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Theodore Kulongoski, Governor

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June 28, 2007 *Also Sent Via E-mail*

Mr. Robert J. Wyatt
Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, OR 97209

Re: Phase 2 Offshore Field Sampling Approach
Groundwater Source Evaluation
Northwest Natural Gas Company Site
Portland, Oregon
ECSI #84

Dear Mr. Wyatt:

The Oregon Department of Environmental Quality (DEQ) has reviewed the "Phase 1 Report and Phase 2 Field Sampling Approach, GASCO Siltronic Groundwater Source Evaluation" dated May 2007 (Phase 1 Report/Phase 2 FSA). Anchor Environmental, LLC (Anchor) prepared the Phase 1 Report/Phase 2 FSA on behalf of the Northwest Natural Gas Company (NWNG).

NWNG is currently engaged in ongoing investigations of manufactured gas plant (MGP) waste and associated contamination in the uplands of their property (NWNG Property, aka the "Gasco Site") and the adjoining Siltronic Corporation property (Siltronic Property). In addition, NWNG is conducting in-water investigations offshore of the Gasco Site and the northern portion of the Siltronic Property to support the Portland Harbor in-water remedial investigation and feasibility study (RI/FS) being performed by the Lower Willamette Group (LWG). The results of the in-water work will also provide information to: 1) further assess uplands contaminant transport pathways (e.g., direct discharge, groundwater) as sources of contamination to the river; 2) support uplands source control measures evaluations and designs for the both facilities; and 3) assist planning of in-water work being contemplated by the US Environmental Protection Agency (EPA).

NWNG is conducting in-water investigatory work in phases. The Phase 1 offshore field sampling approach (Phase 1 FSA) was completed earlier this year with the purpose of collecting groundwater chemistry data and general geotechnical information in the near shore area along the Gasco Site and the northern portion of the Siltronic Property to: 1) assess the lateral and vertical extent of site-related contamination in groundwater along the Gasco Site shoreline for comparison to data collected in the upland; and 2) collect information on subsurface geotechnical conditions to support source control measures evaluations, including a vertical barrier; and 3) provide data to develop the in-water sampling and analytical program for the Phase 2 offshore field sampling approach (Phase 2 FSA).

The Phase 2 FSA is scheduled to begin in early July after the opening of the season's first fish window. NWNG's primary objectives for the Phase 2 FSA include: 1) assessing the nature and extent of MGP impacts in TZW and groundwater beneath the river and their relationship to upland groundwater contamination; 2) evaluating the distributions of chemicals detected in TZW and how they relate to historical direct discharge and deposition of MGP waste in the river; and 3) developing an understanding of where historical discharges and/or deposition of MGP waste have impacted biologically active TZW in navigation channel sediments.

The Phase 2 FSA is organized into two "steps." Step 1 will provide data to assess TZW and shallow groundwater chemistry beneath the Willamette River in the area of investigation. Based on the results of Step 1, the Step 2 field program will be developed. During Step 2 deep boring locations will be selected and sediment and groundwater sampling will be conducted down to the basalt. Data collected during Step 2 will be used to evaluate the relationship between uplands groundwater contamination and impacts detected under the river.

The Phase 1 Report/Phase 2 FSA provides:

- The results of work completed during the Phase 1 FSA including, drilling and sampling one upland boring and twelve near shore borings along the shoreline of the NWNG Property and the northern portion of the Siltronic Property; and
- A work plan for the Phase 2 FSA including, in-water sediment, TZW, and groundwater sampling offshore of the Gasco Site and northern portion of the Siltronic Property.

This letter focuses primarily on DEQ's review of the Phase 2 FSA. DEQ is not providing detailed comments regarding the Phase 1 Report at this time. DEQ understands that NWNG will compile the results of the Phase 1 and Phase 2 FSAs and present interpretations of the combined datasets in a single document prepared subsequent to completion of the Phase 2 FSA field work.

DEQ's general comments to the Phase 1 Report, our conditions for implementing the Phase 2 FSA, and our comments to the Phase 2 FSA are provided below. NWNG and DEQ discussed the conditions and comments regarding the Phase 2 FSA in detail during a meeting on June 25, 2007.

PHASE 1 REPORT

DEQ acknowledges that the Phase 1 FSA was completed consistent with agreements reached with NWNG[1], and that the data collection objectives of the project were met. DEQ's general comments to the Phase 1 Report are provided below to clarify our expectations for future reporting.

- NWNG has identified benzene, naphthalene, and cyanide (i.e., total, amenable, and free

[1] Anchor Environmental, LLC, 2006, "Final Phase 1 Field Sampling Approach, GASCO Siltronic Groundwater Source Evaluation", September (as amended by: 1] the "Addendum to Offshore Final Phase I Field Sampling Approach, NW Natural, Gasco Site, Portland, Oregon", September 29; and 2] "Addendum 2 to Final Phase 1 Field Sampling Approach, Groundwater Source Evaluation, Northwest Natural Gas Company Site, Portland, Oregon," December 28). A work plan prepared on behalf of the Northwest Natural Gas Company.

forms) as "key constituents" to use in assessing groundwater contamination associated with MGP waste. NWNG should be advised that DEQ does not consider these analytes adequate for delineating the nature and extent of contamination. For example, relevant ecological criteria for toluene, ethylbenzene, and xylenes are lower than benzene. DEQ expects NWNG to fully evaluate the nature and extent all MGP waste chemicals of interest (COI) in the "DNAPL/contaminated groundwater" focused feasibility study (FFS).

- Based on DEQ's review of Table 3 it appears NWNG relied on "dissolved" concentrations of naphthalene to prepare Figure 5b. This approach is not acceptable to DEQ. In the future figures depicting the interpreted horizontal and/or vertical distribution of COI should utilize "total" concentrations.
- During the Phase 1 FSA, groundwater and sediment samples were analyzed for total, amenable, and free forms of cyanide. NWNG notes that the cyanide aquatic toxicity criteria are based on the concentration of "free" cyanide and focuses discussions of cyanide data on this form. NWNG should be advised that DEQ considers the EPA's National Recommended Water Quality Criteria for human health and fish consumption for "total" cyanide of 140 micrograms per liter to be relevant for reviewing and screening analytical data.

DEQ anticipates that data generated during the Phase 1 and Phase 2 FSAs will be compiled and presented in a single document, and will review data descriptions and interpretations in more detail at that time.

PHASE 2 FIELD SAMPLING APPROACH

DEQ approves implementing the Phase 2 FSA under the following conditions:

- Step 1 proposes analyzing transition zone water (TZW) and shallow groundwater samples for volatile organic compounds (VOCs) and cyanide (i.e., total, amenable, and free forms). DEQ understands that NWNG intends to expedite sample analysis for these chemicals to support decisions regarding the locations of Step 2 borings. However, DEQ considers the proposed analyte list to be inadequate to achieve the data collection goals of the project. DEQ will require the Step 1 suite of analyses to be expanded to include all of the COI identified at the Gasco Site, including polycyclic aromatic hydrocarbons (PAHs) and metals (see tables 9a and 9b). DEQ understands from the June 25th meeting that all of the analyses of PAHs and metals may not be complete when planning for Step 2 is initiated; however DEQ considers this data essential to meet the overall objectives of the project.
- NWNG proposes collecting sediment samples for analysis at the Step 2 borings. As mentioned above, the locations of the Step 2 borings will be determined based on the results of analyzing samples collected during Step 1. DEQ will require that NWNG analyze sediment samples collected during Step 2 for diesel-range and residual range petroleum hydrocarbons using the NWTPH-Dx analytical method. This information will be used to assess the total concentrations of petroleum hydrocarbons in sediments and will supplement the sediment data for individual constituents of MGP waste (e.g., benzene, toluene, ethylbenzene, and xylenes, and PAHs).
- DEQ concurs with NWNG that the focus of the Phase 2 FSA is to assess the nature and extent of TZW and groundwater contamination beyond the shoreline. However, based on the

limited offshore groundwater data currently available, the horizontal and vertical variability of groundwater contamination interpreted in the uplands and near shore areas, and the timeframe for conducting field work, DEQ considers it unlikely that the Phase 2 FSA will produce sufficient data to quantify or definitively determine the extent and magnitude of groundwater contaminant discharges to the river. For these reasons, DEQ views the overall goal of Step2 to be collecting data to assess the fate and transport of COI along the axes of uplands groundwater plumes projected offshore. Step 1 boring locations should be adjusted with this goal in mind (i.e., transect B and C boring locations should be adjusted to position borings at or nearer the downstream NWNG property line and offshore of near shore borings GS-02 and GS-03).

- Consistent with DEQ's letter dated December 15, 2005, selected groundwater samples should be analyzed for chlorinated herbicides, chlorinated dibenzo-p-dioxins, and chlorinated dibenzofurans. DEQ expects at least two groundwater samples to be collected for this purpose during Step 2. The samples should be collected at depth from the upstream-most borings located on transects B and C.
- There is the possibility that highly contaminated sediments could be encountered at shallow depths during drilling along transects B and C. If this is the case, the double-case method of drilling should be employed during Step 2 to reduce the potential for impacted shallow sediments to be carried down the borehole during drilling and bias the results of the samples collected at depth. Using this drilling method could improve the comparability of this data to uplands groundwater data and assist in distinguishing between shallow groundwater impacts from historical direct discharge to the river, and contamination associated with groundwater transport.
- The presence and occurrence of dense non-aqueous phase liquids (DNAPLs) in subsurface material should be a data collection objective of the Phase 2 FSA. Close attention should be paid for visual evidence of DNAPL in sediment. DEQ also expects all cored geologic material collected during Step 2 to be screened in the field using methods appropriate for MGP waste (e.g., ultraviolet fluorescence).

DEQ expects NWNG to incorporate the conditions listed above into the Phase 2 FSA field program.

ADDITIONAL COMMENTS

Section 3.1.1. NWNG proposes meeting with DEQ to review and discuss the results of Step 1 and determining the locations for Step 2 borings. NWNG should be advised that DEQ will invite representatives of EPA and members of the Portland Harbor Technical Coordinating Team to participate in this meeting.

Section 3.2. As discussed under the conditions above, DEQ is requiring NWNG to analyze Step 1 and Step 2 TZW and groundwater samples for all site COI. Consistent with the prioritization scheme used during the Phase 1 FSA, sample collection should be based on the location of the boring and the anticipated contamination. For example, samples should be collected from borings located offshore of borings GS-05 through GS-12 in the order of VOCs, PAHs, cyanide

(total, amenable, and free forms), metals, and ammonia. Samples collected offshore from borings GS-01 through GS-04 should collect cyanide (total, amenable, and free forms), VOCs, PAHs, ammonia, and metals in order.

Section 3.5. DEQ understands that the transducer described in the last paragraph of this section will be in-place during the entire Phase 2 FSA. DEQ anticipates the frequency of transducer measurements will allow the elevation of the river to be determined at the time each TZW or groundwater sample is collected.

This information will be used to preliminarily assess the potential for tidal fluctuations to influence the chemistry of TZW samples (i.e., assess potential inverse relationship between COI concentrations and river stage). Using the findings of Step 1, DEQ expects NWNG to develop an approach for further assessing the influence of tidal fluctuations on TZW chemistry during Step 2.

Section 3.6.1, 1st paragraph. NWNG proposes using push-probe drilling and sampling equipment to collect TZW and groundwater samples during steps 1 and 2. Prior to initiating the Step 1, DEQ understands that a plate will be attached to the end of a section of drill casing. The casing/plate combination is designed to minimize: 1) the depth the casing sinks into river sediments, and 2) short-circuiting of river water into the sample collection interval. Immediately prior to initiating sampling, the casing/plate combination will be lowered through the water column until it comes to rest on the river bottom. The plate will serve as the basis for determining sample collection depth intervals (i.e., the plate equals “zero” feet below mudline [bml]).

Groundwater and TZW sampling will be conducted by lowering a screened sampling device through the casing and then pushing it into sediments. The sampling device will be covered by a retractable sleeve that covers and seals the screen to prevent contact with sediment and water. Upon reaching the target depth interval, the sleeve will be retracted exposing the screen to the formation for purposes of sampling.

Using the methods and procedures described above, DEQ considers placement of the screen to be the most critical factor in collecting TZW samples. As discussed on June 25th, DEQ will require that the top of the exposed screen be set between 1.0 to 1.5 feet below the bottom of the casing/plate combination. DEQ expects this measurement to be documented at each Step 1 boring location.

As we indicated on June 25th, DEQ will also require the deep groundwater sample at each Step 1 boring to be collected from a depth interval of 13 to 15 feet bml. The Phase 2 FSA proposes these samples be collected from 10 to 12 feet bml. Collecting samples from the deeper interval could assist in distinguishing TZW contamination from groundwater versus historical MGP waste direct discharge/deposition.

Section 3.6.1, 2nd paragraph. NWNG indicates the Step 2 drilling program may include 6 deep borings. DEQ has previously informed NWNG that without having the results of Step 1 drilling and sampling work, it is premature to determine the numbers of Step 2 borings.

Section 3.6.1, 3rd paragraph. As noted above additional water may need to be removed from the outer casing prior to purging the rods for the TZW sample at each Step 1 boring location.

Given that a data collection objective of the Phase 2 FSA is to assess the fate and transport of COI along flowpaths across transects A, B, C, and D, DEQ expects dissolved oxygen (DO) and oxidation-reduction potential (ORP) to be added to the list of field water quality parameters. Many of the COI, notably cyanide, are sensitive to these parameters. A flow-through cell will provide the most representative field measurements of DO and ORP, as well as pH, specific conductance, and temperature.

Section 3.6.4. For completeness DEQ requests that NWNG provide a copy of ASTM standard D2488-00 to document borehole logging procedures and soil descriptions for the project.

Section 3.7. This section of the Phase 2 FSA briefly describes the measures that NWNG will use to prevent and control spills onto the barge deck and/or into the river during over-water drilling and sampling activities. DEQ expects that procedures will be consistent with those developed, approved, and used during the Phase 1 FSA.

Based on observations made during the Phase 1 FSA, DEQ recommends the following refinements be made to on the barge spill prevention and control procedures.

- Bermed secondary containment should be provided for the entire drill rig and sampling handling area(s) on the barge to prevent minor releases of hydraulic and/or lubricating oil, antifreeze, sample material from running off of the deck.
- Although not detailed in the Phase 2 SAP, DEQ expects the configuration of booms deployed in the river to be consistent with the approach developed during the Phase 1 FSA. Deployment will include (from inner-most to outer-most: 1) sorbent booms that encircle the drilling casing; 2) sorbent booms that surround the barge (including the spuds) and work area (i.e., area beneath the drilling platform); and 3) a containment boom that encloses the barge and prevents releases could occur outside the sorbent boomed area, if any, form escaping to the river. In addition, an inventory of available sorbent pads/booms should be checked prior to initiating work and each day thereafter to ensure that sufficient quantities of each are available and ready for immediate use if needed.

Section 3.8.4. DEQ understands that disposable gloves will be changed frequently during the processing of each individual groundwater or sediment sample to prevent cross-contamination of sampling equipment or sample containers.

Section 3.8.5. It is unclear to DEQ whether TZW and groundwater sampling equipment decontamination procedures are described in this section of the Phase 2 FSA. For example, cleaning and decontamination of the HydroPunch™ sampling device required use of a high-

pressure hot water washer. NWNG should clarify whether these procedures are included, and if not they should be provided.

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 investigation derived waste produced from decontamination and make it easier to manage and secure the discarded items.

Tables 7, 8, and 9. These three tables should be revised consistent with the conditions and comments listed above. Regarding tables 8 and 9, it does not appear that ammonia has been included in the analyte lists. These tables should be revised accordingly.

DEQ expects that 10% of the deeper groundwater samples collected during Step 1 will be analyzed for "dissolved" metals for comparison to total metals data. DEQ recommends that dissolved metals be analyzed for in the first and fourth samples collected along Transect B (from downstream to upstream). Dissolved metals data will provide additional information regarding potential groundwater contributions of these analytes to shallow sediment and TZW. DEQ expects the groundwater samples being analyzed for dissolved metals to be filtered in the field directly into laboratory-supplied containers containing preservative. This is consistent with the field procedures used during the Phase 1 FSA.

Tables 9a and 9b. DEQ expects the laboratory method reporting limits (MRLs) and method detection limits (MDLs) to be consistent with those being used by the LWG for the Portland Harbor RI/FS. In addition, DEQ notes NWNG's comment to Table 9b regarding the influence of sample size on the MRLs and MDLs for PAHs. NWNG should be advised that to the maximum extent practicable given the conditions encountered in the field, DEQ expects sufficient sample volumes to be collected to meet the data collection goals of the Phase 2 FSA.

DEQ's review of Table 9a indicates that certain VOCs (e.g., 1,2-dichlorobenzene) and PAHs (e.g., dibenzofuran) are missing from the analyte list for sediments. Tables 9a and 9b should be reviewed for completeness.

Figure 7. DEQ understands that NWNG intends for Transect B borings to be located at the base of the navigation channel slope. If this is the case then it appears the locations of first three Transect B borings (from downstream to upstream) should be shifted further off-shore. This may also be the case for near shore borings GS-01 through GS-05. These borings may be shown higher on the riverbank than intended. The figure should be reviewed and revised as appropriate.

NEXT STEPS

Based on the June 25th meeting discussions, DEQ has approved NWNG beginning Step 1 during the week beginning July 2nd. Prior to initiating Step 1 sampling DEQ expects NWNG to provide a written addendum that documents the conditions contained in this letter have been fully

incorporated into the Phase 2 FSA. The addendum should include revised versions of tables 7, 8, and 9, and Figure 7. The addendum should also address DEQ's comments. DEQ's written approval of the Phase 2 FSA will be provided after the addendum has been received and reviewed for completeness.

In addition, during a meeting on May 21st NWNG informed DEQ that the scope of work for the Phase 2 FSA was going to be expanded to include water column sampling. DEQ understands that the details of this work will be provided in a separate document and that the work will be conducted within the timeframe of the Phase 2 FSA.

DEQ appreciates the efforts NWNG is making to conduct offshore drilling and sampling work during the earliest available time period.

Prior to July 2nd contact me with questions regarding this letter. I will be on vacation from July 2nd through July 6th. During my absence contact Henning Larsen (503/229-5527) as needed.

Sincerely,

Dana Bayuk
Project Manager
Portland Harbor Section

Cc: Sandy Hart, NWNG
Patty Dost, Schwabe Williamson & Wyatt
Rob Ede, Hahn & Associates
John Edwards, Anchor Environmental
Carl Stivers, Anchor Environmental
Tom McCue, Siltronic
Alan Gladstone, Davis Rothwell Earle & Xochihua
James Peale, Maul Foster & Alongi, Inc.
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Rene Fuentes, EPA
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July 2, 2007

Dana Bayuk
Project Manager
Portland Harbor Section
Oregon Department of Environmental Quality
2020 SW 4th Avenue, Suite 400
Portland, Oregon 97201-4987

Re: Addendum to Phase 2 Field Sampling Approach
Gasco Siltronic Groundwater Source Evaluation

Dear Mr. Bayuk:

Thank you for the detailed review of the phase 2 field sampling approach. This addendum modifies the phase 2 field sampling plan (FSA) as it was presented in the *Phase 1 Report and Phase 2 Field Sampling Approach, Gasco Siltronic Groundwater Source Evaluation* (Anchor, May 2007). DEQ met with NW Natural on June 25 to discuss modifications to the FSA and those changes were documented in DEQ's June 28 letter to NW Natural. Further discussion of the workplan occurred by teleconference on June 28 between Dana Bayuk, Henning Larsen, and John Edwards.

On pages 2 and 3 of the June 28 letter DEQ approves implementing the Phase 2 Field Sampling Approach (FSA) under six conditions. Pages 3 through 8 of the letter provide additional comments and the next steps anticipated by DEQ. Pages 2 through 8 of the June 28 letter are reproduced below for the purpose of documenting the agreed modifications to the Phase 2 FSA workplan. The NW Natural response is provided in italics after each of the DEQ conditions and comments.

- Step 1 proposes analyzing transition zone water (TZW) and shallow groundwater samples for volatile organic compounds (VOCs) and cyanide (i.e., total, amenable, and free forms). DEQ understands that NWNG intends to expedite sample analysis for these chemicals to support decisions regarding the locations of Step 2 borings. However, DEQ considers the proposed analyte list to be inadequate to achieve the data collection goals of the project. DEQ will require the Step 1 suite of analyses to be expanded to include all of the COI identified at the Gasco Site, including polycyclic aromatic hydrocarbons

(PAHs) and metals (see tables 9a and 9b). DEQ understands from the June 25th meeting that all of the analyses of PAHs and metals may not be complete when planning for Step 2 is initiated; however DEQ considers this data essential to meet the overall objectives of the project.

Agreed

- NWNG proposes collecting sediment samples for analysis at the Step 2 borings. As mentioned above, the locations of the Step 2 borings will be determined based on the results of analyzing samples collected during Step 1. DEQ will require that NWNG analyze sediment samples collected during Step 2 for diesel-range and residual range petroleum hydrocarbons using the NWTPH-Dx analytical method. This information will be used to assess the total concentrations of petroleum hydrocarbons in sediments and will supplement the sediment data for individual constituents of MGP waste (e.g., benzene, toluene, ethylbenzene, and xylenes, and PAHs).

  Agreed

- DEQ concurs with NWNG that the focus of the Phase 2 FSA is to assess the nature and extent of TZW and groundwater contamination beyond the shoreline. However, based on the limited offshore groundwater data currently available, the horizontal and vertical variability of groundwater contamination interpreted in the uplands and near shore areas, and the timeframe for conducting field work, DEQ considers it unlikely that the Phase 2 FSA will produce sufficient data to quantify or definitively determine the extent and magnitude of groundwater contaminant discharges to the river. For these reasons, DEQ views the overall goal of Step2 to be collecting data to assess the fate and transport of COI along the axes of uplands groundwater plumes projected offshore. Step 1 boring locations should be adjusted with this goal in mind (i.e., transect B and C boring locations should be adjusted to position borings at or nearer the downstream NWNG property line and offshore of near shore borings GS-02 and GS-03).

  Agreed. The revised boring locations are shown on the attached map. DEQ has reviewed the revised locations and agreed with the revisions during the June 28 teleconference.

- Consistent with DEQ's letter dated December 15, 2005, selected groundwater samples should be analyzed for chlorinated herbicides, chlorinated dibenzo-p-dioxins, and chlorinated dibenzofurans. DEQ expects at least two groundwater samples to be collected for this purpose during Step 2. The samples should be collected at depth from the upstream-most borings located on transects B and C.

  Agreed

- There is the possibility that highly contaminated sediments could be encountered at shallow depths during drilling along transects B and C. If this is the case, the double-case method of drilling should be employed during Step 2 to reduce the potential for impacted shallow sediments to be carried down the borehole during drilling and bias the results of the samples collected at depth. Using this drilling method could improve the comparability of this data to uplands groundwater data and assist in distinguishing between shallow groundwater impacts from historical direct discharge to the river, and contamination associated with groundwater transport.

  Agreed. During the June 28 teleconference it was agreed that Anchor would discuss technical issues associated with double casing with the drilling contractor Boart Longyear. The drilling method for Step 2 has not yet been finalized. During Step 1 at least two attempts will be made to obtain sediment cores using push probe sampling methods. If push probe methods are not successful, alternative sediment sampling methods will be considered for Step 2. The final sediment coring method and the double casing issue will be further discussed before a final sampling method satisfactory to DEQ and NW Natural is determined.

- The presence and occurrence of dense non-aqueous phase liquids (DNAPLs) in subsurface material should be a data collection objective of the Phase 2 FSA. Close attention should be paid for visual evidence of DNAPL in sediment. DEQ also expects all cored geologic material collected during Step 2 to be screened in the field using methods appropriate for MGP waste (e.g., ultraviolet fluorescence).

  Agreed

DEQ expects NWNG to incorporate the conditions listed above into the Phase 2 FSA field program.

ADDITIONAL COMMENTS

Section 3.1.1. NWNG proposes meeting with DEQ to review and discuss the results of Step 1 and determining the locations for Step 2 borings. NWNG should be advised that DEQ will invite representatives of EPA and members of the Portland Harbor Technical Coordinating Team to participate in this meeting.

So Noted

Section 3.2. As discussed under the conditions above, DEQ is requiring NWNG to analyze Step 1 and Step 2 TZW and groundwater samples for all site COI. Consistent with the prioritization scheme used during the Phase 1 FSA, sample collection should be based on the location of the boring and the anticipated contamination. For example, samples should be collected from

borings located offshore of borings GS-05 through GS-12 in the order of VOCs, PAHs, cyanide (total, amenable, and free forms), metals, and ammonia. Samples collected offshore from borings GS-01 through GS-04 should collect cyanide (total, amenable, and free forms), VOCs, PAHs, ammonia, and metals in order.

Agreed

Section 3.5. DEQ understands that the transducer described in the last paragraph of this section will be in-place during the entire Phase 2 FSA. DEQ anticipates the frequency of transducer measurements will allow the elevation of the river to be determined at the time each TZW or groundwater sample is collected.

Agreed. A water level transducer will be installed and in operation during offshore sampling.

This information will be used to preliminarily assess the potential for tidal fluctuations to influence the chemistry of TZW samples (i.e., assess potential inverse relationship between COI concentrations and river stage). Using the findings of Step 1, DEQ expects NWNG to develop an approach for further assessing the influence of tidal fluctuations on TZW chemistry during Step 2.

Agreed. NW Natural plans to conduct a river water sampling program this summer. A workplan to conduct the sampling is being prepared for submittal to DEQ. Plans are also being prepared to deploy digital seepage meters offshore of the Gasco Siltronic site. DEQ will be informed of those plans before they are implemented.

Section 3.6.1, 1st paragraph. NWNG proposes using push-probe drilling and sampling equipment to collect TZW and groundwater samples during steps 1 and 2. Prior to initiating the Step 1, DEQ understands that a plate will be attached to the end of a section of drill casing. The casing/plate combination is designed to minimize: 1) the depth the casing sinks into river sediments, and 2) short-circuiting of river water into the sample collection interval. Immediately prior to initiating sampling, the casing/plate combination will be lowered through the water column until it comes to rest on the river bottom. The plate will serve as the basis for determining sample collection depth intervals (i.e., the plate equals "zero" feet below mudline [bml]).

Groundwater and TZW sampling will be conducted by lowering a screened sampling device through the casing and then pushing it into sediments. The sampling device will be covered by a retractable sleeve that covers and seals the screen to prevent contact with sediment and water. Upon reaching the target depth interval, the sleeve will be retracted exposing the screen to the formation for purposes of sampling.

Using the methods and procedures described above, DEQ considers placement of the screen to be the most critical factor in collecting TZW samples. As discussed on June 25th, DEQ will require that the top of the exposed screen be set between 1.0 to 1.5 feet below the bottom of the casing/plate combination. DEQ expects this measurement to be documented at each Step 1 boring location.

As we indicated on June 25th, DEQ will also require the deep groundwater sample at each Step 1 boring to be collected from a depth interval of 13 to 15 feet bml. The Phase 2 FSA proposes these samples be collected from 10 to 12 feet bml. Collecting samples from the deeper interval could assist in distinguishing TZW contamination from groundwater versus historical MGP waste direct discharge/deposition.

Agreed. These field procedures may require some modification depending upon field conditions, but such changes will be subject to DEQ review and approval prior to implementation.

Section 3.6.1, 2nd paragraph. NWNG indicates the Step 2 drilling program may include 6 deep borings. DEQ has previously informed NWNG that without having the results of Step 1 drilling and sampling work, it is premature to determine the numbers of Step 2 borings.

During the June 28 teleconference DEQ agreed that nine Step 2 borings will be satisfactory; considering the time constraints imposed by the fish window for conducting in-river activities.

Section 3.6.1, 3rd paragraph. As noted above additional water may need to be removed from the outer casing prior to purging the rods for the TZW sample at each Step 1 boring location.

Given that a data collection objective of the Phase 2 FSA is to assess the fate and transport of COI along flowpaths across transects A, B, C, and D, DEQ expects dissolved oxygen (DO) and oxidation-reduction potential (ORP) to be added to the list of field water quality parameters. Many of the COI, notably cyanide, are sensitive to these parameters. A flow-through cell will provide the most representative field measurements of DO and ORP, as well as pH, specific conductance, and temperature.

Agreed. DO and ORP field monitoring will be conducted. The current plan does not include removal of water from the outer casing, but NW Natural will evaluate the water quality during purging to determine if the casing needs to be evacuated.

Section 3.6.4. For completeness DEQ requests that NWNG provide a copy of ASTM standard D2488-00 to document borehole logging procedures and soil descriptions for the project.

Agreed

Section 3.7. This section of the Phase 2 FSA briefly describes the measures that NWNG will use to prevent and control spills onto the barge deck and/or into the river during over-water drilling and sampling activities. DEQ expects that procedures will be consistent with those developed, approved, and used during the Phase 1 FSA.

Based on observations made during the Phase 1 FSA, DEQ recommends the following refinements be made to on the barge spill prevention and control procedures.
Bermed secondary containment should be provided for the entire drill rig and sampling handling area(s) on the barge to prevent minor releases of hydraulic and/or lubricating oil, antifreeze, sample material from running off of the deck.
Although not detailed in the Phase 2 SAP, DEQ expects the configuration of booms deployed in the river to be consistent with the approach developed during the Phase 1 FSA. Deployment will include (from inner-most to outer-most: 1) sorbent booms that encircle the drilling casing; 2) sorbent booms that surround the barge (including the spuds) and work area (i.e., area beneath the drilling platform); and 3) a containment boom that encloses the barge and prevents releases could occur outside the sorbent boomed area, if any, form escaping to the river. In addition, an inventory of available sorbent pads/booms should be checked prior to initiating work and each day thereafter to ensure that sufficient quantities of each are available and ready for immediate use if needed.

Agreed

Section 3.8.4. DEQ understands that disposable gloves will be changed frequently during the processing of each individual groundwater or sediment sample to prevent cross-contamination of sampling equipment or sample containers.

Agreed

Section 3.8.5. It is unclear to DEQ whether TZW and groundwater sampling equipment decontamination procedures are described in this section of the Phase 2 FSA. For example, cleaning and decontamination of the HydroPunch™ sampling device required use of a high-pressure hot water washer. NWNG should clarify whether these procedures are included, and if not they should be provided.

The driller plans to use high pressure washing for decontamination on the drill rig.

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 investigation derived waste produced from decontamination and make it easier to manage and secure the discarded items.

Agreed

Tables 7, 8, and 9. These three tables should be revised consistent with the conditions and comments listed above. Regarding tables 8 and 9, it does not appear that ammonia has been included in the analyte lists. These tables should be revised accordingly.

DEQ expects that 10% of the deeper groundwater samples collected during Step 1 will be analyzed for "dissolved" metals for comparison to total metals data. DEQ recommends that dissolved metals be analyzed for in the first and fourth samples collected along Transect B (from downstream to upstream). Dissolved metals data will provide additional information regarding potential groundwater contributions of these analytes to shallow sediment and TZW. DEQ expects the groundwater samples being analyzed for dissolved metals to be filtered in the field directly into laboratory-supplied containers containing preservative. This is consistent with the field procedures used during the Phase 1 FSA.

Tables 9a and 9b. DEQ expects the laboratory method reporting limits (MRLs) and method detection limits (MDLs) to be consistent with those being used by the LWG for the Portland Harbor RI/FS. In addition, DEQ notes NWNG's comment to Table 9b regarding the influence of sample size on the MRLs and MDLs for PAHs. NWNG should be advised that to the maximum extent practicable given the conditions encountered in the field, DEQ expects sufficient sample volumes to be collected to meet the data collection goals of the Phase 2 FSA.

DEQ's review of Table 9a indicates that certain VOCs (e.g., 1,2-dichlorobenzene) and PAHs (e.g., dibenzofuran) are missing from the analyte list for sediments. Tables 9a and 9b should be reviewed for completeness.

Revised Tables 7, 8, and 9 are attached to this addendum.

Figure 7. DEQ understands that NWNG intends for Transect B borings to be located at the base of the navigation channel slope. If this is the case then it appears the locations of first three Transect B borings (from downstream to upstream) should be shifted further off-shore. This may also be the case for near shore borings GS-01 through GS-05. These borings may be shown higher on the riverbank than intended. The figure should be reviewed and revised as appropriate.

The revised boring location map was provided to DEQ last week, and DEQ approved the revised map during the June 28 teleconference. The revised boring location map is attached to this addendum.

NEXT STEPS

Based on the June 25th meeting discussions, DEQ has approved NWNG beginning Step 1 during the week beginning July 2nd. Prior to initiating Step 1 sampling DEQ expects NWNG to provide

a written addendum that documents the conditions contained in this letter have been fully incorporated into the Phase 2 FSA. The addendum should include revised versions of tables 7, 8, and 9, and Figure 7. The addendum should also address DEQ's comments. DEQ's written approval of the Phase 2 FSA will be provided after the addendum has been received and reviewed for completeness.

Agreed. The drilling contractor will be mobilizing equipment during July 2 and July 3, and the first boring is scheduled for July 5.

In addition, during a meeting on May 21st NWNG informed DEQ that the scope of work for the Phase 2 FSA was going to be expanded to include water column sampling. DEQ understands that the details of this work will be provided in a separate document and that the work will be conducted within the timeframe of the Phase 2 FSA.

A river water sampling workplan is being prepared for DEQ review. Following approval, the river water monitoring will occur during the next 30 to 90 days.

Please contact me if further discussion of this addendum is needed. DEQ written approval of this addendum is needed before sampling is initiated on July 5.

Respectfully submitted,

John E. Edwards, RG, CEG

Anchor Environmental, L.L.C.

Attachments: Tables 7, 8, 9
Boring Location Map

Cc: Bob Wyatt, NW Natural
Patty Dost, Schwabe, Williamson, Wyatt
Rob Ede, HAI
Carl Stivers, Anchor
John Renda, Anchor
Tim Stone, Anchor

Table 7
Gasco Siltronic Phase 2 Field Sampling Plan Locations, Number of Samples, Depths, and Intervals

Step 1 Reconnaisance Groundwater/Pore Water Sampling			
Site ID	Target Coordinates (NAD 83)		Estimated number of Samples
	Latitude	Longitude	1-2 ft, 5-7 ft, and 13-15 ft
1			3
2			3
3			3
4			3
5			3
6			3
7			3
8			3
9			3
10			3
11			3
12			3
13			3
14			3
15			3
16			3
17			3
18			3
19			3
20			3
21			3
22			3
23			3
# Characterization Samples Analyzed			**69**
5% Field Splits			3
Field Blanks			1
Rinsate Blanks			1
Trip Blanks			1 per container
Estimated Number of Step 1 Samples (not including QC)			**72**

Step 2			Number of Deep Groundwater Samples	Number of Sediment Profile Samples
Site ID	Target Coordinates (NAD 83)		Estimated number of Samples	Estimated number of Samples
	Latitude	Longitude	25 ft, 50 ft, 100 ft, 125 ft, 150 ft, 175 ft	1-2 ft, 5-7 ft, and 8-10 ft
1			6	3
2			6	3
3			6	3
4			6	3
5			6	3
6			6	3
7			6	3
8			6	3
9			6	3
# Characterization Samples Analyzed			**54**	**27**
5% Field Splits			3	1
Field Blanks			1	1
Rinsate Blanks			1	1
Trip Blanks			1 per container	1 per container
Estimated Number of Step 2 Samples (not including QC)				**85**

Notes:
1. Sampling stations and depths are proposed and may be revised based on conditions encountered in
2. 175' is the assumed depth to bedrock. Borings will extend until sample refusal occurs.

Table 8
Parameter List, Containers, and Guidelines for Sample Handling and Storage

Parameter	Container Size and Type	Holding Time	Preservative
Reconnaissance Groundwater, Pore Water, and Deep Groundwater Sampling			
Step 1 and Step 2			
VOCs	two 40 ml VOA vials	14 days	HCL ph<2, Cool/4°C
Free Cyanide	500 ml HDPE*	48 hours	NaOH pH>12
Total Cyanide	500 ml HDPE*	14 days	NaOH pH>12
Amenable Cyanide	500 ml HDPE*	14 days	NaOH pH>12
Total PAHs	1 Liter Amber Glass*	7 days until extraction 40 days after extraction	Cool/4°C
Ammonia	250 ml HDPE*	28 days	H2SO4 ph<2, Cool/4°C
Total Metals	250 ml HDPE*	6 months except Hg (28 days)	HNO3, ph<2
Dissolved Metals (field filtered)	250 ml HDPE*	6 months except Hg (28 days)	HNO3, ph<2
Sediment Profiling			
Moisture Content	16-oz WM HDPE (Moisture, Atterberg, Spec Gravity combined)	na	Sealed Jar
Grain Size (with hydrometer)	16-oz WM HDPE	na	na
Total Organic Carbon (%)	4-oz Glass	28 days	na
VOCs	40 mL VOC Vials and Easy Draw Sampler	14 days	Sodium Bisulfite or Methanol Cool/4° C
PAHs	8-oz Glass	14 days until extraction	Cool/4° C
		1 year until extraction 40 days after extraction	Freeze
Total Cyanide	8-oz Glass (CN, NH4, Metals combined)	14 days	Cool/4° C
Total Metals		6 months except Hg (28 days)	Cool/4° C
Ammonia as Nitrogen	8-oz Glass (CN, NH4, Metals combined)	7 days	Cool/4°C
Sulfides	2- oz Glass	7 days	Zn acetate, Cool/4° C

Note:

* See Table 9 for exact volume requirements. The smallest possible container meeting these material requirements will be supplied by the laboratory.

Table 9a
Sediment Profiling
Chemical Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Mass needed (g)
Conventionals			**mg/kg**	**mg/kg**	
Moisture Content	---	ASTM D-2216	---	---	**10**
Grain Size with hydrometer	---	ASTM D-421/422	---	---	**300**
Sulfides	Method	9030M	0.5	0.08	**10**
Ammonia as Nitrogen	350.1M	Plumb	0.5	0.2	**20**
Total Organic Carbon (%)	Method	PSEP	0.05	0.02	**5**
Chemical					
VOCs	**5030A**	**8260B**	**ug/kg**	**ug/kg**	**20**
Acetone	---	---	10	1.6	---
Acrolein	---	---	2.5	0.51	---
Acrylonitrile	---	---	2	0.23	---
Benzene	---	---	1	0.039	---
Bromochloromethane	---	---	1	0.06	---
Bromodichloromethane	---	---	1	0.068	---
Bromoform	---	---	1	0.046	---
Bromoethane	---	---	1	0.072	---
Bromomethane	---	---	1	0.37	---
2-Butanone	---	---	4	1.1	---
Carbon Disulfide	---	---	1	0.13	---
Carbon Tetrachloride	---	---	1	0.099	---
Chlorbenzene	---	---	1	0.07	---
Chlorodibromomethane	---	---	1	0.068	---
Chlorethane	---	---	1	0.28	---
2-Chloroethyl Vinyl Ether	---	---	2	0.15	---
Chloroform	---	---	1	0.056	---
Chloromethane	---	---	1	0.19	---
trans-1,4-Dichloro-2-butene	---	---	2	0.51	---
Dibromomethane	---	---	1	0.082	---
1,4-Dichlorobenzene	---	---	1	0.12	---
1,1-Dichloroethane	---	---	1	0.057	---
1,2-Dichloroethane	---	---	1	0.031	---
1,1-Dichloroethene	---	---	1	0.082	---
trans-1,2-Dichloroethene	---	---	1	0.19	---
1,2-Dichloropropane	---	---	1	0.035	---
cis-1,3-Dichloropropene	---	---	1	0.031	---
trans-1,3-Dichloropropene	---	---	1	0.044	---
Dichlorodifluoromethane	---	---	1	0.11	---
Ethylbenzene	---	---	1	0.071	---
2-Hexanone	---	---	2	0.64	---
Idomethane	---	---	2	0.67	---
Isopropylbenzene	---	---	1	0.044	---
4-Methyl-2-Pentanone	---	---	2	0.24	---
Methylene chloride	---	---	5	0.29	---
Methyl tert-butyl ether	---	---	1	0.039	---
Napthalene	---	---	1	0.35	---
Styrene	---	---	1	0.074	---
1,1,1,2-Tetrachloroethane	---	---	1	0.031	---
1,1,2,2-Tetrachloroethane	---	---	1	0.096	---
Tetrachloroethene	---	---	1	0.096	---
Toluene	---	---	1	0.15	---
1,1,1-Trichloroethane	---	---	1	0.059	---
1,1,2-Trichloroethane	---	---	1	0.059	---
Trichloroethene	---	---	1	0.062	---
Trichlorofluoromethane	---	---	1	0.081	---
1,2,3-Trichloropropane	---	---	1	0.11	---

Table 9a
Sediment Profiling
Chemical Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Mass needed (g)
Vinyl Acetate	---	---	1	0.36	---
Vinyle Chloride	---	---	1	0.085	---
m,p-Xylene	---	---	1	0.13	---
o-Xylene	---	---	1	0.075	---
Hexachlorobutadiene	---	---	2	0.17	---
1,2-Dibromoethane (EDB)	---	---	1	0.051	---
PAHs	**EPA 3541**	**EPA 8270C-SIM**	**ug/Kg**	**ug/Kg**	**50**
Acenaphthene	---	---	5	0.16	---
Acenaphthylene	---	---	5	0.22	---
Anthracene	---	---	5	0.22	---
Benzo(a)anthracene	---	---	5	0.16	---
Benzo(b)fluoranthene	---	---	5	0.48	---
Benzo(k)fluoranthene	---	---	5	0.33	---
Benzo(g,h,i)perylene	---	---	5	0.23	---
Benzo(a)pyrene	---	---	5	0.22	---
Chrysene	---	---	5	0.41	---
Dibenz(a,h)anthracene	---	---	5	0.26	---
Fluoranthene	---	---	5	0.34	---
Fluorene	---	---	5	0.19	---
Ideno(1,2,3-cd)pyrene	---	---	5	0.24	---
2-Methylnaphthalene	---	---	5	0.34	---
Naphthalene	---	---	5	0.34	---
Phenanthrene	---	---	5	0.33	---
Pyrene	---	---	5	0.36	---
Total Cyanide	**9010A**	**9012A**	**0.1 mg/Kg**	**0.03 mg/Kg**	**25**
Metals	---	---	**mg/Kg**	**mg/Kg**	**20**
Aluminum	3050B	6020	2	2	---
Antimony	3050B	6020	0.05	0.02	---
Arsenic	3050B	6020	0.5	0.07	---
Barium	3050B	6020	0.05	0.03	---
Beryllium	3050B	6020	0.02	0.006	---
Cadmium	3050B	6020	0.05	0.007	---
Calcium	3050B	6010B	10	3	---
Chromium	3050B	6020	0.2	0.04	---
Copper	3050B	6020	0.1	0.02	---
Iron	3050B	6010B	4	3	---
Lead	3050B	6020	0.05	0.02	---
Magnesium	3050B	6010B	4	2	---
Manganese	3050B	6010B	1	0.3	---
Mercury	7471A	7471A	0.02	0.008	**5**
Nickel	3050B	6020	0.2	0.04	---
Potassium	3050B	6010B	400	300	---
Selenium	7742/SM3114B	7742	0.1	0.02	---
Silver	3050B	6020	0.02	0.003	---
Sodium	3050B	6010B	20	10	---
Thallium	3050B	6020	0.02	0.002	---
Zinc	3050B	6020	0.5	0.2	---
Minimum Mass Needed (Step 2)					**465**

Table 9b
Reconnaissance Groundwater/Pore Water and Deep Groundwater
Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

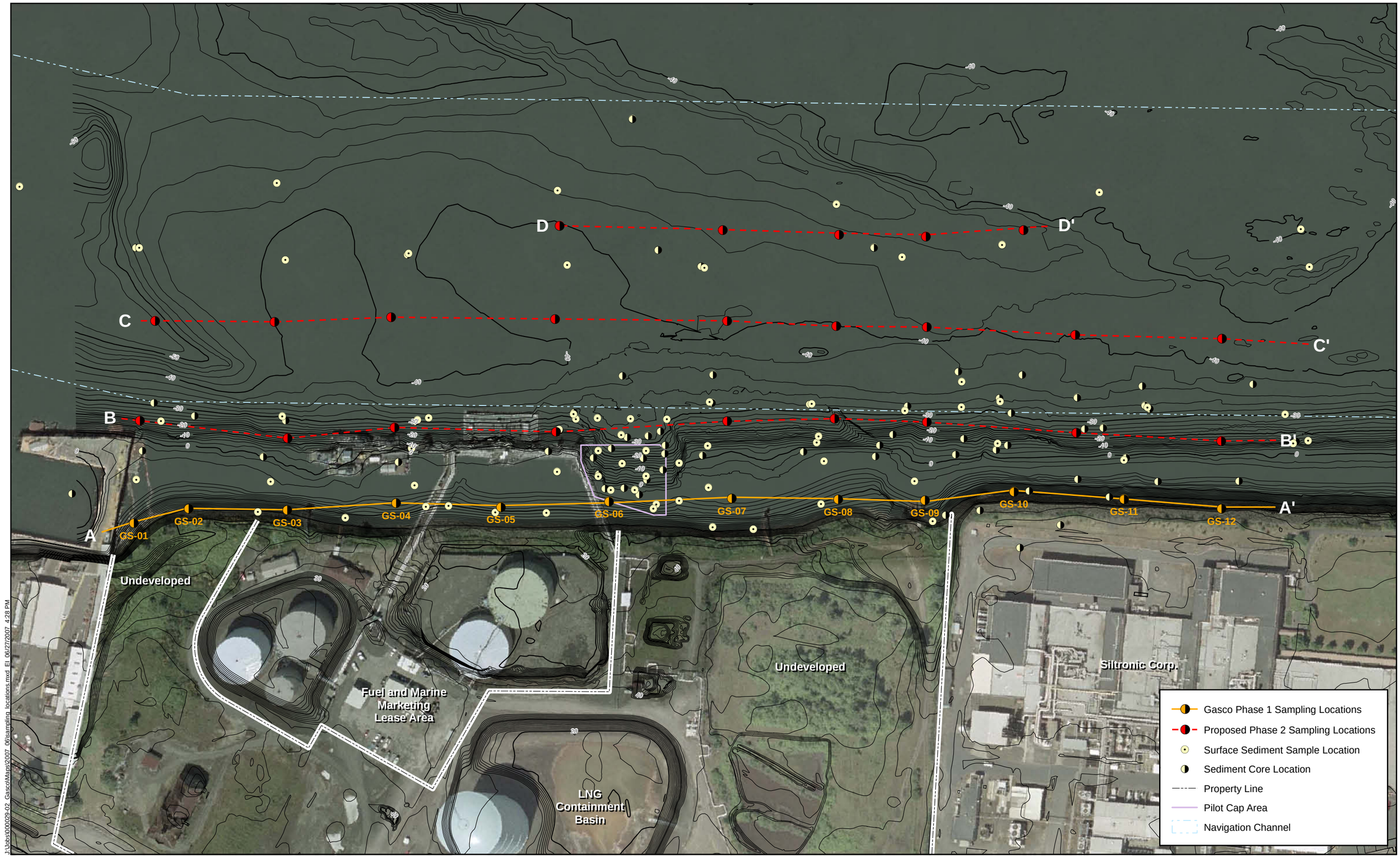
Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Volume needed (ml)
VOCs (Unfiltered)	**5030B**	**8260B**	**ug/L**	**ug/L**	**80**
Acetone	---	---	20	4.08	---
Acrolein	---	---	20	1.42	---
Acrylonitrile	---	---	5	0.531	---
Benzene	---	---	0.5	0.136	---
Bromochloromethane	---	---	0.5	0.164	---
Bromodichloromethane	---	---	0.5	0.109	---
Bromoform	---	---	0.5	0.279	---
Bromomethane	---	---	0.5	0.217	---
2-Butanone	---	---	20	1.94	---
Carbon Disulfide	---	---	0.5	0.159	---
Carbon Tetrachloride	---	---	0.5	0.139	---
Chlorbenzene	---	---	0.5	0.134	---
Chlorodibromomethane	---	---	0.5	0.104	---
Chlorethane	---	---	0.5	0.226	---
2-Chloroethyl Vinyl Ether	---	---	5	0.333	---
Chloroform	---	---	0.5	0.136	---
Chloromethane	---	---	0.5	0.136	---
trans-1,4-Dichloro-2-butene	---	---	10	0.597	---
1,2-Dibromoethane	---	---	2	0.0981	---
Dibromomethane	---	---	0.5	0.119	---
1,2-Dichlorobenzene	---	---	0.5	0.111	---
1,3-Dichlorobenzene	---	---	0.5	0.102	---
1,4-Dichlorobenzene	---	---	0.5	0.114	---
1,1-Dichloroethane	---	---	0.5	0.101	---
1,2-Dichloroethane	---	---	0.5	0.114	---
1,1-Dichloroethene	---	---	0.5	0.122	---
trans-1,2-Dichloroethene	---	---	0.5	0.143	---
1,2-Dichloropropane	---	---	0.5	0.139	---
cis-1,3-Dichloropropene	---	---	0.5	0.11	---
trans-1,3-Dichloropropene	---	---	0.5	0.0894	---
Dichlorodifluoromethane	---	---	0.5	0.166	---
Ethylbenzene	---	---	0.5	0.13	---
Hexachlorobutadiene	---	---	2	0.28	---
2-Hexanone	---	---	20	3.96	---
Idomethane	---	---	5	0.375	---
Isopropylbenzene	---	---	2	0.105	---
4-Methyl-2-Pentanone	---	---	20	2.7	---
Methylene chloride	---	---	2	0.193	---
Methyl tert-butyl ether	---	---	0.5	0.197	---
Napthalene	---	---	2	0.285	---
Styrene	---	---	0.5	0.0943	---
1,1,1,2-Tetrachloroethane	---	---	0.5	0.111	---
1,1,2,2-Tetrachloroethane	---	---	0.5	0.138	---
Tetrachloroethene	---	---	0.5	0.126	---
Toluene	---	---	0.5	0.108	---
1,2,4-Trichlorobenzene	---	---	2	0.218	---
1,1,1-Trichloroethane	---	---	0.5	0.116	---
1,1,2-Trichloroethane	---	---	0.5	0.138	---
Trichloroethene	---	---	0.5	0.133	---
Trichlorofluoromethane	---	---	0.5	0.131	---
1,2,3-Trichloropropane	---	---	0.5	0.213	---
Vinyl Acetate	---	---	5	0.663	---
Vinyle Chloride	---	---	0.5	0.042	---
m,p-Xylene	---	---	0.5	0.219	---
o-Xylene	---	---	0.5	0.102	---

Table 9b
Reconnaissance Groundwater/Pore Water and Deep Groundwater
Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Volume needed (ml)
Total PAHs (Unfiltered)	**EPA 3520C**	**EPA 8270C**	**ug/L**	**ug/L**	**500***
Acenaphthene	---	---	0.02	0.00198	---
Acenaphthylene	---	---	0.02	0.00178	---
Anthracene	---	---	0.02	0.00103	---
Benzo(a)anthracene	---	---	0.02	0.00210	---
Benzo(b)fluoranthene	---	---	0.02	0.00158	---
Benzo(k)fluoranthene	---	---	0.02	0.00194	---
Benzo(g,h,i)perylene	---	---	0.02	0.00182	---
Benzo(a)pyrene	---	---	0.02	0.00158	---
Chrysene	---	---	0.02	0.00124	---
Dibenz(a,h)anthracene	---	---	0.02	0.00162	---
Dibenzofuran	---	---	0.02	0.00380	---
Fluoranthene	---	---	0.02	0.00238	---
Fluorene	---	---	0.02	0.00258	---
Ideno(1,2,3-cd)pyrene	---	---	0.02	0.00208	---
2-Methylnaphthalene	---	---	0.02	0.00268	---
Naphthalene	---	---	0.02	0.00316	---
Phenanthrene	---	---	0.02	0.00320	---
Pyrene	---	---	0.02	0.00222	---
Free Cyanide (Unfiltered)	**ASTM D-4282-02**	**ASTM D-4282-02**	**10 ug/L**	**3 ug/L**	**50**
Total Cyanide (Unfiltered)	**335.4**	**335.4**	**10 ug/L**	**3 ug/L**	**50**
Amenable Cyanide (Unfiltered)	**NA**	**335.1**	**10 ug/L**	**3 ug/L**	**50**
Total Metals (Unfiltered)	---	---	**ug/L**	**ug/L**	**125**
Aluminum	CLP	6020	2	0.7000	---
Antimony	CLP	6020	0.05	0.0200	---
Arsenic	CLP	6020	0.5	0.2000	---
Barium	CLP	6020	0.05	0.0300	---
Beryllium	CLP	6020	0.02	0.0070	---
Cadmium	CLP	6020	0.02	0.2000	---
Calcium	CLP	6010B	50	20.0000	---
Chromium	CLP	6020	0.2	0.0600	---
Copper	CLP	6020	0.1	0.0300	---
Iron	CLP	6010B	20	20.0000	---
Lead	CLP	6020	0.02	0.0090	---
Magnesium	CLP	6010B	20	9.0000	---
Manganese	CLP	6010B	5	2.0000	---
Mercury	7470A	7470A	0.2	0.0400	**25**
Nickel	CLP	6020	0.2	0.0600	---
Potassium	CLP	6010B	2000	700.0000	---
Selenium	CLP	6020	1	0.2000	---
Silver	CLP	6020	0.02	0.0090	---
Sodium	CLP	6010B	100	60.0000	---
Thallium	CLP	6020	0.2	0.0040	---
Zinc	CLP	6020	0.5	0.3000	__
Ammonia	**NA**	**350.1**	**0.05**	**0.0200**	**10**
Minimum Volume Needed					**890**

Note:

* PAH MRLs/MDLs adjusted 4X due to smaller sample size



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ANCHOR ENVIRONMENTAL, L.L.C.

0 175
Scale in Feet
1 inch equals 175 feet

Attorney Client Privileged and Confidential
Work Product Prepared in Anticipation of Litigation

Figure 1
Proposed and Previous Sampling Locations
NW Natural - Gasco Site
Portland, Oregon

John Renda

From: John Edwards

Sent: Tuesday, July 17, 2007 4:42 PM

To: Dana Bayuk (BAYUK.dana@deq.state.or.us); Henning Larsen

Cc: 'Wyatt, Robert'; Dost, Patty; Carl Stivers; John Renda; Tim Stone; Jennifer Baptist; John Edwards; 'Rob B. Ede'

Subject: FW: Modification to Step 1 Pore Water Sample Protocol

Dana;

As requested during the NW Natural/DEQ July 16 meeting we are providing this Modification to the Step 1 Pore Water Sample Protocol.

NW Natural agreed to comply with this protocol change for Step 1 borings conducted subsequent to the meeting.

This documents a revision to Section 3.6.1 Groundwater/Pore Water Sampling in the *Phase 1 Report and Phase 2 Field Sampling Approach Gasco Siltronic Groundwater Source Evaluation* (Anchor, May, 2007).

The protocol as written in Section 3.6.1 requires that the outer casing/bottom plate assembly be allowed to sink into the sediment until the casing stops moving prior to obtaining the pore water samples.

Based upon field observations made while conducting the Step 1 borings completed to date, the casing will sink several feet below the mudline surface in areas where the sediment is soft. Significant sinking of the casing is expected to occur along the B transect. Significant sinking was observed at test locations along the B transect prior to startup of the Step 1 sampling. The C transect borings have been completed and significant sinking did not occur in those borings.

This protocol change adds one pore water sample to selected boring locations, as described below.

For the remaining Step 1 borings, the following protocol will be followed.

1. The depth to top of mudline will be estimated using a lead line and confirmed using an underwater camera.

2. The outer casing/plate assembly will be lowered to the mudline surface at the depth identified with the camera. If significant settling of the casing is detected as the casing is lowered past the mudline, the casing depth will be locked before the plate has settled more than one foot below the camera-identified mudline. The first pore water sample will then be obtained at a depth interval of 1-2 feet below the plate.

3. After obtaining the 1-2 foot sample, the casing will be allowed to settle in the sediment until it stops moving. With the plate at the settled depth, pore water samples will then be obtained at the following depth intervals below the plate, 1-2 ft, 5-7 ft, and 13-15 ft.

Therefore, at these soft sediment locations, a total of four pore water samples may be obtained. However, in all future locations, at least three pore water samples will be obtained after the casing/plate has settled, as required in Section 3.6.1 of the May 2007 workplan.

Regards

John

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August 14, 2007

Dana Bayuk
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Re: Phase 2 Step 2 Field Sampling Approach
Gasco Siltronic Groundwater Source Evaluation

Dear Mr. Bayuk:

Thank you for meeting with NW Natural on August 9, 2007 to discuss the results of the Phase 2, Step 1 Offshore investigation and plans for the Step 2 investigation. The purpose of this letter is to present the water quality data from the Step 1 offshore investigation and to provide the map of planned Step 2 boring locations. Timely agency review and approval of the planned boring locations are needed to allow completion of the Step 2 borings during the in-water fish window. NW Natural has the barge and drilling contractor currently scheduled to begin the Step 2 field work during the last week of August, 2007.

Twenty three Step 1 offshore borings were completed during the period from July 5 through July 24, 2007. Pore water samples from the offshore borings were provided to Columbia Analytical Services daily for analysis on a three day fast-turnaround basis for VOCs, free cyanide, amenable cyanide, and total cyanide. The fast turnaround was instituted to provide information for planning the Step 2 borings in a timely manner to facilitate completion of the Step 2 offshore investigation within the allowable in-water fish window.

The Step 1 data provided herein are currently in the validation process and should be considered draft and subject to revision. However, these data are acceptable for the purpose of planning the Step 2 boring locations. The completed Phase 2, Step 1 investigation and proposed Phase 2, Step 2 investigation are consistent with the Phase 2 field sampling plan (FSP) as it was presented in the *Phase 1 Report and Phase 2 Field Sampling Approach, Gasco Siltronic Groundwater Source Evaluation* (Anchor, May 2007) and the *Addendum to Phase 2 Field Sampling Approach* (Anchor, July 2, 2007).

The attached data tables and figures were provided to DEQ by email on August 7, 2007 and discussed in the August 9 meeting. The tables and figures provide the pore water quality data resulting from fast-turnaround analysis of the Step 1 pore water samples. As specified in the FSP, the pore water samples are also being tested for PAHs on a normal lab turnaround schedule. Therefore the PAH data will not be available for determining the locations of the Step 2 borings. As agreed in the FSP, the fast-turnaround data in Tables 1 and 2 have been evaluated to determine the appropriate locations for the Step 2 offshore borings. The Step 2 borings on Figure 11 incorporate the locations proposed by DEQ in the August 9 meeting. Following is a list of the attached tables and figures.

Table 1: **Field Water Quality Data**
Table 2: **Groundwater Chemistry data**
Figure 1: **Map View Free Cyanide Data (includes locations of x-sections)**
Figure 2: **Map View Amenable Cyanide Data**
Figure 3: **Map View Total Cyanide Data**
Figure 4: **Map View Benzene Data**
Figure 5: **Map View Naphthalene Data**
Figure 6: **Map View Toluene Data**
Figure 7: **X-section A-A′**
- **a: benzene**
- **b: naphthalene**
- **c: toluene**
- **d: total cyanide**
- **e: amenable cyanide**
- **f: free cyanide**

Figure 8a – 8f: **X-sections B-B′**
Figure 9a – 9f: **X-sections C-C′**
Figure 10a–10f: **X-sections D-D′**
Figure 11: **Proposed Phase 2, Step 2 Boring Locations**

As shown in Figure 11, 8 Step 2 borings are planned. These locations coincide with three transects perpendicular to the river at the following Step 1 borings.

GS-B2	GS-B5	GS-B7
GS-C2	GS-C5	GS-C7
	GS-D2	GS-D4

As discussed in the FSP, Phase 2, Step 2 will have 2 components, sediment sampling and pore water sampling. Sampling will be consistent with the *Phase 1 Report and Phase 2 Field Sampling Approach, Gasco Siltronic Groundwater Source Evaluation* (Anchor, May 2007) and the *Addendum to Phase 2 Field Sampling Approach* (Anchor, July 2, 2007). Attachment A includes Tables 7, 8, 9a, and 9b from the *Addendum to the Phase 2 Field Sampling Approach*. Table 7 summarizes field QC sampling. Table 8 provides a detailed summary of the target analytes, sample container types, holding times, and sample preservatives for Phase 2 sample collection. Table 9a summarizes the details of the sediment profiling chemical analytes, analysis methods, method reporting limits, method detection limits, and minimum sample mass requirements. Table 9b summarizes the details of the groundwater/pore water analytes, analysis methods, method reporting limits, method detection limits, and minimum sample mass and volume requirements.

Sediment Sampling

Anchor is currently working with the drilling contractor, Boart Longyear, to construct a piston-core sampler that will be deployed and pushed with the Geoprobe. Samples will be collected by direct push to a target depth of approximately 10 feet below mudline. The piston core is planned to be constructed of a 3-inch diameter aluminum core tube. If piston core refusal is encountered at less than 10 feet below mudline, a Geoprobe macro core sampler (2-inch diameter, 5 foot long sampler) will be used to sample the remaining interval.

Groundwater Sampling

During Step 2 the drill rig will be set up to obtain groundwater samples at approximate 25 ft depth intervals below mudline. The sampling procedures will be as presented in the FSP. The borings will be advanced until sampler refusal occurs.

DEQ written approval of the Step 2 boring locations is needed before the drill rig is mobilized on August 27.

Respectfully submitted,

John E. Edwards, RG, CEG

Anchor Environmental, L.L.C.

Attachments: Tables 1 and 2
Figures 1 through 11
Attachment A (Tables 7, 8, 9a, 9b)

Cc: Bob Wyatt, NW Natural
Patty Dost, Schwabe, Williamson, Wyatt
Rob Ede, HAI
Carl Stivers, Anchor
John Renda, Anchor

TABLES

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Table 1
Field Water Quality Parameters
Gasco Phase 2 Investigation
Gasco/Siltronic
Portland, Oregon

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

Location ID	Date	pH	Conductivity (µS)	Temp (ºC)	ORP (mV)	Diss O_2 (mg/l)	Water Quality	NAPL Present	Sheen Present
GS-B1-A	7/17/2007	6.51	174	22.57	20.3	2.27	Silty, dark grey, clearing		
GS-B1-B	7/17/2007	6.39	1086	21.03	10.7	0.80	Silty, grey, clearing		
GS-B1-C	7/17/2007	6.13	2151	19.98	47.9	1.54	Silty, grey		
GS-B2-A1	7/17/2007	6.88	146	23.69	34.5	3.84	Silty, grey, strong odor		X
GS-B2-A2	7/17/2007	6.71	175	23.92	40.0	1.09	Silty, grey, thick sheen		X
GS-B2-B	7/17/2007	6.43	1008	20.60	44.1	0.64	Silty, grey, clearing		
GS-B2-C	7/17/2007	6.69	813	22.83	29.0	0.70	Silty, grey, clearing		
GS-B3-A	7/19/2007	7.07	190	23.88	-21.8	0.92	Silty, grey, clearing		
GS-B3-B	7/19/2007	6.59	549	25.58	7.7	1.84	Silty, grey		
GS-B3-C	7/19/2007	6.83	831	23.78	-6.1	0.85	Silty, grey, clearing		
GS-B4-A	7/19/2007	6.81	296	22.99	23.9	0.48	Silty, grey		
GS-B4-B	7/19/2007	6.44	1300	21.11	38.2	1.04	Silty, grey		X
GS-B4-C	7/19/2007	6.82	852	22.62	18.0	1.03	Silty, grey, clearing		
GS-B5-A	7/18/2007	6.86	1110	22.28	0.6	0.70	Silty, grey, clearing		X
GS-B5-B	7/18/2007	6.58	511	22.57	-2.3	0.59	Silty, grey		X
GS-B5-C	7/18/2007	6.63	1002	20.94	-1.0	0.89	Silty, cloudy, grey		X
GS-B6-A	7/6/2007	6.35	167	21.09	3.0	0.91	Silty, cloudy, light tan		
GS-B6-B	7/6/2007	6.42	216	21.71	-3.6	0.81	Silty, cloudy, tan		
GS-B6-C	7/6/2007	6.55	711	22.05	-61.0	0.60	Clear, colorless		
GS-B7-A	7/5/2007	6.17	1005	20.84	-13.7	3.01	Slightly cloudy, light grey		
GS-B7-B	7/5/2007	6.81	137	22.84	-30.0	4.80	Slightly cloudy, light grey		
GS-B7-C	7/5/2007	6.08	175	22.30	5.7	2.72	Slightly cloudy, light grey		
GS-B8-A	7/9/2007	6.59	232	21.26	-20.7	0.46	Silty, dark grey		
GS-B8-B	7/9/2007	6.58	380	22.41	-30.4	0.74	Silty, grey		X
GS-B8-C	7/9/2007	6.49	1025	20.07	-40.2	0.41	Slightly cloudy, grey		
GS-B9-A	7/9/2007	6.74	138	23.85	-13.6	0.43	Silty, grey		
GS-B9-B	7/9/2007	6.54	171	25.01	18.1	4.22	Slightly cloudy, grey	X	X
GS-B9-C	7/9/2007	6.37	906	21.02	-35.0	0.38	Silty, grey		
GS-C1-A	7/16/2007	7.00	2695	25.75	-48.2	5.50	Silty, grey, gas bubbles		
GS-C1-B	7/16/2007	6.79	2338	23.11	-55.3	0.71	Silty, light grey, 'fizzy'		
GS-C1-C	7/16/2007	6.78	1345	21.29	-61.9	0.13	Clear, colorless		
GS-C2-A	7/16/2007	7.06	1018	22.45	30.1	1.26	Slightly cloudy, light tan		X
GS-C2-B	7/16/2007	7.36	1094	22.67	-8.3	0.56	Slightly cloudy, light grey		X
GS-C2-C	7/16/2007	7.49	1338	21.97	-16.1	0.50	Slightly silty, grey		X
GS-C3-A	7/13/2007	7.56	845	23.50	50.0	0.88	Slightly cloudy, grey		
GS-C3-B	7/13/2007	7.33	706	22.38	19.9	0.86	Slightly cloudy, grey		
GS-C3-C	7/13/2007	7.49	887	23.31	17.1	0.24	Slightly cloudy, grey		
GS-C4-A	7/13/2007	6.95	802	21.20	32.2	0.89	Clear, grey tint		
GS-C4-B	7/13/2007	7.02	823	20.79	26.2	0.57	Slightly cloudy, grey tint		
GS-C4-C	7/13/2007	7.01	742	21.83	36.2	0.58	Slightly cloudy, grey		
GS-C5-A	7/12/2007	6.70	1349	23.36	-25.8	0.34	Slightly cloudy, grey, clearing		
GS-C5-B	7/12/2007	6.91	779	22.94	-65.3	0.29	Slightly silty, grey		
GS-C5-C	7/12/2007	6.91	685	23.53	-74.0	0.34	Slightly silty, grey		
GS-C6-A	7/12/2007	6.57	838	20.77	45.2	1.14	Clear, colorless		
GS-C6-B	7/12/2007	6.75	829	20.40	24.4	0.81	Slightly silty, light grey		
GS-C6-C	7/12/2007	6.90	831	21.11	15.5	0.76	Slightly cloudy, colorless		
GS-C7-A	7/11/2007	6.77	867	22.68	-57.4	0.36	Slightly cloudy, light grey		
GS-C7-B	7/11/2007	6.77	957	21.09	-65.5	0.71	Slightly cloudy, grey		
GS-C7-C	7/11/2007	6.84	929	24.17	-77.3	0.23	Slightly cloudy, light grey		
GS-C8-A	7/11/2007	6.52	909	21.17	-20.1	0.34	Slightly cloudy, grey		X
GS-C8-B	7/11/2007	6.70	1048	20.55	-36.3	0.69	Slightly cloudy, grey		
GS-C8-C	7/11/2007	6.87	819	20.66	-15.0	0.31	Slightly cloudy, light light grey		
GS-C9-A	7/10/2007	7.06	775	23.74	-42.3	0.21	Slightly cloudy, tan		
GS-C9-B	7/10/2007	7.23	860	22.59	-20.7	0.55	Slightly cloudy, light grey		
GS-C9-C	7/10/2007	7.13	2291	22.09	-22.2	0.29	Slightly cloudy, tan		
GS-D1-A	7/20/2007	7.30	872	21.52	112.6	0.91	Clear, colorless		
GS-D1-B	7/20/2007	7.55	867	20.77	81.8	0.59	Slightly silty, greyish		
GS-D1-C	7/20/2007	7.65	971	21.48	90.1	0.50	Slightly silty, greyish		
GS-D2-A	7/20/2007	7.62	1003	21.63	71.1	0.40	Clear, colorless		
GS-D2-B	7/20/2007	7.67	816	20.92	61.8	0.35	Cloudy		
GS-D2-C	7/20/2007	7.66	684	21.30	59.2	0.33	Slightly silty, greyish		
GS-D3-A	7/23/2007	6.80	1367	21.49	80.3	0.77	Clear, colorless		
GS-D3-B	7/23/2007	7.27	1503	23.06	57.7	0.64	Clear, colorless		
GS-D3-C	7/23/2007	7.17	1550	22.43	90.2	0.70	Cloudy, greyish		
GS-D4-A	7/23/2007	7.36	1270	25.02	75.7	0.52	Cloudy, grey tint		
GS-D4-B	7/23/2007	7.22	2004	24.77	85.0	0.29	Slightly silty, greyish		
GS-D4-C	7/23/2007	7.07	2148	21.93	105.2	0.67	Slightly silty, greyish		
GS-D5-A	7/24/2007	7.44	776	21.35	63.7	0.67	Clear, colorless		
GS-D5-B	7/24/2007	7.50	2138	20.73	41.5	0.30	Slightly silty, greyish		
GS-D5-C	7/24/2007	7.64	2600	20.99	36.8	0.21	Cloudy, greyish		
River (38' below surface)	7/5/2007	6.70	119	20.42	3.9	10.64			
River (20' below surface)	7/9/2007	7.20	104	22.10	54.1	8.01			
River (48' below surface)	7/13/2007	8.02	110	22.40	-12.4	7.20			
River	7/19/2007	8.13	132	23.54	-72.1	6.65			

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Table 2
Groundwater Chemistry Data
Phase 2 Investigation
Gasco/Siltronic
Portland, Oregon

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	Location ID	GS-B1	GS-B1	GS-B1	GS-B2	GS-B2	GS-B2	GS-B2	GS-B3	GS-B3	GS-B3	GS-B4	GS-B4	GS-B4	GS-B5	GS-B5	GS-B5
	Sample ID	GS-B1-A	GS-B1-B	GS-B1-C	GS-B2-A1	GS-B2-A2	GS-B2-B	GS-B2-C	GS-B3-A	GS-B3-B	GS-B3-C	GS-B4-A	GS-B4-B	GS-B4-C	GS-B5-A	GS-B5-B	GS-B5-C
	Sample Date	7/17/2007	7/17/2007	7/17/2007	7/17/2007	7/17/2007	7/17/2007	7/17/2007	7/19/2007	7/19/2007	7/19/2007	7/19/2007	7/19/2007	7/19/2007	7/18/2007	7/18/2007	7/18/2007
	Depth Below Mudline	0.9 to 1.9	4.9 to 6.9	12.9 to 14.9	1.5 to 2.5	4.5 to 5.5	8.5 to 10.5	16.5 to 18.5	1 to 2	5 to 7	13 to 15	1 to 2	5 to 7	13 to 15	1.6 to 2.6	5.6 to 7.6	13.6 to 15.6
	Screen Elevation	-28.2 to -29.2	-32.2 to -34.2	-40.2 to -42.2	-32.7 to -33.7	-35.7 to -36.7	-39.7 to -41.7	-47.7 to -49.7	-36.6 to -37.6	-40.6 to -42.6	-48.6 to -50.6	-34.1 to -35.1	-38.1 to -40.1	-46.1 to -48.1	-31.3 to -32.3	-35.3 to -37.3	-43.3 to -45.3
	Sample Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Chemical Name	**Unit**																
Conventionals																	
Total Cyanide	mg/l	**1.21**	**0.26**	**0.64**	**2.74**	**2.07**	**0.35**	**0.59**	**0.45**	**0.1**	**0.21**	**0.23**	**0.3**	**0.1**	**0.08**	**0.1**	**0.45**
Amenable cyanide	mg/l	**0.28**	**0.05**	**0.03**	0.01 U	0.01 U	**0.35**	**0.11**	0.01 U	0.01 U	0.01 U	**0.04**	0.01 U	0.01 U	**0.02**	0.01 U	**0.02**
Cyanide Free	mg/l	0.01 U	0.01 U	**0.006 J**	**0.023**	**0.026**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
VOC																	
1,1,1,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,1,1-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,2,3-Trichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,1-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.24 J**	0.50 U	0.50 U	**0.32**	1 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4 U	2.0 U	2.0 U
1,2-Dibromoethane	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,2-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
2-Butanone (MEK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	**36**	20 U	20 U	20 U	20 U	40 U	20 U	20 U
2-Chloroethylvinylether	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
2-Hexanone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	40 U	20 U	20 U
4-Methyl-2-pentanone (MIBK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	40 U	20 U	20 U
Acetone	ug/l	20 U	20 U	20 U	20 U	**4.2 J**	20 U	20 U	20 U	**11 J**	20 U	20 U	20 U	20 U	40 U	20 U	20 U
Acrolein	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	40 U	20 U	20 U
Acrylonitrile	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
Benzene	ug/l	**0.20 J**	**0.26 J**	0.50 U	**8.8**	**5.7**	0.50 U	0.50 U	0.50 U	**0.36 J**	0.50 U	0.50 U	**54 D**	0.50 U	**2.2 D**	**2.0**	**0.62**
Bromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Bromodichloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Bromoform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Bromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Carbon disulfide	ug/l	**0.25 J**	**0.18 J**	**0.22 J**	0.50 U	**0.17 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Carbon tetrachloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Chlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.17 J**	0.50 U	**0.3 JD**	**0.17 J**	0.50 U
Chloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Chloroform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Chloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.28 J**	0.50 U	0.50 U	0.50 U	**0.34 J**	**0.28 J**	**0.33**	**0.46 JD**	0.50 U	**1.1**
cis-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Dibromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Dibromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Dichlorodifluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Dichloromethane	ug/l																
Ethylbenzene	ug/l	0.50 U	0.50 U	0.50 U	**33**	**22**	**0.29 J**	**0.45 J**	0.50 U	**0.28 J**	0.50 U	0.50 U	**36**	0.50 U	**11 D**	**7.7**	**2.1**
Hexachlorobutadiene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4 U	2.0 U	2.0 U
Iodomethane	ug/l	**4.9 J**	**4.9 J**	**4.8 J**	**4.8 J**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
Isopropylbenzene	ug/l	**0.22 J**	**0.12 J**	0.5 U	**2.9**	**2.1**	0.5 U	0.5 U	0.5 U	**0.74 J**	0.5 U	**0.57 J**	**18**	0.5 U	**5.7 D**	**6.2**	**4.2**
Methylene Chloride	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4 U	2.0 U	2.0 U
Methyl tert-butylether	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Naphthalene	ug/l	**0.66 J**	**1 J**	2 U	**100 D**	**94 D**	**1.1 J**	**11**	2 U	**0.45 J**	2 U	**6**	**53**	**0.67**	**1800 D**	**81 D**	**9.4**
Styrene	ug/l	0.50 U	0.50 U	0.50 U	**0.18 J**	**0.13 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Tetrachloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Trichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Toluene	ug/l	**18**	**15**	**1.6**	**14**	**41**	**2.7**	**2.6**	**0.79**	**16**	**0.68**	**0.88**	**6.3**	**4.4**	**22 D**	**100 D**	**5.7**
trans-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U	10 U	10 U
Trichlorofluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
Vinyl acetate	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
Vinyl chloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1 U	0.50 U	0.50 U
m,p-Xylenes	ug/l	0.50 U	**0.27 J**	0.50 U	**1.2**	**0.92**	0.50 U	0.50 U	0.50 U	**0.44 J**	0.50 U	0.50 U	**3.10**	0.50 U	**2.9 D**	**1.1**	**0.58**
o-Xylene	ug/l	**0.14 J**	**0.17 J**	0.5 U	**2.9**	**1.7**	**0.13 J**	**0.12 J**	0.5 U	**0.71**	**0.22 J**	**0.12 J**	**18**	0.5 U	**8.1 D**	**2.8**	**2.5**

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Table 2
Groundwater Chemistry Data
Phase 2 Investigation
Gasco/Siltronic
Portland, Oregon

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

	Location ID	GS-B6	GS-B6	GS-B6	GS-B7	GS-B7	GS-B7	GS-B8	GS-B8	GS-B8	GS-B9	GS-B9	GS-B9
	Sample ID	GS-B6-A	GS-B6-B	GS-B6-C	GS-B7-A	GS-B7-B	GS-B7-C	GS-B8-A	GS-B8-B	GS-B8-C	GS-B9-A	GS-B9-B	GS-B9-C
	Sample Date	7/6/2007	7/6/2007	7/6/2007	7/5/2007	7/5/2007	7/5/2007	7/9/2007	7/9/2007	7/9/2007	7/9/2007	7/9/2007	7/9/2007
	Depth Below Mudline	1 to 2	5 to 7	13 to 15	1 to 2	5 to 7	13 to 15	1 to 2	5 to 7	13 to 15	1.5 to 2.5	5 to 7	14.9 to 16.9
	Screen Elevation	-34.3 to -35.3	-38.3 to -40.3	-46.3 to -48.3	-32.5 to -33.5	-36.5 to -38.5	-44.5 to -46.5	-31.5 to - 32.5	-35.5 to -37.5	-43.5 to -45.5	-32.6 to -33.6	-36.1 to -38.1	-46.0 to -48.0
	Sample Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Chemical Name	**Unit**												
Conventionals													
Total Cyanide	mg/l	**0.06**	**0.08**	**0.22**	**0.10**	0.01 U	**0.007 J**	**0.02**	**0.11**	**0.55**	**0.03**	**0.04**	**0.25**
Amenable cyanide	mg/l	0.01 U	0.01 U	**0.08**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.07**	0.01 U	0.01 U	0.01 U
Cyanide Free	mg/l	0.01 U	**0.008 J**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
VOC													
1,1,1,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.33 J**	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromoethane	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (MEK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Chloroethylvinylether	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methyl-2-pentanone (MIBK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acetone	ug/l	**5.6 J**	**6.1 J**	20 U	20 U	**6.1 J**	**5.2 J**	**7.6 J**	**5.5 J**	20 U	**5.6 J**	20 U	20 U
Acrolein	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acrylonitrile	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	ug/l	0.50 U	**1.8**	0.50 U	**0.15 J**	**7.8**	**170 D**	**1.1**	**0.24 J**	**0.27 J**	0.50 U	**0.54**	0.50 U
Bromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon disulfide	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	**0.26 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.26 J**	0.50 U	**0.22 J**	**0.20 J**	0.50 U	**0.17 J**
cis-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**11**	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichloromethane	ug/l												
Ethylbenzene	ug/l	0.50 U	**1.0**	0.50 U	0.50 U	**0.69**	**16**	0.50 U	0.50 U	0.50 U	0.50 U	**1.7**	0.50 U
Hexachlorobutadiene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iodomethane	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**2.7 J**	5.0 U	**2.7 J**
Isopropylbenzene	ug/l	**0.76 J**	**1.3 J**	2.0 U	**2.0 J**	1.0 U	**1.6 J**	2.0 U	**0.11 J**	2.0 U	2.0 U	**1.2 J**	2.0 U
Methylene Chloride	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	**1.7 J**	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert-butylether	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Naphthalene	ug/l	**6.6**	**22**	**0.57 J**	**0.44 J**	**54**	**750 D**	**1.7 J**	2.0 U	2.0 U	2.0 U	**25**	2.0 U
Styrene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/l	**0.12 J**	**0.14 J**	0.50 U	**0.16 J**	**0.57**	**32**	**130 D**	**26**	**1.9**	**1.5**	**50**	**2.4**
trans-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl acetate	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**4.9**	0.50 U	0.50 U	**0.29 J**
m,p-Xylenes	ug/l	0.50 U	**0.55**	0.50 U	**0.32 J**	**0.49 J**	**17**	0.50 U	0.50 U	0.50 U	0.50 U	**0.33 J**	0.50 U
o-Xylene	ug/l	**0.15 J**	**0.99**	0.50 U	**0.55**	**0.47 J**	**9.4**	0.50 U	**0.11 J**	0.50 U	0.50 U	**0.64**	0.50 U

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Table 2
Groundwater Chemistry Data
Phase 2 Investigation
Gasco/Siltronic
Portland, Oregon

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

	Location ID	GS-C1	GS-C1	GS-C1	GS-C2	GS-C2	GS-C2	GS-C2	GS-C3	GS-C3	GS-C3	GS-C4	GS-C4	GS-C4
	Sample ID	GS-C1-A	GS-C1-B	GS-C1-C	GS-C2-A	GS-C2-B	GS-C2-C	GS-C2-C Dup	GS-C3-A	GS-C3-B	GS-C3-C	GS-C4-A	GS-C4-B	GS-C4-C
	Sample Date	7/16/2007	7/16/2007	7/16/2007	7/16/2007	7/16/2007	7/16/2007	7/16/2007	7/13/2007	7/13/2007	7/13/2007	7/13/2007	7/13/2007	7/13/2007
	Depth Below Mudline	1.7 to 2.7	5.7 to 7.7	13.7 to 15.7	2.4 to 3.4	5.4 to 7.4	13.4 to 15.4	13.4 to 15.4	1 to 2	5 to 7	13 to 15	1 to 2	5 to 7	13 to 15
	Screen Elevation	-51.8 to -52.8	-55.8 to -57.8	-63.8 to -65.8	-44.8 to -45.8	-47.8 to -49.8	-55.8 to -57.8	-55.8 to -57.8	-46.4 to -47.4	-50.4 to -52.4	-58.4 to -60.4	-45.9 to -46.9	-49.9 to -51.9	-57.9 to -59.9
	Sample Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Chemical Name	**Unit**													
Conventionals														
Total Cyanide	mg/l	**0.2**	**0.06**	**0.39**	**0.03**	**0.01**	**0.04**	**0.04**	**0.01**	**0.02**	**0.03**	**0.06**	**0.02**	**0.01**
Amenable cyanide	mg/l	0.01 U	0.06	**0.01**	**0.01**	**0.01**	**0.04**	**0.04**	**0.01**	0.01 U	**0.02**	**0.03**	**0.01**	**0.01**
Cyanide Free	mg/l	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
VOC														
1,1,1,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromoethane	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/l	**0.16 J**	**1.5**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/l	0.50 U	**0.22 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/l	**0.15 J**	**1.7**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (MEK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Chloroethylvinylether	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methyl-2-pentanone (MIBK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acetone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acrolein	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acrylonitrile	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	ug/l	**0.42 J**	**11**	**3.6**	**1.6**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.29 J**	0.50 U	0.50 U
Bromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon disulfide	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	**0.29 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/l	**1.4**	**14**	0.50 U	**9.10**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane	ug/l	**0.45 J**	**0.18 J**	**0.38 J**	**1.1**	0.50 U	0.50 U	**0.16 J**	0.50 U	0.50 U	0.50 U	0.50 U	**0.99**	**0.99**
cis-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichloromethane	ug/l													
Ethylbenzene	ug/l	0.50 U	**5.5**	**1.4**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**3.50**	0.50 U	0.50 U
Hexachlorobutadiene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U						
Iodomethane	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	ug/l	**0.39 J**	**4.5**	**29**	**4.1**	0.5 U	**0.11 J**	**0.11 J**	0.5 U	**1.2 J**	0.5 U	**0.78**	0.5 U	0.5 U
Methylene Chloride	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert-butylether	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Naphthalene	ug/l	**1 J**	**430 D**	**8.6**	**35**	**0.54 J**	**28**	**29**	**0.65 J**	**1.8 J**	2 U	**330 D**	**1 J**	**1.3 J**
Styrene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/l	**6.6**	**20**	**1.5**	**1.1**	**4.3**	**10**	**11**	**8.6**	**4.3**	**5.4**	**0.44 J**	**0.31 J**	**3.2**
trans-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl acetate	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	ug/l	**0.11 J**	**0.17 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
m,p-Xylenes	ug/l	**0.44 J**	**1.7**	**0.94**	**0.66**	0.50 U	0.50 U	0.50 U	0.50 U	**0.29 J**	**0.23 J**	**0.41 J**	0.50 U	0.50 U
o-Xylene	ug/l	**0.32 J**	**6.0**	**4.6**	**3.1**	0.5 U	0.5 U	0.5 U	0.5 U	**0.22 J**	**0.11 J**	**1.1**	0.5 U	0.5 U

DRAFT

Table 2
Groundwater Chemistry Data
Phase 2 Investigation
Gasco/Siltronic
Portland, Oregon

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

	Location ID	GS-C5	GS-C5	GS-C5	GS-C6	GS-C6	GS-C6	GS-C7	GS-C7	GS-C7	GS-C8	GS-C8	GS-C8	GS-C9	GS-C9	GS-C9	GS-C9
	Sample ID	GS-C5-A	GS-C5-B	GS-C5-C	GS-C6-A	GS-C6-B	GS-C6-C	GS-C7-A	GS-C7-B	GS-C7-C	GS-C8-A	GS-C8-B	GS-C8-C	GS-C9-A	GS-C9-B	GS-C9-C	GS-C9-C Dup
	Sample Date	7/12/2007	7/12/2007	7/12/2007	7/12/2007	7/12/2007	7/12/2007	7/11/2007	7/11/2007	7/11/2007	7/11/2007	7/11/2007	7/11/2007	7/10/2007	7/10/2007	7/10/2007	7/10/2007
	Depth Below Mudline	1 to 2	5 to 7	13 to 15	1.1 to 2.1	5.3 to 7.3	13.3 to 15.3	1 to 2	5 to 7	13 to 15	1.2 to 2.2	5.2 to 7.2	13.2 to 15.2	1 to 2	5 to 7	13 to 15	13 to 15
	Screen Elevation	-46.0 to -47.0	-50.0 to -52.0	-58.0 to -60.0	-45.5 to -46.5	-49.7 to -51.7	-57.7 to -59.7	-46.6 to -47.6	-50.6 to -52.6	-58.6 to -60.6	-45.5 to -46.5	-49.5 to -51.5	-57.5 to -59.5	-42.9 to -43.9	-46.9 to -48.9	-54.9 to -56.9	-54.9 to -56.9
	Sample Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Chemical Name	**Unit**																
Conventionals																	
Total Cyanide	mg/l	**0.19**	**0.21**	**0.12**	**0.18**	**0.15**	**0.15**	**0.35**	**0.41**	**0.41**	**0.26**	**0.51**	**0.06**	**0.02**	**0.008 J**	0.01 U	0.01 U
Amenable cyanide	mg/l	0.01 U	**0.06**	**0.03**	**0.05**	**0.02**	**0.03**	**0.02**	**0.02**	**0.11**	0.01 U	**0.05**	**0.01**	0.01 U	0.01 U	0.01 U	0.01 U
Cyanide Free	mg/l	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
VOC																	
1,1,1,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.68 JD**	**27 D**	**0.68**	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	100 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromoethane	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	100 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	**0.18 J**	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (MEK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	50.0 U	1000 U	20 U	20 U	20 U	20 U	20 U
2-Chloroethylvinylether	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	12.5 U	250 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	50.0 U	1000 U	20 U	20 U	20 U	20 U	20 U
4-Methyl-2-pentanone (MIBK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	50.0 U	1000 U	20 U	20 U	20 U	20 U	20 U
Acetone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	50.0 U	1000 U	20 U	20 U	20 U	20 U	20 U
Acrolein	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	50.0 U	1000 U	20 U	20 U	20 U	20 U	20 U
Acrylonitrile	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	12.5 U	250 U	5.0 U	**1.5 J**	**1.4 J**	5.0 U	5.0 U
Benzene	ug/l	**0.22 J**	**0.22 J**	0.50 U	0.50 U	0.50 U	0.50 U	**0.34 J**	0.50 U	0.50 U	**36 D**	**44 D**	**1.8**	**0.16 J**	**0.77**	0.50 U	0.50 U
Bromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon disulfide	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon tetrachloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	ug/l	**1.1**	**0.26 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	**0.58**	0.50 U	0.50 U
cis-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**230.0 D**	**11000 D**	**240 D**	**0.41 J**	**0.57**	**0.16 J**	**0.16 J**
cis-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichloromethane	ug/l																
Ethylbenzene	ug/l	0.50 U	**3.0**	0.50 U	0.50 U	0.50 U	0.50 U	**0.52**	0.50 U	0.50 U	**13 D**	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	100 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iodomethane	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	12.5 U	250 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	ug/l	**3.3**	**5.1**	2.0 U	**0.42 J**	2.0 U	2.0 U	**1.8 J**	**1.9 J**	**1.9 J**	**5.0 JD**	25 U	0.5 U	2.0 U	2.0 U	2.0 U	2.0 U
Methylene Chloride	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	**0.63 JD**	**14 JD**	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methyl tert-butylether	ug/l	0.50 U	0.50 U	**0.34 J**	0.50 U	**0.29 J**	**0.34 J**	0.50 U	0.50 U	0.50 U	1.3 U	25 U	**3.0**	**17**	**16**	**0.29 J**	**0.31 J**
Naphthalene	ug/l	**1.3 J**	**5.0**	2.0 U	2.0 U	2.0 U	2.0 U	**85 D**	2 U	**0.71 J**	**8.0 D**	100 U	2 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Tetrachloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	**7 JD**	**1.3**	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	ug/l	**0.86**	**0.65**	**5.3**	**0.64**	**3.4**	**1.5**	**0.22 J**	**0.17 J**	**0.48 J**	**6.6 D**	25 U	**0.74**	**23**	**5.7**	**2.7**	**2.7**
trans-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.70 JD**	**18 JD**	**1.0**	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	25.0 U	500 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.3 U	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl acetate	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	12.5 U	250 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	ug/l	**0.070 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.12 J**	0.50 U	0.50 U	**780 D**	**7600 D**	**91 D**	**0.050 J**	**0.080 J**	**0.22 J**	**0.24 J**
m,p-Xylenes	ug/l	**0.61**	**1.0**	0.50 U	0.50 U	0.50 U	0.50 U	**0.32 J**	0.50 U	**1.90**	**0.7 JD**	25 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Xylene	ug/l	**1.4**	**6.3**	0.50 U	0.50 U	0.50 U	0.50 U	**0.42 J**	**0.39 J**	**4.1**	**2.7 D**	25 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U

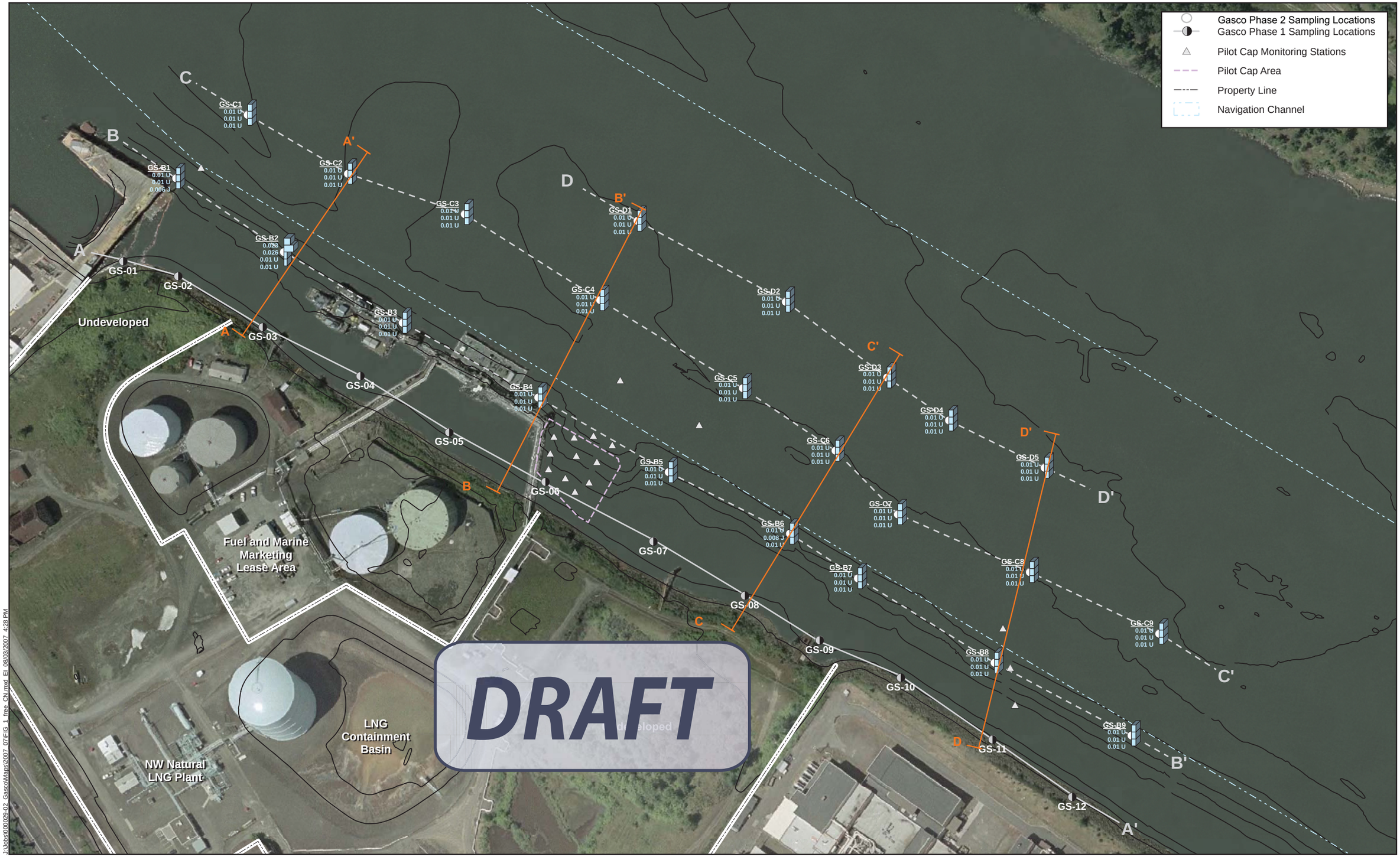
DRAFT

Table 2
Groundwater Chemistry Data
Phase 2 Investigation
Gasco/Siltronic
Portland, Oregon

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

	Location ID	GS-D1	GS-D1	GS-D1	GS-D2	GS-D2	GS-D2	GS-D3	GS-D3	GS-D3	GS-D4	GS-D4	GS-D4	GS-D4	GS-D5	GS-D5	GS-D5
	Sample ID	GS-D1-A	GS-D1-B	GS-D1-C	GS-D2-A	GS-D2-B	GS-D2-C	GS-D3-A	GS-D3-B	GS-D3-C	GS-D4-A	GS-D4-B	GS-D4-C	GS-D4-C Dup	GS-D5-A	GS-D5-B	GS-D5-C
	Sample Date	7/20/2007	7/20/2007	7/20/2007	7/20/2007	7/20/2007	7/20/2007	7/23/2007	7/23/2007	7/23/2007	7/23/2007	7/23/2007	7/23/2007	7/23/2007	7/24/2007	7/24/2007	7/24/2007
	Depth Below Mudline	1 to 2	5 to 7	13 to 15	1 to 2	5 to 7	13 to 15	0.5 to 1.5	4.5 to 6.5	12.5 to 14.5	1 to 2	5 to 7	13 to 15	13 to 15	1 to 2	5 to 7	13 to 15
	Screen Elevation	-44.8 to -45.8	-48.8 to -50.8	-56.8 to -58.8	47.6 to -48.6	-51.6 to -53.6	-59.6 to -61.6	-49.4 to -50.4	-53.4 to -55.4	-61.4 to -63.4	-50.4 to -51.4	-54.4 to -56.4	-62.4 to -64.4	-62.4 to -64.4	-47.9 to -48.9	-51.9 to -53.9	-59.9 to -61.9
	Sample Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Chemical Name	**Unit**																
Conventionals																	
Total Cyanide	mg/l	**0.04**	**0.02**	**0.02**	**0.04**	**0.05**	**0.05**	**0.05**	**0.05**	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	0.01 U	0.01 U	**0.004 J**
Amenable cyanide	mg/l	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.03**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Cyanide Free	mg/l	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
VOC																	
1,1,1,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,1,1-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,1,2,2-Tetrachloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,1,2-Trichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,2,3-Trichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,1-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,1-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,2,4-Trichlorobenzene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	20.0 U
1,2-Dibromoethane	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	20.0 U
1,2-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	**1.50**	**3.20**	**2.70**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,2-Dichloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,2-Dichloropropane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,3-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
1,4-Dichlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	**0.14 J**	**0.12 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
2-Butanone (MEK)	ug/l	20 U	20 U	**3 J**	20 U	**3.7 J**	**4.9 J**	20 U	20 U	**34**	20 U	20 U	20 U	20 U	20 U	20 U	200.0 U
2-Chloroethylvinylether	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	50.0 U
2-Hexanone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	200.0 U
4-Methyl-2-pentanone (MIBK)	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	200.0 U
Acetone	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	200.0 U
Acrolein	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	200.0 U
Acrylonitrile	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	50.0 U
Benzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**17**	**14.0 D**
Bromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Bromodichloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Bromoform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Bromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Carbon disulfide	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Carbon tetrachloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Chlorobenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	**0.48 J**	**0.44 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.48 J**	5.0 U
Chloroethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Chloroform	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Chloromethane	ug/l	**0.59**	**1.50**	**0.97**	**0.40 J**	**0.30 J**	**0.30 J**	**0.33 J**	**1.10**	**0.65**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
cis-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.37 J**	**0.14 J**	0.50 U	**0.16 J**	0.50 U	0.50 U	5.0 U
cis-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Dibromochloromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Dibromomethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Dichlorodifluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Dichloromethane	ug/l																
Ethylbenzene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**26**	**110.0 D**
Hexachlorobutadiene	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	20.0 U
Iodomethane	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	50.0 U
Isopropylbenzene	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.93 J**	**14**	**13.0 JD**
Methylene Chloride	ug/l	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	20.0 U
Methyl tert-butylether	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Naphthalene	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	**0.68 J**	2 U	2 U	2 U	2 U	**42**	**1000.0 D**
Styrene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Tetrachloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Trichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Toluene	ug/l	**0.25 J**	**0.77**	**4.1**	**0.33 J**	**3.4**	**3.2**	**0.31**	**4.0**	**15**	**0.42 J**	**1.5**	**1.6**	**1.5**	**0.72**	**2.5**	**21 D**
trans-1,2-Dichloroethene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
trans-1,3-Dichloropropene	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
trans-1,4-Dichloro-2-butene	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100.0 U
Trichlorofluoromethane	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
Vinyl acetate	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	50.0 U
Vinyl chloride	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.0 U
m,p-Xylenes	ug/l	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.24**	0.50 U	0.50 U	0.50 U	0.50 U	**0.23 J**	**3.0**	**11.0 D**
o-Xylene	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.31 J**	**5.2**	**21.0 D**

FIGURES



ANCHOR ENVIRONMENTAL, L.L.C.

0 175
Scale in Feet
1 inch equals 175 feet

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Free Cyanide (mg/l) in groundwater

Figure 1
Free Cyanide (mg/l)
NW Natural - Gasco Site
Portland, Oregon

J:\Jobs\000029.02_GascoMaps\2007_07\FIG_1_free_CN.mxd EI 08/03/2007 4:28 PM

ANCHOR ENVIRONMENTAL, L.L.C.

0 175
Scale in Feet
1 inch equals 175 feet

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Amenable Cyanide (mg/l) in groundwater

Figure 2
Amenable Cyanide (mg/l)
NW Natural - Gasco Site
Portland, Oregon

J:\Jobs\000029.02_GascoMaps\2007_07\FIG_2_amenable_CN.mxd EI 08/03/2007 4:54 PM

ANCHOR ENVIRONMENTAL, L.L.C.

0 175
Scale in Feet
1 inch equals 175 feet

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Total Cyanide (mg/l) in groundwater

Figure 3
Total Cyanide (mg/l)
NW Natural - Gasco Site
Portland, Oregon

J:\Jobs\000029.02_GascoMaps\2007_07\FIG_3_total_CN.mxd EI 08/03/2007 5:01 PM

J:\Jobs\000029.02 Gasco\Maps\2007 07\FIG 4 benzene.mxd EI 08/03/2007 4:56 PM

ANCHOR ENVIRONMENTAL, L.L.C.

0 175
Scale in Feet

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Benzene (µg/l) in groundwater

Figure 4
Benzene (µg/l)
NW Natural - Gasco Site
Portland, Oregon

J:\Jobs\000029-02_Gasco\Maps\2007_07\FIG_5_naphthalene.mxd EI 08/03/2007 4:56 PM

ANCHOR ENVIRONMENTAL, L.L.C.

0 175
Scale in Feet
1 inch equals 175 feet

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Naphthalene (µg/l)
in groundwater

Figure 5
Naphthalene (µg/l)
NW Natural - Gasco Site
Portland, Oregon

ANCHOR ENVIRONMENTAL, L.L.C.

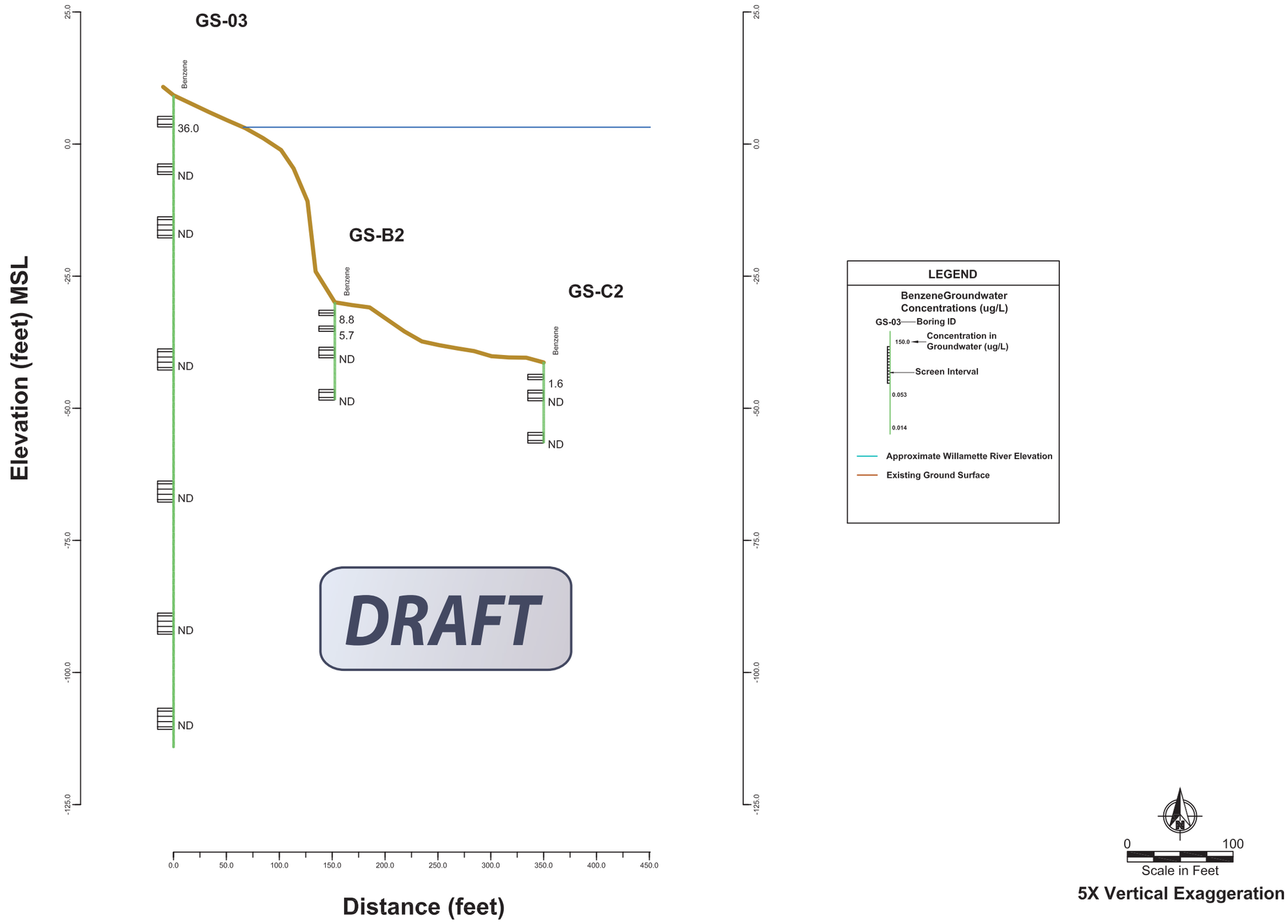
0 175
Scale in Feet
1 inch equals 175 feet

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Toluene (µg/l) in groundwater

Figure 6
Toluene (µg/l)
NW Natural - Gasco Site
Portland, Oregon

J:\Jobs\000029.02_Gasco\Maps\2007_07\FIG_6_toluene.mxd EI 08/03/2007 4:57 PM

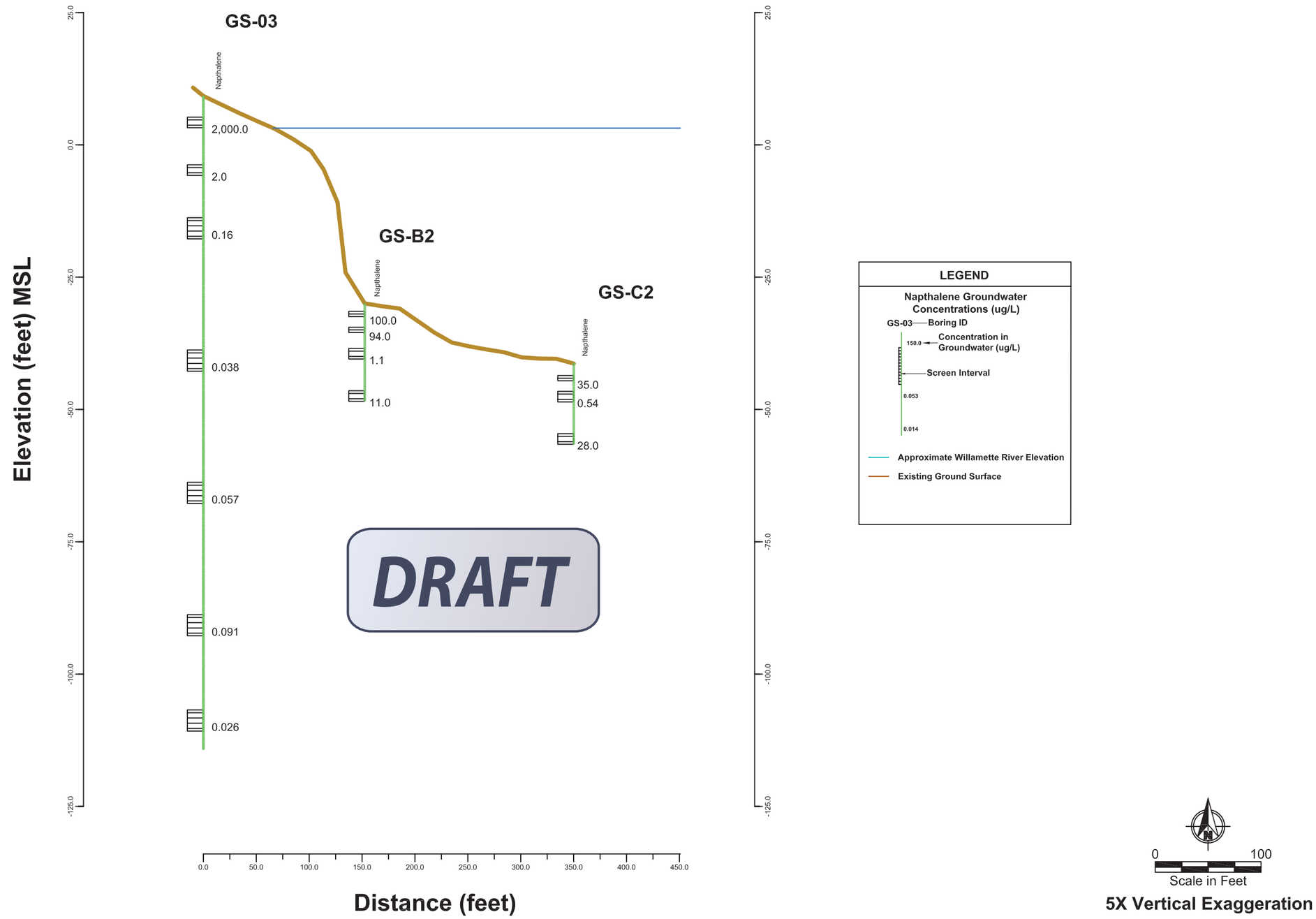


Aug 06, 2007 7:37am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSA.dwg Benzene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 7a
Cross Section A-A' - Benzene
NW Natural - Gasco Site
Portland, Oregon

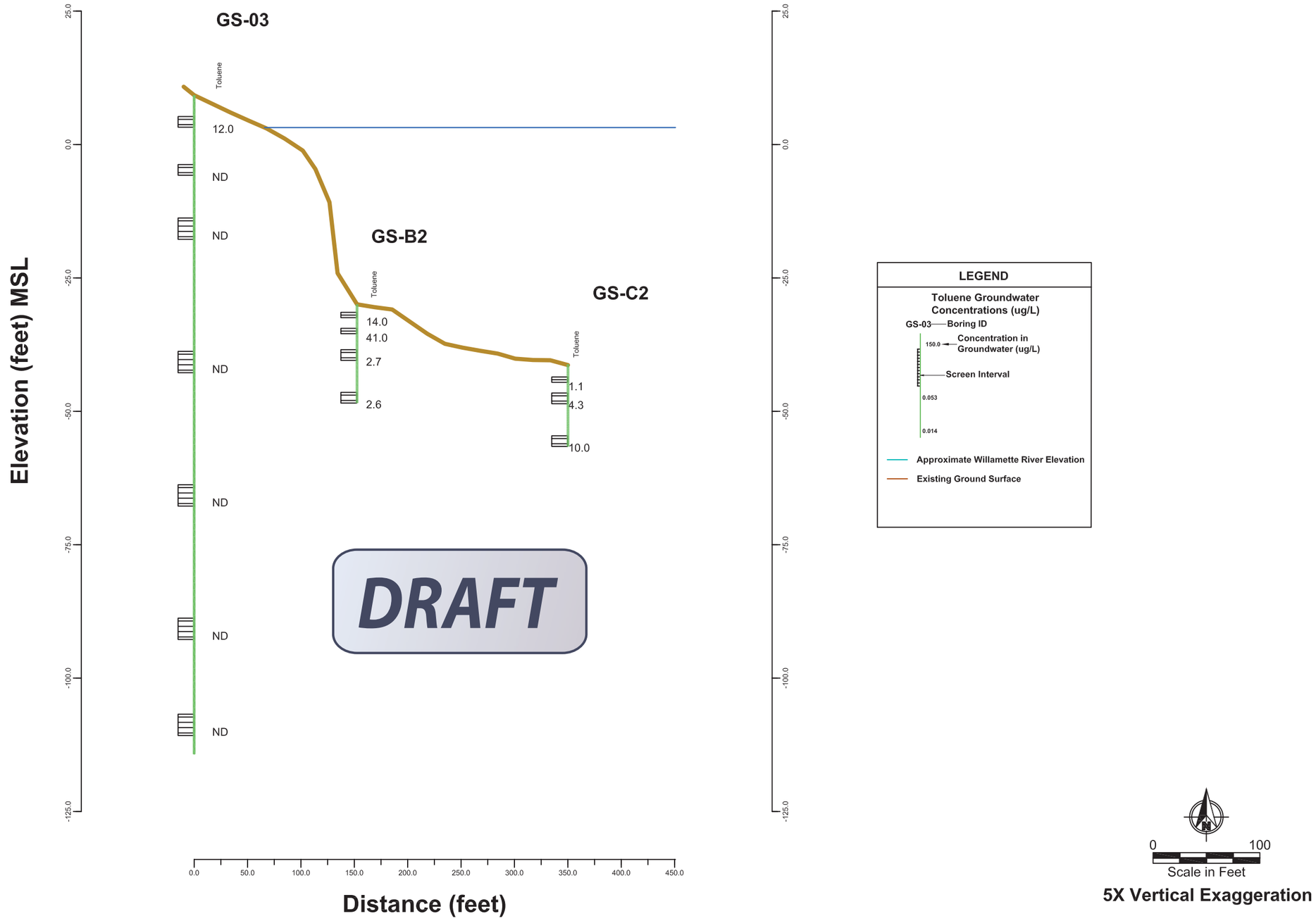


Aug 06, 2007 7:38am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSA.dwg Napthalene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 7b
Cross Section A-A' - Napthalene
NW Natural - Gasco Site
Portland, Oregon

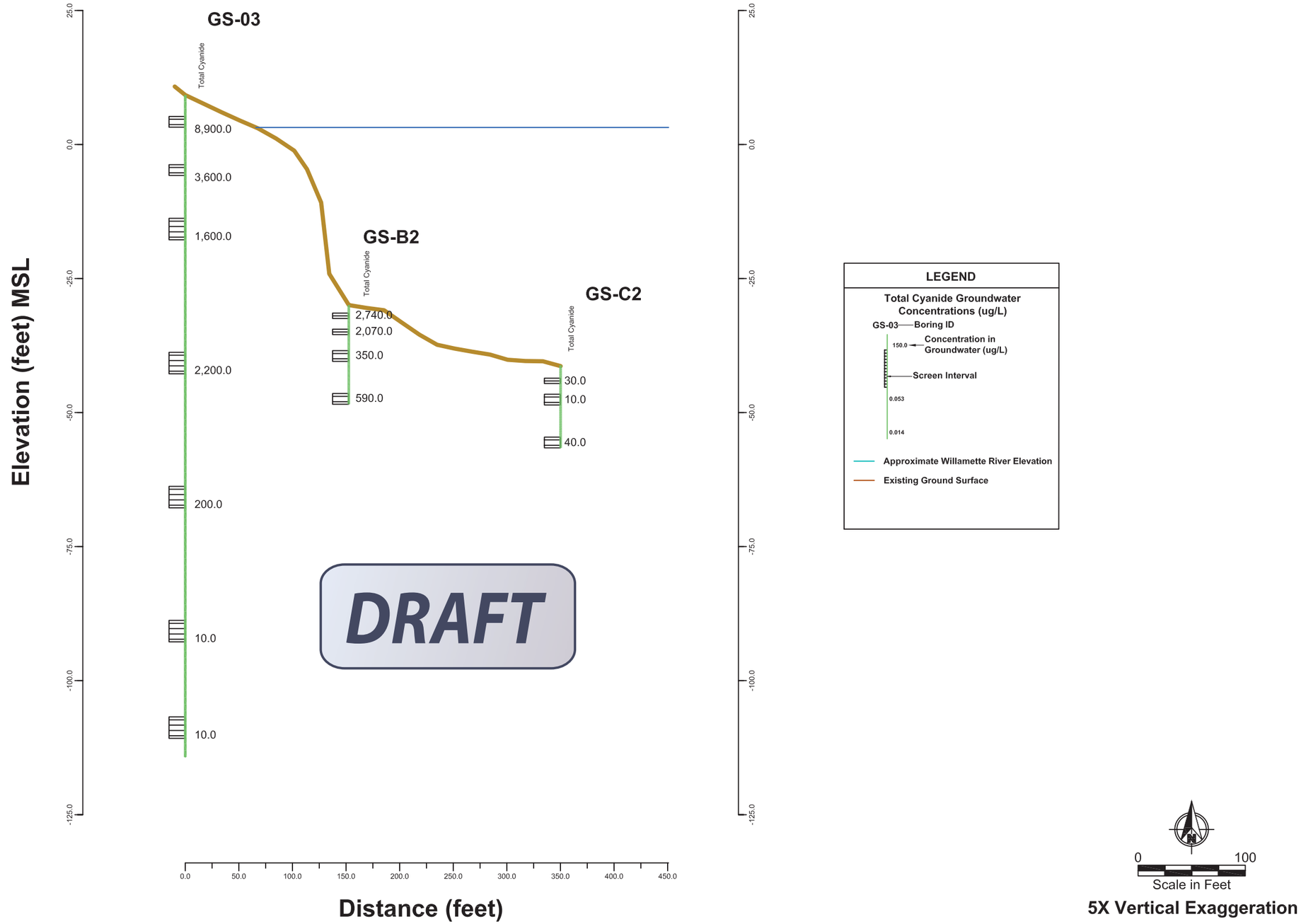


Aug 06, 2007 7:38am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSA.dwg Toluene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 7c
Cross Section A-A' - Toluene
NW Natural - Gasco Site
Portland, Oregon

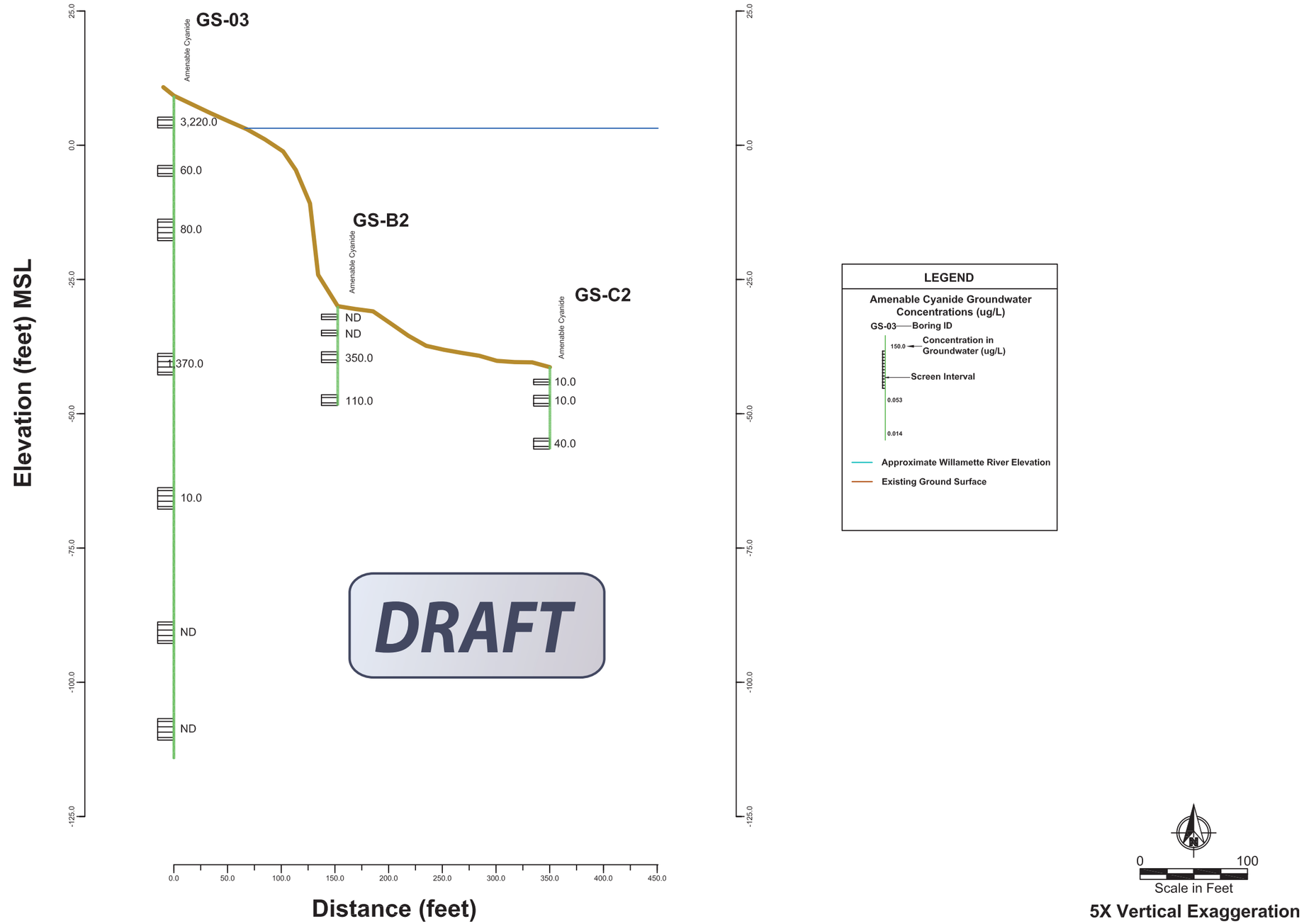


Aug 06, 2007 7:38am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSA.dwg Total Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 7d
Cross Section A-A' - Total Cyanide
NW Natural - Gasco Site
Portland, Oregon

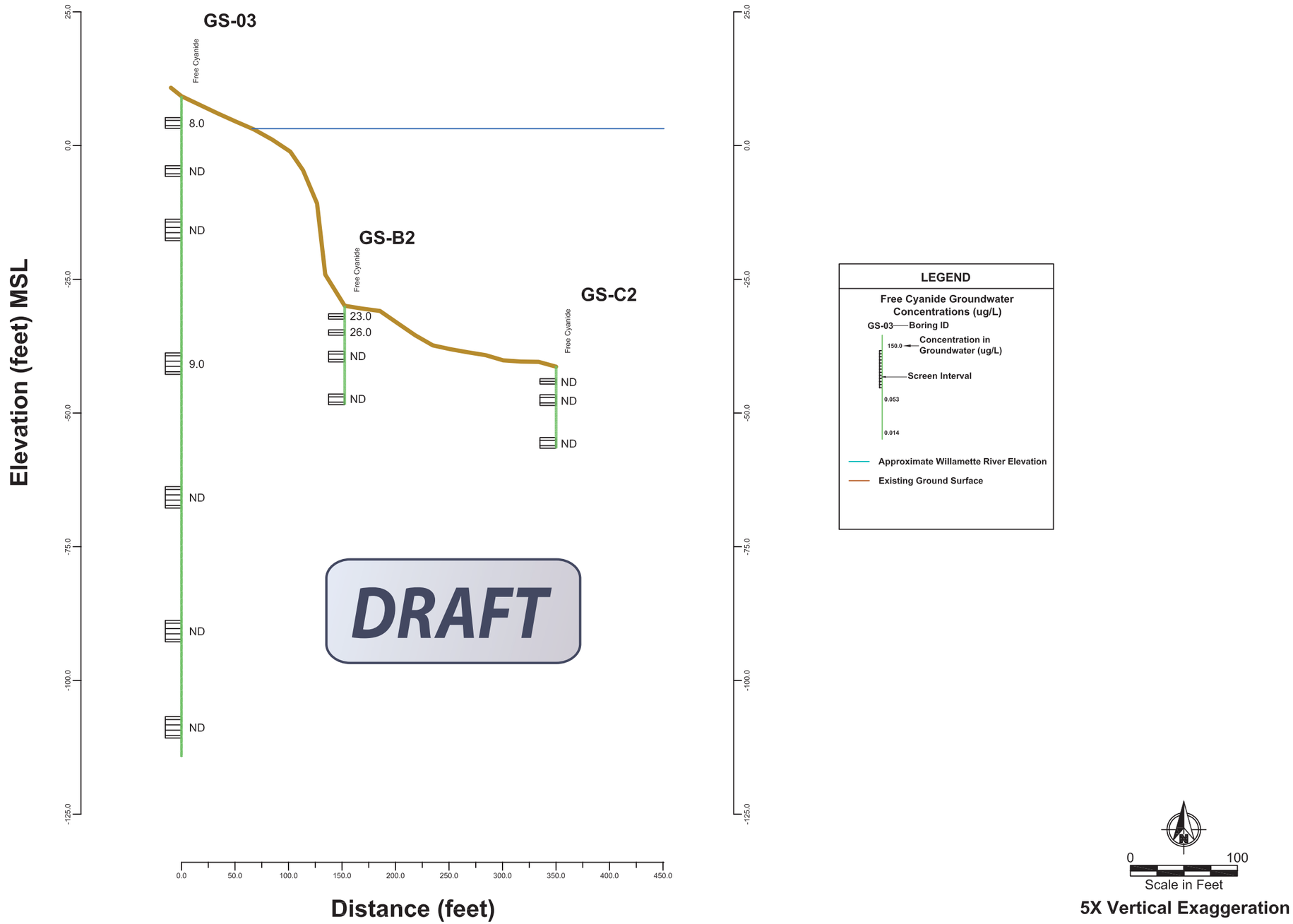


Aug 06, 2007 7:39am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSA.dwg Amenable Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 7e
Cross Section A-A' - Amenable Cyanide
NW Natural - Gasco Site
Portland, Oregon

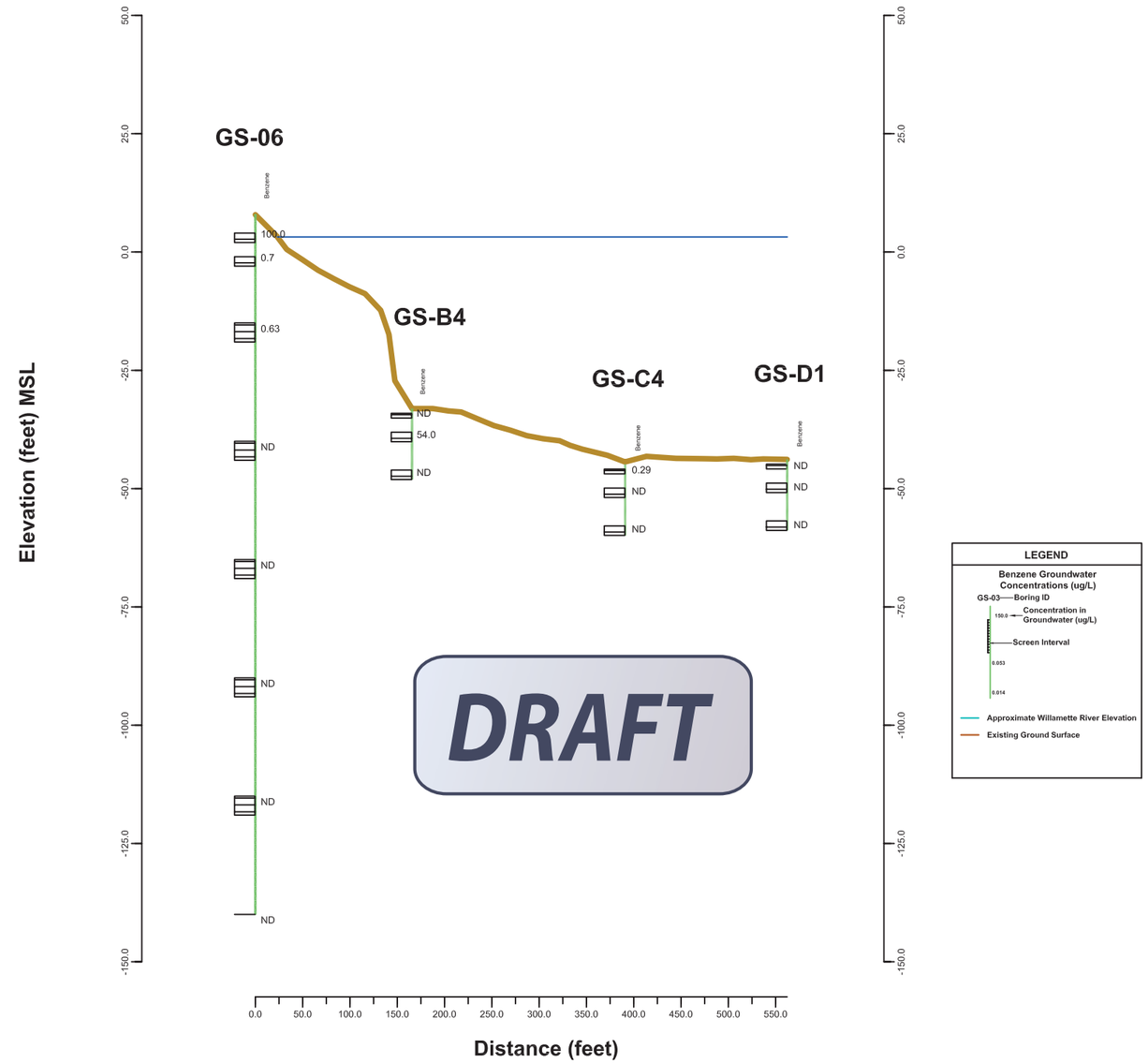


Aug 06, 2007 7:39am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSA.dwg Free Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 7f
Cross Section A-A' - Free Cyanide
NW Natural - Gasco Site
Portland, Oregon



0 150
Scale in Feet

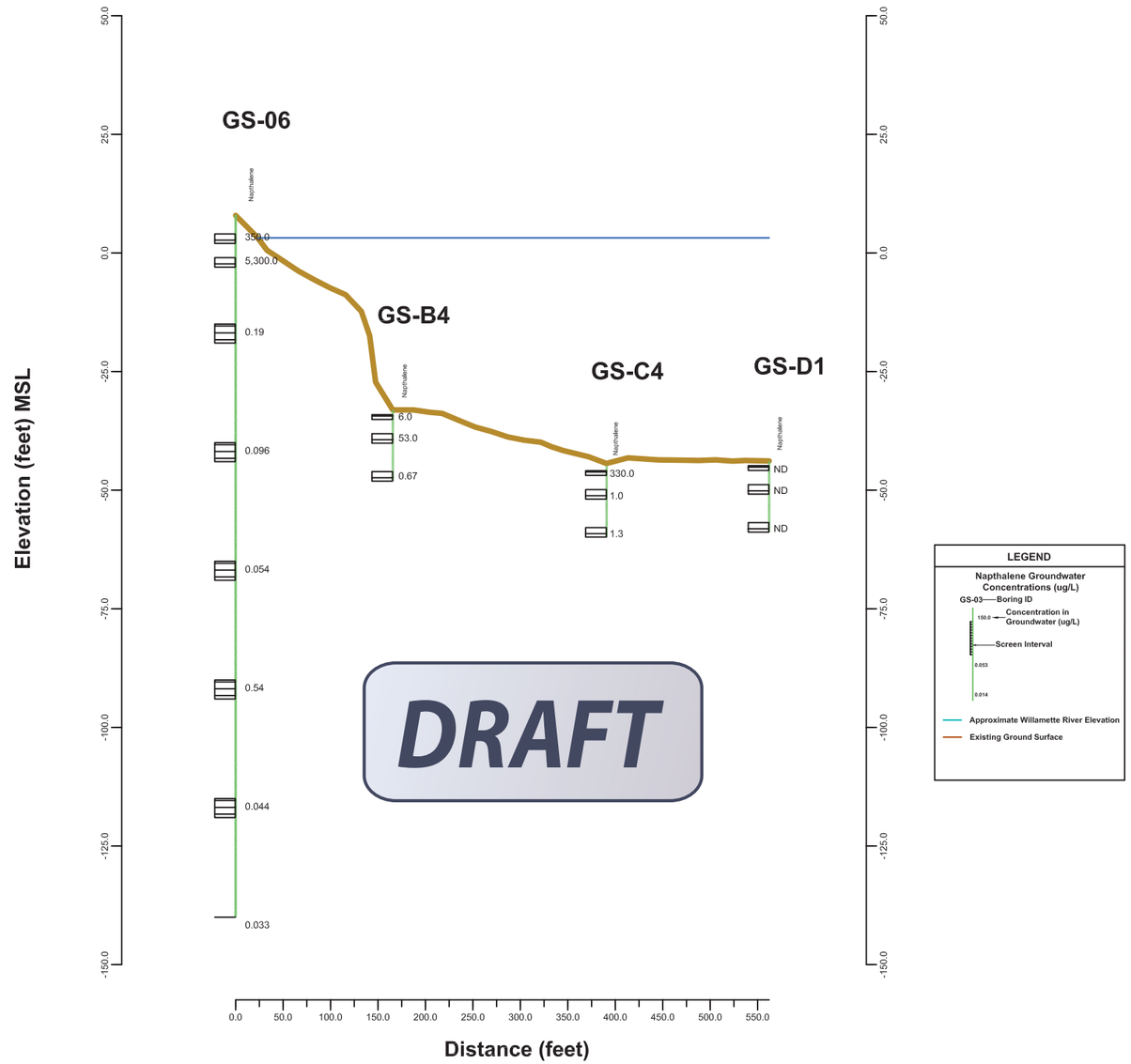
5X Vertical Exaggeration

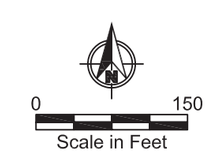
Aug 06, 2007 7:53am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSB.dwg Benzene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 8a
Cross Section B-B' - Benzene
NW Natural - Gasco Site
Portland, Oregon





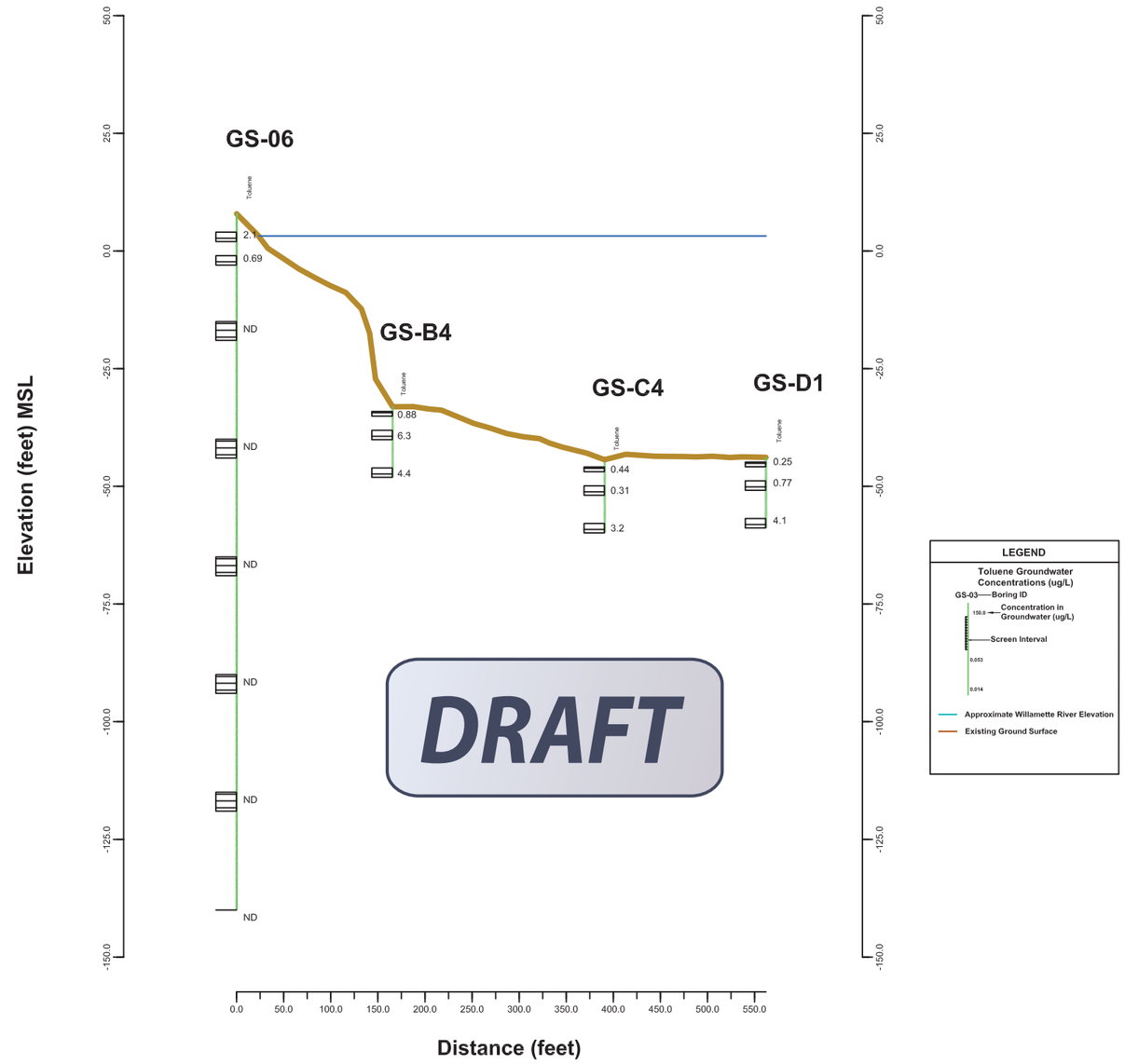
5X Vertical Exaggeration

Aug 06, 2007 7:54am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSB.dwg Napthalene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 8b
Cross Section B-B' - Napthalene
NW Natural - Gasco Site
Portland, Oregon



0 150
Scale in Feet

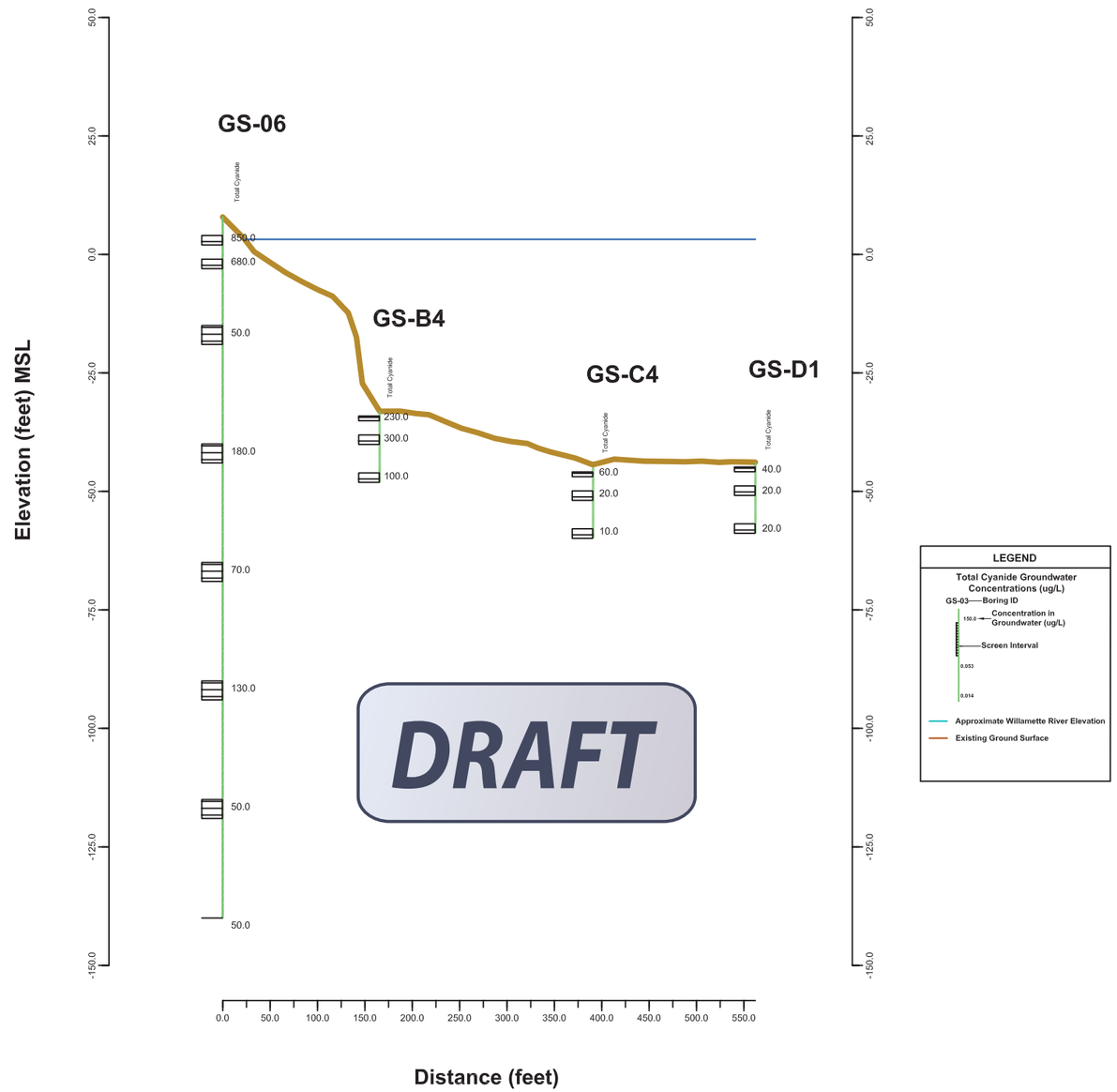
5X Vertical Exaggeration

Aug 06, 2007 7:54am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSB.dwg Toluene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 8c
Cross Section B-B' - Toluene
NW Natural - Gasco Site
Portland, Oregon



0 150
Scale in Feet

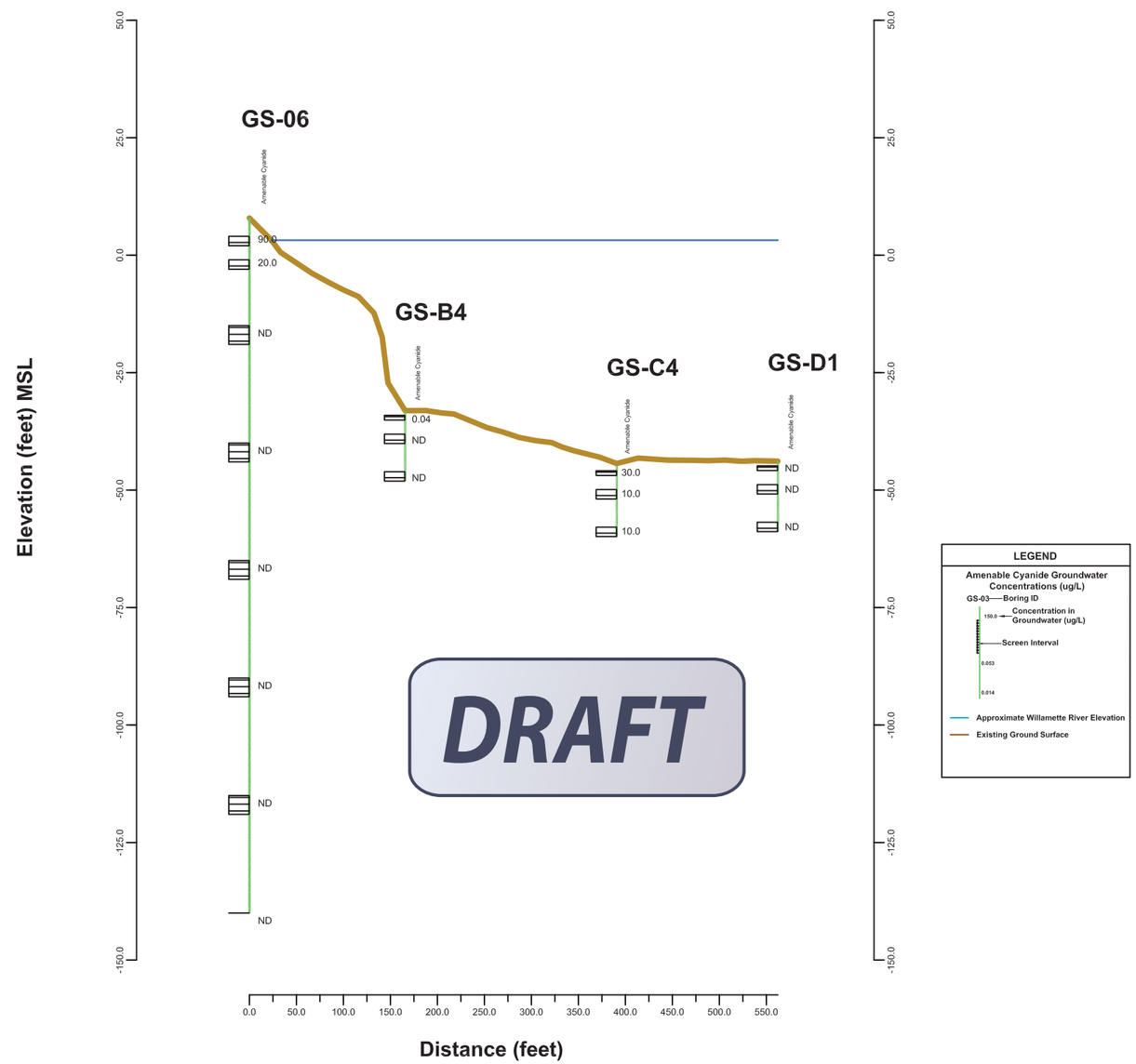
5X Vertical Exaggeration

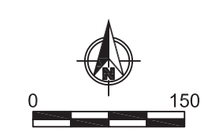
Aug 06, 2007 7:54am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSB.dwg Total Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 8d
Cross Section B-B' - Total Cyanide
NW Natural - Gasco Site
Portland, Oregon





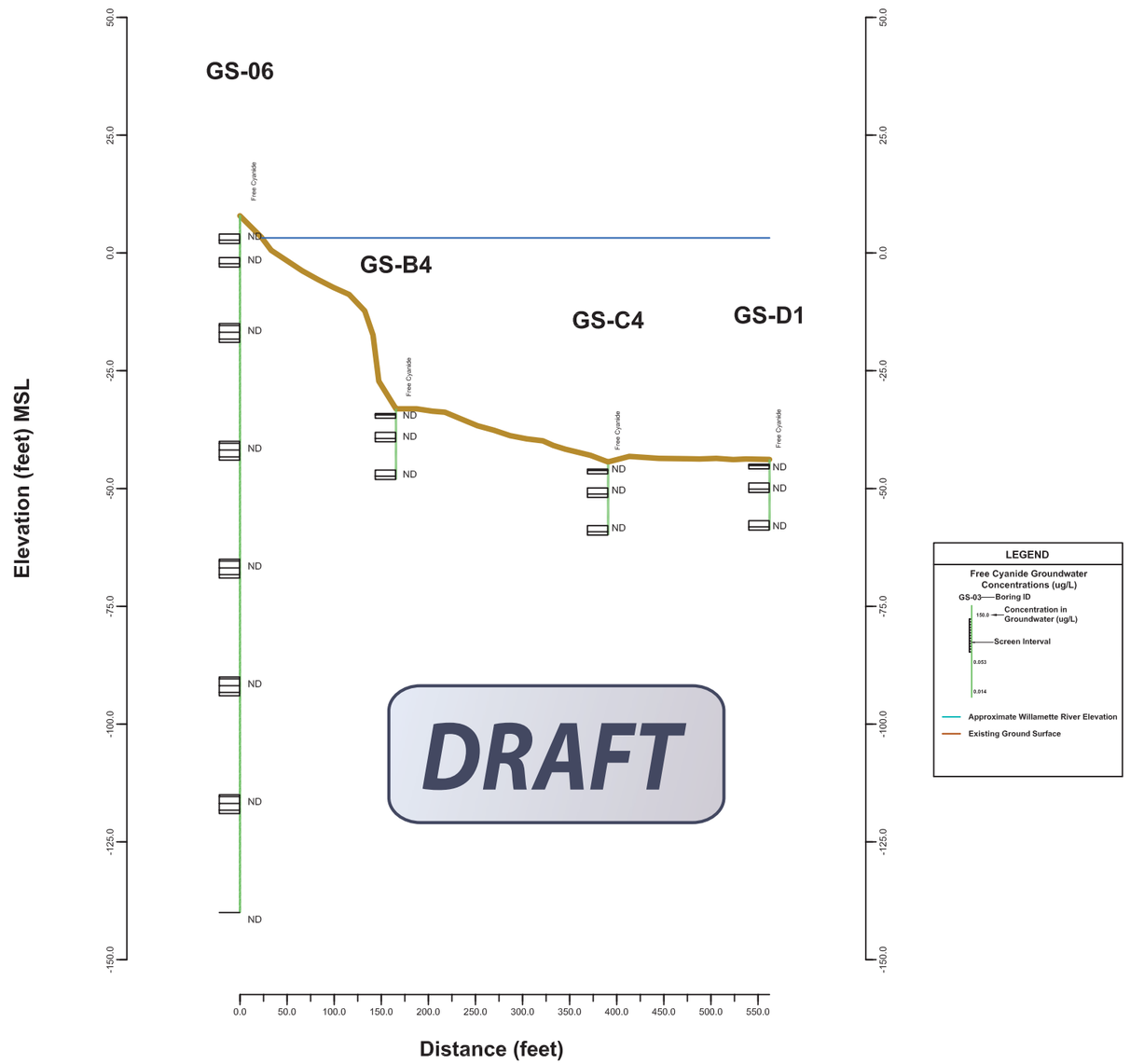
5X Vertical Exaggeration

Aug 06, 2007 7:55am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSB.dwg Amenable Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 8e
Cross Section B-B' - Amenable Cyanide
NW Natural - Gasco Site
Portland, Oregon



0 150
Scale in Feet

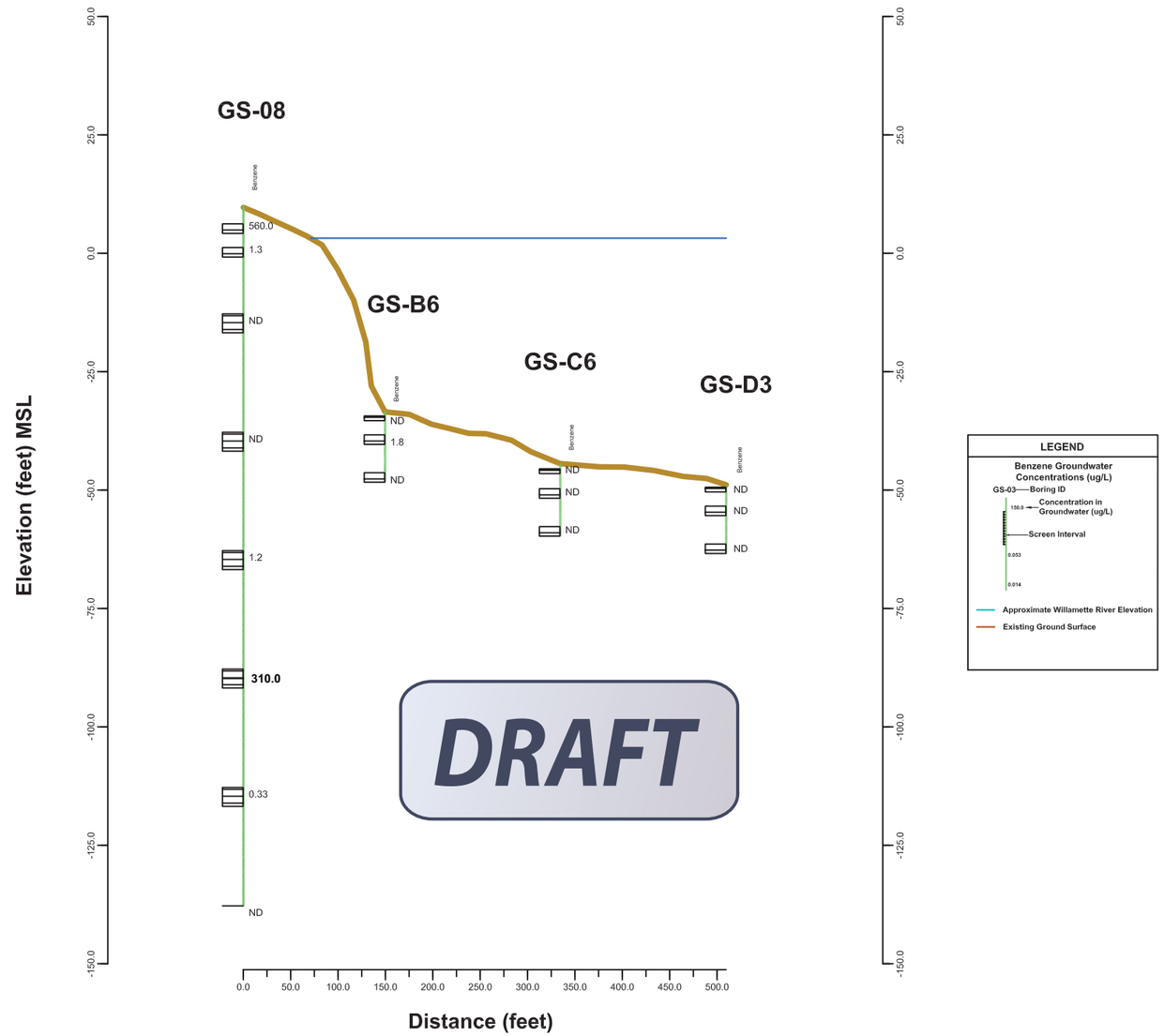
5X Vertical Exaggeration

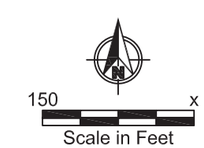
Aug 06, 2007 7:55am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSB.dwg Free Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 8f
Cross Section B-B' - Free Cyanide
NW Natural - Gasco Site
Portland, Oregon





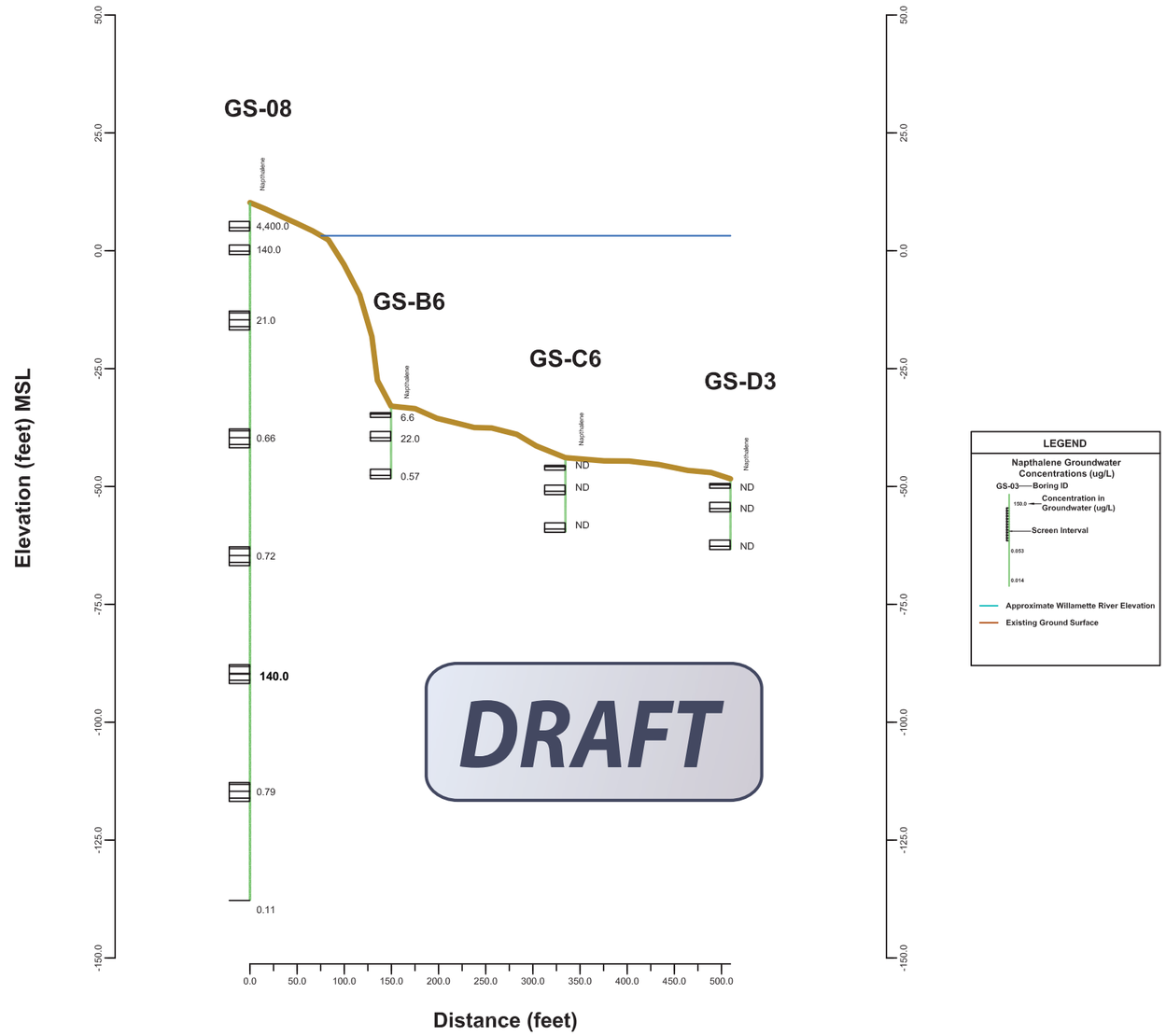
5X Vertical Exaggeration

Aug 06, 2007 8:31am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSC.dwg Benzene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 9a
Cross Section C-C' - Benzene
NW Natural - Gasco Site
Portland, Oregon



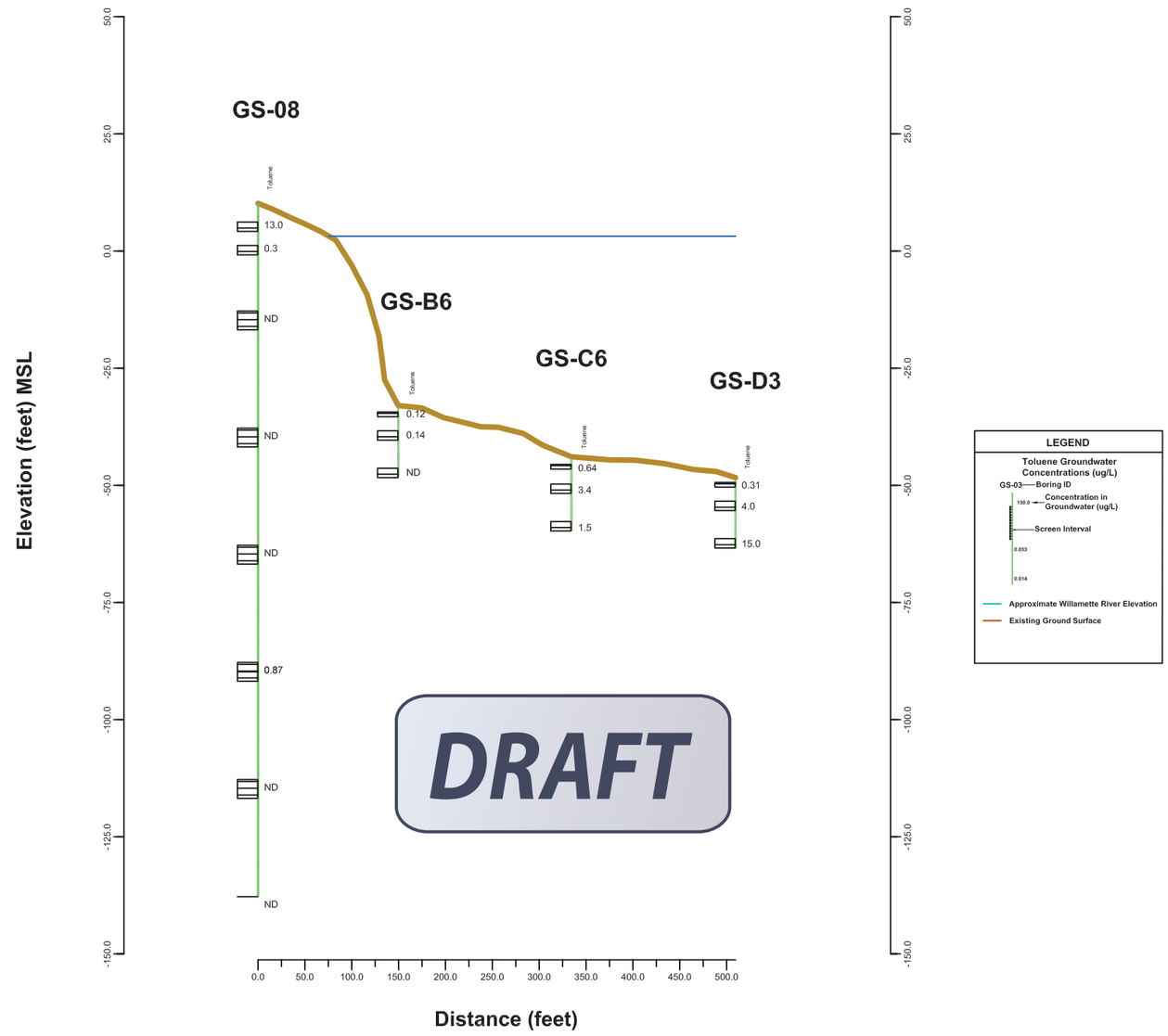
150 x
Scale in Feet
5X Vertical Exaggeration

Aug 06, 2007 8:31am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSC.dwg Napthalene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 9b
Cross Section C-C' - Napthalene
NW Natural - Gasco Site
Portland, Oregon



LEGEND

Toluene Groundwater Concentrations (ug/L)

GS-03 — Boring ID

150.0 — Concentration in Groundwater (ug/L)

Screen Interval

0.053

0.014

Approximate Willamette River Elevation

Existing Ground Surface

150 x

Scale in Feet

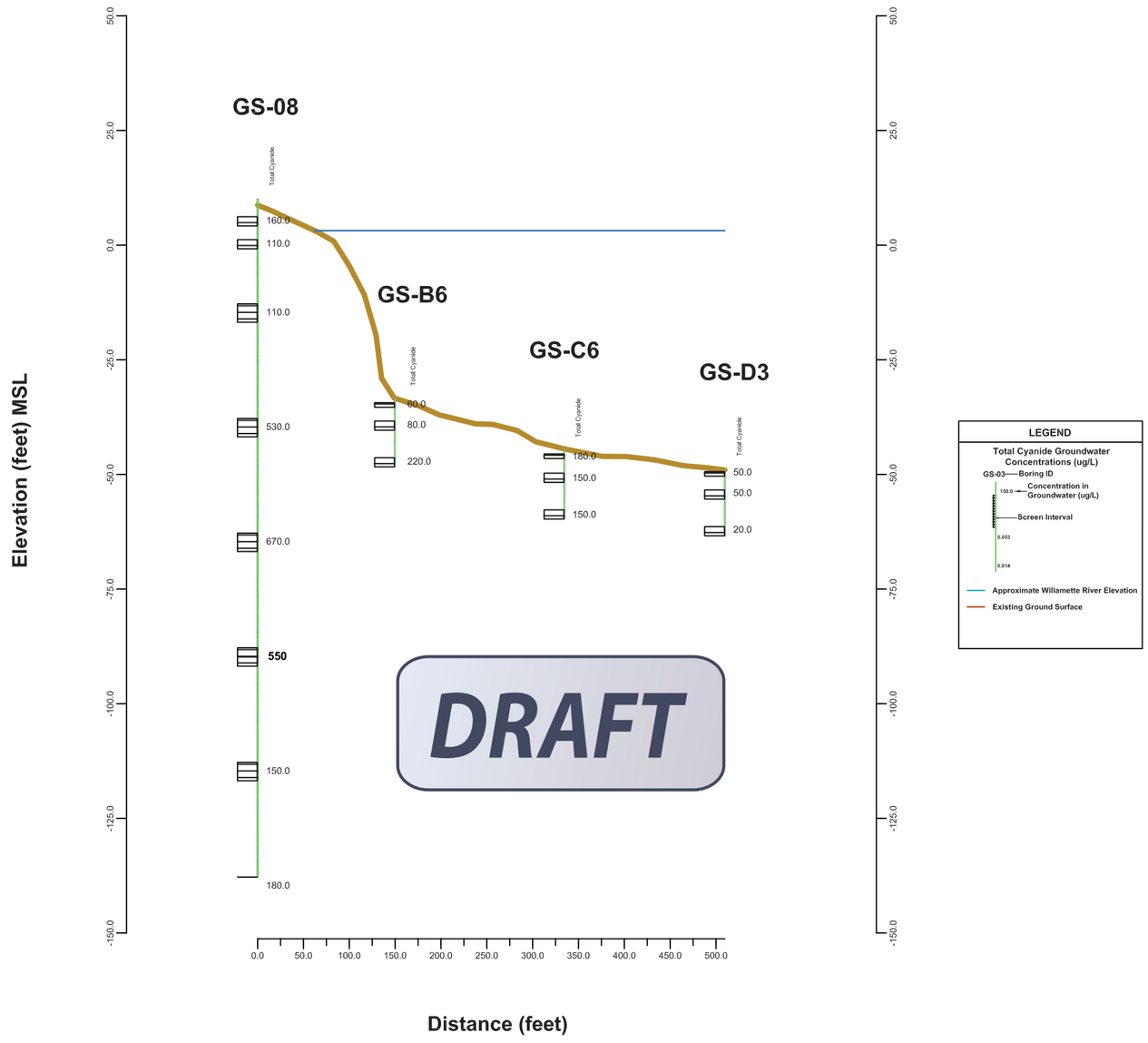
5X Vertical Exaggeration

Aug 06, 2007 8:31am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSC.dwg Toluene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 9c
Cross Section C-C' - Toluene
NW Natural - Gasco Site
Portland, Oregon



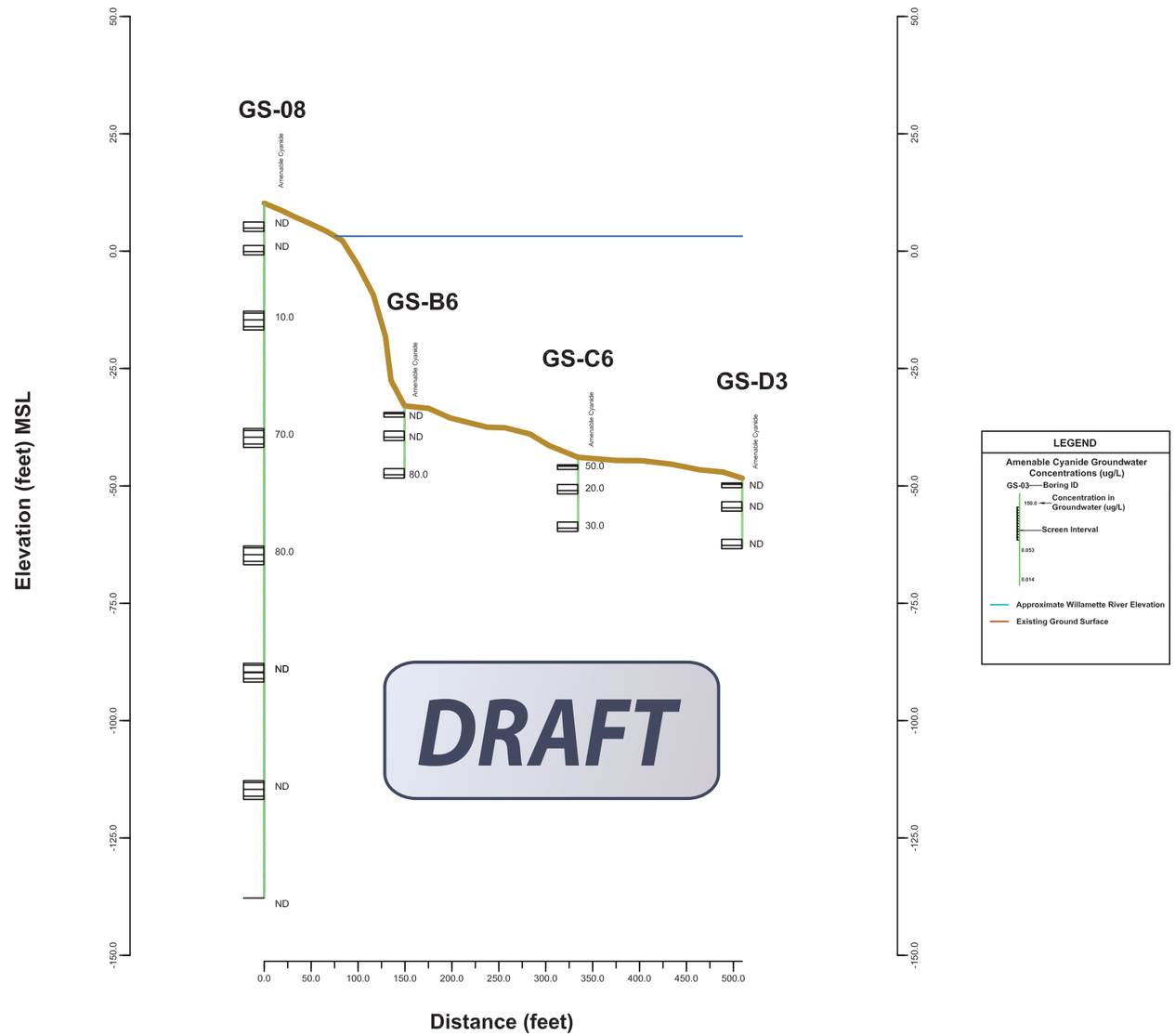
150 x
Scale in Feet
5X Vertical Exaggeration

Aug 06, 2007 8:32am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSC.dwg Total Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 9d
Cross Section C-C' - Total Cyanide
NW Natural - Gasco Site
Portland, Oregon



LEGEND

Amenable Cyanide Groundwater Concentrations (ug/L)

GS-03 — Boring ID

150.0 — Concentration in Groundwater (ug/L)

Screen Interval

0.053

0.014

Approximate Willamette River Elevation

Existing Ground Surface

150 x

Scale in Feet

5X Vertical Exaggeration

Aug 06, 2007 8:32am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSC.dwg Amenable Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

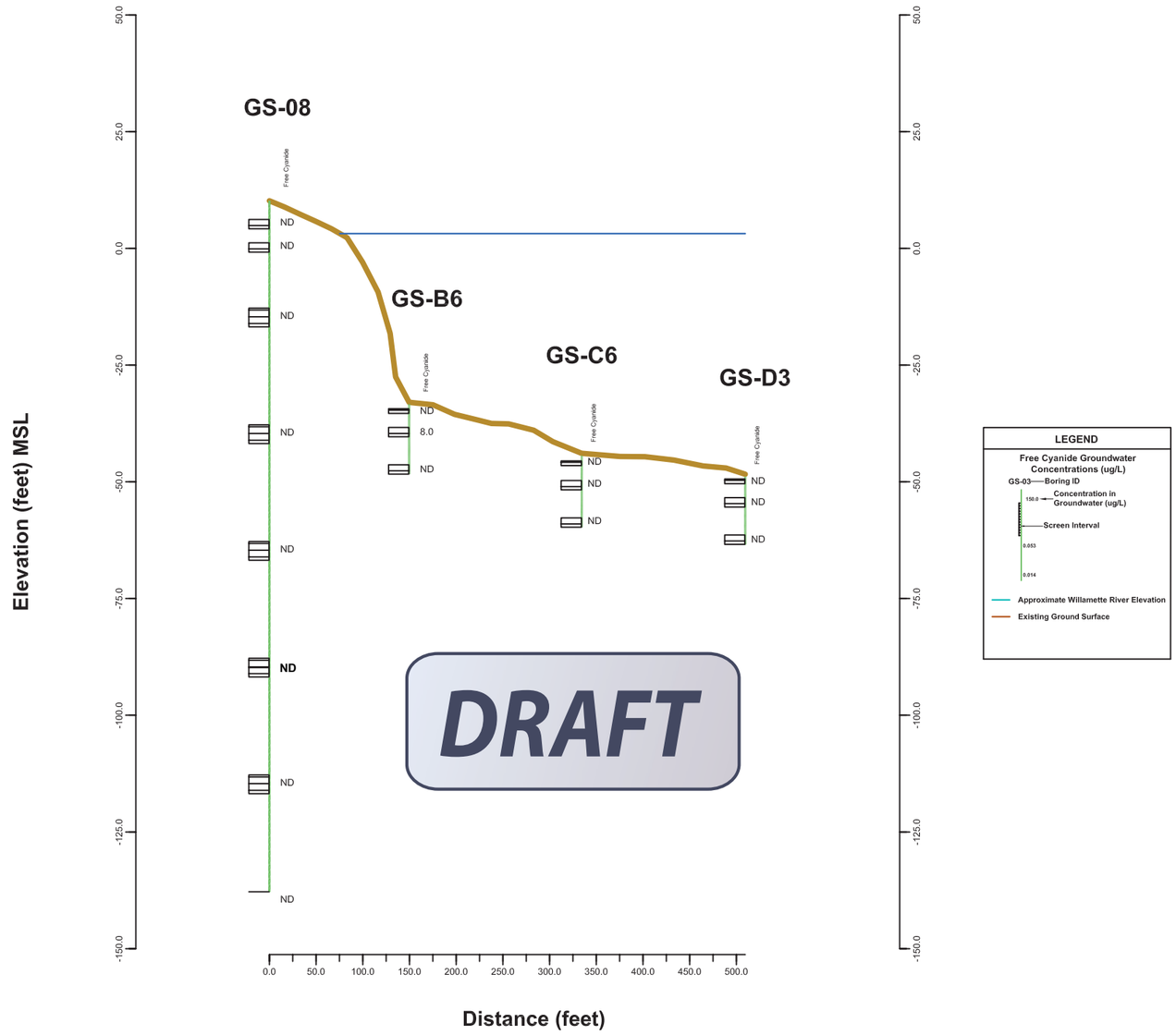
July 2007 Phase 2 Investigation

Figure 9e

Cross Section C-C' - Amenable Cyanide

NW Natural - Gasco Site

Portland, Oregon



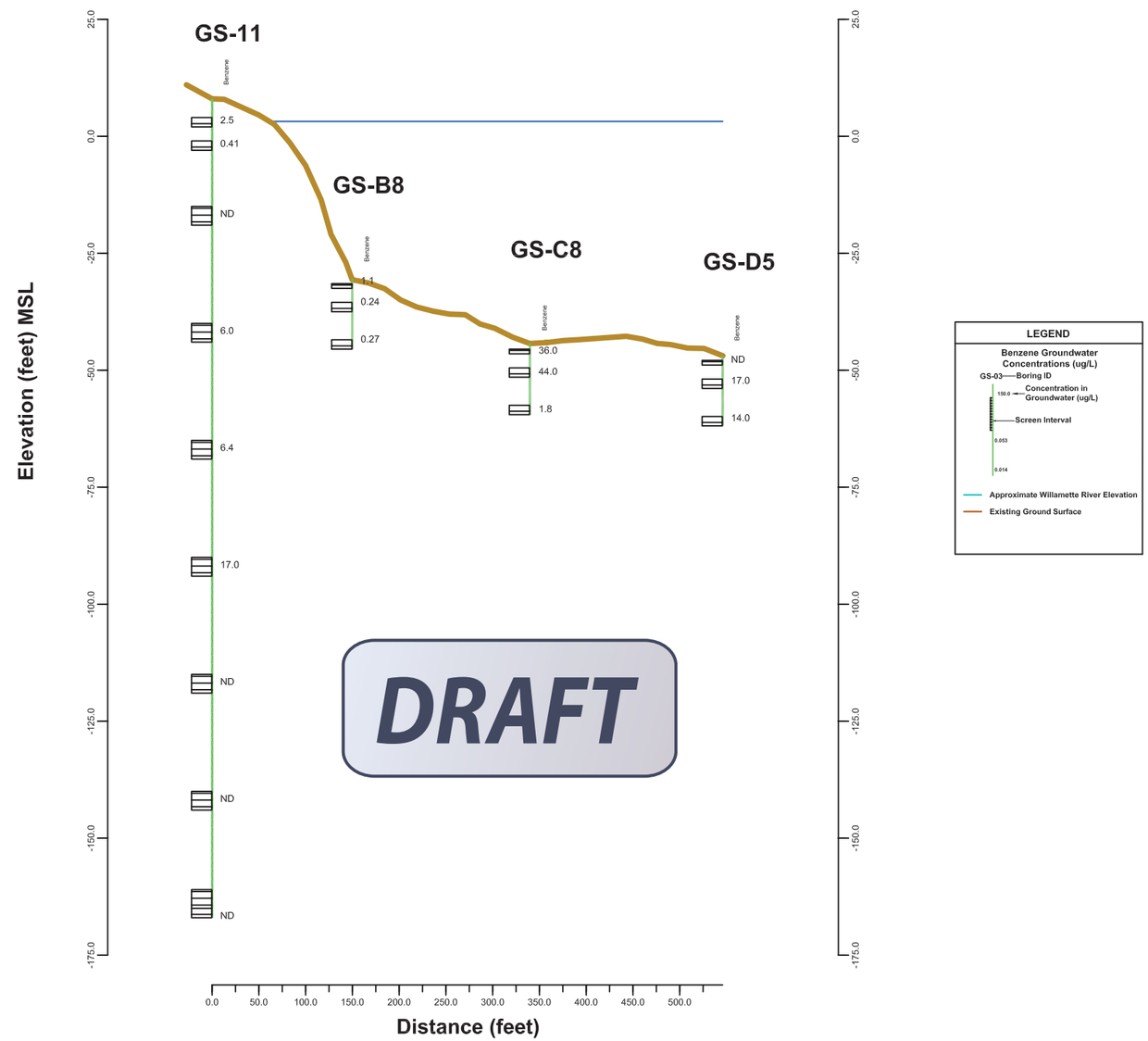
150 x
Scale in Feet
5X Vertical Exaggeration

Aug 06, 2007 8:32am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSC.dwg Free Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 9f
Cross Section C-C' - Free Cyanide
NW Natural - Gasco Site
Portland, Oregon



LEGEND

Benzene Groundwater Concentrations (ug/L)

GS-03 — Boring ID

150.0 — Concentration in Groundwater (ug/L)

Screen Interval

0.053

0.014

Approximate Willamette River Elevation

Existing Ground Surface

0 150

Scale in Feet

5X Vertical Exaggeration

Aug 06, 2007 8:28am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSD.dwg Benzene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

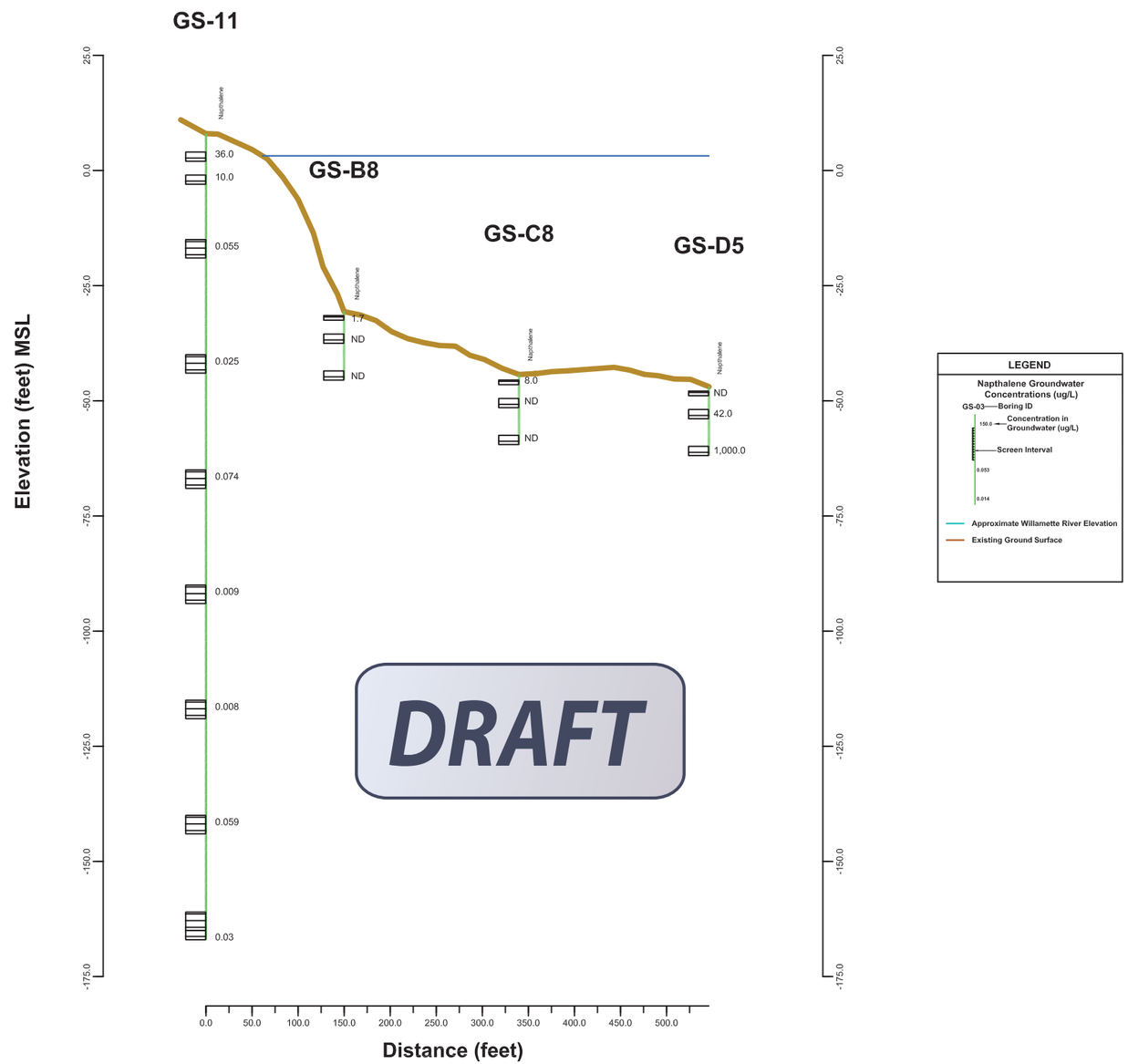
July 2007 Phase 2 Investigation

Figure 10a

Cross Section D-D' - Benzene

NW Natural - Gasco Site

Portland, Oregon

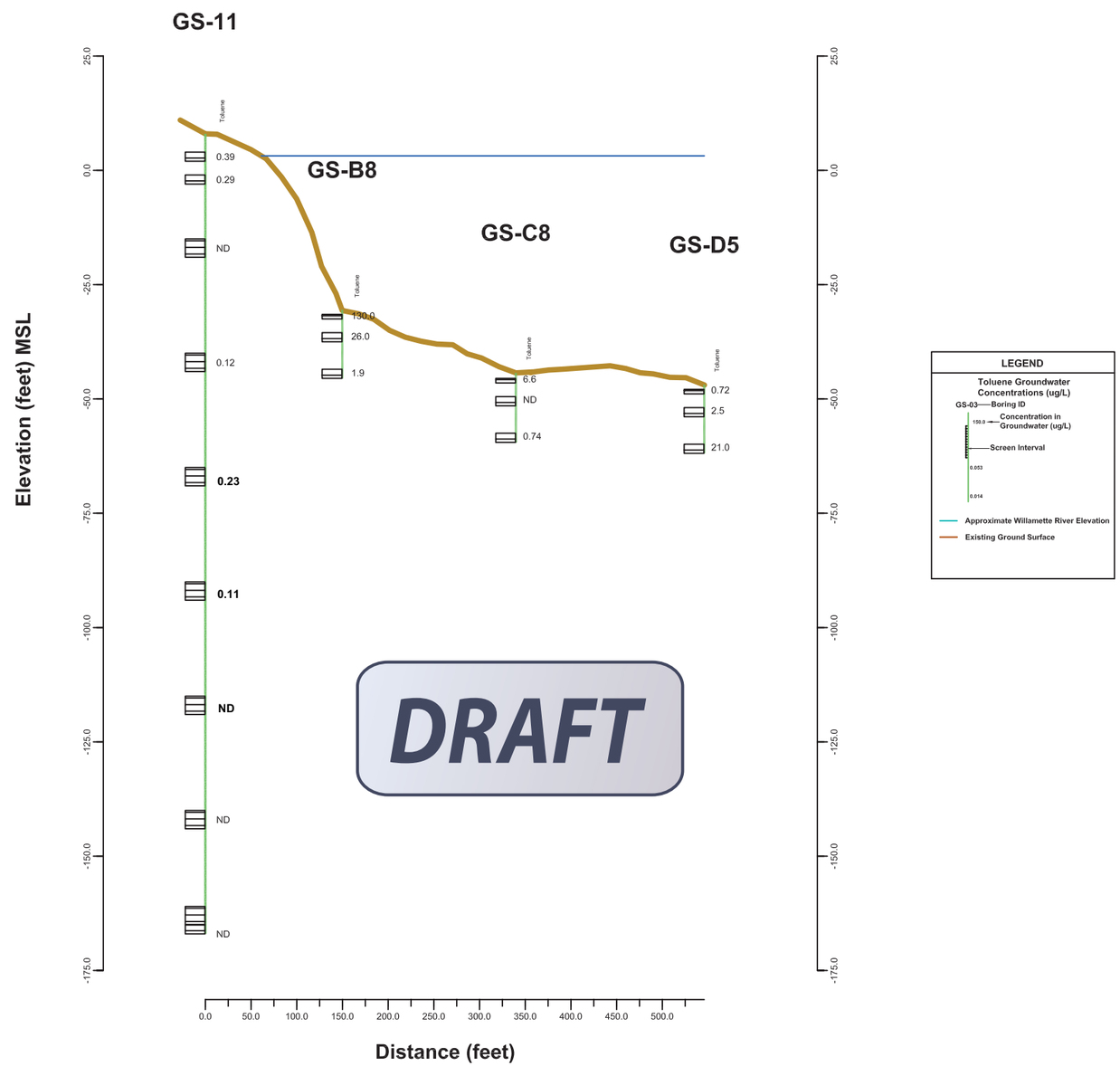


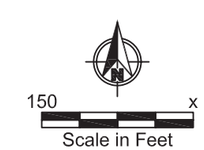
Aug 06, 2007 8:28am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSD.dwg Napthalene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 10b
Cross Section D-D' - Napthalene
NW Natural - Gasco Site
Portland, Oregon





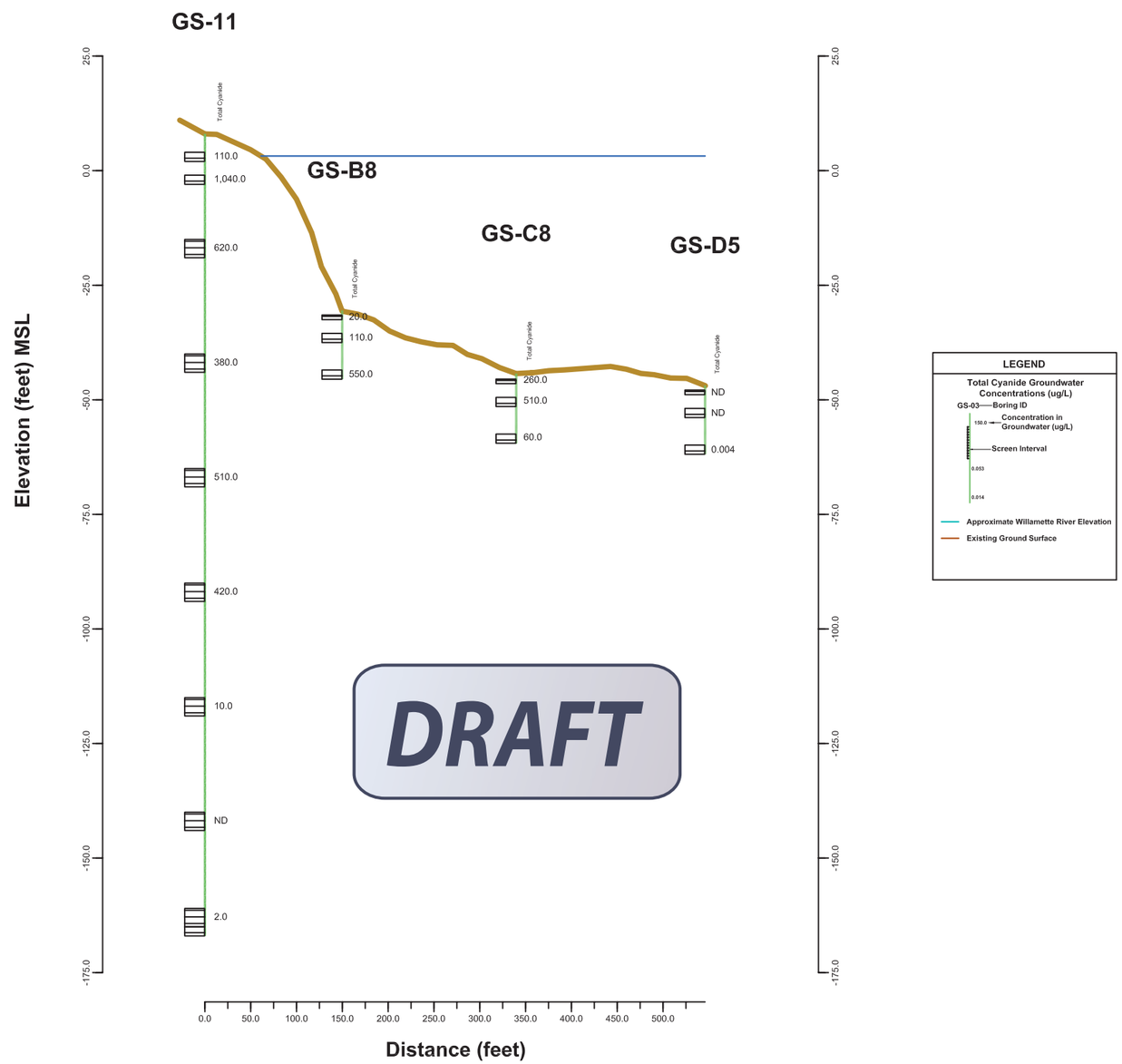
5X Vertical Exaggeration

Aug 06, 2007 8:29am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSD.dwg Toluene

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 10c
Cross Section D-D' - Toluene
NW Natural - Gasco Site
Portland, Oregon



LEGEND

Total Cyanide Groundwater Concentrations (ug/L)

GS-03 — Boring ID

150.0 — Concentration in Groundwater (ug/L)

Screen Interval

0.053

0.014

Approximate Willamette River Elevation

Existing Ground Surface

0 150

Scale in Feet

5X Vertical Exaggeration

Aug 06, 2007 8:29am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSD.dwg Total Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

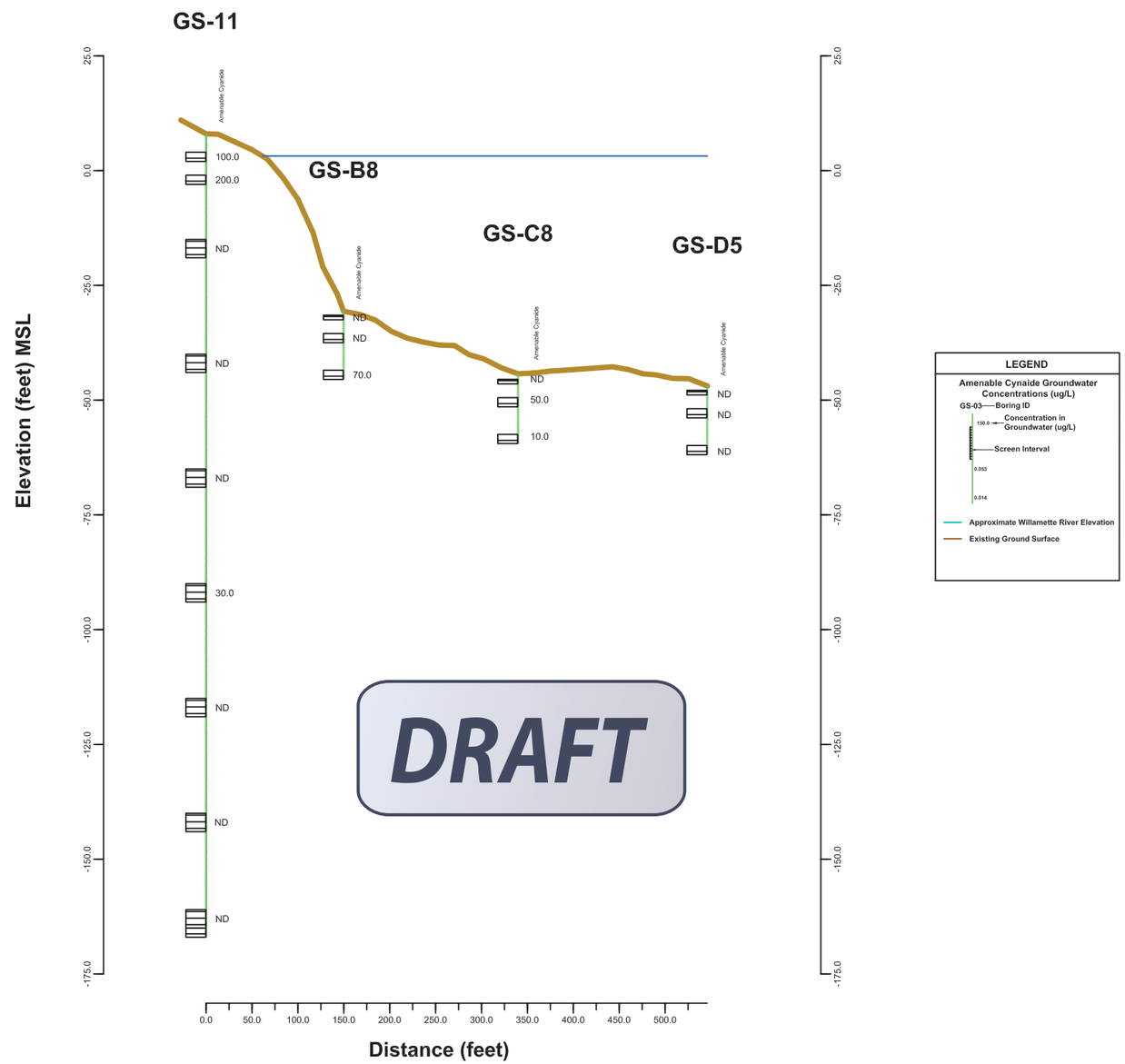
July 2007 Phase 2 Investigation

Figure 10d

Cross Section D-D' - Total Cyanide

NW Natural - Gasco Site

Portland, Oregon



LEGEND

Amenable Cynaide Groundwater Concentrations (ug/L)

GS-03 — Boring ID

150.0 — Concentration in Groundwater (ug/L)

Screen Interval

0.053

0.014

Approximate Willamette River Elevation

Existing Ground Surface

0 150

Scale in Feet

5X Vertical Exaggeration

Aug 06, 2007 8:29am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSD.dwg Amenable Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE

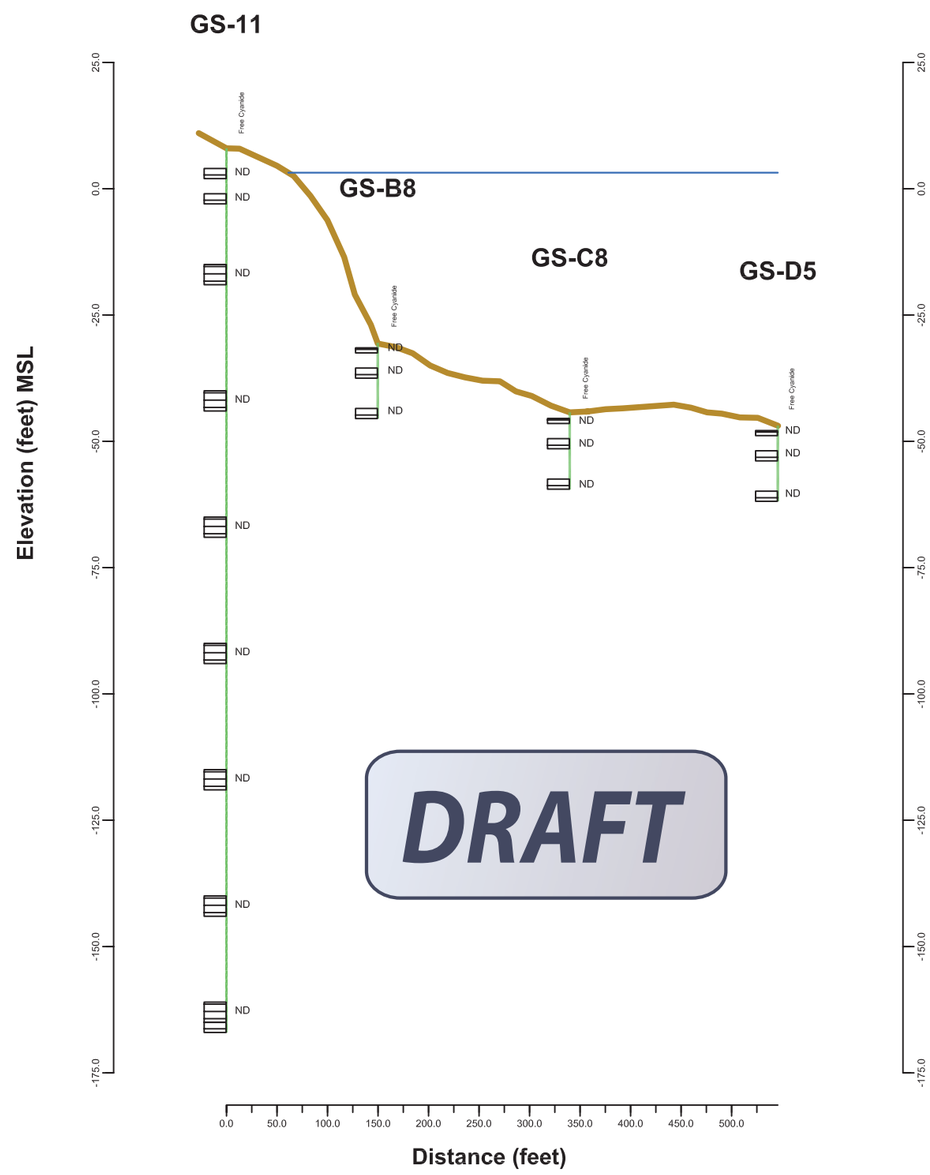
July 2007 Phase 2 Investigation

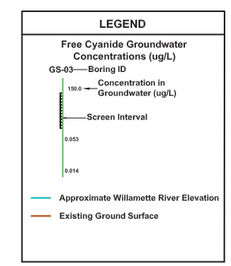
Figure 10e

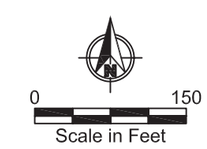
Cross Section D-D' - Amenable Cyanide

NW Natural - Gasco Site

Portland, Oregon







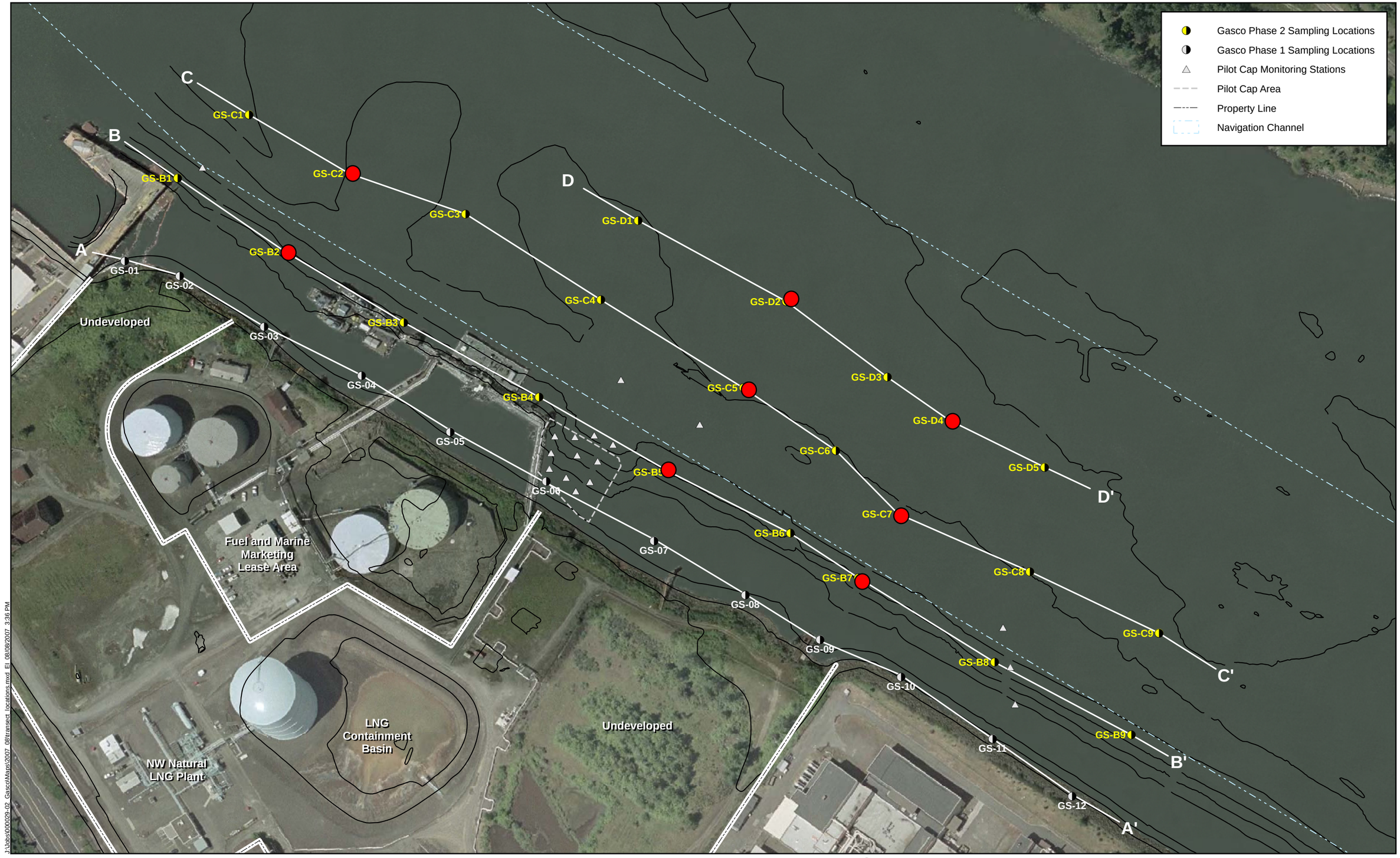
5X Vertical Exaggeration

Aug 06, 2007 8:30am jpelc C:\Documents and Settings\jpelc\My Documents\Gasco\Phase2\XSD.dwg Free Cyanide

ANCHOR ENVIRONMENTAL, L.L.C.

DRAFT UNVALIDATED DATA - SUBJECT TO CHANGE
July 2007 Phase 2 Investigation

Figure 10f
Cross Section D-D' - Free Cyanide
NW Natural - Gasco Site
Portland, Oregon



ANCHOR ENVIRONMENTAL, L.L.C.

0 175
Scale in Feet
1 inch equals 175 feet

Proposed Phase 2 Step 2 Boring locations

Figure 11
Proposed Phase 2 Step 2 Boring locations
NW Natural - Gasco Site
Portland, Oregon

ATTACHMENT A

Table 7
Gasco Siltronic Phase 2 Field Sampling Plan Locations, Number of Samples, Depths, and Intervals

Step 1 Reconnaisance Groundwater/Pore Water Sampling			
Site ID	Target Coordinates (NAD 83)		Estimated number of Samples
	Latitude	Longitude	1-2 ft, 5-7 ft, and 13-15 ft
1			3
2			3
3			3
4			3
5			3
6			3
7			3
8			3
9			3
10			3
11			3
12			3
13			3
14			3
15			3
16			3
17			3
18			3
19			3
20			3
21			3
22			3
23			3
# Characterization Samples Analyzed			**69**
5% Field Splits			3
Field Blanks			1
Rinsate Blanks			1
Trip Blanks			1 per container
Estimated Number of Step 1 Samples (not including QC)			**72**

Step 2			Number of Deep Groundwater Samples	Number of Sediment Profile Samples
Site ID	Target Coordinates (NAD 83)		Estimated number of Samples	Estimated number of Samples
	Latitude	Longitude	25 ft, 50 ft, 100 ft, 125 ft, 150 ft, 175 ft	1-2 ft, 5-7 ft, and 8-10 ft
1			6	3
2			6	3
3			6	3
4			6	3
5			6	3
6			6	3
7			6	3
8			6	3
# Characterization Samples Analyzed			**48**	**24**
5% Field Splits			2	
Field Blanks			1	
Rinsate Blanks			1	
Trip Blanks			1 per container	
Estimated Number of Step 2 Samples (not including QC)				**74**

Notes:
1. Sampling stations and depths are proposed and may be revised based on conditions encountered in
2. 175' is the assumed depth to bedrock. Borings will extend until sample refusal occurs.

Table 8
Parameter List, Containers, and Guidelines for Sample Handling and Storage

Parameter	Container Size and Type	Holding Time	Preservative
Reconnaissance Groundwater, Pore Water, and Deep Groundwater Sampling			
Step 1 and Step 2			
VOCs	two 40 ml VOA vials	14 days	HCL ph<2, Cool/4°C
Free Cyanide	500 ml HDPE*	48 hours	NaOH pH>12
Total Cyanide	500 ml HDPE*	14 days	NaOH pH>12
Amenable Cyanide	500 ml HDPE*	14 days	NaOH pH>12
Total PAHs	1 Liter Amber Glass*	7 days until extraction 40 days after extraction	Cool/4°C
Ammonia	250 ml HDPE*	28 days	H2SO4 ph<2, Cool/4°C
Total Metals	250 ml HDPE*	6 months except Hg (28 days)	HNO3, ph<2
Dissolved Metals (field filtered)	250 ml HDPE*	6 months except Hg (28 days)	HNO3, ph<2
Sediment Profiling			
Moisture Content	16-oz WM HDPE (Moisture, Atterberg, Spec Gravity combined)	na	Sealed Jar
Grain Size (with hydrometer)	16-oz WM HDPE	na	na
Total Organic Carbon (%)	4-oz Glass	28 days	na
VOCs	40 mL VOC Vials and Easy Draw Sampler	14 days	Sodium Bisulfite or Methanol Cool/4° C
PAHs	8-oz Glass	14 days until extraction	Cool/4° C
		1 year until extraction 40 days after extraction	Freeze
Total Cyanide	8-oz Glass (CN, NH4, Metals combined)	14 days	Cool/4° C
Total Metals		6 months except Hg (28 days)	Cool/4° C
Ammonia as Nitrogen	8-oz Glass (CN, NH4, Metals combined)	7 days	Cool/4°C
Sulfides	2- oz Glass	7 days	Zn acetate, Cool/4° C

Note:

* See Table 9 for exact volume requirements. The smallest possible container meeting these material requirements will be supplied by the laboratory.

Table 9a
Sediment Profiling
Chemical Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Mass needed (g)
Conventionals			**mg/kg**	**mg/kg**	
Moisture Content	---	ASTM D-2216	---	---	**10**
Grain Size with hydrometer	---	ASTM D-421/422	---	---	**300**
Sulfides	Method	9030M	0.5	0.08	**10**
Ammonia as Nitrogen	350.1M	Plumb	0.5	0.2	**20**
Total Organic Carbon (%)	Method	PSEP	0.05	0.02	**5**
Chemical					
VOCs	**5030A**	**8260B**	**ug/kg**	**ug/kg**	**20**
Acetone	---	---	10	1.6	---
Acrolein	---	---	2.5	0.51	---
Acrylonitrile	---	---	2	0.23	---
Benzene	---	---	1	0.039	---
Bromochloromethane	---	---	1	0.06	---
Bromodichloromethane	---	---	1	0.068	---
Bromoform	---	---	1	0.046	---
Bromoethane	---	---	1	0.072	---
Bromomethane	---	---	1	0.37	---
2-Butanone	---	---	4	1.1	---
Carbon Disulfide	---	---	1	0.13	---
Carbon Tetrachloride	---	---	1	0.099	---
Chlorbenzene	---	---	1	0.07	---
Chlorodibromomethane	---	---	1	0.068	---
Chlorethane	---	---	1	0.28	---
2-Chloroethyl Vinyl Ether	---	---	2	0.15	---
Chloroform	---	---	1	0.056	---
Chloromethane	---	---	1	0.19	---
trans-1,4-Dichloro-2-butene	---	---	2	0.51	---
Dibromomethane	---	---	1	0.082	---
1,4-Dichlorobenzene	---	---	1	0.12	---
1,1-Dichloroethane	---	---	1	0.057	---
1,2-Dichloroethane	---	---	1	0.031	---
1,1-Dichloroethene	---	---	1	0.082	---
trans-1,2-Dichloroethene	---	---	1	0.19	---
1,2-Dichloropropane	---	---	1	0.035	---
cis-1,3-Dichloropropene	---	---	1	0.031	---
trans-1,3-Dichloropropene	---	---	1	0.044	---
Dichlorodifluoromethane	---	---	1	0.11	---
Ethylbenzene	---	---	1	0.071	---
2-Hexanone	---	---	2	0.64	---
Idomethane	---	---	2	0.67	---
Isopropylbenzene	---	---	1	0.044	---
4-Methyl-2-Pentanone	---	---	2	0.24	---
Methylene chloride	---	---	5	0.29	---
Methyl tert-butyl ether	---	---	1	0.039	---
Napthalene	---	---	1	0.35	---
Styrene	---	---	1	0.074	---
1,1,1,2-Tetrachloroethane	---	---	1	0.031	---
1,1,2,2-Tetrachloroethane	---	---	1	0.096	---
Tetrachloroethene	---	---	1	0.096	---
Toluene	---	---	1	0.15	---
1,1,1-Trichloroethane	---	---	1	0.059	---
1,1,2-Trichloroethane	---	---	1	0.059	---
Trichloroethene	---	---	1	0.062	---
Trichlorofluoromethane	---	---	1	0.081	---
1,2,3-Trichloropropane	---	---	1	0.11	---

Table 9a
Sediment Profiling
Chemical Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Mass needed (g)
Vinyl Acetate	---	---	1	0.36	---
Vinyle Chloride	---	---	1	0.085	---
m,p-Xylene	---	---	1	0.13	---
o-Xylene	---	---	1	0.075	---
Hexachlorobutadiene	---	---	2	0.17	---
1,2-Dibromoethane (EDB)	---	---	1	0.051	---
PAHs	**EPA 3541**	**EPA 8270C-SIM**	**ug/Kg**	**ug/Kg**	**50**
Acenaphthene	---	---	5	0.16	---
Acenaphthylene	---	---	5	0.22	---
Anthracene	---	---	5	0.22	---
Benzo(a)anthracene	---	---	5	0.16	---
Benzo(b)fluoranthene	---	---	5	0.48	---
Benzo(k)fluoranthene	---	---	5	0.33	---
Benzo(g,h,i)perylene	---	---	5	0.23	---
Benzo(a)pyrene	---	---	5	0.22	---
Chrysene	---	---	5	0.41	---
Dibenz(a,h)anthracene	---	---	5	0.26	---
Fluoranthene	---	---	5	0.34	---
Fluorene	---	---	5	0.19	---
Ideno(1,2,3-cd)pyrene	---	---	5	0.24	---
2-Methylnaphthalene	---	---	5	0.34	---
Naphthalene	---	---	5	0.34	---
Phenanthrene	---	---	5	0.33	---
Pyrene	---	---	5	0.36	---
Total Cyanide	**9010A**	**9012A**	**0.1 mg/Kg**	**0.03 mg/Kg**	**25**
Metals	---	---	**mg/Kg**	**mg/Kg**	**20**
Aluminum	3050B	6020	2	2	---
Antimony	3050B	6020	0.05	0.02	---
Arsenic	3050B	6020	0.5	0.07	---
Barium	3050B	6020	0.05	0.03	---
Beryllium	3050B	6020	0.02	0.006	---
Cadmium	3050B	6020	0.05	0.007	---
Calcium	3050B	6010B	10	3	---
Chromium	3050B	6020	0.2	0.04	---
Copper	3050B	6020	0.1	0.02	---
Iron	3050B	6010B	4	3	---
Lead	3050B	6020	0.05	0.02	---
Magnesium	3050B	6010B	4	2	---
Manganese	3050B	6010B	1	0.3	---
Mercury	7471A	7471A	0.02	0.008	**5**
Nickel	3050B	6020	0.2	0.04	---
Potassium	3050B	6010B	400	300	---
Selenium	7742/SM3114B	7742	0.1	0.02	---
Silver	3050B	6020	0.02	0.003	---
Sodium	3050B	6010B	20	10	---
Thallium	3050B	6020	0.02	0.002	---
Zinc	3050B	6020	0.5	0.2	---
Minimum Mass Needed (Step 2)					**465**

Table 9b
Reconnaissance Groundwater/Pore Water and Deep Groundwater
Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Volume needed (ml)
VOCs (Unfiltered)	**5030B**	**8260B**	**ug/L**	**ug/L**	**80**
Acetone	---	---	20	4.08	---
Acrolein	---	---	20	1.42	---
Acrylonitrile	---	---	5	0.531	---
Benzene	---	---	0.5	0.136	---
Bromochloromethane	---	---	0.5	0.164	---
Bromodichloromethane	---	---	0.5	0.109	---
Bromoform	---	---	0.5	0.279	---
Bromomethane	---	---	0.5	0.217	---
2-Butanone	---	---	20	1.94	---
Carbon Disulfide	---	---	0.5	0.159	---
Carbon Tetrachloride	---	---	0.5	0.139	---
Chlorbenzene	---	---	0.5	0.134	---
Chlorodibromomethane	---	---	0.5	0.104	---
Chlorethane	---	---	0.5	0.226	---
2-Chloroethyl Vinyl Ether	---	---	5	0.333	---
Chloroform	---	---	0.5	0.136	---
Chloromethane	---	---	0.5	0.136	---
trans-1,4-Dichloro-2-butene	---	---	10	0.597	---
1,2-Dibromoethane	---	---	2	0.0981	---
Dibromomethane	---	---	0.5	0.119	---
1,2-Dichlorobenzene	---	---	0.5	0.111	---
1,3-Dichlorobenzene	---	---	0.5	0.102	---
1,4-Dichlorobenzene	---	---	0.5	0.114	---
1,1-Dichloroethane	---	---	0.5	0.101	---
1,2-Dichloroethane	---	---	0.5	0.114	---
1,1-Dichloroethene	---	---	0.5	0.122	---
trans-1,2-Dichloroethene	---	---	0.5	0.143	---
1,2-Dichloropropane	---	---	0.5	0.139	---
cis-1,3-Dichloropropene	---	---	0.5	0.11	---
trans-1,3-Dichloropropene	---	---	0.5	0.0894	---
Dichlorodifluoromethane	---	---	0.5	0.166	---
Ethylbenzene	---	---	0.5	0.13	---
Hexachlorobutadiene	---	---	2	0.28	---
2-Hexanone	---	---	20	3.96	---
Idomethane	---	---	5	0.375	---
Isopropylbenzene	---	---	2	0.105	---
4-Methyl-2-Pentanone	---	---	20	2.7	---
Methylene chloride	---	---	2	0.193	---
Methyl tert-butyl ether	---	---	0.5	0.197	---
Napthalene	---	---	2	0.285	---
Styrene	---	---	0.5	0.0943	---
1,1,1,2-Tetrachloroethane	---	---	0.5	0.111	---
1,1,2,2-Tetrachloroethane	---	---	0.5	0.138	---
Tetrachloroethene	---	---	0.5	0.126	---
Toluene	---	---	0.5	0.108	---
1,2,4-Trichlorobenzene	---	---	2	0.218	---
1,1,1-Trichloroethane	---	---	0.5	0.116	---
1,1,2-Trichloroethane	---	---	0.5	0.138	---
Trichloroethene	---	---	0.5	0.133	---
Trichlorofluoromethane	---	---	0.5	0.131	---
1,2,3-Trichloropropane	---	---	0.5	0.213	---
Vinyl Acetate	---	---	5	0.663	---
Vinyle Chloride	---	---	0.5	0.042	---
m,p-Xylene	---	---	0.5	0.219	---
o-Xylene	---	---	0.5	0.102	---

Table 9b
Reconnaissance Groundwater/Pore Water and Deep Groundwater
Analytes, Analysis Methods, Reporting and Detection Limits, and Minimum Mass Requirements

Analyte	Preparation Method	Analytical Method	Method Reporting Limit	Method Detection Limit	Minimum Volume needed (ml)
Total PAHs (Unfiltered)	**EPA 3520C**	**EPA 8270C**	**ug/L**	**ug/L**	**500***
Acenaphthene	---	---	0.02	0.00198	---
Acenaphthylene	---	---	0.02	0.00178	---
Anthracene	---	---	0.02	0.00103	---
Benzo(a)anthracene	---	---	0.02	0.00210	---
Benzo(b)fluoranthene	---	---	0.02	0.00158	---
Benzo(k)fluoranthene	---	---	0.02	0.00194	---
Benzo(g,h,i)perylene	---	---	0.02	0.00182	---
Benzo(a)pyrene	---	---	0.02	0.00158	---
Chrysene	---	---	0.02	0.00124	---
Dibenz(a,h)anthracene	---	---	0.02	0.00162	---
Dibenzofuran	---	---	0.02	0.00380	---
Fluoranthene	---	---	0.02	0.00238	---
Fluorene	---	---	0.02	0.00258	---
Ideno(1,2,3-cd)pyrene	---	---	0.02	0.00208	---
2-Methylnaphthalene	---	---	0.02	0.00268	---
Naphthalene	---	---	0.02	0.00316	---
Phenanthrene	---	---	0.02	0.00320	---
Pyrene	---	---	0.02	0.00222	---
Free Cyanide (Unfiltered)	**ASTM D-4282-02**	**ASTM D-4282-02**	**10 ug/L**	**3 ug/L**	**50**
Total Cyanide (Unfiltered)	**335.4**	**335.4**	**10 ug/L**	**3 ug/L**	**50**
Amenable Cyanide (Unfiltered)	**NA**	**335.1**	**10 ug/L**	**3 ug/L**	**50**
Total Metals (Unfiltered)	---	---	**ug/L**	**ug/L**	**125**
Aluminum	CLP	6020	2	0.7000	---
Antimony	CLP	6020	0.05	0.0200	---
Arsenic	CLP	6020	0.5	0.2000	---
Barium	CLP	6020	0.05	0.0300	---
Beryllium	CLP	6020	0.02	0.0070	---
Cadmium	CLP	6020	0.02	0.2000	---
Calcium	CLP	6010B	50	20.0000	---
Chromium	CLP	6020	0.2	0.0600	---
Copper	CLP	6020	0.1	0.0300	---
Iron	CLP	6010B	20	20.0000	---
Lead	CLP	6020	0.02	0.0090	---
Magnesium	CLP	6010B	20	9.0000	---
Manganese	CLP	6010B	5	2.0000	---
Mercury	7470A	7470A	0.2	0.0400	**25**
Nickel	CLP	6020	0.2	0.0600	---
Potassium	CLP	6010B	2000	700.0000	---
Selenium	CLP	6020	1	0.2000	---
Silver	CLP	6020	0.02	0.0090	---
Sodium	CLP	6010B	100	60.0000	---
Thallium	CLP	6020	0.2	0.0040	---
Zinc	CLP	6020	0.5	0.3000	__
Ammonia	**NA**	**350.1**	**0.05**	**0.0200**	**10**
Minimum Volume Needed					**890**

Note:

* PAH MRLs/MDLs adjusted 4X due to smaller sample size

John Renda

From: John Renda
Sent: Thursday, August 30, 2007 11:52 AM
Subject: Gasco change of sampling procedure

This email is to document discussions with DEQ on August 30, 2007 concerning sediment sampling intervals for the Gasco Offshore Phase 2 Step 2 sampling currently under way.

The approved workplan is to collect sediment samples at 0-2', 5-7', and 8-10' below mudline. DEQ requested that the 8-10' interval be replaced with a sample collected 13-15' below mudline to be consistent with the Phase 2 Step 1 TZW sampling. Anchor agrees to make this modification.

The piston core sampler uses a 12' aluminum core barrel. The use of a piston core sampler was proposed to collect the soft sediment where we have been having low recovery using the Geoprobe macro-core sampler. Anchor plans to push the piston core sampler until there is significant resistance (direct push, not using the percussion hammer). The remaining sample intervals will be sampled with the Geoprobe macro-core sampler. Sample volume will be limited with the macro-core sampler (all material will be used for laboratory testing) and therefore, it is anticipated that there will be no sample volume remaining for NAPL screening (using UV light) in these intervals. These intervals will be logged in the field and visual observations of sheen, NAPL, and/or tar will be recorded.