MEMORANDUM

DATE: August 9, 2000

TO: Ching Pi Wang, Department of Ecology TCP

FROM: Jeremy Porter and Lori Herman, Hart Crowser

RE: Preliminary Response to EPA Comments on Baxter Remedial Investigation Report

J-7026-02

CC: Georgia Baxter, J. H. Baxter

This memorandum summarizes our initial response to the comments provided by the United States Environmental Protection Agency (EPA) regarding the Remedial Investigation report (RI) concerning the J. H. Baxter Arlington (Baxter) site. The comments provided by Cheryl Williams, Rene Fuentes, and Julius Nwosu of EPA were based on information available to them, but because of they were not been involved in the investigation plan,, they may not have recognized the following:

The purpose of this RI was a focused investigation to evaluate the potential sources to observed groundwater contamination, and to identify contamination issues that need to be addressed. It was not intended to be a comprehensive, detailed study of site conditions; and the document was intended as an Interim investigation report.

Considerable amounts of site characterization data were collected between 1988 and 1999, prior to the RI. These data primarily included quarterly groundwater and storm water sampling at eight wells, five Parcel A French drains, and a composite sample of nine Parcel B French drains; as well as some limited surface soil and subsurface soil data. These data were summarized in the Work Plan (Hart Crowser, 1999) but not all repeated in the RI report; and

The next scheduled activity (per the 1998 schedule of MTCA and NPDES activity coordination) is a follow-on investigation to fill in data gaps identified in the RI. The intent of this next work plan is to further characterize and delineate NAPL source areas beneath the butt tank and near SB-6 as well as installing three monitoring

wells in the main treatment area to further characterize the groundwater plume and flowpath.

Relative to the EPA comment letter, responses to individual comments are provided below.

RESPONSE TO COMMENTS BY RENE FUENTES

General Comments

1. Line 1 to 10
Site data collected before the RI are summarized in the Work Plan. As explained on page 1 of the RI, the analyses in the RI focus on the data obtained during the RI field investigation, but build on all available historical data to develop a conceptual model and identify contaminant sources. Since no examples of data gaps are provided in this comment, we will address specific concerns as they are brought up in later comments.

1. Line 10 to 24
This comment labels the issues at the Baxter site as "major sources of contamination" and appears to imply the RI concludes that these are minor issues. What distinguishes minor from major issues is not explained, but the RI does identify several issues that require addressing. The RI does not discount data that indicate existing sources of contaminants; however, it does use analytical tools to estimate the relative contribution of these sources to groundwater. Groundwater data collected at 8 monitoring wells quarterly for the past 10 years indicates contamination in the area of BXS-1 and MW-3. In the Work Plan we identified possible sources of the detected groundwater contamination, and the RI was designed to evaluate these possible sources and narrow the scope of remedial efforts. The RI does not ignore or trivialize the detected occurrence of contaminants.

2.
The large variability in PCP concentrations within a short lateral distance observed at the site (between the butt tank source area and MW-1) occurs at the source area. Groundwater contaminant plumes are typically much wider downgradient of source areas than around the source area, since contaminants are dispersed through hydrogeologic processes. Therefore, the large variability in PCP concentrations around the source area does not mean the plume is only 100 feet wide at a point 600 feet downgradient of the source.

Although it is stated that "there are too few data points to understand the on-site contamination", there is no explanation of what is not understood or what pieces of information are desired. The data gaps identified in the RI will be addressed in the follow-up investigation.

3.

Although PCP does have a specific gravity much greater than water, PCP is a solid in pure form at atmospheric conditions. Movement of a granular solid through 40 feet of soil is not a commonly observed transport phenomenon. High concentrations of PCP in the subsurface have only been observed in connection with the petroleum carrier oil, which is the form PCP is used at the site. The carrier oil is an LNAPL, and thus will accumulate at the top of the water table. This LNAPL is what was identified in the RI at boring SB-6 and underneath the butt treating tank. Installing monitoring wells in these areas and measuring LNAPL thickness will be part of the follow-up investigation. LNAPL has not been observed in any of the existing monitoring wells.

add WL fluctuation

4.

Groundwater data have been collected quarterly at site monitoring wells since 1990 and are presented in Table 2 of the RI. These data provide a consistent characterization of groundwater gradients in each season. Eleven wells are currently installed at the site. Groundwater gradients in the Main Treatment Area will be further characterized by additional monitoring wells installed in the follow-up investigation.

5.

The rationale for selecting sampling locations and method of collection are described in the Work Plan for the RI, and are summarized in Table A-1 of the RI. Soil samples from every boring were collected and analyzed. Three borings were completed as monitoring wells. Borings in which groundwater was sampled but no well was installed were designed to delineate the groundwater contaminant plume and assist in locating monitoring wells to be installed during the follow-up investigation.

French drain storm water samples are composited before analysis as outlined in the NDPES permit requirements. These analyses are performed as an ongoing NPDES monitoring program. Composite samples are taken from French drains on Parcel B where there are no treatment operations. Monitoring well HCMW-5 was placed downgradient of French drains 25 and 26. Screen lengths are long because of the large seasonal variation in water levels at the site; however, HCMW-5 was first sampled in the dry season when the bottom of the screen was 5 feet below the top of the water table,

and thus provides a good measure of PCP concentration where it is likely to be highest due to LNAPL occurrences.

A quarterly monitoring program of site monitoring wells using consistent techniques has been in place for the last ten years. New low-flow sampling techniques are being phased in to provide samples with lower turbidity which are therefore more representative of true dissolved concentrations.

6.
The groundwater gradient at the site has been well characterized in the vicinity of PCP occurrences. PCP has not been detected in wells to the south and southwest of the observed source areas. There is no evidence of southward migration of groundwater or groundwater contaminants outside of Parcel A or the Woodwaste Landfill.

7.
French drains as a potential source of groundwater contamination were thoroughly investigated in the RI. Well HCMW-5 was installed downgradient of drains 25 and 26. Boring SB-3 was located downgradient of drain 24, and existing wells BXS-1 and BXS-2 are also downgradient of this drain. Boring SB-4 was located downgradient of drain 23 and within the infiltration zone of the principal stormwater drain ditch within Parcel A. Drains 13 and 14 are not actual drain fields, but are catch basins piped to this drainage ditch. All other French drains are located on Parcel B away from treatment operations and treated materials. The rationale behind placement of each boring, well, and surface soil sample are provided in the Work Plan and in Table A-1 of the RI.

8.
Wells installed in the RI were placed with specific investigative purposes. HCMW-5 is located downgradient of storm drains 25 and 26 and in a potential historical contaminated area (the 'excavated tar area'). HCMW-6 was located in the Treated Pole Storage Yard away from the Main Treatment Area. The chosen location was far enough downgradient of the eastern edge of the Treated Pole Storage Yard to provide a measure of the influence of direct infiltration of precipitation through the yard but easterly enough to better define the groundwater contours in this area. HCMW-7 was located downgradient of the apparent PCP plume to monitor for off-site migration of contaminants.

A follow-up investigation is planned in the areas of observed contamination, as previously described.

9.
All other site data are collected and summarized in the Work Plan. The conceptual model presented in the RI results from combining all available data. PCP concentrations in all site monitoring wells have been monitored quarterly for the past ten years. The only three wells in which PCP has been detected above the MCL are BXS-1, MW-2, and MW-3. The 150 ug/L concentration detected in May 1990 was at BXS-1, where PCP concentrations have declined over the past 10 years with little seasonal variation. The 440 ug/L concentration detected in 1991 was at MW-3, which has been the consistent groundwater hotspot. The PCP concentration at MW-2 has always been less than 10 ug/L, and has declined over the last four years.

These monitoring wells are screened across the top of the water table because the association of PCP contamination with LNAPL indicates that the highest concentrations of PCP will be near the top of the water table.

what it degrades to
when.

10.
Degradation byproducts are often more rapidly degraded than PCP itself. Breakdown products will depend on the pathway of degradation, and could potentially involve chlorohydroquinones (as mentioned) or lesser chlorinated phenols. Tetrachlorophenol is not a reliable indicator of degradation since low concentrations are present in the PCP treating solution. Tri-, di-, and monochlorinated phenols are routinely analyzed for and have not been detected in site groundwater. We are not aware of toxicity concerns regarding chlorohydroquinones.

Conventional parameters and ions have been monitored in site groundwater for the past ten years. Providing a detailed analysis of these parameters to fit into hydrogeologic or natural attenuation model is complicated by the existence of the woodwaste landfill. Creating a more rigorous model is more costly and less useful than collecting additional empirical data, as intended in the follow-up investigation.

11.
A discrete sample of LNAPL has not been collected since existing monitoring wells do not contain LNAPL. LNAPL will be sampled in the follow-up investigation if observed. The report breaks out the occurrence of chemicals in each medium sampled (surface soil, subsurface soil, groundwater, and surface water). Tables 8 through 11 of the RI summarize the occurrence of chemicals in each medium.

12.

Site features and locations of all soil borings and monitoring wells were surveyed, and their location on the map are an accurate representation of their true location relative to the property boundary. The data as presented allow for accurate calculation of distances to off-site features.

Specific Comments

14.
LNAPL was not discretely sampled during the RI. The aqueous phase of groundwater samples that were collected beneath the butt treating tank (where LNAPL was observed) was analyzed. The high TPH concentrations in these samples are likely due to the high turbidity of these samples and perhaps lack of complete separation of the aqueous and LNAPL phases.

15.
The third parcel is referred to as the Woodwaste Landfill, not Parcel C. The woodwaste landfill is located to the west of Parcel A.

16.
The scope of work for the RI was designed to investigate the potential sources of contamination to groundwater at the site, not to fully characterize the site. Further characterization of located sources will occur in the follow-up investigation.

17.
As described in the work plan, approximately 2,000 gallons of PCP treating solution was spilled in the 1990 event, with most of it recovered.

18.
The location of the butt treating thermal tank was accurately determined through interviews with site workers and aerial photographs. Boring SB-8 was located adjacent to the tank on the downgradient side to evaluate this as a potential source.

19.
Infiltration was calculated assuming no runoff because this is a more conservative estimate for contaminant migration. If runoff is included, it would decrease the contribution of French drain and surface infiltration and increase the estimated contribution of LNAPL to groundwater PCP concentrations. Precipitation not included in recharge is lost to evaporation, not evapotranspiration. Typically at the site storm water pools in ditches and low areas throughout the winter months. Infiltration through neither

the site surface nor the French drains is rapid, and allows for evaporation. No evapotranspiration losses were included.

20.
The earliest date PCP was detected at the site boundary was in 1990, but since the potential exists for this plume to be present up to twenty years prior to 1990 a steady-state model seems appropriate to estimate the extent of the groundwater plume. The estimated extent of the PCP plume is provided from the fate and transport model (Table 13), under scenarios of biodegradation and no biodegradation. In the model, the estimated concentrations of PCP at MW-3 corresponds with the measured concentration. The model then predicts PCP concentrations at two points - MW-H (A hypothetical well located just off-site, downgradient of French drain 24) and HCMW-7. These concentrations represent the steady-state, and therefore maximum, concentration achievable at these points. The model represents a better estimate of plume extent than using only groundwater travel times.

21.
The lag time estimates come from water elevation data presented in the Work Plan, as referenced. Direct surface infiltration and French drain infiltration both contribute to recharge. Since French drains infiltrate water only four feet below ground surface, these do not provide a much faster pathway to the water table than direct infiltration.

22.
MTCA Modified Method B cleanup levels for soil are based on residential cleanup levels for groundwater. The modified aspect refers to use of site-specific data to determine parameters such as K_{OC} and organic carbon content. They represent soil concentrations at the site that will result in residentially acceptable concentrations of contaminants in groundwater. The MCL is currently applied to groundwater.

23.
No LNAPL has been observed in any monitoring wells on site. The only areas in which NAPL have been observed will be further characterized in the follow-up investigation.

24.
The sheen observed is evidence of an LNAPL, which will occur in the smear zone of water table fluctuation. Therefore the extent of LNAPL contamination can be estimated by the water table history. The follow-up investigation will further delineate the vertical extent of PCP contamination in these source areas.

Discharge of the PCP plume does not appear to be a concern because Portage Creek is located over 3000 feet from the site, and PCP is not detected in monitoring well HCMW-7, only 300 feet from the site.

31.
PCP is stored as a solid in the Penta Storage shed in a contained area. The shed does not contain PCP in a mobile form that is easily released to the subsurface. Well BXS-1 is located close to the shed and groundwater in this well is monitored quarterly. An additional well west of the retorts is planned for the follow-up investigation.

32.
Although BXS-4 and MW-4 are screened farther below the water table than other site wells, they are screened at similar elevations as the other wells. BXS-4 could not be screened higher due to the presence of a confining silty clay layer.

33.
Quarterly groundwater monitoring has provided a consistent measure of groundwater elevation and gradients. Water level fluctuations are consistent with water level data throughout the Puget Sound area. Source-area monitoring wells are planned to be installed during the follow-up investigation.

34.
The K_{OC} correlation for PCP concentrations less than 10 mg/kg in soil was calculated using a standard least squares method of linear fitting, and agrees with the K_{OC} calculated from groundwater/soil concentrations (Table 4) and literature data.

RESPONSE TO COMMENTS BY JULIUS NWOSU

General Comments

1.
The PCP concentration of 150 ppb detected in May 1990 was at well BXS-1; all subsequently detected concentrations of PCP at this well have been significantly lower. The RI does not state that the PCP plume is only confined to within the site boundaries. It is unclear what data are lacking for the northeast corner of the site.

2.
French drains are identified as a potential contributor to groundwater PCP concentrations in the RI, but our analysis indicates that the major contributor is due to

the LNAPL. The analysis acknowledges storm water contribution but focuses on the apparently greater LNAPL contribution. Remedial alternatives being considered as part of the RI/FS process address both LNAPL and storm water pathways.

The active wells in the site vicinity are not downgradient of the site (see Figure 3 of the RI).

3.
The existence of attenuation is also supported by the decrease in PCP concentrations between on-site wells. Wells installed in the Main Treatment Area during the follow-up investigation will better characterize the change in PCP concentration downgradient of the source area.

4.
If measured dioxin concentrations are due to dioxin associated with suspended solids, this represents dioxin that is not mobile and will not be transported off-site. Therefore, only freely dissolved dioxin concentrations should be compared to the groundwater screening level. We conducted this analysis to show that the detected concentration may be due to solids content, but without a solids-free groundwater sample we recognize that the detected concentration of dioxin at MW-2 does exceed the screening level and will have to be addressed.

Specific Comments

1.
The Baxter property and all surrounding properties are zoned industrial. Thus it is appropriate to use industrial soil cleanup levels at this site. Groundwater cleanup standards are residential due to the use of the aquifer.

2.
The focus of this investigation, as described in the Work Plan, was on identification of Parcel A sources of PCP and groundwater contamination. The scope of work addressed both previously identified and potential contaminant issues. The follow-up investigation will further explore contamination issues identified in the RI.

3.
The 1990 butt treating tank spill consisted of PCP dissolved in the carrier oil, and occurred when the tank boiled over. The Snohomish County Health District report was carefully reviewed for the RI and can be provided if needed.

4.
The areas initially identified as potential 'stained soil areas' in the work plan were reviewed with site employees and analyzed by an experienced aerial photograph interpreter. Aerial photographs showed these areas to be darker than surrounding land but gave no indication of staining or any processes in the area that would result in staining. These areas were identified on aerial photographs during a period of operation (1967) in which poles were observed but no treating operations were apparent. Monitoring well HCMW-5, located downgradient of the sourthern area, did not indicate any contamination.

5.
The mobile home park well was sampled in 1990 prior to decommissioning and PCP was not detected. No chemical data prior to 1990 for this well exists.

6.
The wells on the eastern edge of the Baxter property are upgradient of the site. Several of the wells located in the 1988 survey no longer exist as their sites have been redeveloped. Figure 3 and Table 1 in the RI provide the most current well survey information.
The PCP concentration detected at MW-4 in April 1995 is below the MCL, and is the only PCP detection in 22 sampling events. Groundwater does not flow to the east on the site. Monitoring wells MW-4 and BXS-4 are on the south and north sides of the Loughnan property, respectively, and indicate that any groundwater flowing onto this property from Baxter does not contain PCP. The Loughnan property well has been abandoned and this property is currently connected to city water.

7.
HCMW-7 was installed north of BXS-1 and MW-3 to bound the plume to the north. Since no potential receptors are located between these wells, and the point of compliance of remedial actions will likely be the property boundary, the need for further plume characterization between the boundary and HCMW-7 is not obvious; however, we are considering installing an additional downgradient well.

8.
Wells are currently installed along the northwest site boundary. We are considering installing an additional off-site well west of HCMW-7.

Southwesterly flow of contaminated water from the butt tank source area to the southern part of the site is unlikely given data collected HCMW-5 and the groundwater grab samples at SB-2 and SB-8. Groundwater potentially migrating to the south of the site would originate from the southern portion of Parcel B, which is not the site of treatment processes, chemical handling, treated materials, or any other known contaminant source.

9.
See response to comment 22 of Rene Fuentes. Modified MTCA Method B levels are calculated to be protective of groundwater at a residential groundwater cleanup level. The MCL of 1 ppb is used as the groundwater screening level at the site.

10.
See comment 9, above.

11.
Screening levels presented in the RI are based on modified Method B cleanup levels (see comment 9, above) and use site-specific values of organic carbon content and K_{OC}. Using the lognormal average PCP concentration provides an estimate of average PCP concentrations in surface soil in Parcel A and helps to put in perspective the significance of the highest detected PCP concentrations. The average surface soil PCP concentration is used to determine an average PCP concentration in surface water from leaching, using the SPLP data.

12.
The EPA guidance screening levels for dioxins were provided for comparison only. Cleanup levels for this site have ~~not been determined.~~ in the CAP.

13.
We note the possible need for additional support that leaching from the Treated Pole Storage Yard is not a source; however, with one well in the Yard and a boring downgradient (SB-4) at which groundwater was sampled, the need for more characterization at this time is not obvious.

14.
PCP concentrations detected in highly turbid samples do not indicate the true dissolved concentration of PCP, and therefore do not represent the concentration present in infiltrating surface water. Developing a correlation between turbidity and PCP

concentration is not a manipulation of the samples but a standard method of evaluating the influence of one parameter on another.

15.
We agree that the existence of turbidity in groundwater samples does not discount the measured PCP concentrations; however, groundwater samples containing low concentrations of suspended solids (as collected by low-flow sampling) are more representative of dissolved PCP concentrations.

16.
We agree that the dioxins detected at MW-2 are likely related to site operations.

17.
MW-3 is not necessarily a source but a downgradient receptor of a source. We agree that storm water may contribute to PCP concentrations in the groundwater, but the contribution relative to the LNAPL is likely small. PCP concentrations at MW-2 and BXS-1 have declined in the last 10 years, indicating that the plume is not growing larger and may be shrinking.

Out of the 11 monitoring wells at the site, only wells MW-3 and BXS-1 have PCP concentrations consistently above screening levels. Well MW-2 typically contains low concentrations of PCP that fluctuate slightly above and below screening levels. PCP is consistently not detected or detected below screening levels at the other 8 wells at the site. Many of these wells have been monitored quarterly for the past 10 years. These data should not be discounted as limited or unrepresentative.

18.
The well inventory indicates that no drinking water supplies are downgradient of the site.

19.
Table 9 was erroneously cited on page 18. This will be changed to Table 10 in the final report.

SUMMARY

Many of the comments provided by EPA are either addressed in the Work Plan or will be addressed with the follow-up investigation planned by Hart Crowser. The scope of work for the follow-up investigation is attached. In addition to the investigation planned, we might consider adding the following items to address EPA's concerns:

- Adding an additional off-site well approximately 300 feet west of HCMW-7 or on a neighboring property if it becomes available to Baxter;
- If surface water sampling proposed as part of the State Waste Discharge permit indicate a Parcel B drain as a possible source of PCP to groundwater, we could add a well on Parcel B downgradient of the suspected source. This well would also characterize groundwater flow on this part of the site; and
- Sampling wells BXS-1, MW-2, and MW-3 for chlorohydroquinones to assess PCP degradation

25.
The PCP concentration at MW-2 has been monitored quarterly for the past 10 years, and is summarized in the Work Plan.

26.
Intentionally collecting groundwater samples unrepresentative of dissolved PCP concentrations is pointless and misleading. Turbidity increases PCP concentrations because PCP associated with the solids is analyzed along with dissolved PCP. Analysis of soil samples in the saturated zone provides a better measure of past contaminant pathways.

27.
The existence of PCP in the soil is most likely from past site operations, as stated. However,
since only dissolved-phase PCP will be transported off-site in groundwater, PCP associated with solids in groundwater samples should not be included when comparing PCP concentrations to the groundwater cleanup level.

28.
Biodegradation rates were determined to explain why PCP concentrations decrease downgradient of the source area faster than the model predicts without biodegradation. The rates are not intended to be robust values but aid in the conceptual model of the site.

29.
The well survey, field data, and modeling predictions all indicate that PCP migration in groundwater does not threaten any potential human or ecological receptors.

30.
All water supply wells, to the best of our knowledge, are included on Figure 3. Please see Table 1 for a list of well locations, information, and how and when each well was inventoried.

Regional hydrogeologic data summarized in Figures 3 and 4 support the likelihood of discharge to Portage Creek. Portage Creek acts as a hydrogeologic boundary to groundwater flow so impacts to wells on the other side of the Creek would not be an issue. Quilceda Creek is outside the area of concern.