bay is of interest and forwarded by former PMCAC member Helvarg and looking for high impact like Pt Molate but it may be premature. Stello reviewed several other grant groups such as Watershed restorations, and Art, their grant deadlines and possible applications to Pt Molate. Stello reported that she is keeping a Grant repository.

d. Cosco-Busan: Garrett indicated that the Pt Molate Beach Park proposal was edited with lighting, security features and wireless gates and submitted to Parks Supt. Chris Chamberlain. It will come before City Council on July 23 and Council will rate. Garrett shared knowledge that predisposition is to projects that are ready to be built and therefore not expecting that this project will rank highly. Additional concern is maintenance and to team with Youth Works since they have received a National Park Service grant to do things such as building and repairing fences. Beyaert reported on two Bay Trail gaps closure projects and pending funding for Marina Bay trail sections. On PMCAC Pt Molate Beach Park Proposal, N.Smith moved for Committee to endorse this proposal, seconded by Sundance. Unamimous approval.

13. ADJOURNMENT

Garrett moved to adjourn the meeting at 8:34 pm, seconded by N.Smith. Passed unanimously.

14. SCHEDULED MEETINGS

Committee Meeting – .
Monday, August 20, 2012, 6:30 p.m., Multi-Purpose Room, 440 Civic Center Plaza

Minutes respectfully submitted by: _____

Craig K. Murray, PMCAC Staff Liaison

terraphase engineering

August 15, 2012

Mr. George Levya
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

sent via: email

Subject: Monthly Remediation Status Report for Work in July 2012, Former Naval Fuel Depot Point Molate Richmond, California

Dear Mr. Levya:

This monthly remediation status report summarizes the remediation activities conducted by Terraphase Engineering Inc. (Terraphase) under the direction of Upstream Point Molate LLC (Upstream) on behalf of the City of Richmond at the former Naval Fuel Depot Point Molate (the Site). This remediation status report is intended to meet the requirements of Task 9 in the Regional Water Quality Control Board (RWQCB) Order R2-2011-0087 (RWQCB 2011d). The requirements of Task 9 are as follows:

> *The Discharger shall submit a report to the Regional Water Board, 30 days prior to the start of any onsite remediation activities, and then on a monthly basis beginning 30 days after the start of the remediation activities, outlining the onsite remediation activities accomplished during the past month and those planned for the following month. The first monthly report at the beginning of each quarter shall include monitoring and test results and any conclusions or proposed changes to the remediation process based on those results. If any changes to the remediation are proposed during any monthly report, applicable supporting monitoring or test data will be submitted at that time. The status report shall also verify that the Prohibitions in Section A, stipulated above, have been adhered to. Should any of those prohibitions be trespassed, the report shall propose a recommendation acceptable to the Executive Officer to correct the trespass.*

This remediation status report provides a monthly update on the progress of environmental investigations, remediation, maintenance, and monitoring at the Site. This report is organized around each task listed in the RWQCB Order R2-2011-0087 (RWQCB 2011d). Additional tasks related to the Installation Restoration (IR) Site 3 Packaged Groundwater Treatment Plant (PGWTP) and site-wide groundwater monitoring are also included below. For major work tasks completed in 2011, please see the monthly status report for December 2011 (Terraphase 2012a). A reference list of reports and submittals since January 2011 is included as an attachment to this letter.

Terraphase Engineering Inc.
1404 Franklin Street, Suite 600
Oakland, California 94612
www.terraphase.com

12A11

Task 1: Soil Cleanup Goals (Compliance Date: February 13, 2012)

Work completed in July 2012:

1. Prepare response to RWQCB comments on proposed soil cleanup goals (RWQCB 2012b)

Major Work Items Previously Completed in 2012:

1. Prepared proposed soil cleanup goals (included in the draft Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report [Terraphase 2012k]) for review by the City of Richmond and Upstream per the Work Plan for Excavation Delineation and Waste Characterization of Petroleum-Affected Soil (Terraphase 2011m) approved by the RWQCB (RWQCB 2011a)
2. Responded to City of Richmond and Upstream comments on proposed soil cleanup goals
3. Prepared and submitted the proposed soil cleanup goals (included in the draft Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report [Terraphase 2012k]) to the RWQCB
4. Meeting with City of Richmond and RWQCB regarding the proposed soil cleanup goals on February 16 and 29 and March 29, 2012
5. Meeting with the RWQCB, the City of Richmond, and Upstream on April 19, 2012 regarding the soil cleanup goals
6. Respond to RWQCB comments and concerns regarding the proposed soil cleanup goals (RWQCB 2012b)

Upcoming Work in August 2012:

1. Submit revised proposed soil cleanup goals (as part of the draft Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report [Terraphase 2012k]) to the RWQCB in response to comments from the April 19, 2012 meeting

Task 2: Soil and Groundwater Management Plan (Compliance Date: March 15, 2012)

Work completed in July 2012:

1. Development and submittal of the draft Soil and Groundwater Management Plan (SGWMP) to the RWQCB
2. Provide copy of SGWMP to the Point Molate Community Advisory Committee (PMCAC) for review

Major Work Items Previously Completed in 2012:

1. Prepared and submitted the internal draft SGWMP outline to City of Richmond, Upstream, and RWQCB for approval
2. Prepared and submitted an extension request letter to the RWQCB
3. Continued development of the internal draft soil and groundwater management plan (SGWMP)
4. Meeting with the RWQCB on May 30, 2012 regarding the internal draft SGWMP
5. Presentation to the PMCAC on June 18, 2012 regarding the draft SGWMP
6. Submit the internal draft SGWMP to the City of Richmond and Upstream

Upcoming Work in August 2012:

1. Meet with the RWQCB regarding the draft SGWMP

Task 3a: IR Site 3 Feasibility Study and Remedial Action Plan (Compliance Date: May 4, 2012)

Work completed in July 2012:

1. Development of the internal draft remedial design details – plans and specifications

2. Review the data collected during the soil gas investigation and prepare an internal draft summary report
3. Pre-project planning for the waste characterization of the industrial waste area
4. Communication with the USACE and RWQCB regarding the wetland mitigation and monitoring plan and permits

Major Work Items Previously Completed in 2012:

1. Developed and submitted the Section 404 permit application (Terraphase 2012h) and Pre-Construction Notification (Terraphase 2012i) to the USACE
2. Developed and submitted the Section 401 permit application (Terraphase 2012g) to the RWQCB
3. Developed and submitted the administrative permit application (Terraphase 2012l) to the Bay Conservation and Development Commission (BCDC)
4. Submitted the draft Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report (Terraphase 2012k) to the RWQCB (See Task 1 of this report)
5. Meeting with the City of Richmond and RWQCB regarding the draft Feasibility Study and Remedial Action Plan (FS/RAP; Terraphase 2011s) and the draft Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report (Terraphase 2012k) on February 16, February 29, and March 29, 2012
6. Site visit and meeting with the RWQCB on March 26, 2012 regarding the Section 401 permit application (Terraphase 2012g)
7. Site visit and meeting with the USACE regarding the Section 404 permit application (Terraphase 2012h) on May 1, 2012
8. Development of the internal draft documents, including the public fact sheet, Stormwater Pollution Prevention Plan (SWPPP), Health and Safety Plan (HASP), Site Security Plan, Contingency Plan, and Transportation Control Plan (TCP) for the remedial activities
9. Development of the internal draft remedial design details – plans and specifications
10. Developed and submitted the wetlands mitigation and monitoring plan (Terraphase 2012p) to the RWQCB and United States Army Corps of Engineers (USACE)
11. Prepared and submitted responses to the BCDC regarding their comments on the administrative permit application (Terraphase 2012l)
12. Preparation and submission of a consultation letter to the California Office of Historic Preservation regarding national historic district non-contributing elements (City of Richmond 2012)
13. Meeting with the City of Richmond, Upstream, and the RWQCB regarding the draft Feasibility Study and Remedial Action Plan (FS/RAP; Terraphase 2011s) and the draft Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report (Terraphase 2012k) on April 19, 2012
14. Develop and submit a soil gas investigation work plan to the City of Richmond, Upstream, and RWQCB for review (Terraphase 2012w)
15. Develop the internal draft response to comments to the review and comments letter on the draft FS/RAP from the RWQCB (RWQCB 2012b)
16. Conduct a soil gas investigation on IR Site 3 per the Soil Gas Survey Work Plan (Terraphase 2012w)

Upcoming Work in August 2012:

1. Continue work on the draft and response to comments on the Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report (Terraphase 2012k) and as a supplement to the draft FS/RAP (Terraphase 2011s)
2. Development of the internal draft remedial design details – plans and specifications

3. Submit the soil gas investigation summary report to the RWQCB
4. Development of a work plan for the waste characterization of the industrial waste area

Task 3b: IR Site 3 Remedial Action Completion Report (Compliance Date: February 3, 2014)

Not Applicable

Task 4a: IR Site 4 Interim Remedial Action Work Plan (Compliance Date: April 3, 2012)

Work completed in July 2012:

1. Review the data collected during groundwater sampling – baseline investigation
2. Pre-project planning and discussions with the City of Richmond, Upstream, and the RWQCB regarding the interim remedial measures

Major Work Items Previously Completed in 2012:

1. Implementation of the design investigation for remedial activities of VOCs in the groundwater per the Groundwater Remediation Work Plan IR Site 4, Drum Lot 2/Building 87 Area (Terraphase 2011r) approved by the RWQCB (RWQCB 2011c)
2. Membrane interface probe (MIP) investigation per the Groundwater Remediation Work Plan IR Site 4, Drum Lot 2/Building 87 Area (Terraphase 2011r) approved by the RWQCB (RWQCB 2011c)
3. Meeting with the City of Richmond's representative from Nichols Consulting to discuss investigation results on February 8, 2012
4. Review of soil gas and MIP investigation data with the City of Richmond consultant and discuss potential changes to interim remedial measures implementation on March 30, 2012 and on April 18, 2012
5. Groundwater monitoring well installation and sampling
6. Prepared and submitted a response letter (Terraphase 2012q) to PMCAC comments on the Groundwater Remediation Work Plan IR Site 4, Drum Lot 2/Building 87 Area (Terraphase 2011r)
7. Prepared and submitted the addendum (Terraphase 2012r) to the Groundwater Remediation Work Plan IR Site 4, Drum Lot 2/Building 87 Area (Terraphase 2011r) to the RWQCB

Upcoming Work in August 2012:

1. Groundwater monitoring to determine extent of contamination
2. Pre-project planning for interim remedial measures

Task 4b: IR Site 4 Interim Remedial Action Completion Report (Compliance Date: November 2, 2012)

Not Applicable

Task 4c: IR Site 4 Human Health Risk Assessment (Compliance Date: November 4, 2013)

Not Applicable

Task 4d: IR Site 4 Feasibility Study and Remedial Action Plan (Compliance Date: February 3, 2014)

Not Applicable

Task 4e: IR Site 4 Remedial Action Completion Report (Compliance Date: February 3, 2015)

Not Applicable

Task 5: UST Management Plan (Compliance Date: March 4, 2013)

None

Task 6: UST Removal Plan (Compliance Date: 90 days prior to UST demolition)

Not Applicable

Task 7: UST Status Report (Compliance Date: June 3, 2012)

Work completed in July 2012:

1. Conducted routine monthly underground storage tank (UST) closure monitoring inspections per the Post-Closure UST Maintenance and Monitoring Plan (ITSI 2005)
2. Prepare the internal draft second quarter 2012 UST closure monitoring report

Major Work Items Previously Completed in 2012:

1. Conducted routine monthly and quarterly UST closure monitoring inspections per the Post-Closure UST Maintenance and Monitoring Plan (ITSI 2005)
2. Conducted structural inspections of four closed USTs per the Post-Closure UST Maintenance and Monitoring Plan (ITSI 2005)
3. Prepared and submitted the annual 2011 UST closure monitoring report (Terraphase 2012d) to the RWQCB
4. Field inspection, identification, and implementation of maintenance activities on the UST features (such as monitoring wells and drains)
5. Conducted brush clearing on USTs' drainage features to improve access for monitoring
6. Conducted routine quarterly underground storage tank (UST) closure monitoring inspections per the Post-Closure UST Maintenance and Monitoring Plan (ITSI 2005)
7. Prepared the internal draft structural inspection report based on UST inspection in January 2012
8. Installed "Keep Off" signs on the USTs warning vehicle traffic to stay off the tops of the USTs
9. Clean out drainage structures identified as requiring maintenance
10. Prepared and submitted the first quarter 2012 UST closure monitoring report to the RWQCB (Terraphase 2012u)

Upcoming Work in August 2012:

1. Conduct routine quarterly UST closure monitoring inspections
2. Clean out drainage structures identified as requiring maintenance
3. Preparation and submittal of the second quarter 2012 UST closure monitoring report to the City of Richmond, Upstream, and the RWQCB

Task 8: Amended Land Use Controls (Compliance Date: When environmental closure is requested)

Not Applicable

Task 9: Remediation Status Reports (Compliance Date: Monthly)

Work completed in July 2012:

1. Submitted monthly status report for June 2012 (Terraphase 2012y)

Major Work Items Previously Completed in 2012:

1. Submitted monthly status report for December 2011 (Terraphase 2012a)
2. Submitted monthly status report for January 2012 (Terraphase 2012j)
3. Submitted monthly status report for February 2012 (Terraphase 2012m)
4. Submitted monthly status report for March 2012 (Terraphase 2012n)
5. Submitted monthly status report for April 2012 (Terraphase 2012v)
6. Meeting with ACE Group on May 2, 2012 regarding insurance reporting requirements for the Site

7. Submitted monthly status report for May 2012 (Terraphase 2012x)

Upcoming Work in August 2012:

1. Submit monthly remediation status report for July 2012
2. Submit the insurance budget summary and status report to Upstream, the City of Richmond, and ACE Group

Task 10: Discoveries During Facility Redevelopment (Compliance Date: 60 days from initial discovery)

None

Task 11: IR Site 1 ROD (Compliance Date: None)

Work completed in July 2012:

1. Routine monthly landfill inspection of signs, gates, locks, etc. per the Final Post-Closure Maintenance and Monitoring Plan (TTEMI 2002)
2. Routine operation, maintenance, and monitoring of the landfill treatment system
3. Preparation of the second quarter 2012 landfill monitoring report

Major Work Items Previously Completed in 2012:

1. Routine monthly and quarterly landfill inspection of signs, gates, locks, etc. per the Final Post-Closure Maintenance and Monitoring Plan (TTEMI 2002)
2. Quarterly landfill inspection with the Contra Costa County Environmental Health Services Department
3. Routine operation, maintenance and monitoring of the landfill treatment system
4. Prepared and submitted the fourth quarter 2011 landfill monitoring report to the RWQCB (Terraphase 2012c)
5. Installation of temporary treatment equipment due to an extended power failure
6. Prepare and submit the first quarter 2012 landfill monitoring report to the RWQCB (Terraphase 2012t)
7. Evaluation of existing treatment system data and proposed treatment system modifications

Upcoming Work in August 2012:

1. Routine monthly landfill inspection of signs, gates, locks, etc.
2. Routine operation, maintenance, and monitoring of the landfill treatment system
3. Preparation and submittal of the second quarter 2012 landfill monitoring report to the City of Richmond, Upstream, and the RWQCB

Task 12: Construction Stormwater General Permit (Compliance Date: Prior to field work)

Not Applicable

IR Site 3: PGWTP

Terraphase under the direction of Upstream and the City of Richmond operates, maintains, monitors, and prepares the monitoring reports for the PGWTP under the existing General Waste Discharge Requirements for: Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds (VOC), Fuel Leaks and Other Related Wastes (VOC and Fuel General Permit) (RWQCB 2012a). The RWQCB reauthorized operation of the PGWTP at 100 gpm under the new VOC and Fuel General Permit (effective March 15, 2012) per the RWQCB reauthorization letter (RWQCB 2012c). The following summarizes the activities related to the continued operation, maintenance, and monitoring of the PGWTP.

Work completed in July 2012:

1. Routine operation, maintenance, and monitoring of the PGWTP
2. Preparation of the internal draft second quarter 2012 PGWTP monitoring report
3. Replacement of filtration media at the PGWTP

Major work items completed previously in 2012:

1. Prepare a comment letter (Terraphase 2012b) regarding the draft VOC and Fuels General Permit issued by the RWQCB (replaced by the final order [RWQCB 2012a])
2. Prepared and submitted the combined fourth quarter and annual 2011 self-monitoring report to the RWQCB (Terraphase 2012f)
3. Prepare and submit the first quarter PGWTP monitoring report to the RWQCB (Terraphase 2012s)
4. Cleaning and repair of the oil-water separators and associated pump
5. Installation of floaters on the power supply lines in response to the power failure
6. Emergency operation of the PGWTP using backup power and portable pumps
7. Maintenance on the extraction well pumps and piping due to sediment buildup

Upcoming Work in August 2012:

1. Routine operation, maintenance, and monitoring of the PGWTP
2. Maintenance on the extraction well pumps
3. Preparation and submittal of the second quarter 2012 PGWTP monitoring report to the City of Richmond, Upstream, and the RWQCB

Site-wide Groundwater Monitoring

The purpose of the site-wide groundwater monitoring is to provide groundwater quality data that can be evaluated against established screening criteria for the Site. This program will help protect human health and the environment and prevent releases to the San Francisco Bay. Integrating data collected under this program with previous data is intended to support compliance and closure in accordance with regulatory requirements. Groundwater monitoring is being conducted on a semi-annual basis (wet-season and dry-season) per the Site-Wide Groundwater Monitoring Plan (Terraphase 2011n) that was approved by the RWQCB on August 30, 2011 (RWQCB 2011b). Data collected is summarized and submitted as semi-annual monitoring reports to the RWQCB.

Work completed in July 2012:

1. Review the analytical data from the site-wide groundwater monitoring event (wet-season)
2. Prepare the draft site-wide groundwater monitoring report (wet-season)

Major work items completed previously in 2012:

1. Field verification of groundwater monitoring wells to be decommissioned
2. Check of the potential seep from the rock outcrop (no water visible in January, February, and April) per RWQCB request
3. Check of the potential seep from the rock outcrop (water visible in March) per RWQCB request
4. Sampling and analysis of the seep from the rock outcrop on March 26, 2012
5. Submitted the dry-season semi-annual groundwater monitoring report to the RWQCB (Terraphase 2012o)
6. Development of internal draft work plan to decommission groundwater monitoring wells
7. Pre-project planning for groundwater monitoring well decommissioning
8. Assessment of groundwater monitoring wells monuments and risers to be decommissioned
9. Conduct the site-wide groundwater monitoring event (wet-season)

Upcoming Work in August 2012:

1. Pre-project planning for groundwater monitoring well decommissioning
2. Submittal of the wet-season semi-annual groundwater monitoring report to the RWQCB
3. Submission of the Well Decommissioning Work Plan to the RWQCB

Prohibitions Verification

As required in Task 9 of the RWQCB Order, the following prohibitions (Section A of the RWQCB Order) were adhered to during the remedial activities in January 2012, to the knowledge of Terraphase.

1. The discharge of wastes and/or non-hazardous or hazardous substances in a manner which will degrade, or threaten to degrade, water quality or adversely affect, or threaten to adversely affect, the beneficial uses of the waters of the State is prohibited.
2. Further migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup that will cause adverse migration of wastes or hazardous substances are prohibited.
4. The tidal marsh habitat and wetland habitats onsite shall be completely avoided unless encroachment on these areas is required to implement Facility remediation work and resultant impacts to the affected habitat are mitigated through a plan approved by the Executive Officer. A setback of 50 feet shall be established around the tidal marsh and any wetland area as a means of preventing any unintended impacts to it from the remediation.
5. The Site's offshore eel-grass habitat shall be completely avoided during any remedial work to the maximum extent practicable.

Summary

The above detailed summaries by task provide a look at the ongoing remediation activities at the former Naval Fuel Depot Point Molate. The most significant of which are the IR Site 3 FS/RAP and Waste Characterization Report. The RWQCB's comments on the FS/RAP and Waste Characterization Report (including soil cleanup goals) will be incorporated into the two documents with additional information collected during the soil gas investigation and re-submitted to the RWQCB as draft final in 2012. The draft final FS/RAP and Waste Characterization Report will likely be presented to the PMCAC prior to submittal to the RWQCB. A draft SGWMP was submitted to the RWQCB in July 2012. Dry-season groundwater monitoring is planned to occur in October 2012.

If you have questions regarding this report, please call Ryan Janoch or William Carson at (510) 645-1850.

Sincerely,
For Terraphase Engineering Inc.

Ryan Janoch, PE (C78735)
Professional Engineer

William Carson, PE (C60735)
President and Principal Engineer

cc: Carlos Privat, City of Richmond
Craig Murray, City of Richmond
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Attachments: Point Molate Bibliography

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WET-SEASON SEMI-ANNUAL GROUNDWATER MONITORING REPORT
FORMER NAVAL FUEL DEPOT POINT MOLATE
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File Ref: smr-wet-season-ptmol-0001-001-019

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Appendices

Acronyms and Abbreviations

1,1-DCE	1, 1-dichloroethene
AMSL	above mean sea level
ASTM	American Society for Testing and Materials
bgs	below ground surface
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene, and xylenes
C&T	Curtis & Tompkins
Chevron	Chevron Corporation
cis-1, 2-DCE	cis-1, 2-dichloroethene
City	City of Richmond
cm/s	centimeters per second
COC	chain-of-custody
DO	dissolved oxygen
EPA	Environmental Protection Agency
ETCA	Early Transfer Cooperative Agreement
°F	degrees Fahrenheit
FOSET	finding of suitability for early transfer
FPAL	Fuel Product Action Level
FPALDR	Fuel Product Action Level Development Report
GWMP	Groundwater Monitoring Program
IDW	investigation-derived waste
IR	Installation Restoration
IT	International Technology Corporation
ITSI	Innovative Technical Solutions, Incorporated
K	hydraulic conductivity
LCS/LCSD	laboratory control sample/ laboratory control sample duplicate
MS/MSD	matrix spike/matrix spike duplicate
Navy	Department of the Navy
NFD	Naval Fuel Depot
ORP	Oxidation Reduction Potential
PRC	PRC Environmental Management, Inc.

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QA	quality assurance
QC	quality control
%R	percent recovery
RI	Remedial Investigation
RL	reporting limit
RPD	relative percent difference
RWQCB	Regional Water Quality Control Board
SGC	silica-gel cleanup
SMR	Semi-Annual Groundwater Monitoring Report
TCE	trichloroethene
Terraphase	Terraphase Engineering Inc.
TPH	total petroleum hydrocarbon
TtEMI	Tetra Tech EM Inc.
UST	underground storage tank
VC	vinyl chloride
VOC	volatile organic compound
U.S. EPA	United States Environmental Protection Agency

Certification

All geologic information, conclusions, and recommendations in this document have been prepared by a California Professional Geologist.

August 3, 2012

Peter T. Zawislanski — Date

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1.0 INTRODUCTION

Terraphase Engineering Inc. (Terraphase) has prepared this *Wet-Season Semi-Annual Groundwater Monitoring Report* ("SMR") for the Former Naval Fuel Depot (NFD) Point Molate, Richmond, California ("the Site"; Figures 1 and 2) on behalf of Upstream Point Molate LLC. This SMR was prepared for the semi-annual reporting period of January 1st through June 30th, 2012 ("the Reporting Period").

The Site is a former Department of Navy ("Navy") fuel storage facility, which consisted of a series of underground fuel storage tanks (USTs) capable of storing up to 40 million gallons of fuel. Historical releases of fuel occurred during transfer of fuel to and from the USTs.

On May 24, 2011, a *Draft Site-Wide Groundwater Monitoring Plan* ("Draft GWMP"; Terraphase 2011a) was submitted to the Regional Water Quality Control Board (RWQCB). The Draft GWMP included modifications to the groundwater monitoring strategy for the Site. The RWQCB issued comments in a letter from Mr. George Leyva, dated June 22, 2011. In this letter, the RWQCB approved the implementation of the Draft GWMP, provided that the implementation addressed the RWQCB's comments. Groundwater monitoring took place between July 5 and 19, following procedures consistent with the RWQCB's comments. The final *Site-Wide Groundwater Monitoring Plan* ("GWMP"; Terraphase 2011b), which incorporated the RWQCB comments, was submitted to the RWQCB on August 19, 2011.

This SMR presents groundwater monitoring data representative of wet-season conditions at the Site. Wet-season monitoring events take place in the late part of the second quarter of the year (May-June) and the dry-season monitoring event take place during the early part of the fourth quarter of the year (October-November).

Groundwater monitoring was conducted in accordance with the RWQCB-approved GWMP, as discussed above. This SMR presents the following information:

- Section 2.0 provides a site description, site history, physical setting, and a discussion of groundwater action levels for the Site
- Section 3.0 summarizes the monitoring activities completed during the Reporting Period, including a discussion regarding the groundwater monitoring procedures and any deviations from the GWMP.
- Section 4.0 presents and discusses groundwater monitoring results for the Reporting Period, including groundwater elevation and analytical data.

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- Section 5.0 provides a summary of findings for the Reporting Period and compares these findings with historical data.
- Section 6.0 discusses the quality assurance/quality control (QA/QC) assessment for the Reporting Period.
- Section 7.0 provides a summary of the work tentatively scheduled to take place during the second half of 2011.
- Section 8.0 provides a list of report references.

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2.0 BACKGROUND

This section provides a site description, site history, physical setting, and a discussion of groundwater action levels for the Site.

2.1 Site Description

Former NFD Point Molate consists of 412 acres located in Richmond, Contra Costa County, California. The Site is situated in the Potrero Hills on the southern portion of the San Pablo Peninsula along the east shore of San Francisco Bay, and is approximately 1.5 miles north of the Richmond-San Rafael Bridge (Figure 1). Former NFD Point Molate was a former Navy fuel storage facility consisting of 20 concrete fuel storage tanks, capable of storing 40 million gallons of fuel, in 20 large USTs (each with 2.1 million gallons capacity) and several smaller USTs connected to refueling piers by over nine miles of buried pipeline. Historical releases of fuel have occurred primarily from leakage of valves or overfill of USTs. Residual fuel product is present in subsurface soil adjacent to several USTs and residual concentrations of fuel constituents (diesel, JP 4/5, and bunker fuel) are present in groundwater.

The facility is located on the southern portion of the San Pablo Peninsula, approximately 1.5 miles north of the Richmond-San Rafael Bridge in Richmond, California (Figure 1). The facility is bordered by undeveloped land to the north and south with the San Francisco Bay to the west, and by the Chevron Corporation (Chevron) refinery to the east. Chevron uses most of the land near NFD Point Molate for refining, storage, and pipeline distribution of petroleum products.

2.2 Site History

In the early 1800's, the area was used by the padres of Mission Delores and later became a Spanish Rancho. In the late 1860's Chinese fisherman developed a shrimp fishing camp which lasted for more than 40 years, and by 1899 a quarry was in operation at the Site and continued as late as 1915.

After the 1906 earthquake left San Francisco in ruins, the California Wine Association moved to Point Molate and began construction of Winehaven winery. As many as 400 workers lived at Point Molate during peak seasons of operation; the facility held the prestigious title of "world's largest winery." However, with the advent of prohibition in 1919, Winehaven went mostly unused from about 1920 until the late 1930s. In 1937, the California Wine Association dissolved and began selling off its holdings.

In 1941, Point Molate was acquired by the Navy for use as a Naval Fuel Depot. Beginning in 1942, the Navy used NFD Point Molate for fuel storage and distribution for the Pacific Fleet. Fuel storage and supply operations ceased in May 1995 (Navy 2008). The Navy

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designated NFD Point Molate for closure under the fourth round of the Base Realignment and Closure (BRAC) Program on September 30, 1995. Operational closure of the facility occurred on September 30, 1998.

In October 2003, the Navy transferred 85 percent of NFD Point Molate (USTs, drainage basins, and shoreline areas), to the City of Richmond ("the City"). The Navy retained 15 percent of the Site to continue restoration activities. The area retained by the Navy included: Installation Restoration (IR) Site 1 (landfill), IR Site 3 (former treatment ponds area), and IR Site 4 (Drum Lot 1 and Drum Lot 2/Building 87). Based on the finding of suitability for early transfer (FOSET), the remaining 15% of former NFD Point Molate was transferred to the City on May 29, 2010.

2.3 Physical Setting

The following sections describe the physical setting of former NFD Point Molate including site topography and drainage, climate, geology, and hydrogeology.

2.3.1 Site Topography and Drainage

Topography at NFD Point Molate ranges from flat, low-lying near-shore areas (reclaimed tidal flats) to the steep-sided western slopes of the San Pablo Hills. The ridgeline of the San Pablo Hills runs generally northwest-southeast and reaches an elevation of nearly 500 feet above mean sea level (AMSL). Within NFD Point Molate, there are six steep-sided ravines that are generally oriented perpendicular to the ridge axis, generally draining west toward San Francisco Bay. Drainage from these ravines is intercepted by Drainage Areas 1 through 6 (Figure 2). Small areas of delineated wetlands occur in the ravine at Drainage Area 2 and along the shoreline. Several ephemeral seeps have been identified near the storm water catch basins, along the bottom of steep slopes, or along the axes of ravines (TetraTech EMI [TtEMI] 2002).

2.3.2 Climate

The climate of former NFD Point Molate is characterized as marine, with cool summers and mild winters. Monthly average maximum temperatures (for Richmond, California) vary from 73.8 degrees Fahrenheit (°F) in September to 57.6°F in January; monthly average minimum temperatures vary from 56.3°F in September to 42.4°F in January. Richmond receives an average of 23.10 inches of precipitation per year. Average monthly precipitation varies from 4.89 inches in January to 0.04 inches in July. Monthly averages for wet weather months are as follows: November, 3.12 inches; December, 4.34 inches; January, 4.89 inches; February, 3.82 inches; March, 3.11 inches; April, 1.54 inches (Innovative Technical Solutions, Incorporated [ITSI] 2005).

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2.3.3 Geology

The geology of NFD Point Molate consists of sedimentary and low-grade metamorphic units of Cretaceous-aged Franciscan Formation bedrock, Quaternary unconsolidated colluvial and alluvial deposits, Bay Mud, and emplaced fill. The Franciscan bedrock generally consists of arkosic sandstone, quartzite, or siltstone with interbedded mudstone or shale (ITSI 2005).

The general lithology of the hillside areas (in the vicinity of the USTs) consists of overburden (emplaced fill) overlying bedrock. The constructed fill is generally composed of abundant rock fragments ranging from 1/2 to 3 inches in diameter in a predominantly clayey silt soil matrix. Extensive excavation and earth moving during UST construction (including blasting "benches" into the bedrock) disturbed native surface materials over a wide area of the site. The overburden materials overlie a zone of weathered bedrock that ranges considerably in thickness (from 0 to more than 7 feet in places), but with an average thickness of 2 to 3 feet. Typically, weathered bedrock consists of unconsolidated rock fragments (mudstone or sandstone) ranging from 1/4 to 1 inch in diameter. This zone is saturated locally. Weathered sandstone fragments tend to be friable, and weathered mudstone is often deteriorated to moderately jointed stiff clay, especially where saturated conditions prevail (TtEMI 2002).

The weathered Franciscan bedrock zone grades into more competent bedrock, generally encountered at depths of 25 to 35 feet below the tops of the USTs that are near ground surface. The competent Franciscan bedrock contact generally manifests itself by increased rock mass in core specimens and refusal of augering equipment. Standard penetration tests in bedrock generally indicate less than 6 inches penetration at 50 blow counts. Little or no moisture is encountered in competent bedrock. Bedrock lithology is primarily interbedded mudstone and sandstone. Mudstone is typically gray to dark gray, thinly laminated, and fractured (fractures generally represent 2 to 5 percent of the rock matrix). Sandstone bedrock is typically yellowish brown, fine-grained, and friable, with less prevalent fracturing than the mudstone. Fracturing in the mudstone and sandstone is regular, following consistent fracture planes. Fractures are commonly iron-stained, filled by high plasticity clay, and tend to show secondary quartz mineralization (TtEMI 2002).

Ravines and drainage areas at former NFD Point Molate are characterized by the presence of colluvium (valley fill) deposits. Colluvium consists of moderately stiff clayey silt mixed with weathered bedrock fragments, exhibiting an olive gray to yellowish brown mottled texture. Colluvium deposits tend to be thicker at the bases of the larger, more prominent ravines. Colluvial deposits underlying Tanks B and C, located below the base of the ravine at Drainage Area 3, are a minimum of 5 feet thick, and exceed 20 feet in thickness in some areas (TtEMI 2002).

The subsurface geology of the shoreline areas generally consists of varying amounts of emplaced fill overlying Bay Mud, alluvial and/or colluvial deposits. At the North Shoreline, emplaced fill consisting of clayey silt, sandy silt and rock rubble is present to depths of 15 to 20 feet below ground surface (bgs). The fill materials are underlain by a Bay Mud layer approximately 4 to 5 feet thick, which in turn is underlain by approximately 15 to 18 feet of colluvium. The colluvium overlies bedrock, which generally is encountered at a depth of approximately 35 feet bgs. At the South Shoreline, emplaced fill ranges from 2 feet thick near the Public Beach to 20 feet thick in the central portion of the south shoreline. The emplaced fill is underlain by colluvium that increases in thickness (from 12 to 20 feet) northward from the Public Beach. Bedrock was encountered at depths of 17 to 23 feet bgs in the Public Beach area, and at 29 feet bgs in the central portion of the south shoreline area (TtEMI 2002).

2.3.4 Hydrogeology

Groundwater at NFD Point Molate is present in limited quantities in the hillside areas and more prevalently in the flat-lying near-shore areas, where the groundwater forms a highly variable (tidally influenced) water table that is in hydraulic connection with San Francisco Bay (ITSI 2005).

Groundwater in the hillside areas is limited to isolated perched zones, located primarily within weathered bedrock. Colluvium in the ravines generally inhibits groundwater movement, due to its predominantly clay matrix. Physical analysis of colluvium resulted in hydraulic conductivity (K) values ranging from 10^{-7} to 10^{-8} centimeters per second (cm/s). However, some ravines receive sufficient surface water recharge (seasonally) to contain groundwater in unconsolidated material within permeable zones at the base of the colluvium and within underlying fractured bedrock horizons (PRC Environmental Management, Inc [PRC] 1994; TtEMI 2002).

In near-shore areas, tidally influenced groundwater is present in the emplaced fill materials and underlying colluvial and alluvial deposits. The fill materials are not uniform and exhibit highly variable permeability; physical samples from the former Treatment Ponds area yielded an average K of 10^{-6} cm/s. Bay Mud, where present, is saturated, but it is a low permeability unit. Laboratory-derived K values ranged from $1.5x10^{-7}$ to $5.3x10^{-8}$ cm/s in six samples (PRC 1994; TtEMI 2002).

Underlying bedrock throughout NFD Point Molate shows very little primary (matrix) porosity, but the presence of well-developed and consistent fractures throughout allows for the possibility of significant secondary (fracture) porosity. This secondary porosity is inhibited by the abundance of oxidation products (limonite and pyrolusite), clay minerals, and quartz mineralization along the fractures. In situ permeability tests conducted in bedrock wells indicated a K range of 2×10^{-3} to 1.5×10^{-6} cm/s (PRC 1994).

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These values were considered to be anomalously high for competent bedrock, and were attributed to an artificial increase in the secondary porosity due to hydrofracturing caused by the increased pressure of the injected water during testing (ITSI 2005). These data notwithstanding, unweathered bedrock at NFD Point Molate was interpreted to be a geologic unit with low K (PRC 1994; TtEMI 2002). Additional testing in six bedrock wells during the Phase II Remedial Investigation (RI) produced similar calculated K values, ranging from $1.6x10^{-3}$ to $1.0x10^{-6}$ cm/s. These data indicate a moderate K in the bedrock at NFD Point Molate, likely due to secondary porosity (TtEMI 2002).

2.4 Fuel Product Action Levels

Fuel product action levels (FPALs) were developed for the former NFD Point Molate, as described in the final Fuel Product Action Level Development Report (FPALDR; TtEMI 2001). The overall objective of the FPALDR was to develop an approach for assessing potential risks to human and ecological receptors exposed to petroleum-contaminated soil, groundwater, and surface water. The action levels developed in the FPALDR are intended to be used as a screening tool in conjunction with the RWQCB's Interim Guidance on Required Cleanup at Low-Risk Fuel Sites (California RWQCB 1996). The FPALDR approach is similar to the Risk-Based Corrective Action approach developed by the American Society for Testing and Materials (ASTM; 1995), in that early tiers consist of conservative, generic screening values. More site-specific information is incorporated in successive tiers so that the values become more representative of the site. The FPALDR focuses exclusively on Tier 1 action levels rather than on successive tiers that incorporate site-specific information and more comprehensive analytical approaches.

2.4.1 Action Levels from San Francisco Presidio Report

The FPALDR reviewed existing action levels in the San Francisco Bay Area. The Navy proposed that the action levels developed for gasoline, diesel fuel, fuel oil, and fuel constituents in soil, groundwater, and surface water at the Presidio of San Francisco be adopted as the preliminary or Tier 1 FPALDR action levels for the former NFD Point Molate. The FPALs for soil and groundwater are summarized in Table 1.

2.4.2 Groundwater Action Levels

Groundwater beneath the former NFD Point Molate is not considered to be of sufficient quality or quantity to be used as a municipal or domestic potable water supply (Terraphase 2011b). Therefore, for groundwater located more than 150 feet from the shoreline, a groundwater exposure pathway is considered only for the construction/park maintenance worker who might come into contact with contaminated groundwater during excavation. A detailed description of the risk assessment is provided in Attachment E of the Presidio FPALDR (Montgomery Watson 1995).

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The FPALDR identified action levels for total petroleum hydrocarbons (TPH) and TPH-related constituents in groundwater located less than 150 feet from a wetland or shoreline. These action levels were developed for the protection of salt water aquatic receptors for future wetland and near-shore ecological communities within the Presidio's Saltwater Ecological Protection Zone (a 150-foot setback from the bay and the periphery of the proposed wetlands) that are subject to groundwater discharge (International Technology Corporation [IT] 1997a). These action levels are not a part of the official RWQCB Presidio Board Order but have been approved and applied by RWQCB staff. These action levels were based on a bioassay that measured the toxicity of site media to receptors in a future wetland (IT 1997a). Action levels calculated for fuel oil were assumed to represent the diesel fraction of petroleum hydrocarbons as well as fuel oil, since fuel oil samples at the Presidio typically exhibited a characteristic pattern in the diesel range (IT 1997b). Action levels for benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tert-butyl ether were obtained from the literature because these fuel constituents were not reported above detection limits in samples collected for the bioassay study.

Action levels for the protection of freshwater aquatic receptors from TPH-related constituents in groundwater were developed for the Presidio using the results of a chronic aquatic toxicity bioassay, and toxicological information obtained from the literature were applied to freshwater seeps. A detailed description of the bioassays is presented in a 1997 report, Development of Point of Compliance Concentrations for Gasoline in Surface Waters and Sediments of the Proposed Freshwater Stream (Montgomery Watson 1995).

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3.0 ACTIVITIES COMPLETED DURING THE REPORTING PERIOD

The following section discusses the groundwater monitoring activities completed at the Site during the Reporting Period.

3.1 Groundwater Monitoring Well Network

The current groundwater monitoring well network is based on an evaluation of the monitoring conducted to date and historical data trends. Past data indicate that the spatial distribution and concentrations of COPCs in groundwater have been well-characterized through past groundwater monitoring activities (Terraphase 2011b). Groundwater quality trends have been documented over approximately a decade of groundwater monitoring in most parts of the Site. Therefore, the groundwater monitoring well network includes wells that were selected to monitor groundwater conditions along the perimeter of the Site along the San Francisco Bay, and additional groundwater monitoring wells in selected parts of the Site.

The current monitoring well network comprises four categories of wells:

- Perimeter wells: wells located near the San Francisco Bay shoreline and, in the case of IR Site 3, downgradient of the groundwater extraction trench;
- UST wells: wells near "open" underground storage tanks, i.e., tanks for which regulatory closure has not yet been obtained;
- Drainage area wells: wells located at the base of major drainages that contain an open tank site or other sites; and,
- Drum Lot 2 wells: wells located in the northern portion of former Drum Lot 2, where volatile organic compounds (VOCs) are present in groundwater

The groundwater monitoring well network is presented on Figure 3. Construction details for groundwater monitoring wells are presented in Table 2.

3.2 Groundwater Elevation and Fuel Product Thickness Measurements

Depth-to-groundwater and fuel product thickness measurements were made on May 14, 2012.

Depth to groundwater and fuel product thickness were measured using an oil-water interface probe. The data were collected to assess groundwater elevation and flow direction, and the potential presence of free product.

3.3 Groundwater Sampling

Groundwater samples were collected from the groundwater monitoring wells and piezometers listed in Table 2, with the exception of wells MW16+25, MWT03-02, and

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MWT05-02, which had insufficient water for sampling. Groundwater samples were collected using low-flow purging techniques in all wells, except in wells MW11-118, PZ11-76R, MW10-21, MW10-23, MW10-24, MWT12-03, MWT19-01, MWTC-01R, MW29-01, MW29-03, and MW30-08, which were sampled using disposable bailers, following either the three-well-volume purge method or the purge-and-recharge method (Table 4).

The field sampling methods and procedures used during groundwater sampling were consistent with the GWMP, with the following exception:

- Well MWT19-01 did not meet low-flow-purge criteria. The well was purged using the purge-and-recharge method. However, the well did not recover to within 80 percent of the initial water level when it was sampled. More than 24 hours elapsed between purging and sample collection.

Equilibration parameters, including water temperature, pH, turbidity, conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO) were measured during well purging. Observations were made regarding sample color, odor, and turbidity. Copies of the water-quality sampling log sheets completed during the Reporting Period are included in Appendix C.

Groundwater samples were collected in sample containers provided by the analytical laboratory and were stored in an ice-chilled cooler for transport to the laboratory. Sample containers were labeled with the collector's initials, sample identification number (well identification), time of sample collection, date, location, sample type, analytical method, and preservative used. Complete chain-of-custody (COC) forms accompanied the samples to Curtis & Tompkins, Ltd. (C&T), a California-certified analytical laboratory located in Berkeley, California.

3.4 Visual Inspection of Shoreline Area and Free Product Skimming

The shoreline area downgradient of wells containing free product was inspected at low tide for the potential presence of seeps and sheens. Neither seeps nor sheens were observed. After groundwater sampling was completed, free product was skimmed from wells which met the following criteria:

- contain more than 0.1 foot of free product;
- are within 150 feet of the shoreline; and
- are not in an area of active remediation, e.g., near the IR Site 3 extraction trench.

Two groundwater monitoring wells, MW10-23 and MW10-24, had previously met the above criteria, although they did not contain free product during the measurement on

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May 14, 2012. Sorbent socks were previously installed in these two wells to skim the free product. Socks were slowly lowered into the wells to maximize exposure to product layer, and were set to accommodate seasonal water level fluctuations. Sorbent socks were inspected monthly and replaced as needed, i.e., until free product was no longer observed in excess of 0.1 foot thickness. Monthly absorbent sock monitoring logs from the Reporting Period are presented in Appendix G.

3.5 Sample Analysis

Groundwater samples were submitted for the following analyses:

- TPH compounds, using EPA Method 8015B:
    - TPH as diesel (TPH-diesel)
    - TPH as bunker fuel (TPH-bunker)
    - TPH as jet fuel (TPH-jet-fuel)
- Selected chlorinated VOCs, using EPA Method 8260B:
    - chlorobenzene
    - 1,1-dichloroethane
    - 1,1-dichloroethene
    - 1,2-dichloroethane
    - cis-1,2-dichloroethene
    - trans-1,2-dichloroethene
    - tetrachloroethene
    - trichloroethene
    - vinyl chloride

A settling/filtering process and silica-gel cleanup were used on samples prior to the analysis of TPH compounds. These steps were taken to reduce the effects of turbidity, which is relatively high in Site samples. These processes were described in the *Final Addendum #1 to the Final Sampling and Analysis Plan* (Jonas and Associates 2006) and approved by the RWQCB in a letter dated November 1, 2006.

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4.0 GROUNDWATER MONITORING RESULTS FOR THE REPORTING PERIOD

This section provides a summary and discussion of the groundwater monitoring results for the Reporting Period, including groundwater elevations, groundwater flow direction, and groundwater analytical data.

4.1 Groundwater Elevations and Flow Direction

Site-wide groundwater elevation data are presented in Table 3 and on Figure 4. Table 3 also includes historical groundwater elevation data. Groundwater elevation data and contours for the Drum Lot 2 area are shown on Figure 5.

Groundwater elevation in the perimeter wells ranged from -1.86 to 15.94 feet AMSL. Groundwater elevation in other wells varied substantially (from 12.79 to 369.43 feet AMSL) and generally reflected the Site topography. Wet-season 2012 groundwater elevations were compared with wet-season 2011 groundwater elevations. Out of 45 wells for which wet-season event groundwater elevation data are available from both 2011 and 2012, nine wells exhibited a decrease in groundwater elevation of more than 0.5 feet while another none wells exhibited an increase of more than 0.5 feet. The groundwater elevation measurements in the remaining 27 wells were within 0.5 feet of the 2011 measurements. By far the largest relative change in groundwater elevation was observed in wells MW16+25 and MW11-104, which are located along the groundwater extraction trench in IR Site 4 (Figure 3). The relative decreases in groundwater elevation in these wells were 7.57 and 4.40 feet, respectively. These large decreases are the result of an increased rate of groundwater extraction from the trench, beginning in October 2011.

Based on the measured groundwater elevations, the predominant groundwater flow direction follows site topography, with groundwater moving from the hillside ridges, toward the axes of drainage areas, and ultimately toward the Bay. Groundwater gradients vary depending on the proximity to the Bay shoreline, with highest gradients between wells situated on hillside ridges and wells in the axis of the drainages (i.e., drainage wells).

4.2 Presence of Free Product

Free product was observed in four out of 48 wells (Table 4 and 5; Figure 6). The thickness of free product was measurable in wells MW11-88, MWT05-02, MWT06-02, and MWT08-01. The greatest thickness of free product (1.37 feet) was observed in well MWT05-02, which is adjacent to former UST 5. The thickness of free product in well MW11-88 was 0.27 foot. The other two wells contained substantially less than one foot of free product.

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None of the four wells that contained free product met criteria for the installation of sorbent socks. However, absorbent socks have been previously installed in wells MW10-23 and MW10-24 due to past presence of free product. Results of field monitoring and change-outs of sorbent socks in these two wells are presented in Appendix G.

4.3 Groundwater Analytical Results

Analytical results for groundwater samples collected during the Reporting Period are presented below, by well type. Data collected during the Reporting Period are presented on Figures 7, 8, and 9. Recent and historical analytical data for wells within the current monitoring network are summarized in Appendix A. Analytical data reports are presented in Appendix B.

4.3.1 Total Petroleum Hydrocarbons in Perimeter Wells

Total petroleum hydrocarbons were detected above reporting limits (RLs) in six out of 26 perimeter wells (Figure 7). The RLs for TPH-bunker, TPH-diesel, and TPH-jet fuel were 300, 50, and 50 ug/L, respectively.

Groundwater samples from the following six perimeter wells contained TPH-bunker, based on the chromatograms matching the bunker standard:

- MW13+27
- MW11-88
- MW10-23
- MW10-24
- MW11-104
- MW11-118

TPH-bunker concentrations in these wells ranged from 350 to 1,000 ug/L. These concentrations are all below FPALs for wells within 150 feet of the shoreline.

Groundwater samples from the following seven perimeter wells contained TPH-diesel and six perimeter wells contained potentially TPH-jet fuel, based on the chromatograms matching the respective standards:

- MW13+27
- MW11-88
- MW10-23
- MW10-24

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- MW11-19 (Primary and Duplicate; Non-detect for TPH-jet fuel)
- MW11-104
- MW11-118

TPH-diesel concentrations in wells MW13+27, MW11-88, MW10-23, MW10-24, MW-11-19, MW11-104, AND MW11-118 ranged from 53 to 360 ug/L, well below the FPALs for wells within 150 feet of the shoreline. The TPH-jet-fuel concentrations in wells MW13+27, MW11-88, MW10-23, MW10-24, MW11-104, and MW11-118 ranged from 62 to 340 ug/L, well below the FPALs for wells within 150 feet of the shoreline.

4.3.2 Total Petroleum Hydrocarbons in UST Wells

Groundwater samples were collected from 10 out of 12 UST wells. Two UST wells (MWT03-02 and MWT05-02) contained insufficient water for sampling. Total petroleum hydrocarbons were detected above RLs in eight out of the ten UST wells that were sampled (Figure 8).

Based on a comparison of chromatograms with the bunker standard, groundwater samples from the UST wells did not contain TPH-bunker, although TPH-bunker was quantified based on the analytical procedures set forth in the GWMP.

Groundwater samples from the following eight UST wells contained TPH-diesel and potentially TPH-jet fuel, based on the chromatograms matching the respective standards:

- MWT06-02
- MWT08-01
- MWT12-03
- MWT13-02
- MWT15-02
- MWT18-01
- MWT19-01
- MWTB-01R

With the exception of well MWT13-02, TPH-diesel and TPH-jet-fuel concentrations in these wells ranged from 61 to 7,900 ug/L, well below the FPALs for wells that are located more than 150 feet from the shoreline. The TPH-diesel concentration in groundwater from well MWT13-02 was 48,000ug/L, which is above the FPAL for TPH-diesel of 15,000 ug/L. The TPH-jet-fuel concentration in groundwater from well MWT13-02 was 21,000 ug/L, which is equal to the FPAL for TPH-jet-fuel. TPH concentrations in

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well MWT13-02 are probably not indicative of the presence of free product in the well, which is consistent with the absence of free product as measured using the interface probe (Section 4.2).

4.3.3 Total Petroleum Hydrocarbons in Drainage Area Wells

Groundwater samples were collected from three drainage area wells. Total petroleum hydrocarbons were detected above RLs in two out of the three drainage area wells (Figure 8).

Based on a comparison of chromatograms with the TPH standards, groundwater samples from the drainage area wells contained TPH-jet-fuel, rather than TPH-bunker or TPH-diesel.

TPH-jet-fuel concentrations in wells MW02-07 (primary and duplicate sample) and MW03-02 ranged from 420 to 560 ug/L. This range of concentrations is below the FPALs for wells located more than 150 feet from the shoreline.

4.3.4 Volatile Organic Compounds in Drum Lot 2 Area

VOCs were analyzed in samples collected from seven wells in the Drum Lot 2 area, including two perimeter wells (MW10-11 and MW10-12). VOCs were detected above RLs in three out of seven wells in the Drum Lot 2 area: MW01-03, MW29-01, and MW30-08 (Figure 9). The predominant VOC present in these wells was trichloroethene (TCE), with lower concentrations of TCE degradation products, including cis-1,2-dichloroethene (cis-1,2-DCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride (VC). The highest concentration of TCE (160 ug/L) was measured in the duplicate groundwater sample from well MW29-01. The highest concentrations of cis-1,2-DCE, 1,1-DCE, and VC were measured in groundwater from well MW30-08, which is approximately 150 feet downgradient from well MW29-01.

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5.0 SUMMARY OF FINDINGS AND DISCUSSION OF TEMPORAL TRENDS

Data collected during the Reporting Period are summarized in the following sections and compared with historical data. A comprehensive summary of historical and Reporting Period data is presented in Appendix A.

5.1 Free Product

Historical and Reporting Period free product thickness data are presented in Table 5. This table only includes wells that (a) are part of the current monitoring network, and (b) contain or have in the past contained free product. Temporal graphs of free product thickness were prepared for wells which contained free product during the Reporting Period (Appendix E).

As presented in Section 4.2, free product was detected in four out of 48 wells during the Reporting Period.

- Free product thickness measured in well MW11-88 during the Reporting Period (0.27 feet) was lower than was measured in October 2011 (0.44 feet) and July 2011 (0.64 feet). There were no historical free product thickness measurements in this well prior to 2011.

- Free product has been detected in well MWT05-02 from 1999 onward. The minimum thickness detected was 0.005 feet in August 1999 and the maximum thickness detected was 1.37 feet, measured during the Reporting Period, which was very similar to the free product thickness measured during the wet-season monitoring event in 2011 (1.35 feet). The average free product thickness detected in well MWT05-02 during the past 13 years is 0.39 feet.

- Free product has been detected in well MWT06-02 during most events for which data are available from March 1999 onward, at thicknesses as low as 0.01 feet, and as high as 0.81 feet in February 2000. The free product thickness detected during the Reporting Period (0.03 feet) was similar to the thickness measured during the wet-season monitoring event in 2011 (0.01 feet). The average thickness of free product detected during the past 12 years was 0.18 feet.

- Free product thickness measured in well MWT08-01 during the Reporting Period (0.01 feet) was similar to measurements over the last few years. Free product has been detected in this well during most events from August 1999 onward, at thicknesses as low as 0.005 feet and as high as 0.34 feet in October 2000. The average thickness of free product detected during the past 12 years was 0.07 feet.

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Of the current monitoring network wells, wells MW11-100A, MW11-104, MW13+27, MW16+25, MW10-23, MW10-24, MWT03-02, MWT12-03, MWT13-02, MWT15-02, MWT18-01, MWT19-01, MWTB-01, MWTB-01R, MWTC-01R, MW02-07, and MW03-02 previously contained free product but did not contain free product during the Reporting Period. Overall, the number of wells that contained free product during the Reporting Period (4) was lower than the number of wells containing free product during the previous wet-season monitoring event (7).

5.2 Total Petroleum Hydrocarbons

In total, 41 wells were scheduled to be sampled for TPH during the Reporting Period. Three of those 41 wells contained insufficient water for sampling (MW16+25, MWT03-02, and MWT05-02). Therefore, 38 wells were sampled site-wide for TPH. TPH concentrations were below FPALs, with the exception of well MWT13-02, a UST well adjacent to former Tank 13 (Figure 8).

A qualitative evaluation of temporal trends in TPH concentrations is presented in Table 6. The evaluation is based on a comparison of TPH concentrations measured during the Reporting Period with TPH concentrations measured in 2011.

TPH concentrations either decreased or remained stable, except for wells MW11-118, MW10-24, MW02-07 and MW03-02. Well MWT13-02 was not sampled in 2011, and therefore a comparison could not be made.

5.3 Volatile Organic Compounds

Seven wells in the Drum Lot 2 Area were sampled for VOCs during the Reporting Period. VOCs were detected in three of these wells, with TCE being the VOC present at highest concentrations, ranging from 6.8 to 160 ug/L. The TCE concentration in well MW29-01 was lower during the Reporting Period than during the previous wet-season event in 2011, when it was 330 ug/L. The concentration measured during the Reporting Period is generally consistent with the long-term decreasing trend observed since 2001, when the TCE concentration was as high as 770 ug/L.

The TCE concentration in well MW30-08 (77 ug/L) was higher during the Reporting Period than during the previous wet-season event in 2011, when it was 25 ug/L, although it was lower than during 2008 and 2009 when it ranged from 130 to 280 ug/L.

The presence of TCE degradation products in Drum Lot 2 wells indicates that reductive dechlorination is taking place in the aquifer. However, the ratio of cis-1,2-DCE to TCE in well MW30-08 decreased to 0.1 during the Reporting Period, as compared with a ratio of 0.54 during the previous wet-season sampling event.

6.0 QUALITY CONTROL

The sampling and analysis activities for the Reporting Period sampling events were performed according to procedures described in the GWMP (Terraphase 2011b). The laboratory analyses were performed according to analytical methods, detection limits, and QA/QC procedures described in the GWMP.

In addition to laboratory QC samples, the following field QC samples were collected and analyzed:

- 5 field duplicate samples
- 5 equipment blanks
- 1 source water blank
- 3 trip blank samples analyzed for VOCs

The QC procedures and data quality assessment are described in Sections 6.1 and 6.2, respectively. The QC evaluation of the analytical data, including results of laboratory and field QC samples, is summarized in Section 6.3. Appendix F includes the complete data validation reports.

6.1 QC Procedures

6.1.1 Data Verification

Data collected were subjected to the data verification process that includes proofreading and editing hard copy data reports to ensure that data correctly represent the analytical measurement. In general, verification identifies non-technical errors in the data package that can be corrected (e.g., typographical errors). Data verification also includes verifying that the sample identifiers on laboratory reports (hard copy) match those on the chain-of-custody record.

6.1.2 Laboratory QC Samples

Laboratory QC samples are used to:

- Verify that procedures, such as sample handling, storage, and preparation, are not introducing variables into the process that could render the validity of samples questionable; and
- Assess data quality in terms of precision and accuracy.

Laboratory QC samples included laboratory duplicates, laboratory blanks, matrix spike/matrix spike duplicates (MS/MSDs), and laboratory control sample/laboratory control sample duplicates (LCS/LCSDs), as applicable, and other method-required QC

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samples. Each type of laboratory-based QC sample was analyzed at a rate of 5% or one per batch (a batch is a group of up to 20 samples analyzed together) whichever was more frequent. Results are included in the QC package for each analytical report (Appendix B).

6.1.3 Field QC Samples

Field QC samples were collected in general accordance with the GWMP, with the exceptions noted in Section 3.3, to evaluate the ambient sampling conditions, the thoroughness of the decontamination process, and the reproducibility of the field sampling techniques.

Field Duplicate Samples

Field duplicate samples were collected from the same source and at the same time as the primary sample. Field duplicate results are used to evaluate the precision of the overall sampling and analytical system by comparing the relative percent difference (RPD) with the established RPD limit of 20%. Field duplicates were submitted to the laboratory and analyzed for the same parameters as the primary samples. Five groundwater field duplicate samples were collected and analyzed in the Reporting Period sampling event.

Trip Blank Samples

Trip blank samples were provided by the subcontract laboratory and were included with two coolers during the Reporting Period event for VOC analysis to demonstrate that contamination was not originating from sample containers or other factors during sample transport.

Source Water Blank

One source water blank sample was collected during the Reporting Period event. Store-bought distilled water was used for decontaminating equipment and the source water blank. The source blank samples were analyzed to demonstrate that contamination was not originating from the source water.

Equipment Blank

Five equipment blank samples were collected on reusable sampling equipment using distilled water. The equipment blank samples were analyzed to demonstrate that contamination was not originating from decontamination procedures.

6.2 Data Quality Assessment

6.2.1 General Data Review

Field and laboratory data collected during the Reporting Period were reviewed according to the criteria described in the GWMP. The laboratory analytical reports and case narratives were reviewed to verify correct sample designation, identification, and chain-of-custody records and to ensure that analytical method, holding time, and detection limit requirements were met.

6.2.2 Laboratory Data Validation

Analytical data were reviewed and data validation reports were prepared by Terraphase (Appendix F). Analytical data were reviewed in general accordance with the principles for data validation presented in the U.S. Environmental Protection Agency (U.S. EPA) National Functional Guidelines for Organic Laboratory Data Review (U.S. EPA 2008) and the USEPA National Functional Guidelines for Inorganic Laboratory Data Review (U.S. EPA 2004). The data were reviewed in the following areas to evaluate potential impact on data quality:

- Data Completeness
- Analytical Holding Times and Sample Preservation
- Field and Laboratory Blank Samples
- Laboratory Control Samples
- Matrix Spike/Matrix Spike Duplicate Samples
- Surrogate Compound Recovery
- Compound Quantitation

Except as noted in the data validation reports, the analytical data obtained during this sampling event are considered to be usable for the intended monitoring purposes.

6.3 QC Evaluation of the Analytical Data

This section presents the results of the evaluation of both field and laboratory QC checks. The evaluation of the validated data sets compared the targeted data results versus the actual data results through the use of precision, accuracy, representativeness, completeness, and comparability parameters.

6.3.1 Field QC Samples

All field QC sample results (duplicates, equipment blanks, trip blanks, and source blanks) were reviewed. No contaminants were found in equipment blanks, trip blanks, or source blanks. For the field duplicate of sample from well MW02-07, calculated RPDs ranged from 22% to 35%. For all other field duplicates, RPDs were within 20% for detected compounds.

6.3.2 Precision and Accuracy

The procedures in this section are designed to assess QC data for blanks, duplicates, spikes, and surrogates. The review of this data provides information concerning the precision and accuracy measurements conducted by the laboratories and field procedures.

Laboratory Control Sample/Laboratory Control Sample Duplicates

Laboratory control sample/laboratory control sample duplicates percent recovery (%R) were within required QC limits.

Laboratory Method Blanks

The laboratory method blank samples had no detections of target compounds.

Surrogate Spikes

Results for surrogate spikes %R that were prepared and analyzed by the laboratory were within control limits.

Matrix Spikes/Matrix Spike Duplicates

Results for MS/MSDs that were prepared and analyzed by the laboratory were within control limits.

6.3.3 Representativeness

Representativeness is the reliability with which a measurement or measurement system reflects the true conditions under investigation (U.S. EPA 2008). Representativeness is influenced by the number and location of the sampling points, sampling timing and frequency of monitoring efforts, and the field and laboratory sampling procedures (U.S. EPA 1993).

The representativeness of data was enhanced by the use of established field and laboratory procedures and their consistent application. Samples that were collected are considered to be representative of the location of sample collection.

6.3.4 Completeness

The completeness of the data is described as a ratio of the amount of data expected from the field program versus the amount of valid data actually received. Valid data are considered to be those data that have not been rejected (were not R-qualified) either from data validation or internal data review). Completeness can be expressed as the percentage of valid results relative to the total number of requested results.

Based on the data validation reports, none of the results were rejected in the Reporting Period sampling event. The completeness of the sample sets submitted for analysis is 100 percent, which is within the completeness goal of 90% set for this project.

6.3.5 Comparability

Comparability evaluates whether the reported data are comparable with similar data reported by other organizations. The comparability of the laboratory results was found to be acceptable. All units were consistent and appropriate for the matrix sampled.

Comparability also involves comparing data to previous events of sampling at the same locations. Results from the Reporting Period sampling event indicate good comparability with previous sampling events.

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7.0 UPCOMING MONITORING ACTIVITIES

7.1 Replacement of Sorbent Socks

Sorbent socks installed in groundwater monitoring wells MW10-23 and MW10-24 will be inspected monthly and replaced as needed, until free product is no longer observed in excess of 0.1 foot thickness for three consecutive months. The shoreline area downgradient of these wells will be inspected at low tide for the potential presence of seeps and sheens.

7.2 Groundwater Monitoring Events

The next upcoming groundwater monitoring events for the Site is:

- dry-season monitoring event: October/November 2012

The dry-season event includes the sampling of 32 wells. UST wells and drainage wells will not be monitored during the dry-season event because they are routinely dry at that time of the year.

The dry-season groundwater monitoring report will summarize the results from both monitoring events and may provide recommendations for changes to the GWMP.

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TABLES

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Table 1
Comparison of Reporting Limits and Fuel Product Action Levels
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

Analysis	RL (µg/L)	FPAL Greater than 150 feet from the shoreline (ug/L)	FPAL Less than 150 feet from the shoreline (ug/L)	RL at or below FPAL?
TPH (EPA Method 8015B)				
Diesel	50	15,000	2,200	yes
Bunker Fuel	300	21,000	2,200	yes
JP-5	50	21,000	2,200	yes
VOCs (EPA Method 8260B)				
1,1-Dichloroethane	0.5	NE	NE	NE
1,2-Dichloroethane	0.5	NE	NE	NE
1,1-Dichloroethene	0.5	NE	NE	NE
cis-1,2-Dichloroethene	0.5	NE	NE	NE
trans-1,2-Dichloroethene	0.5	NE	NE	NE
Tetrachloroethene	0.5	NE	NE	NE
Trichloroethene	0.5	NE	NE	NE
1,1,1-Trichloroethane	0.5	NE	NE	NE
1,1,2-Trichloroethane	0.5	NE	NE	NE
Vinyl chloride	0.5	NE	NE	NE

Notes:
FPAL = fuel product action level
TPH = total petroleum hydrocarbons
VOCs = volatile organic compounds
EPA = Environmental Protection Agency
ug/L = micrograms per liter
NE = not established
RL = Reporting Limit

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Table 2
Groundwater Monitoring Well Construction Details
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

Well Number	Area	Rationale	Date Installed	Casing Diameter (Inches)	Ground Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Screened Interval (feet bgs)
Perimeter Wells							
MW11-02	North Shoreline	Perimeter	1/25/92	4	22.43	24.30	14.0 - 24.0
MW11-04	North Shoreline	Perimeter	1/25/92	4	21.49	23.47	12.0 - 22.0
MW11-05	North Shoreline	Perimeter	2/1/92	4	20.79	22.91	10.3 - 20.3
MW11-06	North Shoreline	Perimeter	1/25/92	4	20.60	22.60	12.04 - 22.04
MW11-100A	IR Site 3	Perimeter	Unknown	4	19.00	21.04	11.5 - 18.0
MW11-104	IR Site 3	Perimeter	6/11/01	2	17.10	19.27	13.0 - 21.0
MW11-118	IR Site 3	Perimeter	6/20/01	4	17.70	19.69	11.36 - 19.36
MW13+27	IR Site 3	Perimeter	1996	2	17.20	19.64	9.95 - 20.2
MW16+25	IR Site 3	Perimeter	1996	2	17.60	20.80	9.82 - 20.07
MW11-19	IRS4 Drum Lot 1 (Drainage Area 9)	Perimeter	2/5/92	4	17.64	20.33	11.00 - 21.00
MW11-55R	IRS4 Drum Lot 1 (Drainage Area 9)	Perimeter	2/17/99	2	16.20	16.16	9.57 - 19.57
MW11-85	IRS4 Drum Lot 1 (Drainage Area 9)	Perimeter	2/11/99	4	16.31	16.23	7.00 - 17.00
MW11-88	IRS4 Drum Lot 1 (Drainage Area 9)	Perimeter	2/7/99	4	19.66	19.30	11.5 - 20.5
PZ11-74	IRS4 Drum Lot 1 (Drainage Area 9)	Perimeter	9/6/96	2	15.50	14.99	10.60 - 20.85
PZ11-76R	IRS4 Drum Lot 1 (Drainage Area 9)	Perimeter	9/6/96	2	17.52	17.40	9.82 - 20.07
MW10-04	South Shoreline Area	Perimeter	2/2/94	4	21.61	21.43	11.15 - 21.10
MW10-05	South Shoreline Area	Perimeter	2/2/94	4	21.90	21.79	9.50 - 19.43
MW10-08	South Shoreline Area	Perimeter	2/7/94	4	22.10	21.98	9.86 - 24.84
MW10-09	South Shoreline Area	Perimeter	2/4/94	4	22.30	22.24	9.55 - 19.64
MW10-10	South Shoreline Area	Perimeter	2/4/94	4	20.73	20.56	11.33 - 21.33
MW10-21	South Shoreline Area	Perimeter	6/07/01	2	23.90	23.62	15.0 - 25.0
MW10-23	South Shoreline Area	Perimeter	6/08/01	2	23.50	23.18	10.0 - 20.0
MW10-24	South Shoreline Area	Perimeter	11/16/04	4	19.44	19.24	10 - 20
MW10-25	South Shoreline Area	Perimeter	11/17/04	4	19.51	19.13	5 - 15
MW10-11	IR Site 1 Drum Lot 2	CVOC, perimeter	2/8/94	4	19.51	19.41	6.40 - 21.52
MW10-12	IR Site 1 Drum Lot 2	CVOC, perimeter	2/7/94	4	17.12	16.90	3.40 - 18.38
Open UST Wells							
MWT02-03	Tank 2 (Drainage Area 10)	Tank well	12/09/98	2	138.17	140.63	14.8 - 29.8
MWT03-02	Tank 3 (Drainage Area 10)	Tank well	12/10/98 Repaired 02/05	2	143.03	146.53	22.5 - 33.0
MWT05-02	Tank 5 (Drainage Area 3)	Tank well	12/03/98	2	211.33	213.55	21.9 - 29.9
MWT06-02	Tank 6 (Drainage Area 3)	Tank well	12/03/98	2	157.36	159.92	20.3 - 29.1
MWT08-01	Tank 8 (Drainage Area 3)	Tank well	12/03/98	2	186.95	188.78	18.4 - 23.6
MWT12-03	Tank 12 (Drainage Area 4)	Tank well	12/08/98	2	309.61	312.13	20.2 - 27.2
MWT13-02	Tank 13 (Drainage Areas 2, 3, 4)	Tank well	12/04/98	2	396.64	399.72	23.43 - 33.63
MWT15-02	Tank 15 (Drainage Area 2)	Tank well	11/20/98	2	278.58	281.35	23-28
MWT18-01	Tank 18 (Drainage Area 2)	Tank well	11/20/98	2	171.83	174.40	19.5 - 24.5
MWT19-01	Tank 19 (Drainage Area 2)	Tank well	11/24/98	2	124.27	126.68	20.5 - 28
MWTB-01R	Tank B (Drainage Area 3)	Tank well	1/31/05	2	93.75	93.45	14 - 34
MWTC-01R	Tank C (Drainage Area 3)	Tank well	1/28/05	2	50.45	50.07	10 - 15
Drum Lot 2 Wells							
MW01-03	IR Site 1 Drum Lot 2 / Bldg 87	CVOC plume	5/13/02	2	34.85	35.07	8.0 - 18.0
MW29-01	IR Site 1 Drum Lot 2 / Bldg 87	CVOC plume	6/2000	2	32.61	32.15	15.0 - 25.0
MW29-02	IR Site 1 Drum Lot 2 / Bldg 87	CVOC plume	5/14/02	2	29.29	29.62	10.0 - 20.0
MW29-03	IR Site 1 Drum Lot 2 / Bldg 87	CVOC plume	5/14/02	2	41.35	41.55	16.0 - 26.0
MW30-08	IR Site 1 Drum Lot 2 / Bldg 87	CVOC plume	11/22/99	2	24.06	23.6	10.25 - 19.40
MW31-01	IR Site 1 Drum Lot 2 / Bldg 88	CVOC plume	4/30/2012	2			18-28
MW31-02	IR Site 1 Drum Lot 2 / Bldg 89	CVOC plume	5/2/2012	2			20-30
MW31-03	IR Site 1 Drum Lot 2 / Bldg 90	CVOC plume	5/1/2012	2			18-28
MW31-04	IR Site 1 Drum Lot 2 / Bldg 91	CVOC plume	5/1/2012	2			23-28
MW31-05	IR Site 1 Drum Lot 2 / Bldg 92	CVOC plume	4/30/2012	2			18-28
MW10-11	IR Site 1 Drum Lot 2	CVOC, perimeter	2/8/94	4	19.51	19.41	6.40 - 21.52
MW10-12	IR Site 1 Drum Lot 2	CVOC, perimeter	2/7/94	4	17.12	16.9	3.40 - 18.38
Drainage Area Wells							
MW02-07	Drainage Area 2	Drainage well	7/27/94	4	48.53	50.89	11.60 - 21.60
MW03-02	Drainage Area 3	Drainage well	12/16/98	4	75.53	74.96	10.33-20.50
MW04-04	Drainage Area 4	Drainage well	12/18/98	2	71.28	73.8	15.25 - 25.75

Notes:
amsl = above mean sea level
bgs = below ground surface
UST = underground storage tank
CVOC = chlorinated volatile organic compound

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Table 3
Groundwater Elevation Data
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

Well Number	Date of Measurement	Top of Casing Elevation (feet amsl)	Depth to Water (feet below top of casing)	Groundwater Elevation (feet amsl)
MW11-02	5/14/2012	24.30	17.76	6.54
MW11-04	5/14/2012	23.47	15.26	8.21
MW11-05	5/14/2012	22.91	16.47	6.44
MW11-06	5/14/2012	22.60	16.24	6.36
MW11-100A	5/14/2012	21.04	15.57	5.47
MW11-104	5/14/2012	19.27	18.23	1.04
MW11-118	5/14/2012	19.69	14.78	4.91
MW13+27	5/14/2012	19.64	16.75	2.89
MW16+25	5/14/2012	20.80	22.66	-1.86
MW11-19	5/14/2012	20.33	15.95	4.38
MW11-55R	5/14/2012	16.16	11.99	4.17
MW11-85	5/14/2012	16.23	11.59	4.64
MW11-88	5/14/2012	19.30	15.08	4.22
PZ11-74	5/14/2012	14.99	10.77	4.22
PZ11-76R	5/14/2012	17.40	14.42	2.98
MW10-04	5/14/2012	21.43	15.57	5.86
MW10-05	5/14/2012	21.79	15.96	5.83
MW10-08	5/14/2012	21.98	10.56	11.42
MW10-09	5/14/2012	22.24	8.28	13.96
MW10-10	5/14/2012	20.56	10.27	10.29
MW10-21	5/14/2012	23.62	17.83	5.79
MW10-23	5/14/2012	23.18	7.24	15.94
MW10-24	5/14/2012	19.24	16.02	3.22
MW10-25	5/14/2012	19.13	6.50	12.63
MW10-11	5/14/2012	19.41	6.62	12.79
MW10-12	5/14/2012	16.90	2.44	14.46
MWT02-03	5/14/2012	140.63	25.04	115.59
MWT03-02	5/14/2012	146.53	NM	NM
MWT05-02	5/14/2012	213.55	27.98	185.57
MWT06-02	5/14/2012	159.92	24.11	135.81
MWT08-01	5/14/2012	188.78	20.58	168.20
MWT12-03	5/14/2012	312.13	26.77	285.36
MWT13-02	5/14/2012	399.72	30.29	369.43
MWT15-02	5/14/2012	281.35	25.82	255.53
MWT18-01	5/14/2012	174.40	24.44	149.96
MWT19-01	5/14/2012	126.68	26.30	100.38
MWTB-01R	5/14/2012	93.45	11.85	81.60
MWTC-01R	5/14/2012	50.07	13.78	36.29

Table 3
Groundwater Elevation Data
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

Well Number	Date of Measurement	Top of Casing Elevation (feet amsl)	Depth to Water (feet below top of casing)	Groundwater Elevation (feet amsl)
MW01-03	5/14/2012	35.07	2.46	32.61
MW29-01	5/14/2012	32.15	6.07	26.08
MW29-02	5/14/2012	29.62	4.96	24.66
MW29-03	5/14/2012	41.55	9.05	32.50
MW30-08	5/14/2012	23.60	0.71	22.89
MW10-11	5/14/2012	19.41	6.62	12.79
MW10-12	5/14/2012	16.90	2.44	14.46
MW02-07	5/14/2012	50.89	18.96	31.93
MW03-02	5/14/2012	74.96	16.77	58.19
MW04-04	5/14/2012	73.80	21.61	52.19

Table 4
Summary of Water Level, Free Product Thickness, and Well Purging Data
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

Well Number	Area	Date of Measurement	Top of Casing Elevation (feet amsl)	Depth to Water (feet below top of casing)	Groundwater Elevation (feet amsl)	Free Product Thickness (feet)	Volume Purged (liters)	Purge Method	Recharge	Flow Rate (milliliters/minute)
MW11-02	North Shoreline	5/14/2012	24.30	17.76	6.54	NO	8.0	low-flow	good	200
MW11-04	North Shoreline	5/14/2012	23.47	15.26	8.21	NO	6.4	low-flow	good	200
MW11-05	North Shoreline	5/14/2012	22.91	16.47	6.44	NO	4.2	low-flow	good	200
MW11-06	North Shoreline	5/14/2012	22.60	16.24	6.36	NO	9.0	low-flow	good	16.3
MW11-100A	IR Site 3	5/14/2012	21.04	15.57	5.47	NO	9.4	low-flow	good	400
MW11-104	IR Site 3	5/14/2012	19.27	18.23	1.04	ND	7.3	low-flow	good	300
MW11-118	IR Site 3	5/14/2012	19.69	14.78	4.91	NO	49.6	three-well-volumes	poor	NA
MW13+27	IR Site 3	5/14/2012	19.64	16.75	2.89	NO	13.2	low-flow	good	160
MW16+25	IR Site 3	5/14/2012	20.80	22.66	-1.86	NO	NS	NS	NS	NS
MW11-19	IRS4 Drum Lot 1 (Drainage Area 9)	5/14/2012	20.33	15.95	4.38	NO	4.7	low-flow	good	260
MW11-55R	IRS4 Drum Lot 1 (Drainage Area 9)	5/14/2012	16.16	11.99	4.17	ND	3.1	low-flow	good	125
MW11-85	IRS4 Drum Lot 1 (Drainage Area 9)	5/14/2012	16.23	11.59	4.64	ND	10.3	low-flow	good	380
MW11-88	IRS4 Drum Lot 1 (Drainage Area 9)	5/14/2012	19.30	15.08	4.22	0.27	24.6	low-flow	good	380
PZ11-74	IRS4 Drum Lot 1 (Drainage Area 9)	5/14/2012	14.99	10.77	4.22	NO	9.7	low-flow	good	500
PZ11-76R	IRS4 Drum Lot 1 (Drainage Area 9)	5/14/2012	17.40	14.42	2.98	NO	5.3	purge-and-recharge	poor	NA
MW10-04	South Shoreline Area	5/14/2012	21.43	15.57	5.86	NO	7.8	low-flow	good	300
MW10-05	South Shoreline Area	5/14/2012	21.79	15.96	5.83	NO	14.2	low-flow	good	260
MW10-08	South Shoreline Area	5/14/2012	21.98	10.56	11.42	NO	4.9	low-flow	good	100
MW10-09	South Shoreline Area	5/14/2012	22.24	8.28	13.96	NO	4.2	low-flow	good	100
MW10-10	South Shoreline Area	5/14/2012	20.56	10.27	10.29	NO	4.7	low-flow	good	130
MW10-21	South Shoreline Area	5/14/2012	23.62	17.83	5.79	NO	5.5	purge-and-recharge	poor	NA
MW10-23	South Shoreline Area	5/14/2012	23.18	7.24	15.94	NO	19.5	three-well-volumes	poor	NA
MW10-24	South Shoreline Area	5/14/2012	19.24	16.02	3.22	NO	18.0	purge-and-recharge	poor	NA
MW10-25	South Shoreline Area	5/14/2012	19.13	6.50	12.63	NO	4.4	low-flow	good	140
MW10-11	IR Site 1 Drum Lot 2	5/14/2012	19.41	6.62	12.79	NO	3.2	low-flow	good	150
MW10-12	IR Site 1 Drum Lot 2	5/14/2012	16.90	2.44	14.46	NO	5.3	low-flow	good	120
MWT02-03	Tank 2 (Drainage Area 10)	5/14/2012	140.63	25.04	115.59	ND	18.6	low-flow	good	420
MWT03-02	Tank 3 (Drainage Area 10)	5/14/2012	146.53	NM	NM	ND	NS	NS	NS	NS
MWT05-02	Tank 5 (Drainage Area 3)	5/14/2012	213.55	27.98	185.57	1.37	7.6	NS	NS	NS
MWT06-02	Tank 6 (Drainage Area 3)	5/14/2012	159.92	24.11	135.81	0.03	8.1	low-flow	good	150
MWT08-01	Tank 8 (Drainage Area 3)	5/14/2012	188.78	20.58	168.20	0.01	5.3	low-flow	good	160
MWT12-03	Tank 12 (Drainage Area 4)	5/14/2012	312.13	26.77	285.36	ND	4.7	purge-and-recharge	poor	NA
MWT13-02	Tank 13 (Drainage Areas 2, 3, 4)	5/14/2012	399.72	30.29	369.43	ND	2.1	low-flow	good	130
MWT15-02	Tank 15 (Drainage Area 2)	5/14/2012	281.35	25.82	255.53	ND	2.7	low-flow	good	140
MWT18-01	Tank 18 (Drainage Area 2)	5/14/2012	174.40	24.44	149.96	NO	4.7	low-flow	good	110
MWT19-01	Tank 19 (Drainage Area 2)	5/14/2012	126.68	26.30	100.38	NO	2.9	purge-and-recharge	poor	NA
MWTB-01R	Tank B (Drainage Area 3)	5/14/2012	93.45	11.85	81.60	0.01	4.9	low-flow	good	140
MWTC-01R	Tank C (Drainage Area 3)	5/14/2012	50.07	13.78	36.29	ND	18.9	three-well-volumes	poor	NA
MW01-03	IR Site 1 Drum Lot 2 / Bldg 87	5/14/2012	35.07	2.46	32.61	NO	4.3	low-flow	good	200
MW29-01	IR Site 1 Drum Lot 2 / Bldg 87	5/14/2012	32.15	7.10	25.05	NO	36.3	three-well-volumes	poor	NA
MW29-02	IR Site 1 Drum Lot 2 / Bldg 87	5/14/2012	29.62	4.96	24.66	ND	2.5	low-flow	good	100
MW29-03	IR Site 1 Drum Lot 2 / Bldg 87	5/14/2012	41.55	9.05	32.50	NO	34.8	three-well-volumes	poor	NA
MW30-08	IR Site 1 Drum Lot 2 / Bldg 87	5/14/2012	23.60	0.71	22.89	NO	29.3	purge-and-recharge	poor	NA
MW10-11	IR Site 1 Drum Lot 2	5/14/2012	19.41	6.62	12.79	NO	3.2	low-flow	good	150
MW10-12	IR Site 1 Drum Lot 2	5/14/2012	16.90	2.44	14.46	NO	5.3	low-flow	good	120
MW02-07	Drainage Area 2	5/14/2012	50.89	18.96	31.93	NO	7.3	low-flow	good	240
MW03-02	Drainage Area 3	5/14/2012	74.96	16.77	58.19	NO	9.3	low-flow	good	250
MW04-04	Drainage Area 4	5/14/2012	73.80	21.61	52.19	NO	12.0	low-flow	good	200

Notes:
P = Free product was detected but thickness could not be quantified due to smearing on probe
NM = not measureable
ND = not detected
NS = not sampled, due to the well being dry or containing insufficient water for sampling
NA = not applicable
amsl = above mean sea level

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Table 5
Historical Free Product Thickness
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

Well Number	Jan-99	Mar-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99	Jan-00	Feb-00	Mar-00	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01
Perimeter Wells																						
MW11-100A	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW11-104	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW13+27	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW16+25	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW11-88	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW10-23	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW10-24	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Open UST Wells																						
MWT03-02	NM	0	0	0	0	0.02	0.01	0	0	0	0	0	0	0	0	0	0	0	NM	0	0	0
MWT05-02	NM	0.49	0.005	0.84	NM	1.29	0.37	0.26	0.39	0.49	0.28	0.22	0.32	0.22	0.25	0.21	0.25	0.1	0.13	0.04	0.08	0.13
MWT06-02	NM	0.03	0.36	0.29	0.27	0.24	0.29	0.33	0.81	0.23	0.17	0.11	0.22	0.11	0.38	0.33	0.53	0.42	0.52	0.56	0	0
MWT08-01	NM	0	0.04	0.21	NM	0.04	0.1	0.01	0.05	0.01	0.02	0.005	0.15	0.005	0.25	0.26	0.34	0.1	0.09	NM	0.01	NM
MWT12-03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MWT13-02	NM	NM	0.5	0.5	0.43	0.48	0.45	0.05	0.02	0.66	0.2	0.01	0.04	0.01	0.015	0.03	0.09	0.21	0.25	0.24	0.23	NM
MWT15-02	NM	NM	0	0	NM	0.00	0	0	0	0	0	0	0	0	0	0	0	0	NM	0	0	0
MWT18-01	NM	0	0.01	0	NM	0.00	0.01	0.01	3.73	0.9	0.64	1.17	2.43	1.17	1.97	1.73	0.01	0.36	1.09	0.71	NM	0
MWT19-01	NM	0.03	0.01	0.29	NM	0.10	0.01	NM	NM	0.01	NM	0.015	NM	0.015	0.005	0.01	NM	NM	0.035	0.01	0.01	NM
MWTB-01	NM	NM	0.28	0.22	NM	0.00	0.01	0	NM	0.005	NM	0.01	0.14	0.01	0.02	0.43	0.61	0.55	0.54	0.47	0.25	0.2
MWTB-01R	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MWTC-01	NM	0	0	0	NM	0.00	0	0	0	0	0	0	0	0	0	0	0	0	NM	0	0.01	0.01
Drainage Area Wells																						
MW02-07	0	0.02	0.02	0.02	NM	0.05	0.02	NM	0.005	NM	0	0	0	0	0	0	0	0	NM	0	0	0
MW03-02	0	0	0	0	NM	0	0	0	0	0	0	0	0	0	0	0	0.01	0	NM	0	0	0

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Table 5
Historical Free Product Thickness
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

Well Number	Apr-01	May-01	Jun-01	Jan-02	Oct-02	Jul-03	Jan-04	Jul-04	Jan-05	Jul-05	May-06	Sep-06	Sep-07	Mar-08	Sep-08	Apr-09	Jul-11	Oct-11	May-12
Perimeter Wells																			
MW11-100A	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.01	0.00	0.00	**0**	0	0
MW11-104	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	**0.01**	0	0	0
MW13+27	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.01	**0.01**	**0.02**	**0.01**	0	**0**
MW16+25	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	**0.01**	**0.01**	0	0	0
MW11-88	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	**0.64**	**0.44**	**0.27**
MW10-23	NM	NM	NM	NM	NM	NM	NM	0.01	NM	NM	NM	NM	**14.27**	NM	**0.01**	**0.01**	**P**	0	0
MW10-24	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0	**P**	0	0
Open UST Wells																			
MWT03-02	0	0	0	NM	0	0	0	0	0	NM	0	0	NM	0	NM	NM	0	0	**0**
MWT05-02	**0.13**	**0.23**	**0.21**	NM	**0.14**	NM	NM	**0.86**	NM	**0.05**	**0.12**	**0.86**	**0.35**	**0.5**	0.01	**0.03**	**1.35**	**1.06**	**1.37**
MWT06-02	**0.01**	0	0	NM	**0.01**	0	**0.02**	**0.14**	**0.01**	**0.06**	**0**	0.03	**0.08**	**0.04**	**0.02**	**0.20**	**0.01**	**0**	**0.03**
MWT08-01	**0.01**	**0.03**	**0.1**	NM	**0.11**	**0.09**	**0.2**	**0.1**	NM	**0.01**	0	0	0	0	**0.02**	**0.01**	**P**	**0.01**	**0.01**
MWT12-03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	**0.01**	0	**0**	0
MWT13-02	**0.52**	**0.18**	**0.15**	NM	**0.27**	NM	NM	0.15	**0.12**	**0.33**	0	0.01	**0.11**	0.04	**0.2**	**0.05**	0	0	0
MWT15-02	**0**	0	0	NM	**0.01**	0	0	0	0	0	0	0	**0.01**	0	0.01	**0.01**	0	0	0
MWT18-01	NM	NM	NM	NM	NM	**0.03**	**0.03**	**0.03**	**0.03**	**0.06**	**0.04**	**0.06**	**0.01**	0	0.01	**0.01**	0	0	0
MWT19-01	**0.01**	**0.01**	**0.01**	NM	**0.005**	0	0	0	0	0	0	0	0	0	0	0.00	0	0	0
MWTB-01	**0.34**	**0.39**	**0.33**	NM	**0.34**	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MWTB-01R	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	**0.15**	**0.02**	**0.05**	0	**P**	**0.01**
MWTC-01	**0.01**	0	0	NM	0	0	0	0	NM	NM	NM	NM	NM	NM	NM	NM	0	0	0
Drainage Area Wells																			
MW02-07	0	0	**0**	NM	0	0	0	0	0	**0**	0	**0**	0	**0**	0	0	0	0	0
MW03-02	0	0	NM	NM	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	**0**

Notes:
NM = not measured
P = Free product was detected but thickness could not be quantified
bold = signifies the presence of free-product

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Table 6

Evaluation of Qualitative Temporal Trends in Concentrations of TPH Compounds and TCE
2012 Wet Season Groundwater Monitoring, Former Naval Fuel Depot Point Molate

	Concentration Trends			
Well Number	TPH-bunker	TPH-diesel	TPH-jet-fuel	TCE
Perimeter Wells				
MW11-02	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW11-04	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW11-05	NC (ND)	NC (ND)	NC (ND)	NA
MW11-06	NC (ND)	NC (ND)	NC (ND)	NA
MW11-100A	Decrease	Decrease	Decrease	NA
MW11-104	Decrease	Decrease	Decrease	NA
MW11-118	<J 2011; >N 2011	<J 2011; >N 2011	<J 2011; >N 2011	NA
MW13+27	Decrease	Decrease	Decrease	NA
MW16+25	NS	NS	NS	NA
MW11-19	NC (ND) 2012	Increase; ND 2011	NC (ND) 2012	NA
MW11-55R	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW11-85	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW11-88	Decrease	Decrease	Decrease	NA
PZ11-74	NC (ND)	NC (ND)	NC (ND)	NA
PZ11-76R	NC (ND)	NC (ND)	NC (ND)	NA
MW10-04	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW10-05	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW10-08	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW10-09	NC (ND)	NC (ND)	NC (ND)	NA
MW10-10	NC (ND)	NC (ND)	NC (ND)	NA
MW10-21	NC (ND) 2012	NC (ND) 2012	NC (ND) 2012	NA
MW10-23	NC J 2011; <N 2011	NC J 2011; <N 2011	NC J 2011; <N 2011	NA
MW10-24	<J 2011; >N 2011	<J 2011; >N 2011	<J 2011; NC N 2011	NA
MW10-25	NC (ND) 2012	Decrease; NC J 2011	Decrease; NC J 2011	NA
MW10-11	NC (ND)	NC (ND)	NC (ND)	NC (ND)
MW10-12	NC (ND)	NC (ND)	NC (ND)	NC (ND)
Open UST Wells				
MWT02-03	Decrease	Decrease	Decrease	NA
MWT03-02	NS	NS	NS	NA
MWT05-02	NS	NS	NS	NA
MWT06-02	Decrease	Decrease	Decrease	NA
MWT08-01	Decrease	Decrease	Decrease	NA
MWT12-03	Decrease	Decrease	Decrease	NA
MWT13-02	NS 2011	NS 2011	NS 2011	NA
MWT15-02	Decrease	Decrease	Decrease	NA
MWT18-01	Decrease	Decrease	Decrease	NA
MWT19-01	Decrease	Decrease	Decrease	NA
MWTB-01R	Decrease	Decrease	Decrease	NA
MWTC-01R	NC (ND)	NC (ND)	NC (ND)	NA
Drum Lot 2 Wells				
MW01-03	NA	NA	NA	Decrease
MW29-01	NA	NA	NA	Decrease
MW29-02	NA	NA	NA	NC (ND)
MW29-03	NA	NA	NA	NC (ND)
MW30-08	NA	NA	NA	>J 2011; >N 2011
Drainage Area Wells				
MW02-07	Increase	NC J 2011	NC J 2011	NA
MW03-02	>J 2011	>J 2011	>J 2011	NA
MW04-04	NC (ND)	NC (ND)	NC (ND)	NA

Notes:
TPH = total petroleum hydrocarbons; analzyed with silica-gel cleanup
TCE = trichloroethene
UST = underground storage tank
NS = not sampled
NS 2011 = not sampled in 2011
NC = no change
NC (ND) = no change, not detected above reporting limits in 2008, 2009, 2011, and 2012
NC J 2011 = no change relative to concentrations in July 2011
NC N 2011 = no change relative to concentrations in November 2011
NA = not analyzed
< J 2011 = decrease relative to concentrations in July 2011
> N 2011 = increase relative to concentrations in November 2011
ND 2011 = not detected above reporting limits in July and November 2011
NC (ND) 2012 = no change, not detected above reporting limits in 2011 and 2012

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FIGURES

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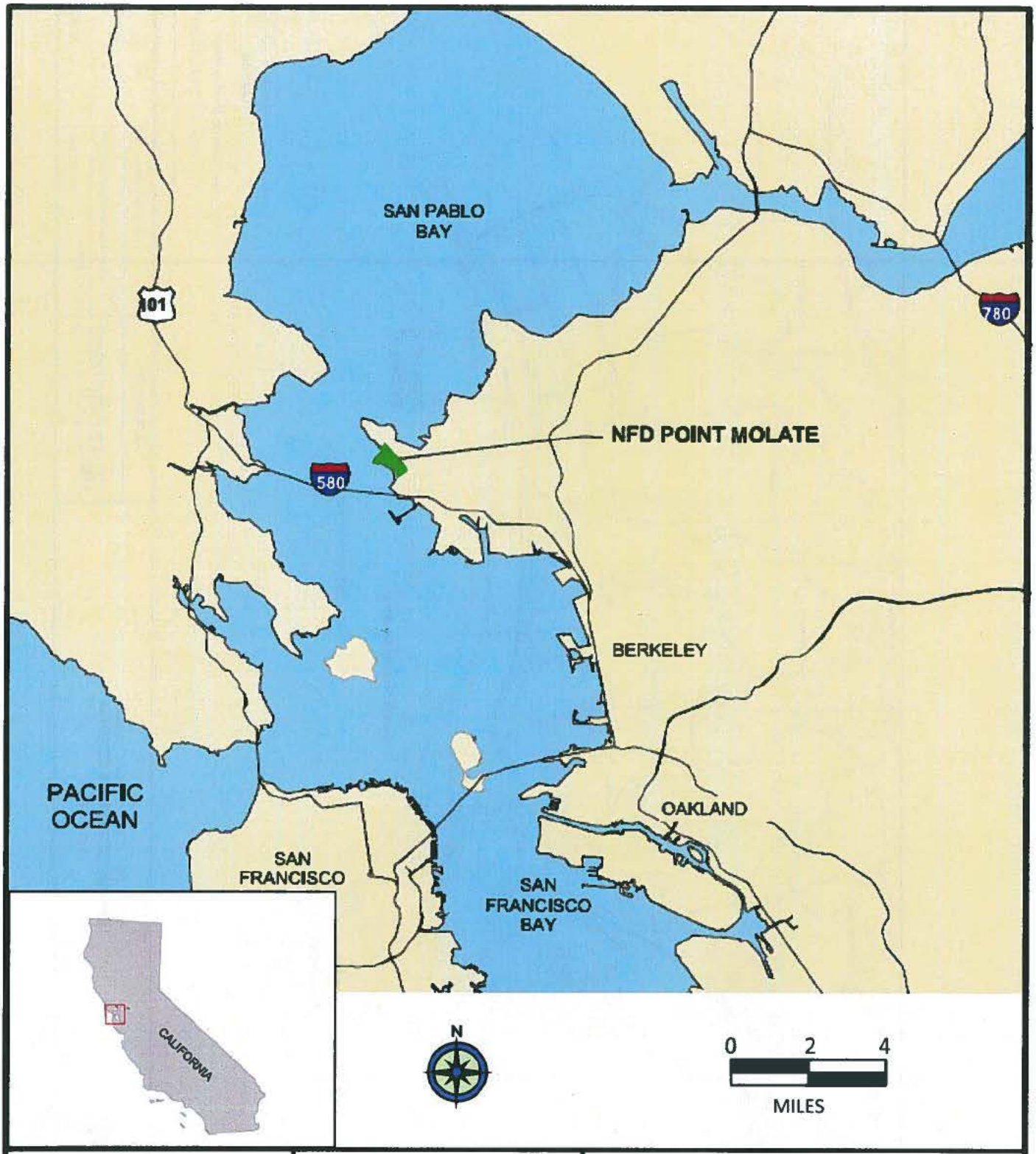

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Site Vicinity Map
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 1

File Name: Fig_1_Site_Vicinity_Map_0001.001.011 Prepared by: EM Checked by: PTZ

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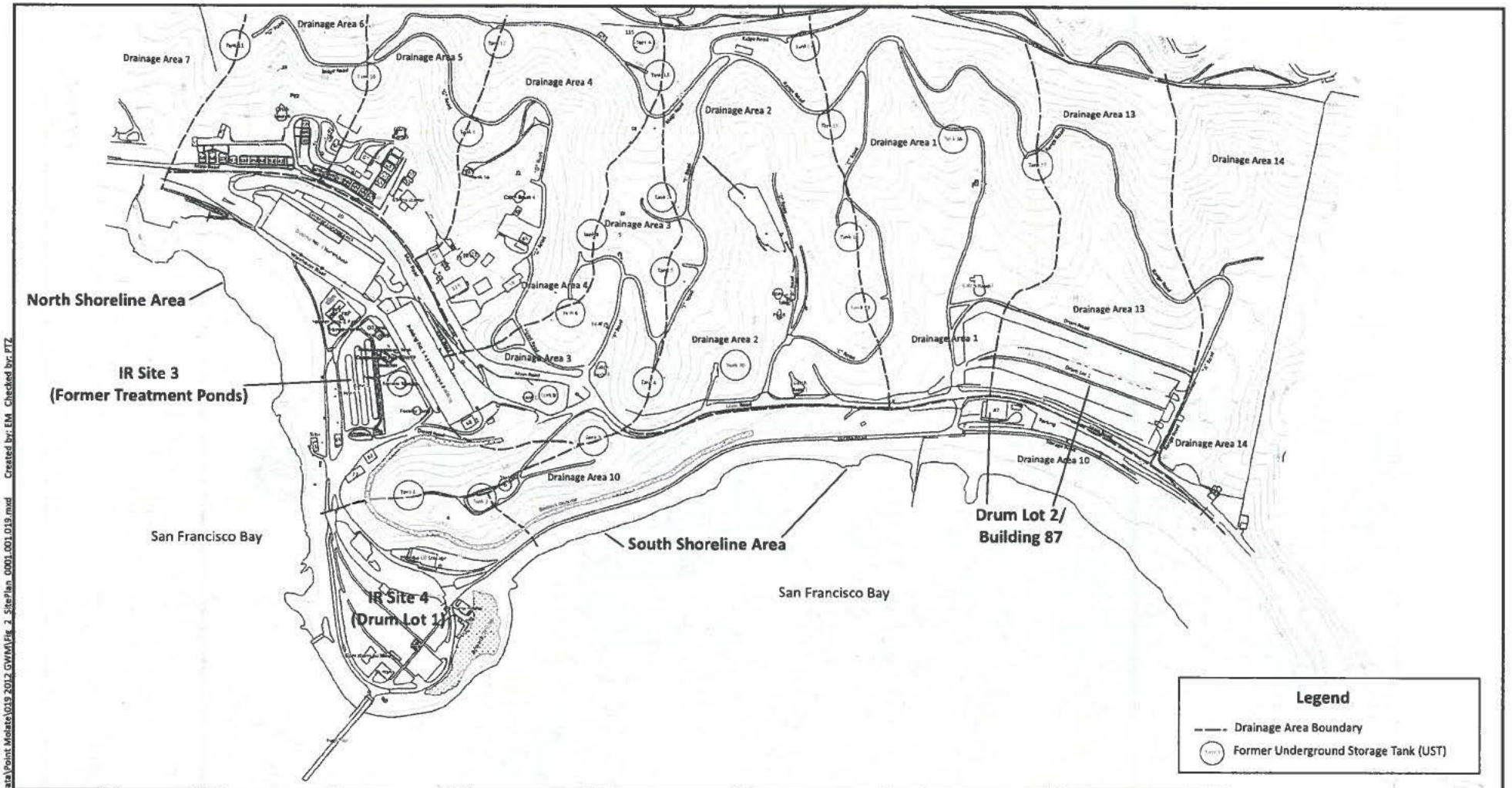

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Site Plan
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 2

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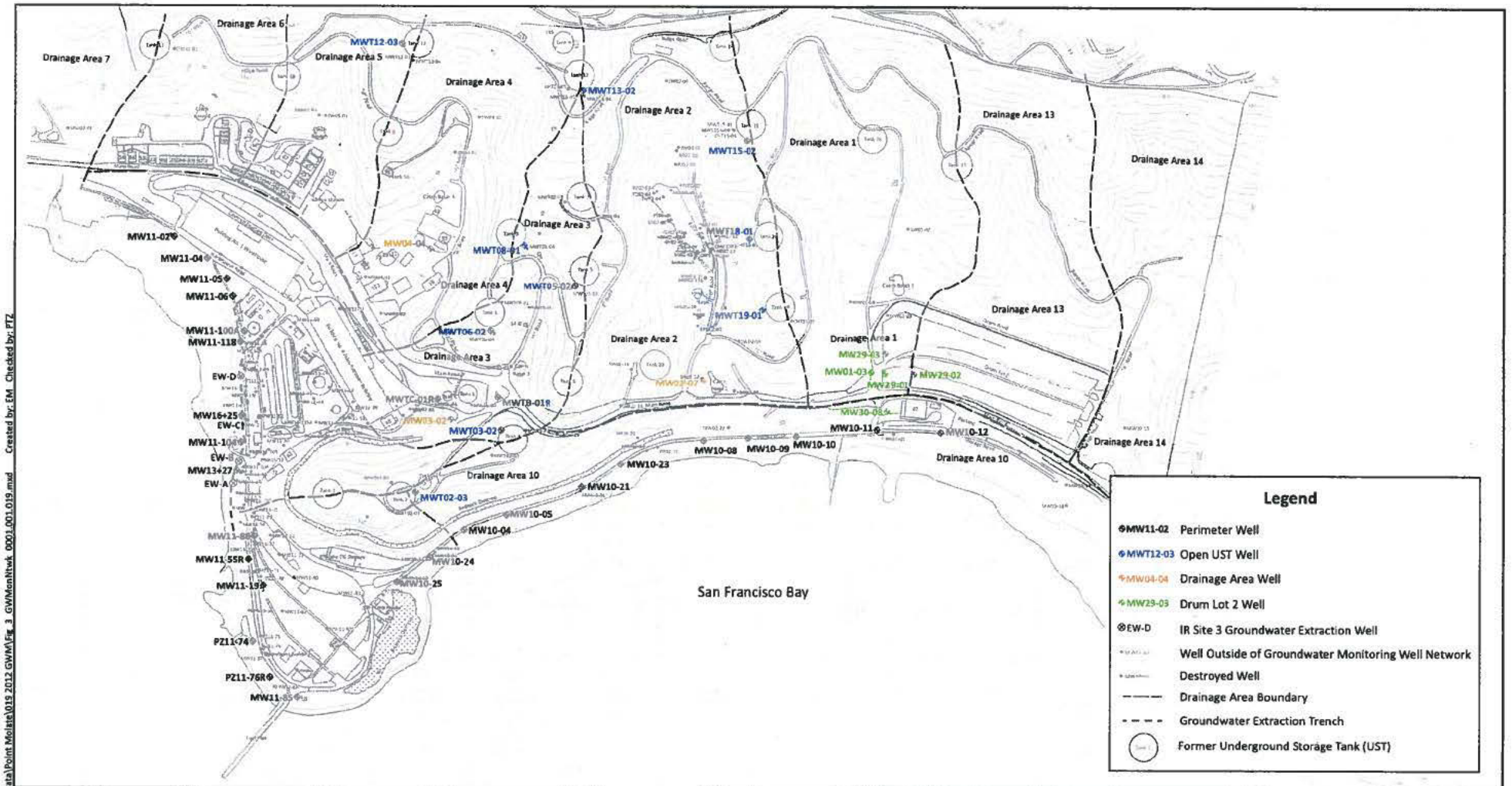

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Groundwater Monitoring Well Network
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 3

File: J:\GIS Backup\GIS Data\Point Molate\019 2012 GWM\Fig_3_GWMonNtwk_0001.001.019.mxd Created by: EM Checked by: PTZ

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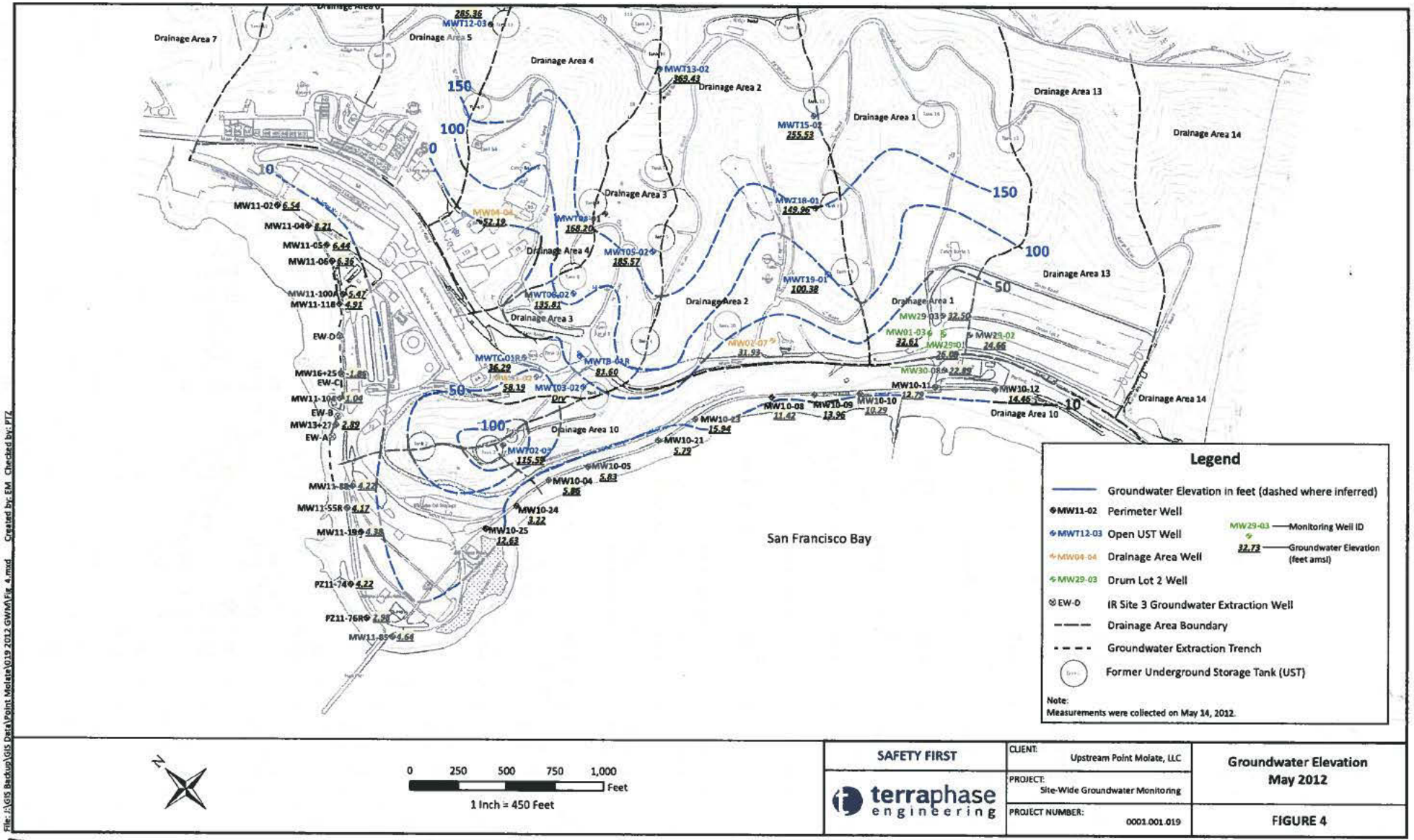

Legend

- Groundwater Elevation in feet (dashed where inferred)
- MW11-02 Perimeter Well
- MWT12-03 Open UST Well
- MW04-04 Drainage Area Well
- MW29-03 Drum Lot 2 Well
- EW-D IR Site 3 Groundwater Extraction Well
- Drainage Area Boundary
- Groundwater Extraction Trench
- Former Underground Storage Tank (UST)

MW29-03 — Monitoring Well ID
32.73 — Groundwater Elevation (feet amsl)

Note:
Measurements were collected on May 14, 2012.

0 250 500 750 1,000 Feet

1 Inch = 450 Feet

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Groundwater Elevation May 2012
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 4

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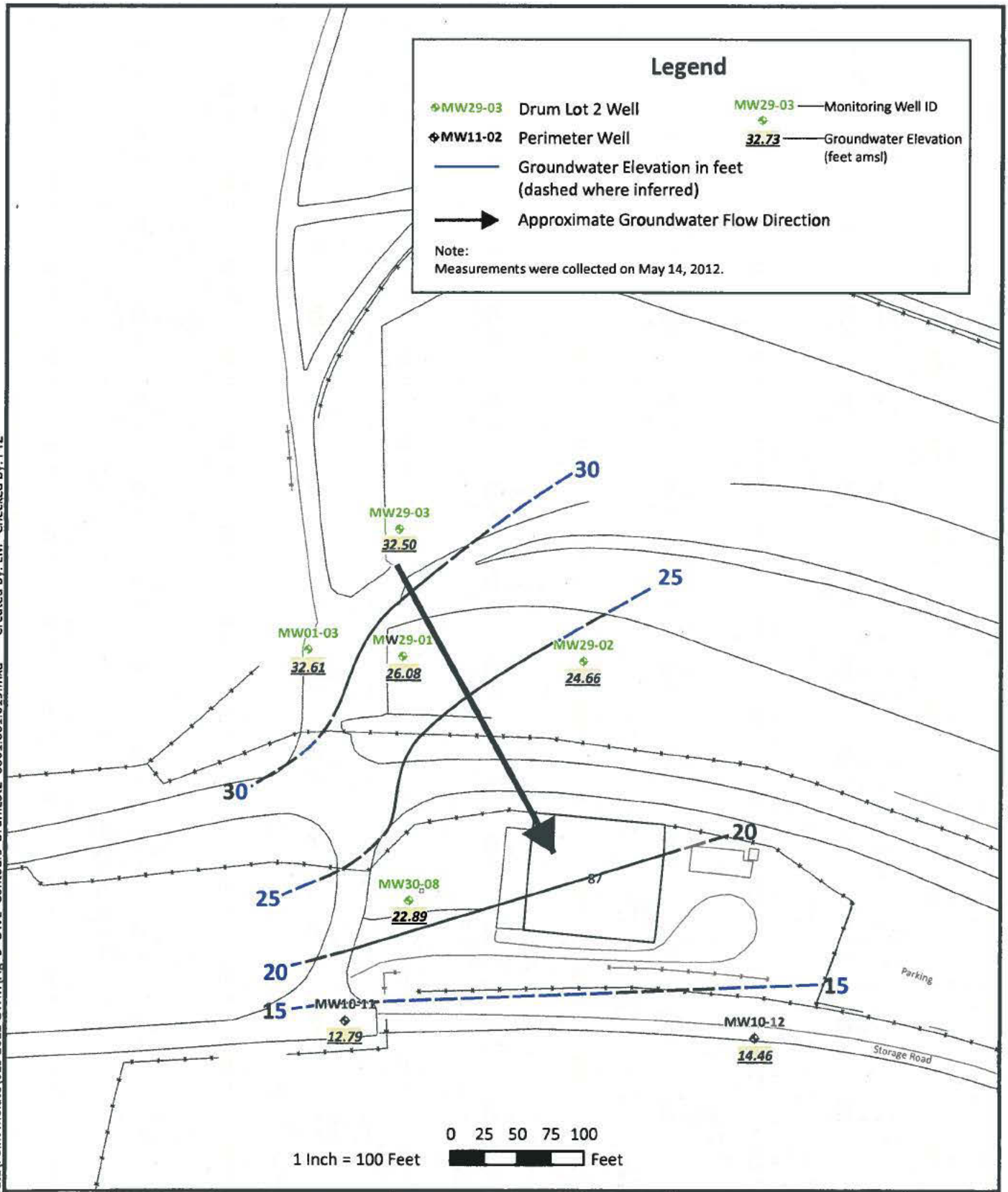

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N	SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Groundwater Elevation Contours Drum Lot 2 Area May 2012
	terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
		PROJECT NUMBER: 0001.001.019	FIGURE 5

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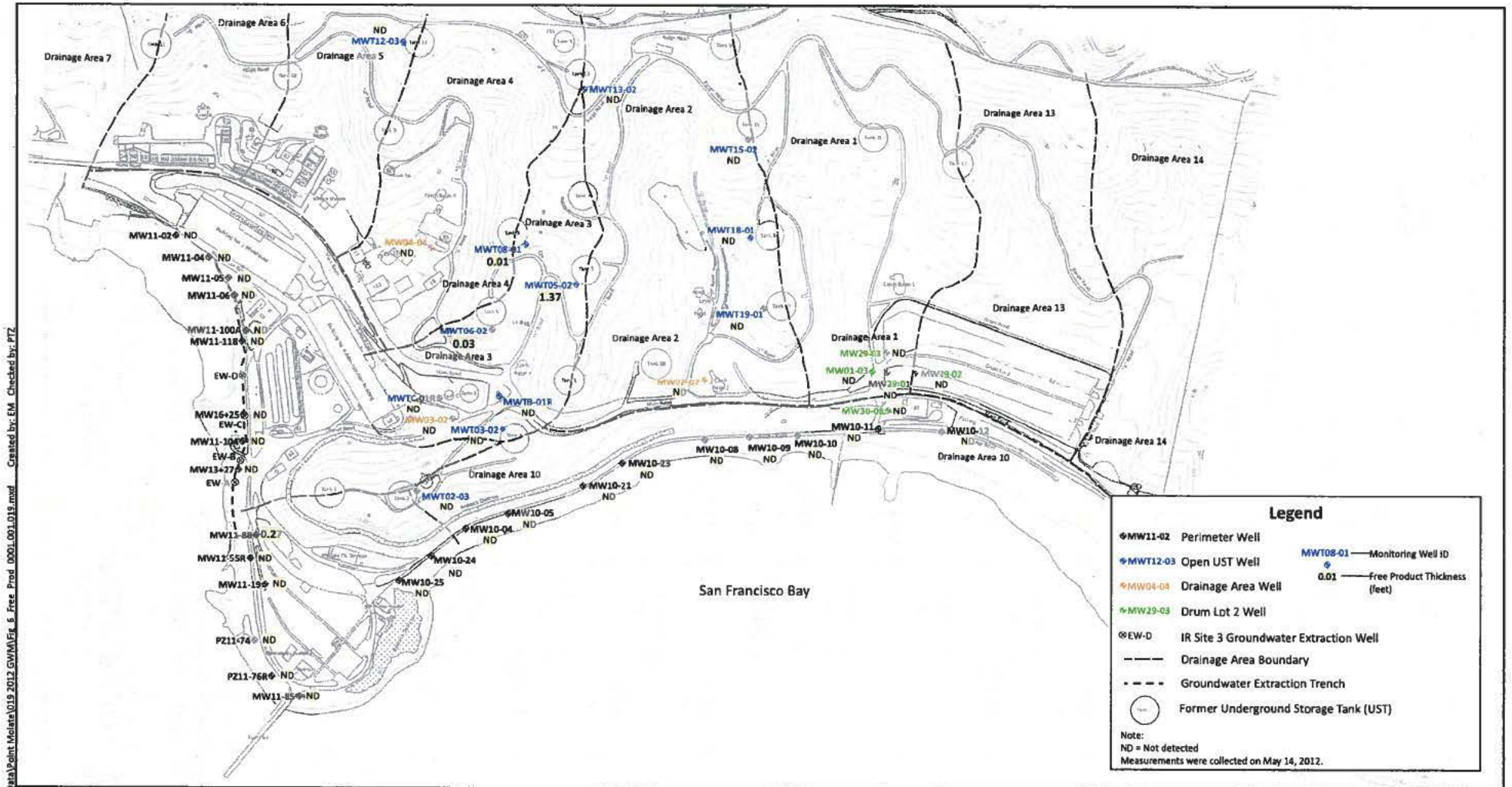

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Free Product Thickness May 2012
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 6

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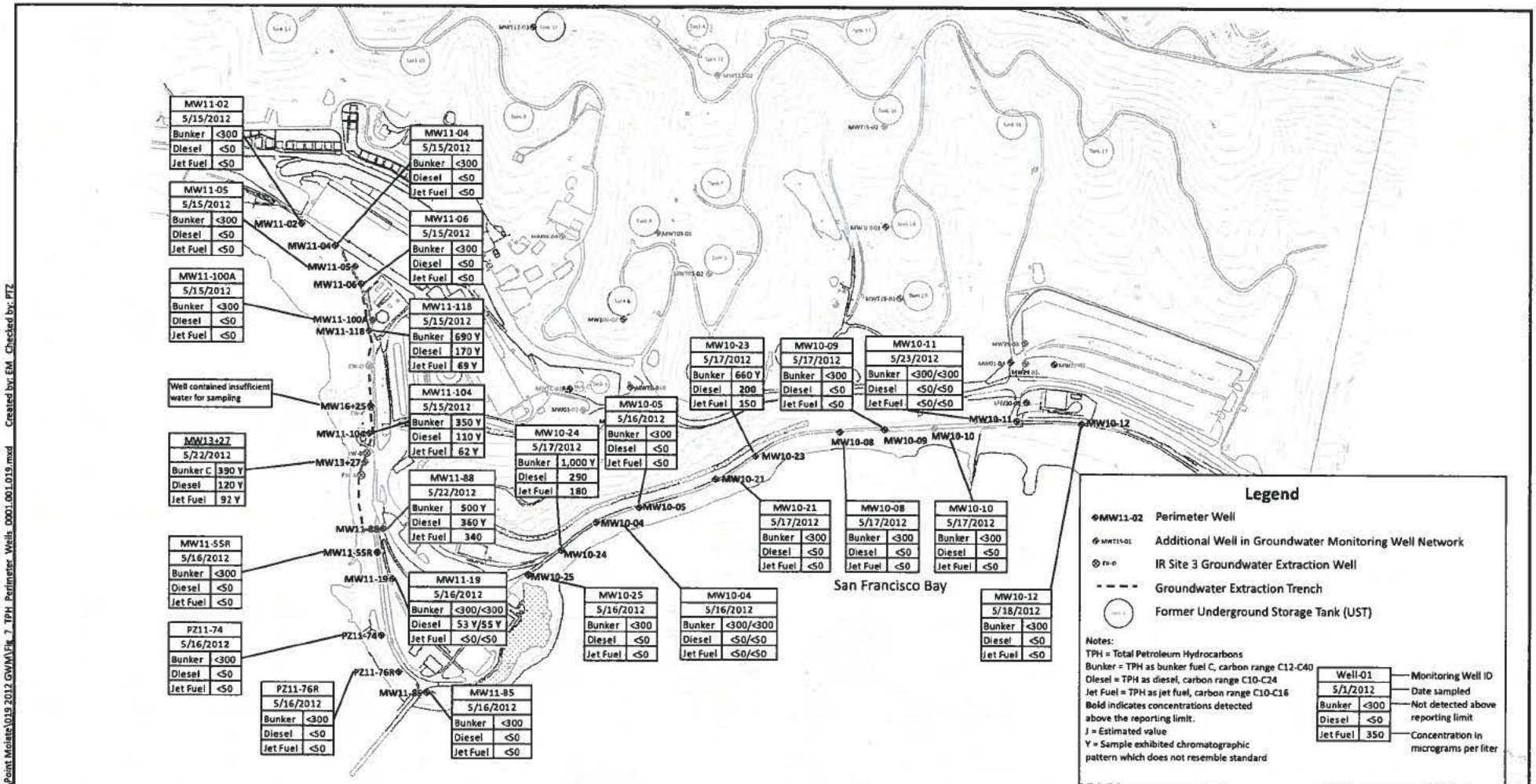

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Concentrations of Total Petroleum Hydrocarbons in Perimeter Wells May 2012
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 7

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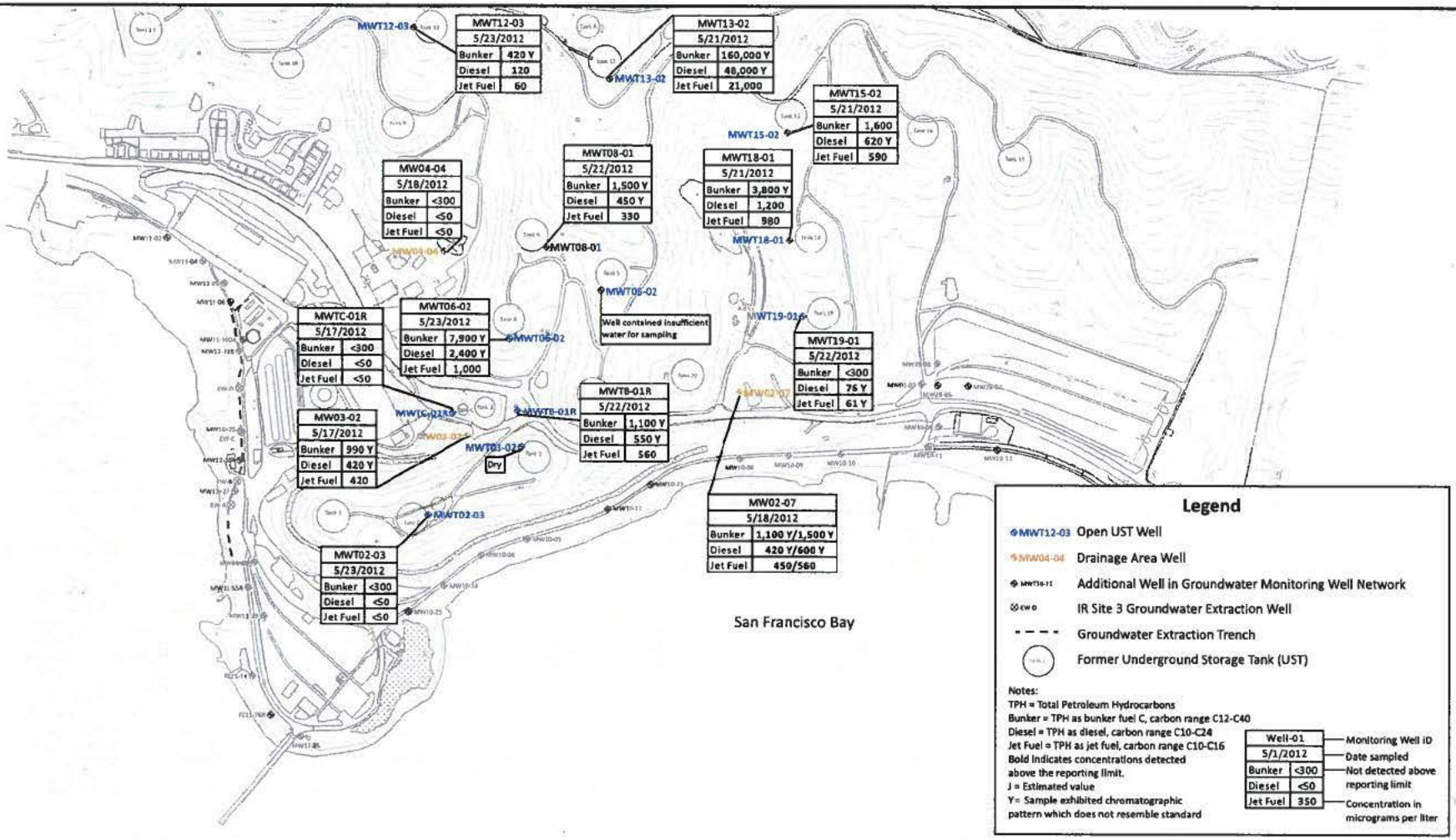

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Concentrations of Total Petroleum Hydrocarbons in UST and Drainage Area Wells - May 2012
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 8

File: J:\GIS Backup\GIS Data\Point Molate\Q19 2012 GWM\Fig. 8 TPH UST&Drainage Wells 0001.001.019.mxd Created by: EM Checked by: FTZ

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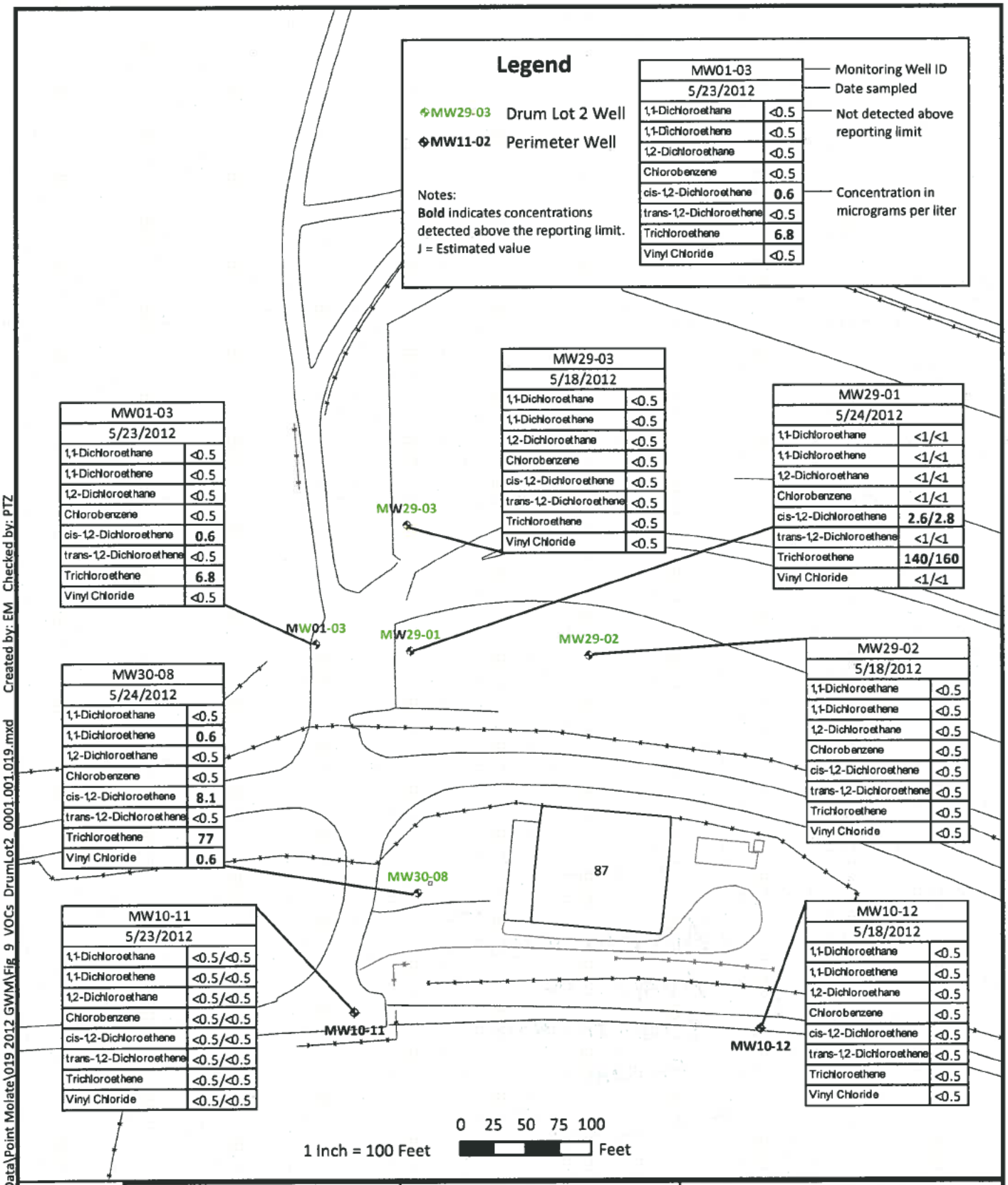

File: J:\GIS Backup\GIS Data\Point Molate\019 2012 GWM\Fig 9 VOCs DrumLot2 0001.001.019.mxd Created by: EM Checked by: PTZ

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Concentrations of Volatile Organic Compounds in Drum Lot 2 Wells May 2012
terraphase engineering	PROJECT: Site-Wide Groundwater Monitoring	
	PROJECT NUMBER: 0001.001.019	FIGURE 9

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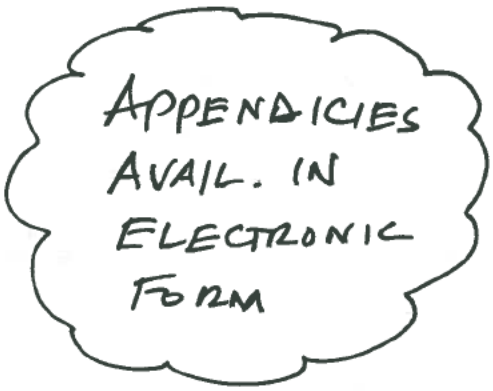

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WELL ABANDONMENT WORK PLAN
FORMER FUEL DEPOT POINT MOLATE
RICHMOND, CALIFORNIA

Prepared on behalf of

City of Richmond
450 Civic Center Plaza
Richmond, California

Prepared for

Mr. Jim Levine
Upstream Point Molate LLC
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Emeryville, California

Prepared by

Terraphase Engineering Inc.
1404 Franklin Street, Suite 600
Oakland, California

August 8, 2012

Project Number 0001.001.018

terraphase engineering

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File Ref: wp-Molate-Well Abandonment-0001 001 018

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APPENDICES

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Certification

All geologic information, conclusions and recommendations in this document have been prepared by a California Professional Geologist.

August 8, 2012

Peter Zawislanski — Date

Principal Hydrogeologist
California Professional Geologist (7210)
California Certified Hydrogeologist (925)

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1.0 INTRODUCTION

This *Well Abandonment Work Plan* (WAWP) was prepared by Terraphase Engineering Inc. (Terraphase) on behalf of the City of Richmond under the direction of Upstream Point Molate LLC (Upstream) to provide field procedures for the abandonment of monitoring and extraction wells and waste disposal at the Former Naval Fuel Depot Point Molate (NFD Point Molate, the "Site"), located in Richmond, California (Figure 1). The abandonment of groundwater monitoring wells that are not part of the current groundwater monitoring program, and are not expected to be used in the future, was required by the Regional Water Quality Control Board (RWQCB) in a comment letter dated June 22, 2011. In addition, extraction wells that are no longer used for groundwater extraction will also be abandoned.

Well abandonment will be conducted by a California-licensed drilling contractor, working under the oversight of a Terraphase field geologist, engineer, and/or technician, working under the supervision of a California Professional Geologist. Waste materials from well abandonment will be disposed at an offsite landfill. The waste is anticipated to be non-hazardous.

2.0 IDENTIFICATION OF WELLS REQUIRING ABANDONMENT

A review of historical documents and maps was conducted to identify wells requiring abandonment. Wells requiring abandonment were defined as wells that are no longer part of the RWQCB-approved groundwater monitoring program and are no longer in use as extraction wells. In total, 118 such wells were identified, as shown in Table 1 and on Figure 2.

2.1 Field Well Survey

Terraphase staff conducted a field well survey to locate and evaluate the 118 wells identified as requiring abandonment. The survey activities included:

- Confirmation of well location, based on historical maps;
- Evaluation of well access, including the potential need for limited-access drilling equipment and brush clearing;
- Confirmation of well depth and diameter;
- Description of infrastructure, such as concrete monuments, stovepipes, and bollards, that will need to be removed during well abandonment;
- Identification of other features that may affect abandonment activities, such as overhead power lines, steep and/or unstable slopes, and decommissioned underground storage tanks (USTs); vehicles cannot be driven on top of the decommissioned USTs due to potential for collapse.

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The findings of the field survey are presented in Table 1. In total, 103 wells were located in the field. The remaining 15 wells could not be located. Some or all of the wells which were not located may have been previously abandoned but the abandonment may not have been documented, or the wells may have been buried during historical field construction and maintenance activities. Additional attempts will be made in the future to locate these wells. However, these missing wells are not part of the scope of this WAWP.

2.2 Well Construction Information

The total aggregate depth of the wells to be abandoned is estimated to be 2,500 feet. Table 1 summarizes the pertinent well construction details. The total depth for some of the wells was estimated based on screen interval information, because well depth information is not available in historical documents and/or the casing was found to be damaged. The borehole and/or casing diameter are unknown for a number of the wells. For the purpose of planning abandonment activities, these parameters will be assumed as shown in Table 1. Well construction logs for wells to be abandoned are included as Appendix A. The wells for which construction logs are missing are identified as such in Table 1.

Most of the well completions include concrete monuments, which generally measure 2 feet by 2 feet. Bollards surround 10 of the wells.

2.3 Access

Access to well locations varies. Most near-shoreline locations are readily accessible and will not impose restrictions on drilling equipment dimensions. Several of the wells in the tank areas (upslope from the Main Road), will require a limited-access drill rig due to the presence of steep slopes and trees. In accordance with the UST closure, driving over the UST tops is not permitted (ITSI 2005; Terraphase 2011).

Access to wells will be evaluated with the Drilling contractor. In the event that access to a well is not safe or reasonably feasible, the Contra Costa County Environmental Health Services Department (CCCEHSD) will be contacted regarding alternative well abandonment options, such as grouting in place. In particular, access to wells near USTs will need to be evaluated to confirm that a drill rig can safely access the well without violating institutional controls that are stipulated in the *Final Finding of Suitability to Transfer* (FOST; Tetra Tech EM Inc. 2003). The FOST prohibits (a) the placement of vehicles or equipment on top of the UST, and (b) any use of the surrounding areas that could disrupt the integrity of the structural closure of the UST.

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3.0 PREPARATORY ACTIVITIES

3.1.1 Health and Safety Plan

The existing Health and Safety Plan (HASP) will be amended as necessary to address health and safety concerns specific to the field activities associated with well abandonment including a submittal of an activity-specific health and safety plan by the selected drilling contractor. Health and safety meetings will be conducted in the field at the start of the project and each day before beginning fieldwork. Field work will be monitored according to the HASP to ensure that appropriate health and safety procedures are followed. A copy of the HASP will be kept on site during fieldwork activities.

3.1.2 Permitting

Prior to initiating well abandonment activities, the necessary well abandonment permits from the CCCEHSD will be obtained.

4.0 WELL ABANDONMENT PROCEDURES

Well abandonment will follow Department of Water Resources (DWR) guidelines (DWR 1991), as summarized below:

- monitoring wells shall be destroyed by removing all material within the original borehole, including the well casing, filter pack, and annular seal;
- material to be extracted from the original borehole shall be removed by means of drilling, including overdrilling, if necessary;
- the created hole shall be completely filled with a cement-bentonite mixture to within 5 feet of the ground surface;
- to prevent bridging and help ensure a good seal, a tremie pipe will be used to feed grout into the hole; the tremie pipe should be submerged several (2 or more) feet below the level of grout in the hole;
- where permitted by the CCCEHSD, the top 5 feet of the borehole will be backfilled with soil to accommodate future Site remediation and/or development activities; and
- where required by the CCCEHSD, grout will be filled to grade and topped off as necessary.

Several of the wells, especially wells located near USTs, are on steep, wooded slopes. Access to UST wells was previously allowed from the top of the adjacent UST. In accordance with the FOST, driving is no longer permitted on top of the USTs. Consequently, access to some wells may

pose a hazard to drill rig operators and may threaten the integrity of the adjacent UST. As appropriate and permitted by the CCCEHSD, wells to which access is considered impractical and/or hazardous may be abandoned by pressure-grouting with a cement-bentonite mix.

Well abandonment will be overseen by a field geologist, working under the supervision of a California Professional Geologist. The field geologist will prepare a field log documenting:

- the diameter and depth of the borehole drilled to remove the well casing and backfill materials; and
- the approximate volume of grout used to backfill the borehole.

A graphic log will be prepared for each abandoned well and will be submitted to the CCCEHSD and RWQCB.

As discussed in Section 2.3, some wells may not be safely accessible by an adequately sized drill rig. In the event that a well cannot be safely accessed, the CCCEHSD will be contacted regarding alternative well abandonment options, such as pressure-grouting.

5.0 REPORTING

A report will be prepared that will include:

- a summary of field activities;
- figures identifying locations of abandoned wells;
- field notes;
- well abandonment logs;
- well abandonment permits; and,
- a discussion of findings.

6.0 REFERENCES

Department of Water Resources (DWR). 1991. California Well Standards. Bulletin 74-90.

Innovative Technical Solutions, Inc. (ITSI). 2005. Final Post-Closure UST Maintenance and Monitoring Plan, Former Naval Fuel Depot Point Molate, Richmond, California. December.

Terraphase. 2011. Underground Storage Tank Monitoring and Maintenance Plan, Former Naval Fuel Depot Point Molate, Richmond, California. March 11 (revised April 4).

Tetra Tech EM Inc. 2003. Final Finding of Suitability to Transfer. Naval Fuel Depot Point Molate. Richmond, California. March 31.

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TABLES

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Table 1
List of Wells to be Abandoned and Well Construction Information
Former Point Molate Naval Fuel Depot, Richmond, California

Well Name	Area	Borehole Diameter (inches)	Casing Diameter (inches)	Screened Interval (ft bgs)	Well Depth (ft bgs)	Elevation Ground (ft msl)	Elevation TOC (ft msl)	Surface finish	Well log in Appendix A?	Notes
BR02-20	Drainage	8	2	38.20 - 43.20	43.20	49.67	51.79	stove pipe	yes	None
BR10-19	South Shoreline	8	4	18.2 - 23.2	23.20	21.85	21.64	flush	yes	Buried by dirt
BR11-90	IR Site 4 Drum Lot 1	8	2	63.5 - 69.0	69.00	17.93	17.56	flush	yes	Utility line overhead
CHT11-01	UST	U	2	30.7 - 42.8	42.80	195.11	198.76	stove pipe		Limited access, in dense shrubs on side of tank, downslope
CHT12-03	UST	U	2	32.2 - 42.4	42.40	308.87	311.53	stove pipe		Difficult access near tank
CHT13-01	UST	U	2	41.6 - 53.8	53.80	382.28	385.12	stove pipe		Very limited access; vegetation, steep slope
CHT15-01	UST	U	2	31.5 - 39.0	39.00	274.34	276.73	stove pipe		Limited access; downhill form tank, dense shrub area
CHT18-01	UST	U	2	27.6 - 37.8	37.80	172.14	174.4	stove pipe		Limited access; downhill form tank, shrub area
CHT19-03	UST	U	2	31.2 - 40.0	40.00	127.91	130.86	stove pipe		Difficult access near tank
ERM-3	North Shoreline	U	4	14.0 - 19.0	19.00	U	23.61	flush		None
ERM-EW2	IR Site 1	10	4	1.5 - 11.5	11.50	60.86	63.1	stove pipe	yes	Some vegetation
MW01-01	Drainage	U	4	9.85 - 20.2	20.20	45.8	48.3	stove pipe	yes	In shrub area
MW02-04	Drainage	6.75	4	18.55 - 28.53	28.53	48.42	49.7	stove pipe		Chain near well; PVC out of vault
MW02-15	IR Site 1	12	4	14.00 - 19.00	19.50	80.82	84.53	stove pipe	yes	Questionable access; roadway may be too soft
MW02-17	Drainage	12	4	15.10 - 25.10	25.10	26.27	29.62	stove pipe	yes	Limited access; bushes, above road level
MW03-01	Drainage	?8	4	19.3 - 29.3	29.30	41.7	41.42	flush		Gated entry >8 feet; lid damaged
MW03-03	Drainage	U	2	8.0 - 18.0	18.00	102.01	104.02	stove pipe		3 posts around well; right off road
MW04-02	Drainage	8	2	24.5 - 34.5	34.50	56.31	55.98	flush		1 ft away from shipping container
MW04-03	Drainage	U	4	9.7 - 19.7	19.70	56.35	56.09	flush		None
MW05-03	Drainage	U	2	8.6 - 13.6	13.60	U	115.99	flush		Questionable access; vegetation clearing required
MW-1	IR Site 3	10	4	14 - 24	25	18	16.68	flush	yes	Pipes leading out of well
MW10-14	South Shoreline	6.75	4	9.56 - 19.54	19.54	19.68	19.61	flush		Very limited access; under trees, bushes
MW11-09	IR Site 3	8	4	10.04 - 20.07	20.07	17.95	17.9	flush	yes	Utilities nearby but not directly overhead; lid damaged
MW11-10	IR Site 3	8	4	10.78 - 20.80	20.80	17.6	17.26	flush	yes	Utilities nearby but not directly overhead
MW11-102A	IR Site 3	8	4	7.35 - 14.35	14.35	16.3	18.34	stove pipe		Limited access; In former tank area with wooden stumps surrounding well
MW11-103	IR Site 3	8 ?	2	10.01 - 19.53	19.53	18	17.84	flush		None
MW11-105	IR Site 3	8 ?	2	11.77 - 20.21	20.21	18.7	20.65	stove pipe		3 posts
MW11-106	IR Site 3	8 ?	4	8.49 - 18.51	18.51	18.2	17.94	flush		None
MW11-107	IR Site 3	8 ?	2	13.63 - 23.36	23.36	21.3	21.24	flush		None
MW11-109	IR Site 3	U	2	U	12	U	U	flush		Overhead utilities
MW11-11	IR Site 3	8	4	10.50 - 20.53	20.53	17.7	17.45	flush	yes	None
MW11-115A	IR Site 3	8 ?	2	3.84 - 20.50	20.50	18.9	20.66	stove pipe		2 posts
MW11-117A	IR Site 3	6	2	5.35 - 16.07	16.07	19.8	21.61	stove pipe		3 posts
MW11-12	IR Site 3	8	4	11.15 - 21.18	21.18	17.87	17.63	flush	yes	None
MW11-121	IR Site 3	8 ?	2	4.5 - 17.04	17.04	20.6	22.51	stove pipe		Questionable access; surrounded by plants/bushes, 3 posts
MW11-13	IR Site 3	8	4	11.37 - 26.38	26.38	18.08	17.52	flush	yes	None
MW11-20	IR Site 4 Drum Lot 1	8	4	12.75 - 27.53	27.53	19.32	19.06	flush	yes	Buried, next to PZ11-77
MW11-21	IR Site 4 Drum Lot 1	8	4	12.06 - 22.11	22.11	20.71	20.49	flush	yes	Spray paint label
MW11-22	IR Site 4 Drum Lot 1	8	4	9.31 - 19.32	19.32	19.6	21.74	stove pipe	yes	Hornet's nest in vault
MW11-23	IR Site 4 Drum Lot 1	8	4	9.22 - 19.22	19.22	20.11	22.02	stove pipe	yes	None
MW11-27R	IR Site 3	U	4	8.40 - 18.42	18.42	16.88	16.55	flush		In area that frequently has large puddle. Not on map
MW11-30	IR Site 3	8	4	6.03 - 16.02	16.02	16.65	16.41	flush	yes	Buried in road
MW11-31	IR Site 3	8	4	7.18 - 17.18	17.18	17.27	17.05	flush	yes	None
MW11-32	IR Site 3	8	4	7.52 - 17.77	17.77	17.48	17.12	flush	yes	None
MW11-37	IR Site 3	8	4	7.11 - 17.13	17.13	18.37	18.02	flush	yes	None
MW11-38	IR Site 3	8	4	7.09 - 17.12	17.12	18.85	18.52	flush	yes	None

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Table 1
List of Wells to be Abandoned and Well Construction Information
Former Point Molate Naval Fuel Depot, Richmond, California

Well Name	Area	Borehole Diameter (inches)	Casing Diameter (inches)	Screened Interval (ft bgs)	Well Depth (ft bgs)	Elevation Ground (ft msl)	Elevation TOC (ft msl)	Surface finish	Well log in Appendix A?	Notes
MW11-40	IR Site 3	8	4	5.07 - 15.09	15.09	20.67	22.88	stove pipe	yes	Questionable access; overhead utilities (25-30 ft high)
MW11-41	IR Site 3	8	4	3.97 - 13.99	13.99	20.38	22.47	stove pipe	yes	None
MW11-43	IR Site 3	8	4	2.41 - 17.45	17.45	19.63	22.05	stove pipe	yes	None
MW11-44	IR Site 3	8	4	3.79 - 18.83	18.83	18.9	21.28	stove pipe	yes	2 posts
MW11-46	IR Site 3	8	4	6.04 - 16.04	16.04	20.52	23.16	stove pipe	yes	Posts
MW11-47	IR Site 3	8	4	3.03 - 18.05	18.05	20.55	22.9	stove pipe	yes	3 posts
MW11-49	IR Site 3	8	4	1.78 - 6.79	6.79	20.86	20.98	stove pipe	yes	None
MW11-51	IR Site 3	8	4	6.76 - 16.77	16.77	23.79	25.78	stove pipe	yes	Uphill but accessible, missing lid, near sewer and building
MW11-53	IR Site 3	8	4	7.68 - 17.69	17.69	17.62	19.76	stove pipe	yes	None
MW11-54	IR Site 4 Drum Lot 1	6.75	4	8.58 - 23.53	23.53	17.3	17.42	stove pipe		No vault/lid; near concrete pad & product recovery system
MW11-56R	IR Site 4 Drum Lot 1	U	2	9.57 - 19.57	19.57	15.19	15.26	flush		None
MW11-57	IR Site 4 Drum Lot 1	6.75	4	7.77 - 23.03	23.03	17.87	17.74	flush	yes	None
MW11-80	IR Site 4 Drum Lot 1	12	4	11.75 - 19.75	19.75	18.52	18.25	flush	yes	Lid damaged
MW11-81	IR Site 4 Drum Lot 1	12	4	9.50 - 19.50	19.50	22.28	22.00	flush	yes	None
MW11-82	IR Site 4 Drum Lot 1	12	4	12.50 - 20.00	20.00	18.62	18.49	flush	yes	None
MW11-83	IR Site 4 Drum Lot 1	12	4	5.30 - 13.30	13.30	19.02	18.58	flush	yes	None
MW11-86	IR Site 4 Drum Lot 1	12	4	10.00 - 17.00	17.00	17.02	16.76	flush	yes	None
MW11-89	IR Site 4 Drum Lot 1	12 ?	4	13.0 - 20.5	20.50	20.08	19.84	flush	yes	Lid broken/not in place; gravel in vault
MW11-91	IR Site 3	U	4	19.04 - 29.04	29.04	39.22	40.18	stove pipe		Questionable access; inside fenced area, narrow road
MW11-92	IR Site 3	U	4	8.62 - 18.62	18.62	17.69	17.69	flush		None
MW11-94	IR Site 3	8	4	5.0 - 15.0	15.00	17.82	17.20	flush	yes	None
MW-2	IR Site 3	10	4	14 - 19	19.60	17.6	19.55	stove pipe	yes	4 posts
MW-4	IR Site 3	U	6	13.7 - 19.91	19.91	20.3	21.39	stove pipe		4 posts around well
MWT02-02	UST	U	2	20.9 -31.25	31.25	142.21	141.90	flush		None
MWT03-01	UST	U	2	17.0 - 25.2	25.20	134.37	136.99	stove pipe		Questionable access: steep, vegetation. Powerline wrapped around well box.
MWT03-03	UST	U	2	15 - 35	35.00	146.09	149.18	stove pipe		None
MWT05-04	UST	U	2	9.9 - 19.4	19.40	198.83	201.93	stove pipe		Limited access: vegetation.
MWT06-03	UST	U	2	23.17 - 30.22	30.22	161.08	163.76	stove pipe		None
MWT06-04	UST	U	2	10.3 - 20.7	20.70	147.12	150.42	stove pipe		Limited access: below level of tank, uneven surface.
MWT07-02	UST	U	2	24.72 - 29.77	29.77	265.31	268.11	stove pipe		None
MWT08-04	UST	U	2	10.1 - 19.9	19.90	182.24	184.84	stove pipe		None
MWT12-02	UST	U	2	22.5 - 29.5	29.50	310.43	313.05	stove pipe		Difficult access near tank
MWT12-04	UST	U	2	17 - 37	37.00	306.31	309.06	stove pipe		
MWT13-04	UST	U	2	14.9 - 24.3	24.30	383.85	386.65	stove pipe		Limited access, downhill from tank
MWT13-05	UST	U	2	10 - 20	20.00	385.04	387.87	stove pipe		Very limited access: steep slope, vegetation
MWT15-01	UST	U	2	22-29.5	29.50	274.34	276.25	stove pipe		Limited access; downhill from tank, dense shrub area
MWT15-04	UST	U	2	16.8 - 26.2	26.20	269.38	272.01	stove pipe		Limited access; downhill from tank, dense shrub area
P86-1/2	IR Site 3	U	8	U	8.4	U	17.67	flush		Questionable access; near former tank area, steep surrounding area
P86-11/12	IR Site 3	U	8	U	24.5	U	20.31	flush		Soft bottom; depth may be greater than 24.5 feet.
P86-13/14	IR Site 3	U	8	U	23.5	U	18.12	flush		Soft bottom; depth may be greater than 23.5 feet.
P86-15/16	IR Site 3	U	10	U	24	U	20.52	flush		Lid missing; casing seems to be missing
P86-9/10	IR Site 3	U	8	U	23	U	19.94	flush		None
PZ-1	Landfill	U	2	U	17	U	U	flush		Questionable access; steep road and bushes; not on map
PZ-2	Landfill	U	2	U	19.8	U	U	flush		Questionable access; steep road and bushes; not on map
PZ10-26	IR Site 4 Drum Lot 1	U	4	3 - 5	5.00	19.69	19.17	flush		None
PZ11-31A	IR Site 3	U	2	6.96-17.01	18.40	17.71	16.97	flush	yes	

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Table 1
List of Wells to be Abandoned and Well Construction Information
Former Point Molate Naval Fuel Depot, Richmond, California

Well Name	Area	Borehole Diameter (inches)	Casing Diameter (inches)	Screened Interval (ft bgs)	Well Depth (ft bgs)	Elevation Ground (ft msl)	Elevation TOC (ft msl)	Surface finish	Well log in Appendix A?	Notes
PZ11-34	IR Site 3	U	2	2.94 - 12.96	12.96	17.32	19.17	stove pipe	yes	None
PZ11-35A	IR Site 3	U	2	7.1-17.1	17.10	17.16	16.85	flush		1 post
PZ11-37A	IR Site 3	U	2	6.63 - 16.66	16.66	18.49	18.24	flush		None
PZ11-37B	IR Site 3	U	2	7.54 - 17.58	17.58	18.11	18.16	flush	yes	None
PZ11-38A	IR Site 3	U	2	6.94 - 16.97	16.97	18.81	18.74	flush		sealed shut with dirt
PZ11-71	IR Site 4 Drum Lot 1	8	2	9.73 - 19.98	19.98	17.8	17.92	stove pipe	yes	Utility line overhead
PZ11-72R	IR Site 4 Drum Lot 1	U	2	8.83 - 18.83	18.83	15.35	15.43	flush		Near MW11-19 (across road), near water
PZ11-73	IR Site 4 Drum Lot 1	8	2	10.34 - 20.59	20.59	18	17.76	flush	yes	None
PZ11-75R	IR Site 4 Drum Lot 1	U	2	9.0 - 19.0	19.00	15.91	15.9	flush		Boulder next to well
PZ11-77	IR Site 4 Drum Lot 1	8	2	10.08 - 20.33	20.33	19.34	19.39	flush	yes	Lid damaged
PZ11-79	IR Site 4 Drum Lot 1	8	2	10.38 - 20.63	20.63	21	20.71	flush	yes	spray paint label
Wells not found during well survey										
MW01-02	Drainage	U	2	7.85 - 18.75	18.75	58.26	60.36	stove pipe		Well not found
MW03-02	Drainage	12	4	10.33 - 20.50	20.50	75.53	74.96	flush	yes	Well not found
MW07-01	Drainage	U	2	12.0 - 25.0	25.00	50.37	53.58	stove pipe		Well not found
MW10-15	South Shoreline	6.75	4	3.98 - 14.53	14.53	41.42	42.82	stove pipe		Well not found
MW10-16	South Shoreline	8	4	14.0 - 24.0	24.00	16.79	16.24	flush		Well not found
MW11-36	IR Site 3	8	4	5.60 - 15.72	15.72	17.68	17.41	flush	yes	Well not found
MWT02-01	UST	U	2	10.35 - 19.5	19.50	128.82	131.12	stove pipe		Well not found
MWT15-02	UST	U	2	23 - 28	28.00	278.58	281.35	stove pipe		Well not found
PZ11-70	IR Site 4 Drum Lot 1	8	2	10.4 - 20.65	20.65	17.6	17.29	flush	yes	Well not found
MW11-100	IR Site 3	8	4	11.5 - 18.0	18.00	19	21.04	stove pipe		Well not found; not on maps; same construction details as MW-100A
MW11-102	IR Site 3	8	4	7.35 - 14.35	*14.35*	16.3	18.34	stove pipe		Well not found; not on maps; same construction details as MW-102A
MW11-115	IR Site 3	8 ?	2	3.84 - 20.50	*20.50*	18.9	20.66	stove pipe		
MW11-117	IR Site 3	8 ?	2	5.35 - 16.07	16.07	19.8	21.61	stove pipe		
MWT21-01	UST	U	2	13.0 - 23.2	23.20	271	271.12	stove pipe		Well not found; not on maps
PRC-1	Other	U	4	19.04 - 29.04	29.04	U	U	stove pipe		Well not found; not on maps

Notes:
ft bgs = feet below ground surface
ft msl = feet mean sea level
TOC = top of casing
U = unknown
? = uncertain
IR = Installation Remediation
UST = Underground Storage Tank

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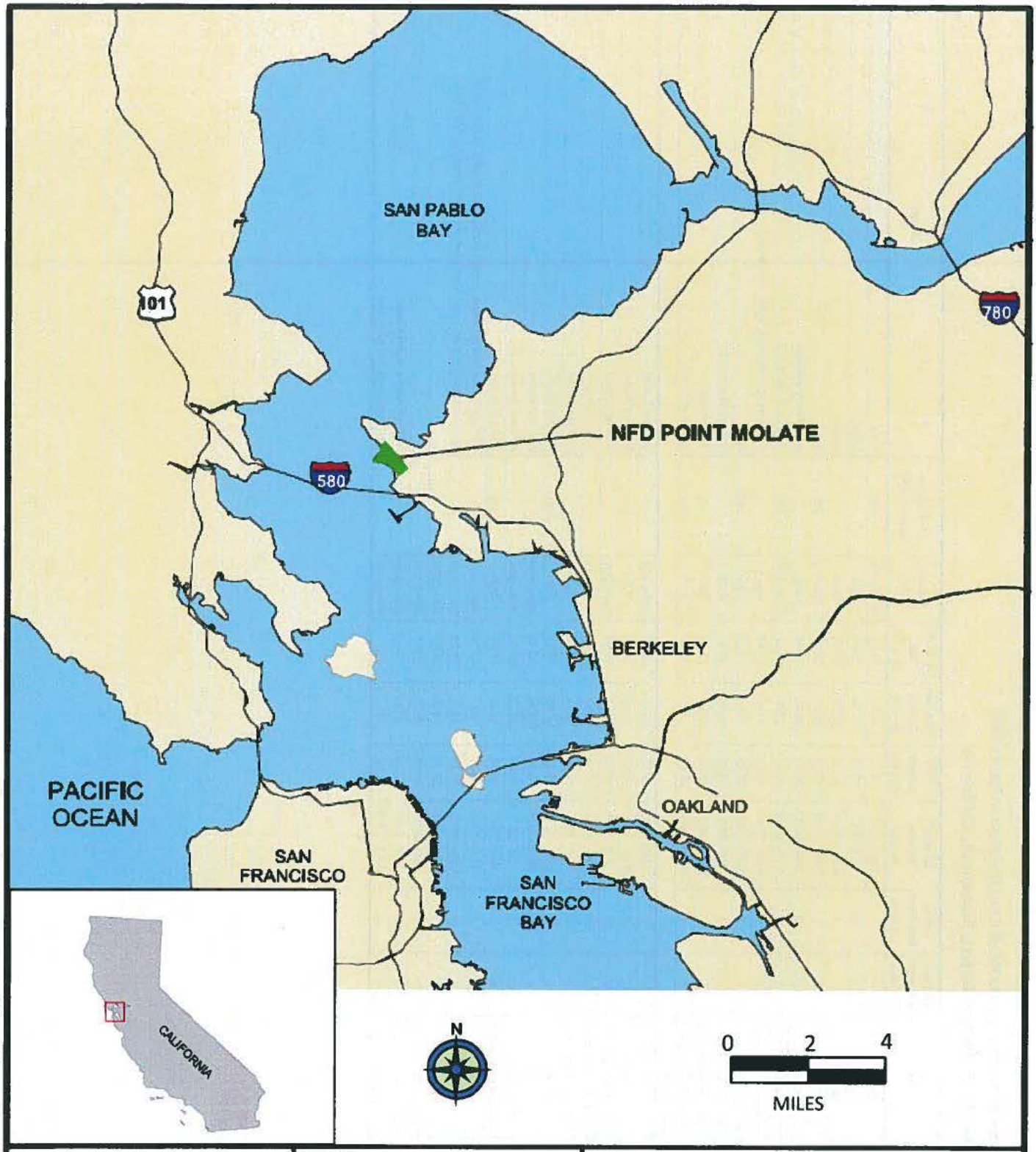

File Name: Fig_1_Site_Vicinity_Map_0001.001.018 Prepared by: EM Checked by: PTZ

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Site Vicinity Map
terraphase engineering	PROJECT: Well Abandonment Work Plan	
	PROJECT NUMBER: 0001.001.018	FIGURE 1

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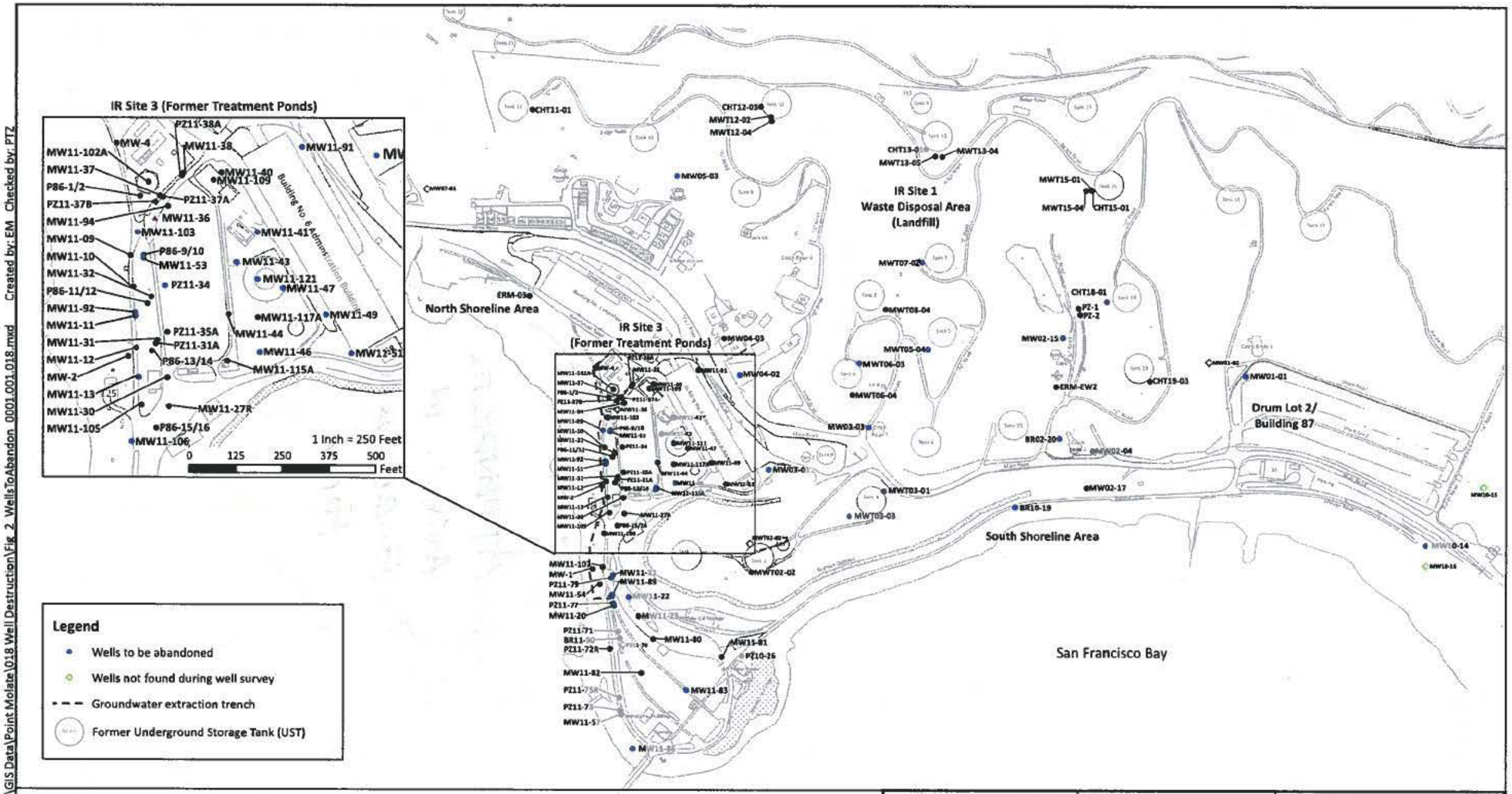

SAFETY FIRST	CLIENT: Upstream Point Molate, LLC	Wells to be Abandoned
terraphase engineering	PROJECT: Groundwater Monitoring Well Destruction	
	PROJECT NUMBER: 0001.001.018	FIGURE 2

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terraphase engineering

August 13, 2012

Mr. George Leyva
California Regional Water Quality control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

sent via: email

Subject: Data Summary for Soil Gas Survey at Former Naval Depot Point Molate, Richmond, California

Dear Mr. Leyva:

Terraphase has prepared this letter to transmit soil vapor data for IR Site 3 at Former Naval Fuel Depot Point Molate in Richmond California. The data was collected in accordance with the Draft Soil Gas Survey Work Plan, IR Site 3, Former Naval Fuel Depot, Point Molate, Richmond, Contra Costa County, dated May 22, 2012 (Terraphase 2012) and the RWQCB approval letter (RWQCB 2012). This workplan was conditionally approved in a letter from the RWQCB dated May 30, 2012. The data consists of soil gas sampling results from field instrumentation as well as laboratory results.

Soil gas sample locations and results are shown on the attached Figure 1 and the sample results are further summarized on Table 1. The data is screened against the Regional Water Quality Control Board's Environmental Screening Levels (ESLs) for residential and commercial/industrial land use found on Table E-2 (RWQCB 2008). Methane concentrations were screened against 5,000 ppmv (or approximately 10% of the lower explosive limit [LEL]) based on the DTSC guidance for School Sites (DTSC 2005).

Summary of Sampling Activities

A total of 12 soil-gas sampling locations were installed using hand augers and direct-push technology when hand augering proved insufficient. Locations were advanced to approximately 4.9 feet below ground surface (bgs). Each soil-gas well was constructed of a 0.25-inch-diameter Teflon® tubing of sufficient length to extend to the ground surface. At the bottom of the tubing, mesh Teflon® was connected to the end of the tubing using military grade Teflon® tape. Approximately six inches of No. 3 sand was placed in the borehole above and below the vapor point. Dry granular bentonite was then placed to approximately 1 foot above the filter pack, and then hydrated granular bentonite was placed to approximately 1 foot bgs. A bentonite-cement grout was used to fill the remaining annulus to 0.5 foot bgs.

At the ground surface, the tubing was fitted with an airtight plastic valve. The soil-gas well assembly was completed with an 8-inch diameter, traffic-rated well vault.

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Prior to sampling and field measurements, 180 mL of soil gas was purged from the soil-gas wells using a plastic gas-tight syringe. An initial leak test using the syringe was performed to assess the sample apparatus fittings after purging was completed.

Field measurements were collected using a sample bag inside of a rigid vacuum box and a vacuum pump. The rigid vacuum chamber allowed the sample bag to be filled directly using negative pressure provided by the vacuum pump. The vacuum box was directly connected to the well's tubing via a sample port with a valve to close or open the port outside of the chamber. A 1-liter Tedlar® bag was connected to the inside sample port, opened, and then the chamber was closed, providing an airtight seal. When activated, the vacuum pump evacuated air from inside the chamber, and the sample bag inflated due to the drop of interior pressure. The air sample was allowed to enter the bag directly without passing through the pump. After the Tedlar® bag was filled, the sampling ports were closed and the bag was closed prior to removal from the vacuum chamber. The sample bag was then connected to a Gas Tech© GTCO2 meter that is able to detect oxygen, carbon dioxide, methane and hydrogen sulfide. Field measurements for each gas was recorded in percentages and/or parts per million by volume. The 4-gas meter was recalibrated for fresh air prior to each sample collection. Silicone that connected the Tedlar® bag to the vacuum chamber sampling port was replaced for each sample location.

After field measurements were taken, the tubing was then fitted with a metal airtight valve using a compression fitting so that it could be connected to the laboratory's sampling apparatus. Soil-gas samples were collected in 1-liter laboratory-supplied stainless-steel (Summa™) canisters. The Summa™ canisters were connected to the soil-vapor probes via a stainless steel manifold equipped with a vacuum gauge and critical orifice flow regulation device sized to allow sample collection at a maximum flow rate of 100 milliliters per minute. Prior to sample collection, a clear flexible shroud was placed around the well and soil-gas sample apparatus and was sealed using sand bags. The air inside the shroud was enriched with laboratory-grade helium to a minimum concentration of 29% by volume, which was measured using a portable helium detector. The sample canister valve was shut off so that a residual vacuum of approximately 5 inches of mercury was left in the canister. Field measurements including time, helium percentage, and Summa™ pressure were recorded approximately every minute of sampling.

Soil-gas location SG-9 yielded water during the initial purging of the well using the gas-tight syringe. Therefore, the well was not sampled for field measurements or for laboratory analyses. SG-10 had limited water in the tubing during the gas-tight syringe purge. The well was sampled using the vacuum chamber and pump. A small amount of water was transferred to the Tedlar® bag, so field measurements were taken using the 4-gas meter, and no sample was submitted to the laboratory.

The canisters were transferred under strict chain-of-custody procedures to a California-certified laboratory and analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX) compounds by United States Environmental Protection Agency (EPA) Method TO-15, and for methane and helium by EPA D1946.

Summary of Sample Results from Laboratory analyzed samples

Analytical results from the off-site laboratory were below screening criteria for BTEX and methane and benzene was not detected at any of the sample locations. Methane was only detected at one location in

the laboratory submitted samples. At location SG-7, methane was detected at 3,900 ppmv. This location is on top of an area proposed for removal in the Draft Waste Characterization Report (Terraphase 2012). After remedial activities at the Site are completed the potential source of methane will removed from this area.

Summary of Sample Results from Laboratory analyzed samples

Field measurements indicated that low-levels of methane were detected at most locations (below the analytical detection limits of the laboratory method) from between 440 ppmv and 1,160 ppmv with the exception of SG-7. Methane was detected at SG-7 in the field instrument was 6,520 ppmv which exceed the screening criteria of 5,000 ppmv. As described above, based on the current proposed remedial alternative for IR Site 3, the source of the methane in the SG-7 area will be removed from the Site. These result corresponded well with the laboratory analyzed sample results. The concentration of methane typically detected in landfill gases is between 450,000 ppmv and 600,000 ppmv indicating that the methane generation at this site is insignificant relative to those expected at a landfill (http://www.atsdr.cdc.gov/hac/landfill/html/ch2.html).

Hydrogen sulfide was not detected at any locations in IR Site 3.

Based on these results, it is apparent that after the removal of petroleum affected soil near SG-7, no significant source of methane will remain at Site 3. Other typical gases that may result from the degradation of petroleum in the subsurface were either not detected (benzene, hydrogen sulfide) or only detected at very low concentrations (toluene, ethyl benzene, xylenes).

If you have any questions or comments regarding this data, feel free to contact William Carson at 510 388-8745.

For Terraphase Engineering Inc.

William Carson, P.E. (C60735)
President and Principal Engineer

Cc: Carlos Privat, City of Richmond
Craig Murray, City of Richmond
Jim Levine, Upstream
Michael Leacox, Nichols Consulting
Joan Garrett, PMCAC
Bruce Bayaert, PMCAC

Attachments: Figure 1: Soil Gas Results
Table 1: Soil-Gas Analytical Results

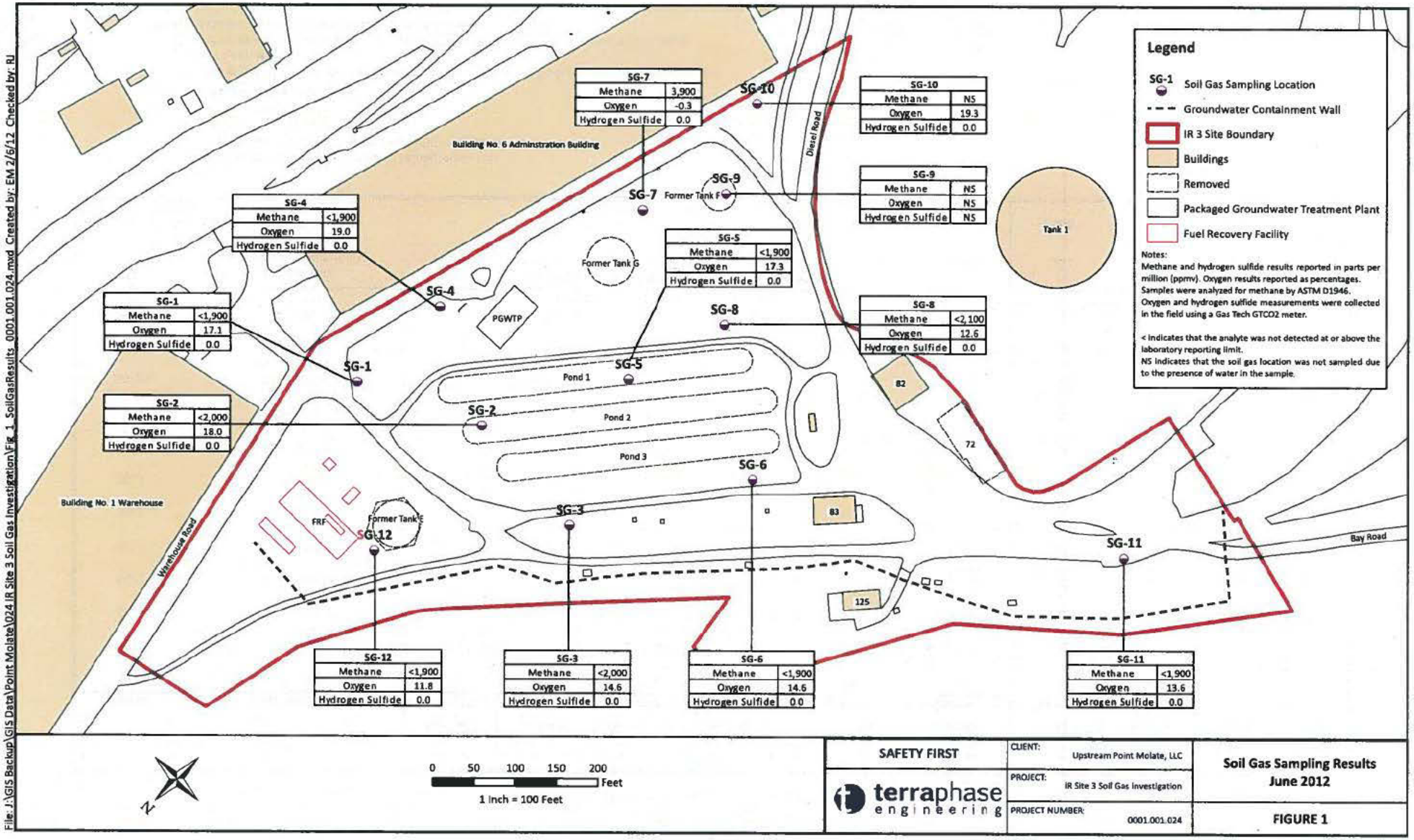
DTSC 2005. Advisory on Methane Assessment and Common Remedies at School Sites. June 16.

RWQCB 2008. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. May.

RWQCB 2012. Conditional Concurrence - Draft Soil Gas Survey Work Plan, IR Site 3, Former Naval Fuel Depot Point Molate, Richmond, Contra Costa County. May 30.

Terraphase 2012. Draft Excavation Delineation and Waste Characterization of Petroleum-Affected Soil Report, IR Site 3, Former Point Molate Naval Fuel Depot, Richmond, California. February 13.

Terraphase 2012. Draft Soil Gas Survey Work Plan, IR Site 3, Former Naval Fuel Depot, Point Molate, Richmond, Contra Costa County. May 22.



SAFETY FIRST

terraphase engineering

CLIENT: Upstream Point Molate, LLC

PROJECT: IR Site 3 Soil Gas Investigation

PROJECT NUMBER: 0001.001.024

Soil Gas Sampling Results June 2012

FIGURE 1

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Table 1
Soil-Gas Analytical Results
Former Naval Fuel Depot Point Molate, Richmond, California

		Lab Data[1]						Field Data[2]			
Sample	Date Sampled	Benzene (µg/m³)	Toluene (µg/m³)	Ethylbenzene (µg/m³)	m,p-Xylenes (µg/m³)	o-Xylene (µg/m³)	Methane (ppmv)	Methane (ppmv)	Oxygen (%)	Carbon Dioxide (%)	Hydrogen Sulfide (ppmv)
SG-1	6/18/2012	<3.0	**21**	**9.3**	**33**	**13**	<1,900	1,000	17.1	4.9	0.0
SG-2	6/18/2012	<3.2	<3.8	<4.4	<4.4	<4.4	<2,000	840	18.0	3.8	0.0
SG-3	6/19/2012	<3.1	<3.7	<4.3	<4.3	<4.3	<2,000	900	14.6	4.0	0.0
SG-4	6/18/2012	<3.0	<3.5	<4.0	<4.0	<4.0	<1,900	440	19	3.0	0.0
SG-5	6/18/2012	<3.1	**3.7**	<4.2	<4.2	<4.2	<1,900	900	17.3	5.0	0.0
SG-6	6/19/2012	<3.1	<3.6	<4.2	<4.2	<4.2	<1,900	880	14.6	5.8	0.0
SG-7	6/18/2012	<3.4	<4.0	<4.6	<4.6	<4.6	3,900	**6,520**	-0.3	15.8	0.0
SG-8	6/18-19/2012	<10.0	<12.0	<14.0	<14.0	<14.0	<2,100	1,280	12.6	10.0	0.0
SG-9	6/19/2012	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SG-10	6/19/2012	NS	NS	NS	NS	NS	NS	740	19.3	3.3	0.0
SG-11	6/18/2012	<3.1	<3.6	<4.2	**6.6**	**4.5**	<1,900	1,100	13.6	6.9	0.0
SG-12	6/19/2012	<3.1	<3.6	<4.1	<4.1	<4.1	<1,900	1,160	11.8	9.1	0.0
ESLs	**Residential**	**84**	**63,000**	**980**	**21,000[3]**		---	---	---	---	---
	Commercial/Industrial	**280**	**180,000**	**3,300**	**58,000[3]**		---	---	---	---	---
Screening Criteria based on DTSC Advisory		---	---	---	---	---	**5,000**	**5,000**	---	---	---

Notes:

1 - Lab data from Curtis and Tompkins Laboratories, LLC.
2 - Field measurements taken with Gas Tech GTCO2 meter
3 - ESL listed is for total xylenes
ppmv - parts per million
(µg/m³) - micrograms per cubic meter
< - Indicates that the analyte was not detected at or below the laboratory reporting limit shown.
--- - not applicable
NS - Indicates that the soil gas location was not sampled due to water present in the sample
BOLD - Indicates that a concentration exceeds the screening.
ESLs - From Table E of San Francisco Bay Regional Water Quality Control Board's "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater" Interim Final - November 2007 (Revised May 2008) - concentrations in µg/m³
Screening Criteria based on DTSC Advisory - based on approximately 10% of LEL (DTSC 2005)

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