STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
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July 26, 2017

Mr. Kelley Kohout
LMI West Seattle Holdings, LLC
1325 Fourth Avenue, Suite 1300
Seattle, Washington 98101-2528

Re: Status of Prospective Purchaser Consent Decree No. 13-2-27556-2 for Alaska Street Texaco (SKS Shell Station) Cleanup Site located at Alaska Street and Fauntleroy Way SW, West Seattle, WA

Dear Mr. Kohout:

The Department of Ecology (Ecology) and LMI West Seattle LLC (LMI) signed a Prospective Purchaser Consent Decree (Decree) that was entered into King County Superior Court on July 29, 2013 (Ecology, 2013), for environmental cleanup at the above Site. The PPCD required LMI to draft a Remedial Investigation (RI), a Feasibility Study (FS) and Cleanup Action Plan (CAP).

Ecology entered into this Decree to enable financing and redevelopment of a brownfields property, whereby creating approximately 200 permanent and 400 temporary jobs, and revitalizing a blighted and contaminated area of West Seattle.

While LMI has implemented a significant interim environmental cleanup action to remove contaminated soil at the Site during construction of the new multi-story apartment building, Ecology is concerned that LMI is not conducting Site remediation work in accordance with the Decree and is ignoring the agency's technical direction on the project. Work has been conducted that does not comport with the Decree, as well as other applicable state regulations. The project suffers from a lack of appropriate and timely communication with the agency on important issues arising during site remediation and development. This has hindered the ability of LMI to demonstrate a successful remediation as well as compliance with MTCA.

This letter is to remind LMI that the work conducted at the Site must be performed in accordance with the Decree (as noted below) and to outline work to be done to resolve outstanding issues and move this Site forward through the cleanup process. Pursuant to the Decree:

- LMI has agreed to undertake the actions specified in this Decree and consents to the entry of this Decree under the Model Toxics Control Act (MTCA). (Section II. (Jurisdiction)(F))

- LMI shall provide a copy of this Decree to all agents, contractors and subcontractors retained to perform work required by this Decree, and shall ensure that all work undertaken by such agents, contractors and subcontractors complies with Decree. (Section III. (Parties Bound)(line 13 thru line 16)

- Pursuant to Section VI. (Work to be Performed):
    - LMI shall perform the remedial actions specified in detail in the Cleanup Action Plan (CAP) (Exhibit C) and the Scope of Work and Schedule (Exhibit D). These exhibits are incorporated by reference and are an integral and enforceable part of this Decree. (A)
    - To recover and treat contaminated groundwater, address the potential for anomalous groundwater migration or soil conditions, and provide contingencies for any discoveries. (A)(2)
    - This includes drilling additional borings(s) under the funeral home area (after demolition and prior to construction) to address the western reach of the areas of concern. (A)(2)(line 21 thru line 23)
    - If Ecology determines that conditions warrant additional monitoring, or additional oxidizer injection, implement such contingency measures as directed by Ecology, including as necessary installing additional remediation well(s). (A)(2)(line 3 thru line 6)
    - LMI agrees not to perform any remedial actions outside the scope of this Decree unless the Parties agree to modify the Scope of Work and Schedule (Exhibit D) to cover these actions. All work conducted by LMI under this Decree shall be done in accordance with Chapter 173-340 unless otherwise provided herein. (B)

- Any documents submitted containing geologic, hydrologic, or engineering work shall be under seal of an appropriately licensed professional as required by Chapter 18.220 RCW or RCW 18.43.130. (Section VIII. (Performance)(line 8 thru line 10))

- With respect to the implementation of this Decree, LMI shall make the results of all sampling, laboratory reports, and/or tests results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5). All sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section XII (Progress Reports), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal. (Section XI. (Sampling, Data Submittal, and Availability))

- Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests. (Section XII. (Progress Reports)(B))

As noted above, Ecology's review of the Cleanup Action Report (CAR) and Draft Work Plan for 2017, has identified several deficiencies. These deficiencies are more specifically detailed in an attachment to this letter.

To move the site forward, and as an alternative to Ecology pursuing other avenues for addressing the above deficiencies, Ecology requests that LMI take the following measures (as written in Section VI. Work to Be Performed VI.A.2):

1. Upload immediately all environmental data generated during remedial investigations and remedial actions at the SKS Shell Site to the agency's EIM system.
2. Revise the Cleanup Action Report (CAR) as an Agency Review Draft Cleanup Action Report for Ecology's review that will include the following:
    a. All data associated with the dewatering system design and performance, analysis input files, contaminant mass calculations that must be submitted to Ecology in electronic format (as excel files when appropriate), along with supporting documentation.
    b. A description of all modifications to the dewatering/injection wells.
    c. All the data, the conceptual site model, and calculations used to design the well configuration and the capture zone for the dewatering wells as required to evaluate projected and actual performance parameters.
    d. Detailed information concerning the dewatering of the Site, which shall include daily pumping rates, duration of pumping, drawdown data, and total volumes pumped from each individual extraction well.
    e. As an appendix, the vapor barrier specifications from the Engineering Design Report (EDR) and as-built specifications for the vapor barrier.
3. Submit an Agency Review Work Plan for the decommissioning of the inappropriately modified remediation wells along SW Alaska Street. This includes replacing these wells as originally constructed before Site development.
4. Revise the Draft Work Plan for 2017 as an Agency Review Work Plan for 2017 to include the following:
    - A quarterly ground water sampling plan for all compliance monitoring wells and right-of-way (ROW) wells.
    - A work Plan to install the four new monitoring wells Ecology requested during a meeting with you and SES on March 1, 2017. Two new monitoring wells installed in locations upgradient of the SKS Shell Site (southwest and west). Two wells to be installed down gradient of the SKS Shell Site (in sidewalk adjacent to SW Alaska (proposed MW111)), and in southern most eastbound lane of SW Alaska Street.
    - The scheduled for ground water treatment via chemical injections should be postponed for at least two ground water monitoring events until ground water conditions at the Site are thoroughly understood.
5. Perform a thorough vapor intrusion assessment following Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State, (Publication No.: 09-09-047, February 2016). If the ground water data does not show compliance, then sub-slab sampling shall be required.
6. Perform additional ground water investigation beneath the Huling Bros. Chevrolet Site (VCP NW2716), to determine if ground water with concentrations above MTCA cleanup levels is present and if this ground water is migrating under the SKS Site.

7. Pursuant to the Decree Section VI (A) (2) (line 21 thru line 23), install additional borings(s) under the funeral home area (upgradient to SMW04, and down gradient of the Kennedy heating oil tank) to address the western reach of the areas of concern.
8. Ensure environmental data validation be performed using Ecology's TCP Data Validation and Sampling Analysis Plan (SAP)/Quality Assurance Project Plan (QAAP) for data validation for all Formal Cleanup Sites (Ecology September 23, 2016). Data validation shall be performed at Quality Assurance Level 2 (EAP2) with Third Party Data Validation.

Ecology will be scheduling a meeting with you to discuss all of the issues in this letter as soon as can be scheduled. We look forward to resolving these issues and moving the Site forward. I can be reached at (425) 649-4446 if you have any questions or wish to discuss this letter.

Sincerely,

Dale Myers

Dale Myers
Northwest Regional Office
Project Manager
425-649-4446

Attachments (2):

Attachment A Deficiencies in remedial activities

Attachment B Supporting Enclosures
ENC1 – Schedule of Deliverables Status
ENC2 – March 27, 2013 Eugene - Rob Robert email
ENC3 – April 16, 2013 Eugene – Rob Roberts email
ENC4 – April 30, 2013 VCP Opinion
ENC5 – June 19, 2014 Rob Roberts - Libby Goldstein email
ENC6 – Review of SKS Shell Site May 15, 2017

By Certified Mail: [9171 9690 0935 0163 8400 83]

cc: Mr. Rob Roberts (Sound Earth Strategies, Inc.)
Mr. Ken Lederman (Foster Pepper PLLC)
Mr. Eugene Freeman (Ecology)
Mr. Bob Warren (Ecology)
Ms. Louise Bardy (Ecology)
Mr. Andy Fitz, (Attorney General's Office)
Central Files, (Ecology)

References

SES. 2013. Draft Remedial Investigation and Feasibility Study Report, SKS Shell Property. April 24, 2013.
SES. 2013. Draft Cleanup Action Plan, SKS Shell Property. June 6, 2013.
SES. 2014. Final Cleanup Action Plan, SKS Shell Property. June 16, 2014.
SES. 2016. Fourth Quarter 2015 Status Report, SKS Shell Station Site. February 9, 2016.
SES. 2016. Cleanup Action Report, SKS Shell Station Site. October 20, 2016.
SES. 2017. 2017 Work Plan, SKS Shell Station Site. April 17, 2017.
Ecology. 2013. Opinion pursuant to WAC 173-340-515(5) on Proposed Remedial Action for the following Hazardous Waste Site, Alaska Street Texaco, VCP NW2715. April 30, 2013.
Ecology (Washington State Department of Ecology). 2013. Prospective Purchaser Consent Decree, SKS Shell Station Property, 3901 SW Alaska St., Seattle, WA. July 29, 2013.

Attachment A

Deficiencies in Remedial Activities

Attachment A

Deficiencies in Work Performed Pursuant to the Consent Decree

The Decree includes the Cleanup Action Plan (CAP) as Exhibit C and the Scope of Work (SOW) and Schedule as Exhibit D. The following are identified deficiencies.

Section III, Parties Bound

- It appears that copies of the Decree were not provided to all agents, contractors, and subcontractors retained to perform work under the Decree.
- No assurance was provided to confirm that all work so undertaken complied with the Decree.

Section VI - Work to be Performed

- The work performed to date has failed to provide protection groundwater monitoring (see Section 6.0 of the CAP), address the potential for anomalous groundwater migration or soil conditions, and provide contingencies for any discoveries of potential preferential pathway.

- Groundwater monitoring during implementation of the remedial action was explicitly identified in Ecology's 2013 opinion letter (Enclosure 4), for assessing potential plume migration and effectiveness of the dewatering activity. Adequate ground water monitoring was not conducted during excavation activities, dewatering activities, or after excavations were completed.

- An unacceptable delay in initiating performance monitoring occurred. Remedial excavation was conducted between April and June 2015. Performance monitoring for all Site wells was not initiated until June 2017.

- The well placement for the dewatering well design was critical to the implementation and effectiveness of the remedy. This was reflected in the dewatering well performance results presented in the Cleanup Action Plan (CAP), Figure 15 (SES, 2013 and SES, 2014). Modification of the dewatering well locations constituted a significant alteration of the system design and performance. A revised assessment of the drawdown and capture capability of the modified well system should have been submitted, in order to confirm that system performance would not be negatively affected.

- The Cleanup Action Report (CAR; SES, 2016) is incomplete and does not meet the requirements of CAP Section 8.3, Compliance Reports.

    - Data concerning the dewatering activities that Ecology has requested needs to be included.

- Modifications to the dewatering/injection wells was omitted.

- All the data, the conceptual site model, and calculations used to design the well configuration and the capture zone for the dewatering wells is required to evaluate projected and actual performance parameters.

- Detailed information concerning the dewatering of the Site was not included in the CAR. The Ecology April 30, 2013 letter (Enclosure 4) specifically requests reporting of daily pumping rates, duration of pumping, drawdown data, and total volumes pumped from each individual extraction well. Instead, the CAR only states the average pump rate for all wells and a total volume extracted from all wells combined.

- The CAR did not demonstrate that gasoline in ground water from the SKS Shell Site had not encroached the Huling Bros Site. The groundwater flow throughout the property is not well represented in Figure 8 of the CAR.

- Review of information presented in the CAR and the letter report "2017 Work Plan – SKS Shell Station PPCD Site" (SES, April 17, 2017) suggest that the groundwater remedy was not effective. Interpretation of results would indicate that (1) there were insufficient monitoring points to assess the state of the plume or the effectiveness of the remedy (Figure 1A shows wells monitored in 2012 and Figure 1B show wells monitored in 2016), and (2) the data suggest that the plume was migrating off-property, resulting in expansion of the Site.

- The report also states that observed groundwater declines at the site wells may indicate drawdown at an off-property location. This may have resulted in a change in groundwater flow direction and/or gradient in response to the changing conditions.

- The 2017 Work Plan (SES, 2017) states that current ground water conditions are consistent with the expected restoration timeframe for the Site, and supports the adequacy of the selected chemical injection remedy under the CAP. Since ground water monitoring was not performed during excavation or dewatering activities, no data exists to support this opinion or justifies the termination of dewatering activities. The Ecology 2013 opinion letter (Enclosure 4) specifically states the dewatering system will operate until contamination is reduced to a target level at all internal and perimeter points of compliance.

Section XI – Sampling, Data Submittal, and Availability

- On October 25, 2016, the Cleanup Action Report (CAR) for the SKS Shell cleanup Site (SES, 2016) was submitted to Ecology for review. However, no sampling data for soil nor groundwater had been entered into the EIM system since December 2012. All environmental data from the remedial action needs to be uploaded to EIM.

- The first set of data from the cleanup action accepted by Ecology's EIM Data Coordinator was February 23, 2017. On March 1, 2017, Ecology noted to SKS that significant data was missing from EIM. Data from the cleanup action is still being uploaded with the latest being May 2017.

Section XII – Progress Reports

- Unacceptable delays in remedial action activities; incomplete quarterly progress reports; no explanations of schedule deviations; and no plans for recovering lost time and maintaining compliance with the schedule.

Section XVIII – Extension of Schedule

- See Section XII above; no request for extension of schedule.

Deficiencies in Work Performed Pursuant Department of Ecology Laws, Regulations, and Guidance

Ecology has determined that some of the work performed or has yet to be performed at the Site is not in compliance with the Model Toxics Control Act Statute and Regulation Chapter 70.105D RCW, Chapter 173-340 WAC, Guidance for Remediation of Petroleum Contaminated Sites (Toxics Cleanup Program Publication No. 10-09-057), and has identified the following deficiencies.

Chapter 173-160 WAC

- The dewatering/injection wells located along SW Alaska Street were altered without Notices of Intent, fees, or well reports filed for the work, and are also no longer in compliance with construction standards (see WAC 173-160-151 and WAC 173-160-191).

Chapter 173-340 WAC

- In June 2013, the draft RI/FS and draft CAP, along with the draft Decree, were presented to the public for their review and comment. Whereas these documents were accepted and finalized, significant data gaps in the RI remained in areas where existing buildings were located. The ground water plume to date has not been adequately characterized. In April 2013, the draft RI/FS was reviewed by Ecology. In a letter dated April 30, 2013 Ecology commented on the draft RI/FS in its 2013 opinion letter (Enclosure 4). Ecology stated that the vertical and lateral extent of the ground water plume was not adequately characterized, and that additional wells would be necessary to describe the perimeter of the plume. This information is critical in moving the Site forward to closure. To Ecology's knowledge, this required investigation was not performed.

- Ecology's data validation requirements were not followed in accordance of WAC 173-204-600, WAC 173-340-820, WAC 173-340-830, Ecology Executive Policy 22-01, and EAP Policy 1-14.
    - Subsequently, SES has agreed to EAP2 with Third Party Validation, and used EAP2 with Third Party Data Validation for the First Quarter 2017 Groundwater Monitoring Report.

Attachment B

Supporting Enclosures

ENC1 – Schedule of Deliverables Status
ENC2 – March 27, 2013 Eugene - Rob Robert email
ENC3 – April 16, 2013 Eugene – Rob Roberts email
ENC4 – April 30, 2013 VCP Opinion
ENC5 – June 19, 2014 Rob Roberts - Libby Goldstein email
ENC6 – Review of SKS Shell Site May 15, 2017

ENC1 – Schedule of Deliverables Status

ALASKA STREET TEXACO/SKS SHELL
Schedule of Deliverables Status
May 16, 2017

Deliverable	Original Due Date	Extended Due Date	Completed	Comments
Install dewatering system	August 2013		July 2014	In compliance
UST Removal			Nov-Dec 2013	UST Report 01/04/14
Soil Excavation & Sampling	April-June 2014	Aug-Oct 2014	**April-June 2015**	Late beyond agreed schedule
Operate dewatering system	April-July 2014	Aug-Nov 2014	**March-June 2015**	Late beyond agreed schedule
Backfill and Membrane Barrier	May-June 2014	Nov-Dec 2014	**Aug-Sept 2015**	Late beyond agreed schedule
Chemical Oxidation Injections	July 2014	Jan-Feb 2015	Planned 2017	
1st QTR Post Cleanup GW Mont	August 2014	Feb-March 2015	**March 2016**	**Incomplete EIM Submitted 2017**
Cleanup Action RPT	Sept-Oct 2014	April-March 2015	Submitted w/o EIM Aug 2016	Began uploading EIM Nov 2016 Partial EIM 02/29/2017
Compliance Monitoring begin		April 2015-2020		**Scheduled to begin May 24, 2017**
ChemOx Injections		April 2015-Mar 2016		**Not Started**
Site Characterization				**Incomplete**
GW Well Installation and Sampling				**Incomplete**
GW Remedy				**Incomplete**

ENC2 –March 27, 2013 Eugene Freeman - Rob Robert email

From: *Freeman, Eugene (ECY)*
Sent: *Wednesday, March 27, 2013 1:00 PM*
To: *'Rob Roberts'*
Subject: *RE: West Seattle*

Hi Rob,

I completed review of the RI/FS document for the SKS Shell site. Your group did a nice job with the document. I thought it was well organized and read quite well. I liked that you broke each characterization event out individually in the discussion. I also thought the conceptual model of the site was reasonably well put together. With that said, there were a couple of areas we need to address further. In particular, we need to look at the groundwater gasoline plume.

As I understand, the gasoline release from the SKS Shell station is the only source that has impacted groundwater. This is based on the proposed groundwater remediation strategy that only addresses the gasoline plume.

Two important features of the gasoline plume that are brought up in the RI/FS are (1) the presence of "antique" gasoline and (2) between 2003 and 2003, 17,000 gallons of gasoline were unaccounted for in the inventory.

The preferred remedy at this Site is monitored natural attenuation (MNA) to occur over 10 years. The antique gas was dated as pre-1970's, which puts it at least 40 years old, yet still persisting in the groundwater. Therefore, it does not appear that natural attenuation has adequately eliminated the pre-existing gasoline plume. What is the basis to believe that the gasoline at the site will attenuate in ten years.

There was 17,000 gallons of gasoline unaccounted for from 2003 to 2008. Has the mass been accounted for in the subsurface. Show the quantitative rationale for this belief. Also, during characterization, were samples collected at any of the utility trenches. Soils in the trenches are likely less compacted than in the more consolidated surrounding sediments. The less compact material could serve as a preferential flow path for contamination off site.

Although natural attenuation is the identified preferred method in the FS, there is no evidence to support that bioremediation is occurring in the subsurface. Is there a microbial population capable of breaking down the petroleum and BTEX in the groundwater. The Department of Ecology has a screening software utility to evaluate MNA of petroleum contaminated Site. The link is, http://www.ecy.wa.gov/programs/tcp/policies/pol_main.html .

Three remediation alternatives were presented for this Site. Two of these options require installation of wells in the right-of-way around the property. Have you received concurrence from the City of Seattle for these alternatives. If the City does not allow drilling in the right-of-way, then you have only presented one option for the FS. Contact the City and have them confirm in writing that Seattle will consider a request to install the well system in the right-of-way.

Write back if you have any other questions.

Gene

From: *Rob Roberts [mailto:rroberts@soundearthinc.com]*
Sent: *Monday, March 25, 2013 4:14 PM*
To: *Freeman, Eugene (ECY)*
Subject: *West Seattle*

Gene,
How is the review going? We should have the dCAP to you this week.
The schedule for the Draft RI/FS and CAP public review is approaching.

Thanks

Rob Roberts
Associate Scientist

SoundEarth Strategies

SoundEarth Strategies, Inc.
2811 Fairview Ave East, Suite 2000
Seattle, Washington 98102
Main: 206.306.1900
Direct: 206.245.1184
Mobile: 425.985.6253

ENC3 – April 16, 2013 Eugene – Rob Roberts email

From: Freeman, Eugene (ECY)
To: "Rob Roberts"
Subject: SKS Shell Status
Date: Tuesday, April 16, 2013 9:13:00 AM

Hi Rob,
As per our recent telephone conversations we discussed the following options for the SKS Shell Site.

1- Ecology would like to bracket the gasoline plume to the west under the Kennedy Funeral Home to make sure we capture all of the plume. The remedy we discussed is to put in another well to the west near the plume perimeter. Installation will happen after the funeral home comes down. The purpose of the well is to either confirm groundwater is clean or, if the sample comes back contaminated, the well can be used as an additional extraction point. If the groundwater at the new well is contaminated, is will be necessary to step out with another well until we have a clean sample.

2- Please incorporate all new data developed since the first RI/FS into the revised document. The new RI/FS document will only address the SKS Shell Site. A single document provides a cleaner presentation for the public review.

3- The former SKS Shell Site has been separated into two separate sites, one consisting of the SKS Shell Site and the other consisting of the Huling and Kennedy Properties. Therefore, two sets of documents will be provided specific to each Site. Ecology is expecting to see the SKS Shell RI/FS within about one week. Upon Receipt, Ecology will turn around the review and opinion letter in one week. The intent is to make the opinion available in a timely manner for development of the DCAP.

4- In addition to installation of the well to the west, we may need to evaluate potential plume migration to the east. The question remaining is whether MW-105 and MW-103 provide sufficient coverage to assure contamination is not migrating through the intersection of Fauntleroy Way SW and SW Alaska Street.

5- The preferred remedy for the SKS Shell Site as discussed is to excavate and dispose of the soil at the property, run dewatering wells on the perimeter, and addition of an oxidizing agent to promote degradation of product.

6- All decisions regarding adequacy of the RI/FS/DCAP will be provided through opinion letters by the Department of Ecology.

If there are any details I have left out or That need clarification with regards to what we talked about please write back. Otherwise, I look forward to getting the SKS Shell RI/FS next week.

Thanks
Gene

Gene Freeman, LHG
Voluntary Cleanup Program, NWRO
3190 160th Ave SE, Bellevue WA 98008
425-649-7191
eufr461@ecy.wa.gov

ENC4 – April 30, 2013 VCP Opinion

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April 30, 2013

Mr. Rob Roberts
SoundEarth Strategies Inc.
2811 Fairview Ave. East, Suite 200
Seattle, Washington 98012

Re: Opinion pursuant to WAC 173-340-515(5) on Proposed Remedial Action for the following Hazardous Waste Site:

- Name: Alaska Street Texaco
- Address: 3901 Southwest Alaska Street, Seattle, Washington
- Facility/Site No.: 39196282
- CSID: 6015
- VCP No.: NW2715

Dear: Mr. Roberts

Thank you for submitting documents regarding your proposed remedial action for the Alaska St Texaco (Site) for review by the Washington State Department of Ecology (Ecology) under the Voluntary Cleanup Program (VCP). Ecology appreciates your initiative in pursuing this administrative option for cleaning up hazardous waste sites under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding a review of submitted documents/reports pursuant to requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site:

- Gasoline, oil, diesel range petroleum hydrocarbons (GRPH, ORPH, DRPH), benzene, toluene, ethyl benzene, xylene (BTEX), and polychlorinated biphenyl (PCB).

Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does

not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

Ecology's Toxics Cleanup Program has reviewed the following information regarding your proposed remedial action(s):

1. Draft Remedial Investigation and feasibility Study Report SKS Shell Property, 3901 Southwest Alaska Way, Seattle, Washington, Prepared by SoundEarth Strategies, Publication date April 24, 2013.

The reports listed above will be kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Appointments can be made by calling the NWRO resource contact at 425.649.7235.

The Site is defined by the extent of contamination caused by the following release(s):

- Gasoline, oil, diesel range petroleum hydrocarbons (GRPH, ORPH, DRPH), and benzene, toluene, ethyl benzene, xylene(BTEX).

The Site is more particularly described in Enclosure A to this letter, which includes a detailed Site diagram. The description of the Site is based solely on the information contained in the documents listed above.

Based on a review of supporting documentation listed above, pursuant to **requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site, Ecology has determined:**

- The vertical and lateral extent groundwater plume is not necessarily adequately characterized at the site. Additional groundwater wells will be necessary to describe the perimeter of the plume. Gasoline contaminated above MTCA cleanup levels in groundwater is observed in wells throughout the SKS Shell property. Groundwater flow is inferred to be north to northeast. Supplemental wells are required north of MW-3, northeast of MW-1 and east of MW-2. All three of the existing wells exceed MTCA cleanup levels. The suggested locations of the new wells are shown as triangles, provided in the attached figure. Additionally, gasoline contamination was also observed in groundwater well SMW04, west of the SKS Shell property. One or more additional wells are necessary too bound the gasoline plume to the west. Additional characterization wells can be installed concurrently with development of the draft cleanup action plan

(DCAP). Information developed from the supplemental wells may warrant a revision of the DCAP to account for change of the nature and extent of the plume.

- Provide groundwater flow direction for each of the most recent eight quarters. Use the three-point approach to develop the flow field and use multiple triangulated sections. Show the triangulated sections and flow direction for each.

- The selected remediation approach at this site includes excavation and removal of petroleum contaminated soil, dewatering of groundwater through operation of extraction wells along the east and north boundaries of the property, chemical oxidation, and monitoring. The groundwater dewatering approach involves installation of wells along the north and east right-of-way adjacent to the property. The suggested extraction rate from all wells is four gallons per minute (GPM). Capture analysis should be performed to determine the distance from the wells that plume capture will have an effect. Additionally, overlap of the cone-of-depression for each extraction well may increase drawdown and consequently result in reduced capture radius. Petroleum contamination will also exist within the SKS shell property. Determine whether the current system adequately reduces concentrations on property and how will this outcome be confirmed.

- The current dewatering approach recommends groundwater extraction for three to four months followed by monitoring. It is more appropriate to operate the system until contamination is reduced to a target level at all internal and perimeter points of compliance. The point of compliance for groundwater is "…throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected", WAC 173-340-720(8)(b).

- Soil removal will require confirmation sampling at sidewalls and bottom of excavated areas. The point-of-compliance for samples shall be established in soils throughout the site, WAC 173-340-740(6)(b). Confirmation samples must show contaminant levels that conform to MTCA cleanup levels selected for this site.

- Soil and groundwater cleanup levels at this site are to comply with MTCA Method A standards (WAC 173-340, Table 720-1 for groundwater and Table 740-1 for soil).

This opinion does not represent a determination by Ecology that a proposed remedial action will be sufficient to characterize and address the specified contamination at the Site or that no further remedial action will be required at the Site upon completion of the proposed remedial action. To obtain either of these opinions, you must submit appropriate documentation to Ecology and request such an opinion under the VCP. **This letter also does not provide an opinion regarding the sufficiency of any other remedial action proposed for or conducted at the Site.**

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

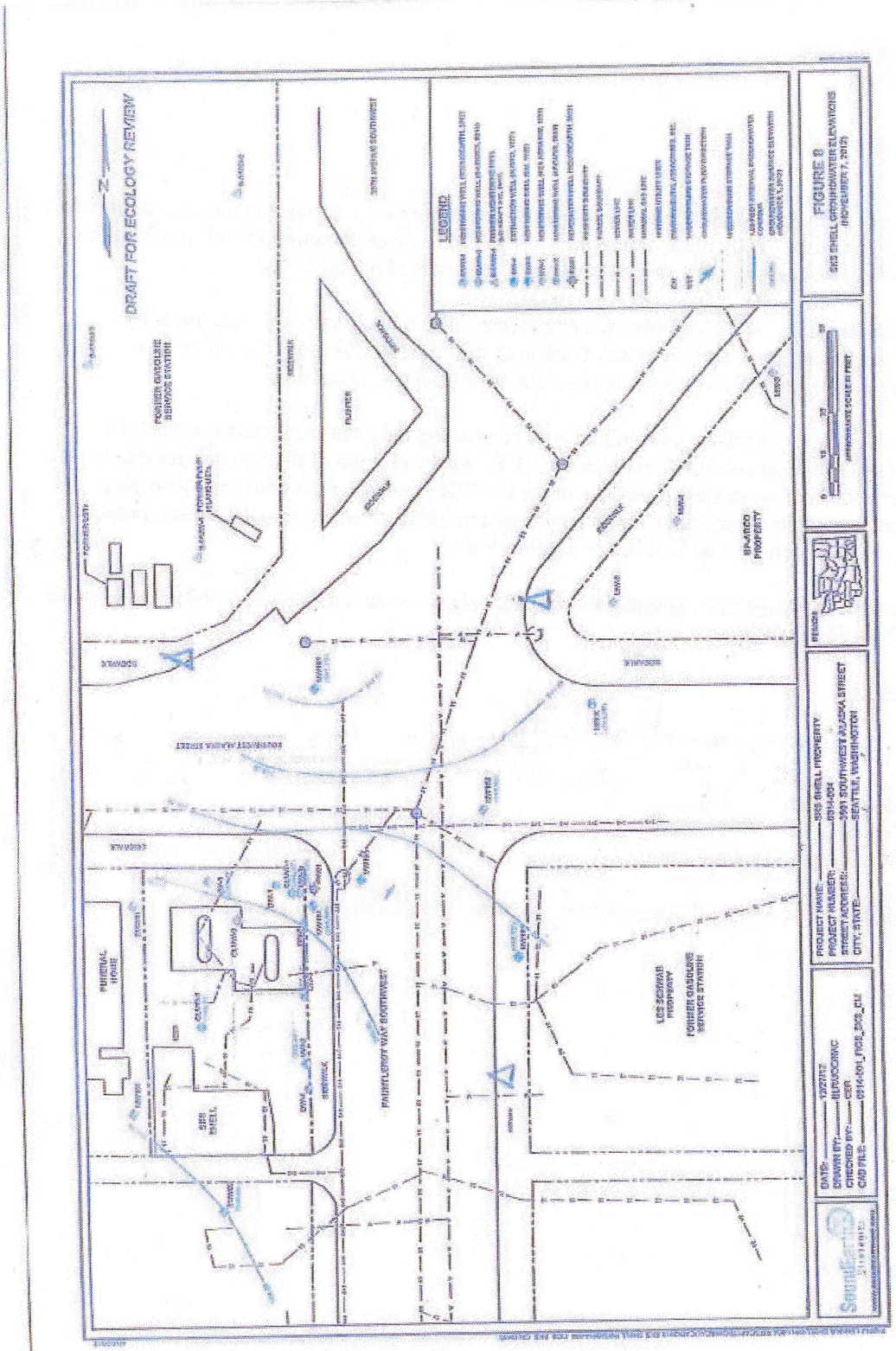
Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or conducted at the Site meet those requirements.

If you have any questions regarding this opinion, please contact me at 425-649-7191or by email at eufr461@ecy.wa.gov.

Sincerely,

Eugene Freeman
Site Manager
NWRO Toxics Cleanup Program

Enclosures: Site Map and Suggested Groundwater Monitoring Well Locations


DRAFT FOR ECOLOGY REVIEW
FIGURE 8
SW SHELL GROUNDWATER ELEVATIONS
(NOVEMBER 7, 2012)
LEGEND
SW SHELL PROPERTY
SW ALASKA STREET
SEATTLE, WASHINGTON
FORMER GASOLINE SERVICE STATION
PENINSULA HOME
SW SHELL
LOS SCHWAB PROPERTY
BRANDO PROPERTY

ENC5 – June 19, 2014 Rob Roberts – Libby Goldstein email

From: Rob Roberts <rroberts@soundearthinc.com>
Sent: Thursday, June 19, 2014 4:05 PM
To: Goldstein, Libby (ECY); Bardy, Louise (ECY)
Cc: Tejal Pastakia - Pastakia & Associates, LLC (tejalp@pastakiallc.com); Charles Gurney (CGurney@Weingarten.com); Knox, Brian
Subject: Alaska Street Texaco (aka SKS Shell)
Attachments: 0914-004 SKS Shell_CAP_June2014_F.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Libby and Louise,

Please find attached the Final CAP for the Site.
Dewatering will begin early August, with excavation of PCS commencing by mid-August or early September.
The MUP has been approved.

I will have a status report out next week as well.

Rob Roberts
Senior Scientist

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ENC6 – Review of SKS Shell Site
May 15, 2017

Review of SKS Shell Site – 5/15/2017

Conclusions RI/FS (SES, 4/24/2013)

"After performing the comparative analysis and ranking of alternatives in accordance with the MTCA evaluation criteria, Cleanup Action Alternative 1 is the recommended alternative. Cleanup Action
Alternative 1 entails the full source removal excavation within the limits of the SKS Shell Property, dewatering of the ROW, and chemical oxidant injection to address residual soil and groundwater contamination beneath the ROW. This combination of remedial methods is the recommended alternative because it achieves the RAOs, meets the requirements set forth in WAC 173-340-360(3) and
WAC 173-340-370, and is the most favorable with respect to the established evaluation and ranking criteria. Cleanup Alternative 1 also exhibits the lowest cost-to-benefit ratio compared to the comparative alternatives."

1- Groundwater Remediation

The SKS Shell Site remedy identified in the Cleanup Action Plan (CAP) was to (1) full source removal excavation of soil, (2) dewatering of the Right-of-Way (ROW), and chemical oxidation of residual contamination in soil and groundwater. Eight wells (RW-01 thru RW-08) originally identified for ROW dewatering. A ninth (RW-09) was added to address contamination in SMW-04 near the Kennedy Funeral Home. Dewatering was originally scheduled for September – December 2013. Dewatering reported to occurred on March 23 2015.

Cleanup Action Report (SES, October 20, 2016)
In accordance with the CAP (SoundEarth 2014b), groundwater was pumped from the SKS Shell Property excavation dewatering trench and remediation wells, RW01 through RW09, located in the adjacent ROWs during excavation of PCS at the SKS Shell Property. Each remediation well was equipped with an electric submersible pump capable of the design flow rate of 0.5- to 1-gallon per minute. The average pumping rate for the 9-well system was approximately 4 to 5 gallons per minute during system operation.

North SKS Shell boundary dewatering wells were installed in July 2014 modified in October 20, 2015. It was not clear that all wells were used. Indication is that two of the wells were used and two new wells (DW-1 and DW-2) were used for dewatering. This is a significant deviation from the planned remedy that Ecology was not notified about. Also, In the April 30, 2013 opinion letter from Ecology, the third bulleted item notes that the remedy needs to reduce concentration on the property and will need to demonstrate that this has happened. Figure 1 shows the expected capture zone. There was no confirmation of the remedies effectiveness.

Provide the well as-builts for DW-1, DW-2, DW-3, DW-4. What is the purpose of these wells, when were they installed and when were they removed?

Ecology has requested data pertaining to discharge rate, pumping duration, and sample concentration from each well in the dewatering system. The response back was that these records were not collected and that there is only a record of total volume withdrawn.

Additionally, WAC 173-340-740(6) and WAC 173-340-720(8) requires that soil and groundwater cleanup meets the cleanup level (Method A, unrestricted) at all points of compliance throughout the site. This point was also identified in the Ecology opinion letter dated April 30, 2013. Confirmation of the cleanup level has not been done nor has there been any consistent effort to collect groundwater data throughout the site.

Ecology has requested the data, method, and electronic files used to create the dewatering system estimates. These have not been produced yet. Ecology has also inquired as to any dewater planning for a four-well system that may have been used. Ecology will need the engineering design plans for the dewatering system and any photographs of the system. These designs should be signed by a licensed professional.

(The dewatering system is intended to remediate contamination in groundwater as was stated in the conclusions to the RI/FS (SES, 2013), the text of which is reproduced at the beginning of this list. The standard procedure for design of dewatering wells includes collection of soil samples and performance of a sieve analysis to determine the appropriate well screen slot size and sand pack grain size (Driscol, 1986). Provide information regarding well development (method, turbidity, etc.). Figure 15 of the DCAP (SES, 2013 and 2014) show the drawdown profile for the dewatering well system. The Department of Ecology requires all data used in design of the groundwater dewatering system for both the wells and the drawdown analysis. Provide all data in Microsoft EXCEL electronic format. Provide all input files and calculation spreadsheets, also in electronic format, that were used in the design phase. Design will also include pump selection, and pump performance data (pump make and model, lift, flow range rating, performance curves, etc.). Provide a schematic of the dewatering system that shows well distribution, piping, valves, discharge locations, flow gage locations, sampling ports, and any other pertinent information. Proper design is paramount to an effective remediation system (EPA, 2008, A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems). If the dewatering wells are not designed to fit the hydrogeologic system, performance of the remedy is completely unverifiable and indefensible.)

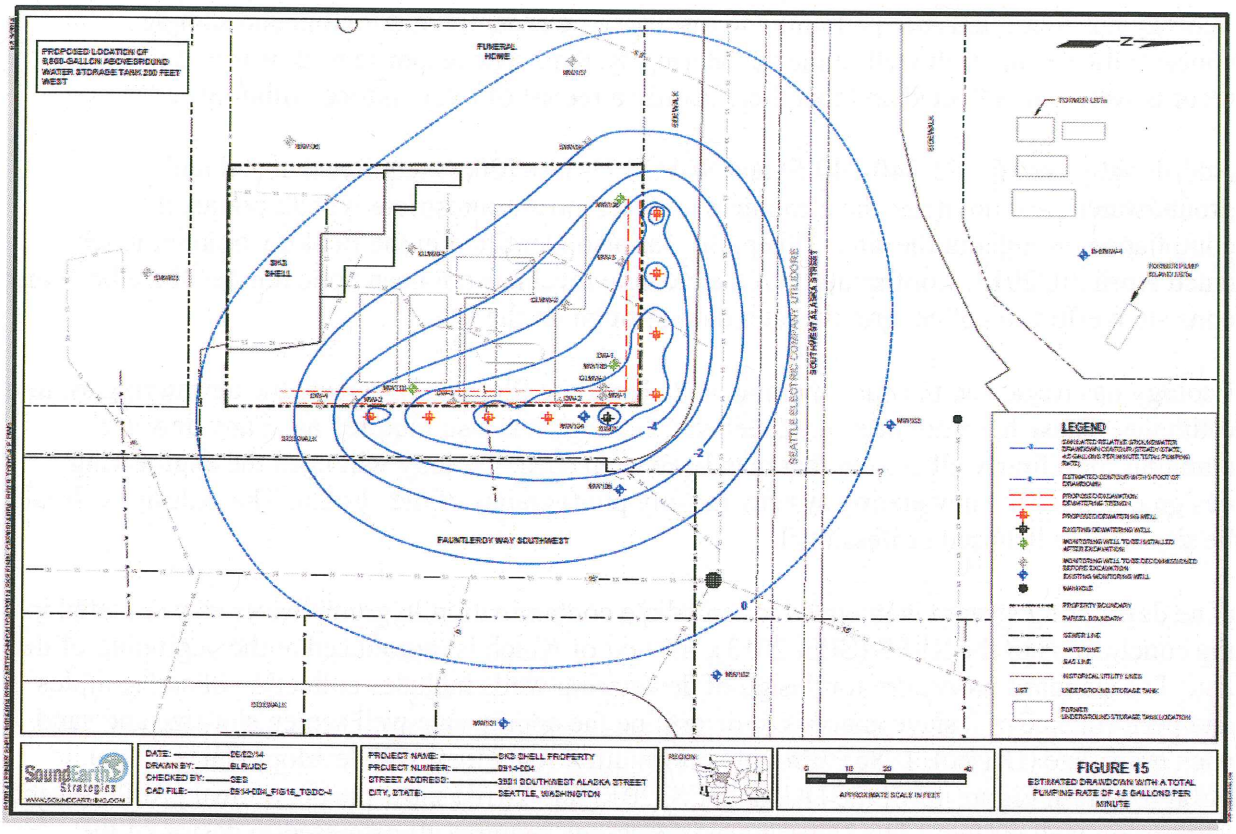


Figure 1. Estimated drawdown for the dewatering wells.

2- Soil Contamination may remain beneath the Site (On and Off-property)

Petroleum contamination likely remains in the soil below groundwater. When petroleum enters the groundwater it can adsorb to soil particles and be absorbed into less permeable soils where it is slowly released over time. This is a well-known phenomenon in groundwater and results in a long tailing effect for persistence of contamination in groundwater. The soil contamination beneath the water table has not been evaluated. Consequently, it is not known whether the soil possess a continuing source of petroleum contamination into groundwater.

The remediation of soil contamination off-property (On-Site) has not been adequately addressed by SES. How will cleanup of this media be confirmed. In the CAP, the oxidant is cited as serving this purpose. However, it is not clear how this will be achieved for contamination that has already migrated beyond the injection wells.

3- Groundwater Monitoring – compliance monitoring

In the Ecology opinion dated April 30, 2013 requested eight quarters of groundwater monitoring data to develop flow direction throughout the site. This information has not been collected. Consequently, the groundwater flow throughout the site has not been established. Figure 2 below shows the groundwater contours provide in the RI/FS report (SES, 2013). An additional well was requested west of the Kennedy Funeral Home. This was not installed, instead a boring was drilled and a grab sample was collected. A well was installed to the north of the Funeral Home (MW-107) but has not been routinely sampled.

Figure 3. Shows a map of the SKS Shell Property with locations for three additional wells to monitor the perimeter of the site for migration of petroleum. This request was submitted in the April 30, 2013 Ecology opinion letter as the first bullet. Additionally, the concern to monitor off property migration was noted in an Ecology email from Eugene Freeman to Rob Roberts dated April 16, 2013.

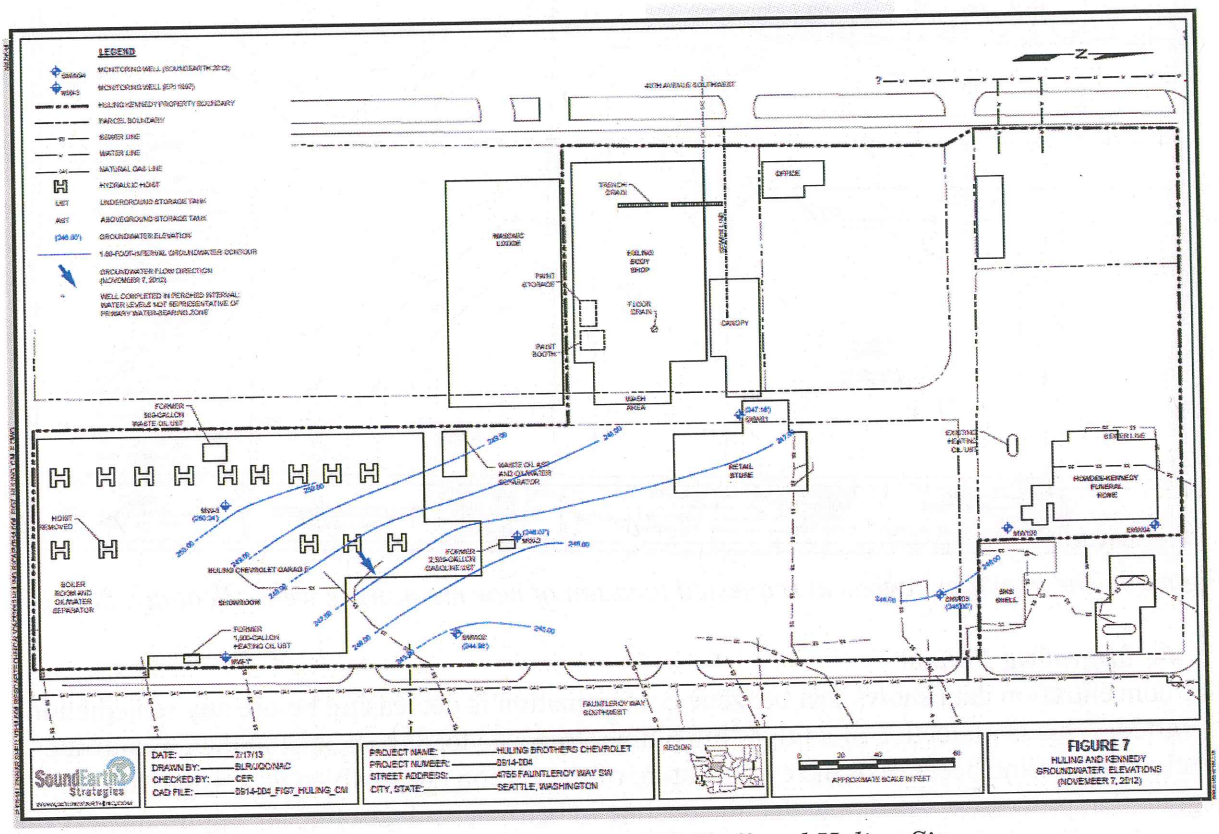


Figure 2. Groundwater flow lines throughout the SKS Shell and Huling Sites.

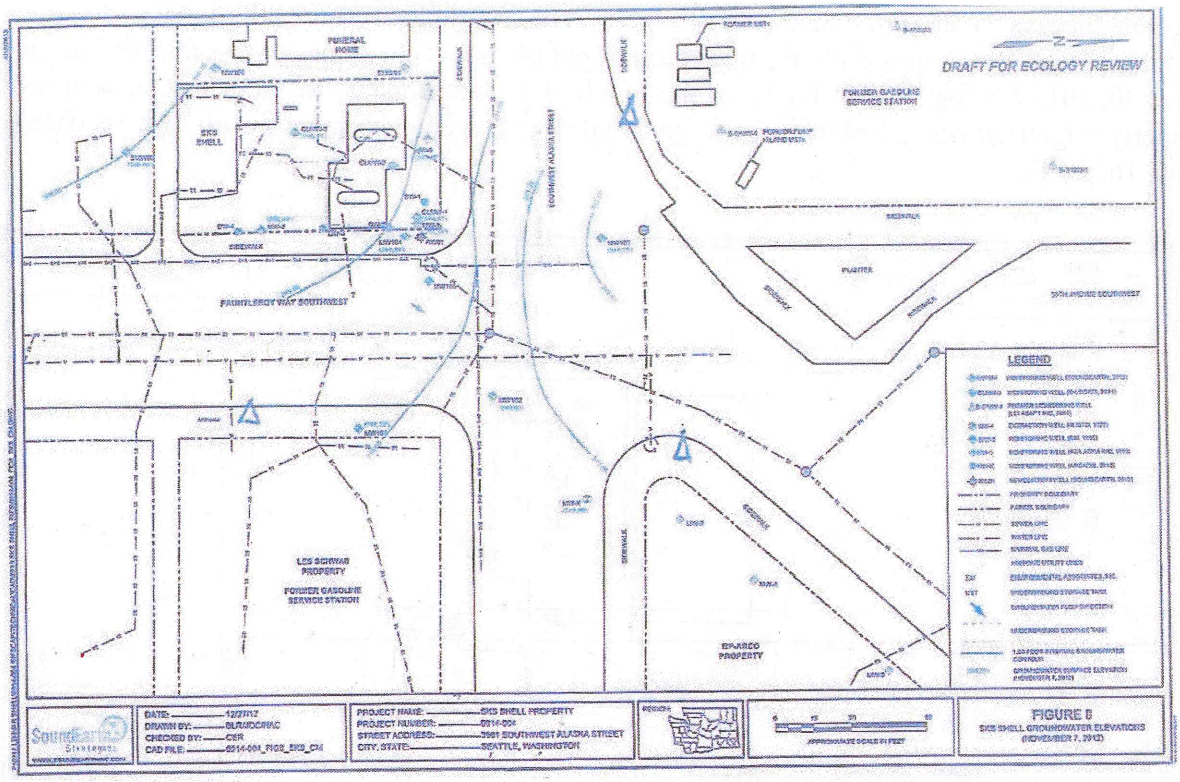


Figure 3. The triangles represent requested location of new monitoring wells (Ecology, 2013)

4- Migrating Plume

The concentration data shows that benzene contamination is decreasing before any remediation is started. This is indicative of a migrating plume. Benzene tends to persist in the groundwater relative to gasoline because of the cyclic nature of the carbon chain which is resistant to degradation processes. Also note that the decline in benzene and gasoline are approximately the same. Gasoline, being a linear carbon chain should break down faster than benzene. The graph shows benzene and gasoline both decrease at about the same rate, also suggesting that the plume is migrating.

Also note that if dewatering was having a significant effect of the contamination in groundwater, there should be an increase in the slope of contaminant concentration decline that reflects reduction. The plot does not show any change in the slope during or after dewatering begins.

The original purpose of the dewatering system was to draw back the advancing plume before it could migrate beyond the radius of influence of the capture zone. However, because the dewatering did not occur in a timely manner, it is likely that the plume expanded beyond the dewatering wells range.

Ecology believes that the plume has migrated beyond the effective range of the remedy and is now impacting properties down gradient.

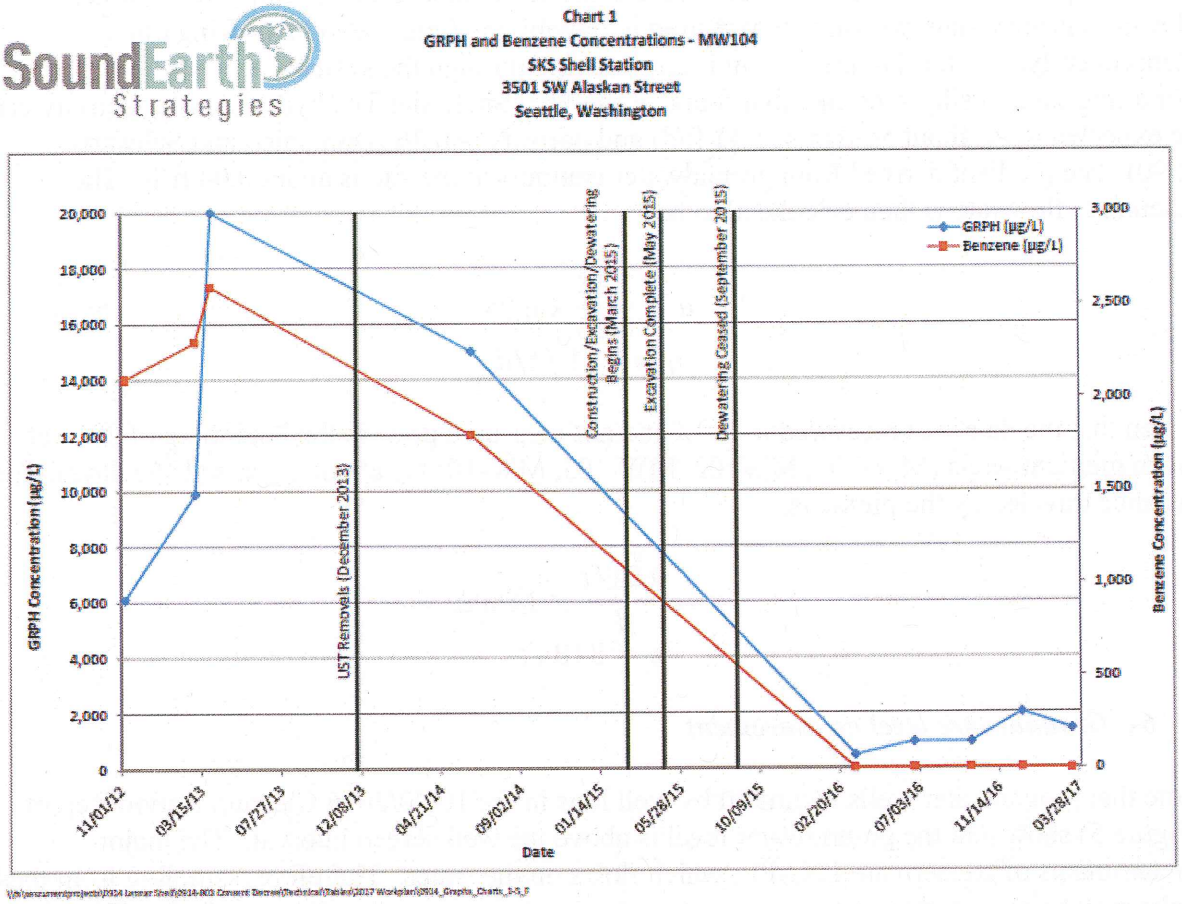


Figure 4. Gasoline and benzene concentration at MW-104.

5- Why Ecology believes the plume is migrating.

Figure 2 and 3 show groundwater contour features through the SKS Shell and Huling Sites. Effectively the contours represent a gradient, a slope to the water table that together with the effects of gravity drives water and contamination to move in the down gradient direction. Based on the gradient (dh/dl) and we know that a porous media possess a conductivity (Ks) and a porosity (n) the flow rate can be calculated. This calculated value that is derived from Darcy's equation is,

$$q = \frac{K_s}{n}\frac{dh}{dl}$$

We can also define a unit volume of the aquifer through which water flows. Water moving into the unit volume (inflow) plus any water in storage must equal the water exiting the unit volume. This process is represented by,

$$Mass = inflow + storage - outflow$$

Since the principle of conservation of mass cannot be violated, and since the groundwater elevation is not rising, we know that if fluid is flowing in, it must also be flowing out. Consequently, any fluid in the system is also moving through the system.
For a fine sand to silty sand like that found at the SKS Shell Site The hydraulic conductivity can be expected to be about 5e-6 m/s (1.42 ft/d) and porosity is 0.26 (Domenico and Schwartz, 1990). The gradient derived from groundwater contours at the site is about 0.04 ft/ft. The calculated flow rate is then calculated to be

$$q = \frac{1.42}{0.26} \times 0.04$$
$$q = 0.21\ ft/d$$

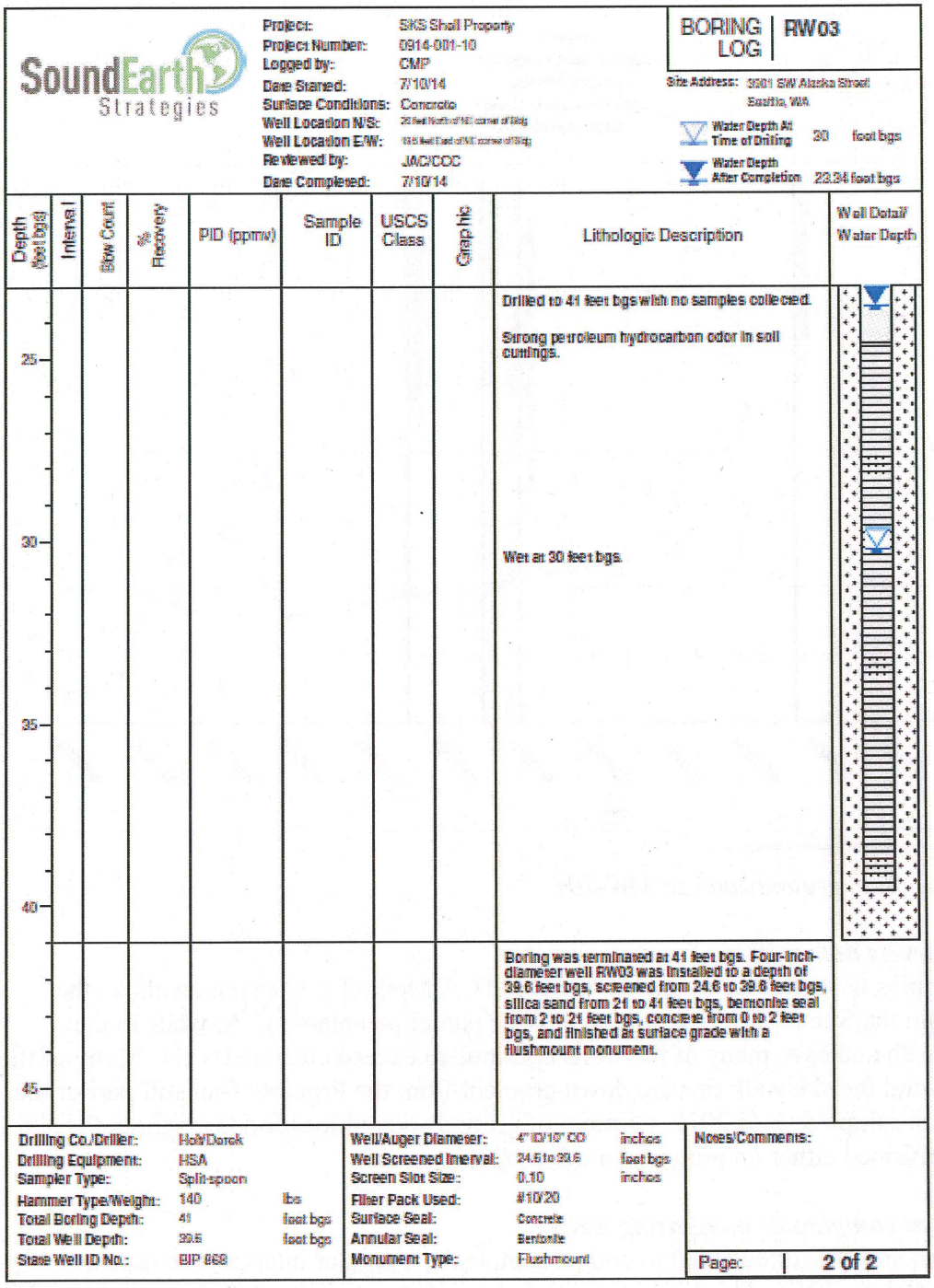
Given that the data was measured in 2012 and not measured prior to the beginning of 2017 at down gradient wells (MW-101, MW102, MW-103, MW-105) is about 4 years (1460 days). The distance traveled by the plume is,

$$x = \frac{0.21ft}{d} \times 1460d$$
$$x = 318\ ft$$

6- Groundwater level measurement

Note that groundwater wells identified by well logs in the 10/20/2016 Cleanup Action Report (Figure 5) show that the groundwater level is above the well screen interval. The major contaminants of concern are LNAPL, which flows on the water. Therefore, sampling from these wells may be expected to under-represent contaminant concentration in groundwater. The figure below shows one of those wells where groundwater is above the screen. This groundwater position above the screen is observed in multiple well completions.

SES notes that the contaminant concentrations in groundwater samples has been increasing with decline in water level. This could be the result of the water table dropping into the screened interval and consequently, the lighter petroleum is now being captured during sampling.



SoundEarth Strategies

Project: SKS Shell Property
Project Number: 0914-001-10
Logged by: CMP
Date Stared: 7/10/14
Surface Conditions: Concrete
Well Location N/S: 25 feet North of NE corner of Bldg
Well Location E/W: 135 feet East of NE corner of Bldg
Reviewed by: JAC/CDC
Date Completed: 7/10/14

BORING LOG | RW03

Site Address: 3301 SW Alaska Street
Seattle, WA

Water Depth At Time of Drilling 30 feet bgs

Water Depth After Completion 23.34 feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppmv)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Detail/ Water Depth
25								Drilled to 41 feet bgs with no samples collected. Strong petroleum hydrocarbon odor in soil cuttings.	
30								Wet at 30 feet bgs.	
35									
40								Boring was terminated at 41 feet bgs. Four-inch-diameter well RW03 was installed to a depth of 39.6 feet bgs, screened from 24.6 to 39.6 feet bgs, silica sand from 21 to 41 feet bgs, bentonite seal from 2 to 21 feet bgs, concrete from 0 to 2 feet bgs, and finished as surface grade with a flushmount monument.	
45									

						Notes/Comments:
Drilling Co./Driller:	Holt/Dorok		Well/Auger Diameter:	4"ID/10" OD	inches	
Drilling Equipment:	HSA		Well Screened Interval:	24.6 to 39.6	feet bgs	
Sampler Type:	Split-spoon		Screen Slot Size:	0.10	inches	
Hammer Type/Weight:	140	lbs	Filter Pack Used:	#10/20		
Total Boring Depth:	41	feet bgs	Surface Seal:	Concrete		
Total Well Depth:	39.6	feet bgs	Annular Seal:	Bentonite		
State Well ID No.:	BIP 868		Monument Type:	Flushmount		

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Figure 5. Water level relative to screen location.

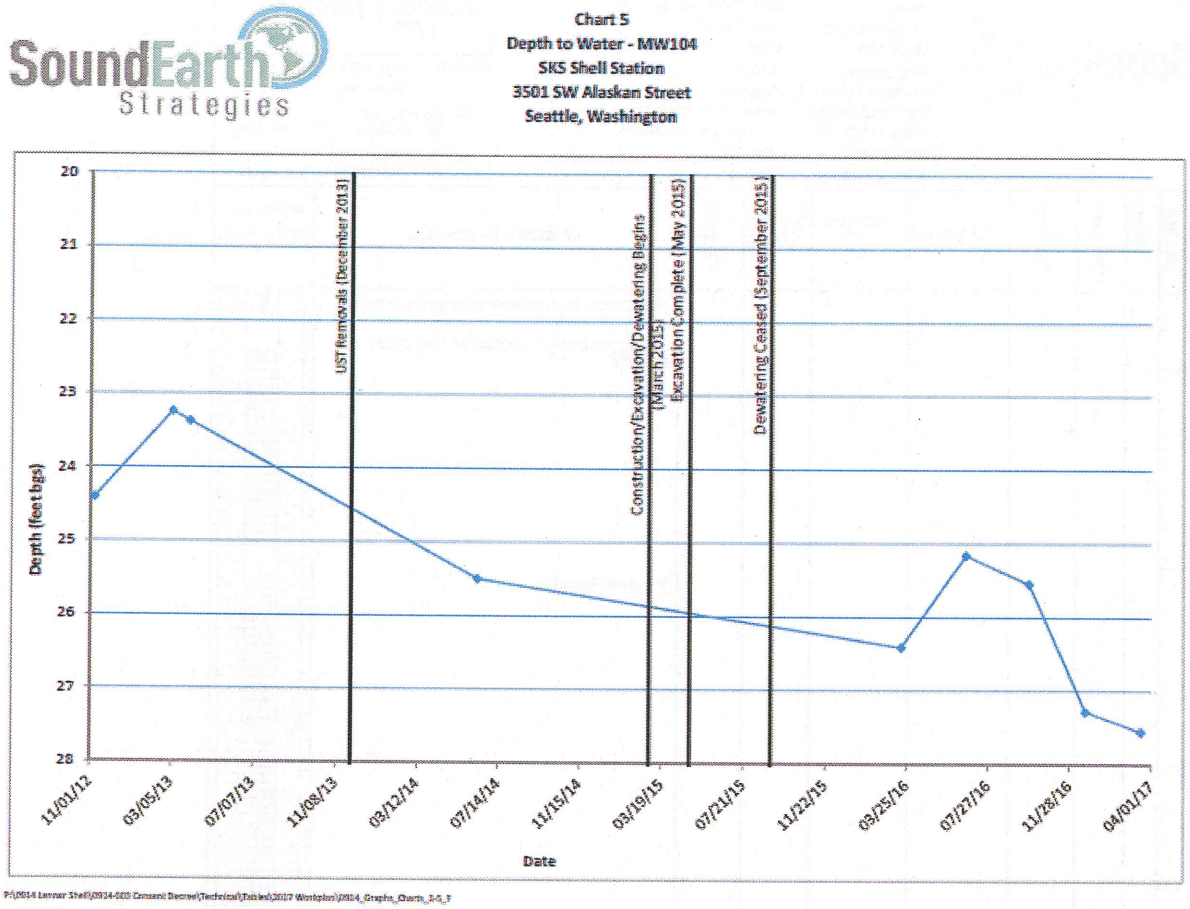

Figure 6. Fluctuation in groundwater at MW-104

7- Cleanup levels not verified

Groundwater samples have not been verified below MTCA Method A Cleanup levels on the property nor within the Site (which extends beyond the parcel boundaries). At wells in the sidewalk to the north and east, many of the wells continue to exceed cleanup levels. Many of the wells that are beyond the sidewalk that are down gradient from the Property (but still part of the Site) have not been sampled since 2012. Cleanup of groundwater at location throughout the site have not been confirmed either on property or off-property.

8- Insufficient compliance monitoring wells

There has not been any concerted effort to collect samples at a regular interval, nor over a representative area since 2012. This leaves a five-year gap for sampling throughout the site. The few samples that have been taken are limited to a small area and sampling has not been performed on a regular basis. Consequently, there is not adequate data, spatially or temporally to determine if cleanup has been accomplished.

Conclusion

The dewatering system was likely ineffective in cleanup of groundwater at this site. There is insufficient data to be able to assess the effectiveness of the system. The operation of the system was not adequately monitored nor were monitoring wells sampled during dewatering operation.

The overall groundwater monitoring network sampling was insufficient to characterize groundwater flow and contaminant concentrations for both spatial and temporal context. The contaminant conditions in groundwater cannot be determined from the spotty data collection.

The Contaminant plume has likely migrated beyond the original extent measured in 2012. This concern was expressed in the March 2013 email and the April 2013 opinion letter from Ecology. In these communications, Ecology requested monitoring of the down gradient wells to confirm that migration does not happen. This was not done. As far as Ecology knows, as of May 2017, these down gradient wells have still not been sampled.

The time-series plots of contaminant concentration appear to confirm that contamination is migrating. Concentrations are declining before any remediation is performed. When remediation is performed, there is no discernible change in the rate of decrease of contamination in the wells. SES claims that the contamination is decaying, however, the decline is much greater that any decay rate that is reasonable for a natural system. Additionally, benzene is known to persist in the environment, yet it appears to decay at the same rate as gasoline. This further suggests that the plume is migrating.

Any injection of oxidant at the dewatering wells will not remediate any petroleum products that have migrated beyond the Right-of-Way not in close proximity of the injection points. Any oxidant will be chasing the contamination and will dissipate before migrating through the intersection. Conditions in the groundwater in the down gradient direction can be confirmed through monitoring of REDOX and DO after injection.

Without sufficient data, the effectiveness of the remedy cannot be determined.