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September 29, 2006
000029-02

Dana Bayuk, RG
Oregon DEQ
2020 SW 4th Avenue, Suite 400
Portland, Oregon 97201-4987

Re: Addendum to Offshore Final Phase I Field Sampling Approach, NW Natural, Gasco Site, Portland, Oregon

Dear Mr. Bayuk:

This letter addendum was prepared by Anchor Environmental, LLC (Anchor) on behalf of NW Natural to address the Oregon DEQ September 25 letter *Final Phase I Field Sampling Approach Groundwater Source Evaluation Northwest Natural Gas Company Site, Portland, Oregon*. The September 25 letter contains DEQ comments on the "*Final Phase 1 Field Sampling Approach, GASCO Siltronic Groundwater Source Evaluation*" dated September 2006 (Phase 1 FSA). Anchor prepared the Phase 1 FSA on behalf of NW Natural.

In the September 25 letter DEQ approved implementation of the Phase I FSA subject to the conditions listed in the following pages. John Edwards, Matt McClincy and Dana Bayuk discussed the September 25 letter in a conference call on September 27. The Phase I FSA workplan is amended as shown in the following comments. The Anchor comments are shown in italics following each of the DEQ comments.

- Given the time limitations of conducting the work and DEQ's priority for moving source control forward as efficiently as practicable, three additional borings should be added to the field sampling program (FSP). The additional borings are located where additional data is needed, or is reasonably likely to be needed.
 - An additional boring (GS-00) should be located approximately 200 feet west-southwest of the Boring GS-01 along the NWNG Site property line between U.S. Moorings. This boring will provide information in an area where additional measures may be needed to prevent migration of contaminated groundwater onto an adjoining property and around hydraulic control and containment features constructed on the NWNG Site.

- *Agreed. The topography along the property line between NW Natural and U.S. Moorings is very rough, so Anchor will confer with DEQ in the field to agree on a location that is accessible for a drill rig. This location is above the ordinary high water line so is not subject to the Corp and DSL permits. Because this boring is not subject to the October 31 Corps permit deadline, it will be drilled last, probably in November.*
 - Two borings should be located upstream of Boring GS-10 (GS-11, GS-12) adjacent to the Siltronic operable unit. Proposed boring GS-10 is located 150 feet upstream of the NWNG/Siltronic property line. The former "lowland effluent pond overflow area" extended approximately 400 feet upstream of the property line, and is considered a source DNAPL and groundwater contamination observed on the Siltronic operable unit. Borings GS-11 and GS-12 will provide additional information off-shore and upstream of the former lowland effluent pond overflow area.
 - *Agreed. These two borings are in the general vicinity of Siltronic borings GP 25, 26, and 28, which were drilled along the Siltronic shoreline. The Siltronic borings were drilled to bedrock and tested deep groundwater for potential MGP related COIs. Significant subsurface information is currently available on the possible depth of MGP related COIs in this area of the shoreline. Therefore, these borings will be drilled last in priority sequence.*
- Borings GS-01, GS-03, GS-05, GS-07, GS-09, and GS-11 should be drilled to the top of the basalt to: 1) determine the thickness of the Alluvial water-bearing zone (Alluvial WBZ) at each location; 2) observe the physical nature of the basalt along the line of borings; and 3) support assessments of source control measures involving vertical barriers. Information collected on the Siltronic operable unit indicates the depth to basalt could be greater than 175 feet below mudline (bml).
Agreed.
 - Borings GS-00, GS-02, GS-04, GS-06, GS-08, GS-010, and GS-12 should be advanced below dissolved phase groundwater contamination in the Alluvial WBZ. Observations made and data collected at monitoring well clusters WS-11, WS-12, and WS-14 on the Siltronic operable unit, provide strong evidence that DNAPL and dissolved phase groundwater contamination associated with NWNG's former operations could occur at depths greater than 100 feet and 160 feet bgs respectively. Given this information, the proposed depth of 100 feet bml is probably not sufficient to evaluate the vertical extent of groundwater contamination.
Agreed

- Related to the condition above, DEQ expects that groundwater samples will be collected for analysis from depth intervals of 5, 10, 25, 50, 75, 100, 125, and 150 feet bml at every boring location, and that every other boring include a sample from 175 feet bml. More complete vertical characterization is essential for planning for future uplands and in-water groundwater monitoring and sampling work, including the Phase 2 FSA, and source control evaluations.

Agreed.

- The field program should be sequenced so that borings located in areas where levels of contamination are suspected to be highest (e.g., GS-04 through GS-11) are drilled and sampled first. This will allow the data from these locations to be collected during the timeframe available for conducting the work.

Agreed. As discussed during the September 27 teleconference, the drilling sequence will be as listed below, subject to equipment access and river conditions. Boring GS-09 will be drilled first, and boring GS-00 will be last. If two drill rigs are mobilized to the Site, this sequence may be modified to adjust to field and equipment conditions.

GS-09

GS-07

GS-05

GS-03

GS-01

GS-08

GS-06

GS-04

GS-02

GS-10

GS-11

GS-12

GS-00

- It is probable that highly contaminated sediments will be encountered at shallow depths during drilling. The double-case method of drilling should be employed to reduce the potential for impacted shallow sediments to be carried down the borehole during drilling and bias the results of samples collected at depth. Using this drilling method could improve the comparability of this data to uplands groundwater data and assist in distinguishing between sediment impacts from

historical direct discharge to the river, and contamination associated with groundwater transport.

Agreed.

- The presence and occurrence of NAPL in subsurface material should be a data collection objective of the Phase 1 (and Phase 2) FSA. In addition to visual inspection, field screening (e.g., hydrophobic dye shake test, ultraviolet fluorescence, sampler core strip test) of geologic material recovered during drilling should be included in the drilling program.

Agreed. The core will be stored on Site for screening by the hydrophobic dye shake test and/or hydrophobic spray test, and ultraviolet fluorescence.

- Detailed descriptions of investigation derived waste (IDW) handling, containment, and management procedures should be provided for over-water work conducted on a barge. The procedures should include provisions for controlling sheen that may be produced during drilling and sampling activities.

Agreed. The current plan is to establish a contained decon station on the barge and second decon station on the Gasco upland property. Decon water generated on the barge will be drummed and transported to an upland staging area. The drilling contractor will also place a floating boom around the drilling barge and have adsorbent boom material available for deployment in the event of a release from the barge. The drill crew on the barge will have available adsorbent materials for use in case of minor spillage on the barge deck.

The conditions listed above have been provided to clarify DEQ's understanding of the FSP items indicated and communicate our expectations regarding the data collection objectives of the Phase 1 FSA.

ADDITIONAL COMMENTS

Section 3.2.1, Page 21. The second paragraph suggests that not collecting soil samples from the same depth intervals as groundwater samples will increase the uncertainty of data interpretations with respect to the conceptual model for the site. DEQ disagrees with pre-qualifying the adequacy and/or usability of any information generated during the Phase 1 FSA before the work is complete and the data is reviewed against the data collection objectives of the project.

Agreed.

Section 3.6.2, 1st paragraph. NWNG indicates that the collection of shallow soil/sediment and groundwater samples may be complicated by the drilling rods sinking into material to greater than 5 feet bml/bgs. DEQ understands from this information that the driller cannot prevent this from occurring.

DEQ requests that if the above scenario occurs, the HydroPunch™ be used to collect the shallow groundwater sample before drilling proceeds (i.e., with no drill rods extended). After the shallow groundwater sample is collected drilling can proceed to 10 feet bml/bgs at which time both the 5 and 10 foot soil/sediment samples can be collected upon retrieval.

Agreed.

Section 3.6.2.2, Page 27. DEQ understands that a packer-based sampling system has been replaced with a HydroPunch™. A memorandum describing the HydroPunch™ method was provided separately from the Phase 1 FSA.

DEQ expects that the description of the HydroPunch™ method will be incorporated into the Phase 1 FSA addendum (see “Next Steps” below) to fully document the FSP for the project.

Agreed. The HydroPunch™ protocol memo is attached to this addendum.

Section 3.6.2.2, last paragraph. In the event heavily impacted soil/sediment and/or groundwater is encountered during drilling, decontamination of sample collection equipment may be difficult.

DEQ requests that in these cases sampling equipment (e.g., pump tubing) be replaced rather than decontaminated and reused. This will reduce the amount of IDW produced from decontamination and make it easier to manage and secure the discarded items.

Agreed. The current plan is to use either a Waterra type foot valve pump or peristaltic pump for purging and sampling. New polyethylene tubing will be used for each new groundwater sample interval.

Table 6. This table should be revised consistent with the conditions listed above.

Agreed. The updated Table 6 is attached.

Table 7. DEQ requires that total (unfiltered polycyclic aromatic hydrocarbons [PAHs] and metals) will be included in the analyte list.

Although DEQ and Portland Harbor partners will consider the results of filtered PAH analysis, it is unlikely that any significant regulatory decisions will be based on these results. The decision to conduct filtered analysis of PAHs is entirely at the discretion of NWNG. Glass filters should be used if NWNG elects to collect filtered samples.

According to Table dissolved metals are to be filtered by the laboratory and preserved after filtering has occurred. This protocol has the potential to bias analytical results low as the samples will likely exhibit turbidity and the time between collection and filtering provides opportunity for sorption of metals to suspended solids.

DEQ requests that groundwater samples being analyzed for dissolved metals be filtered in the field into laboratory-supplied containers containing preservative.

Agreed. Table 7 is attached.

Table 8. DEQ expects the laboratory method reporting limits and method detection limits shown to be consistent with those being used by the Lower Willamette Group for the Portland Harbor Remedial Investigation and Feasibility Study.

Agreed. The testing methods will be the same. We are going to use CAS, the same lab used by LWG. However, we cannot guarantee that the MRLs will be attained, because lab dilutions and chemical interference sometimes causes MRLs to be higher than listed with the testing method.

Figure 15. This figure should be revised consistent with the conditions listed above.

Agreed. Figure 15 is attached.

HydroPunch™ SOP. Prior to collecting a groundwater sample at least one casing volume will be purged from the sampler rods. DEQ also requests that, to the maximum extent practicable, all purging and sampling be performed using a pump.

Agreed. We will attempt to purge the volume of water that accumulates in the casing following placement of the Hydropunch.

As discussed during the September 27 teleconference, Anchor will make all reasonable attempts to transport DEQ personnel and their contractor to the drilling barge. Tim Stone will be DEQ's contact with respect to drilling schedule, and arranging access to the drilling barge.

We also understand that DEQ may want us to provide split groundwater samples during the investigation. We will make every reasonable effort to provide water samples for placement in DEQ supplied sample bottles.

Please contact me or Tim Stone at 503 670-1108. Tim Stone's cell phone number is 503 475 9150.

Respectfully Submitted,

John E. Edwards, RG, CEG

Anchor Environmental, L.L.C.

Cc: Bob Wyatt
Patty Dost
Carl Stivers

Attachments: Table 6
Table 7
Figure 15
HydroPunch™ Memo