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Subject: Data Quality Objective Summary Report in Support of the 200-BP-5 Groundwater Operable Unit Remedial Investigation/Feasibility Study Process

Mr. Thomas:

Oregon appreciates the opportunity to review the DQO Summary Report prepared for the 200-BP-5 Operable Unit Remedial Investigation and Feasibility Study. We note that the project scope is composed of 10 operable units within in the 200-BP-5 groundwater operable unit boundary that includes a total of 229 individual waste sites. We are providing our general concerns and comments below and are appending our technical comments to this letter. These comments are based on the general objectives stated in the DQO Summary Report and the contents of the report. Our general impression is that the document contains an inadequate detail for the decision offered. For example:

- The DQO does not provide adequate detail to define the spatial boundaries of the 200-BP-5 groundwater OU nor does it adequately define the waste sites that lie within those boundaries. A detailed listing of waste sites and figure showing their location within the boundaries of the 200-BP-5 OU should be included. If past sources that lie outside the BP-5 boundaries are considered in the report, then they should be included on the list and figure also.

- The DQO summary report identifies contaminants of potential concern (COPCs) and contaminants of concern (COCs) based on historical information, process history, and limited characterization data. Process history can be used to help identify broad contaminant classes for identifying analytical suites but should not be used to identify or screen out individual contaminants. Sufficient characterization data are not currently available, because most of the representative waste sites identified within the 200-BP-5 OU have not been characterized.

- The information provided indicates that there is a low density of soil borings to waste site. Consequently, the amount of characterization data is not considered adequate to confidently identify vadose zone COPCs. The DQO should analyze the

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universe of contaminants identified through broad analysis of contaminants until the risk assessment has been conducted.

Additionally, we find that the decision process contained within the summary report should be revised or more clearly presented. Some examples are:

- The DQO summary report requires a discussion of how existing groundwater and vadose zone characterization data will be evaluated to confirm it is adequate for remedial investigation and risk assessment purposes. The DQO should describe how both vadose zone and groundwater data will be grouped and evaluated. This type of assessment is necessary to determine if existing information are acceptable and determine the nature and type of information that is still required.

- Current and historic groundwater monitoring samples have primarily been analyzed for specific radiological isotopes, and only limited data are available for non-radiological contaminants (i.e. total metals or organic solvents). The absence of suites of contaminants from groundwater must be confirmed through risk evaluation via adequate characterization, before they can wholesale be eliminated from consideration. If an evaluation has been performed in the past, then it should be presented, discussed and critiqued in the DQO.

We look forward to discussing these overarching comments and the following comments as you continue to develop project plans for closing data gaps to provide the necessary information for informed decision making. Please feel free to contact me at (503) 378-5584 to discuss or clarify our comments.

Sincerely,

Donna L Morgans

Donna Morgans
Hanford Risk Assessment Specialist

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Global Concerns

Concern 1. The DQO does not provide adequate detail to define the spatial boundaries of the 200-BP-5 groundwater OU nor does it adequately define the waste sites that lie within those boundaries (this considers the information provided in Section 1.5 and Figure 1-2). A detailed list of waste sites (representative and analogous), Waste Management Areas, and other past release sites within the boundaries of the 200-BP-5 OU should be listed in the report for easy reference. Additionally, a figure showing the location of the waste sites within the BP-05 OU should be provided. If past sources that lie outside the BP-5 boundaries are considered in the report, then a detailed list and figure(s) clearly showing their locations should also be provided.

Concern 2. The DQO report does not clearly identify the soil borings and characterization data used in the DQO analysis. Rather, the reader must review each of the references cited in the report to determine the "general" availability of information and analytical data. Additionally, several of the current feasibility studies (TW-01 and TW-02 and CW-1 and CW-03) are not available on the administrative record website. Similary, the DQO report does not identify where future soil borings are proposed.

All analytical data used in this DQO report which were obtained from Field Investigation Reports and Remedial Investigation/Feasibility Studies should be provided. The absence of this information does not allow the reader to determine whether sufficient characterization data are available.

Concern 3. Information currently provided in the DQO suggests that there is a low soil boring to waste site ratio. Consequently, the amount of characterization data is not considered adequate to confidently identify vadose zone COPCs. The references provided in Tables 1-3 through 1-6 and Table 3-2, indicate that 10 operable units lie within in the 200-BP-5 groundwater operable unit boundaries (CS-1, CW-1, LW-1, LW-2, MW-1, PW-2, PW-4, PW-5, TW-1, and TW-2) which includes a total of 229 individual waste sites. Note, this doesn't include any of the WMAs that are not clearly identified in this report.

Based upon the 200 Areas Implementation Plan (DOE/RL-98-28), 30 representative sites were identified for these waste site operable units. A total of 24 of the representative sites or TSD units will have at least one soil boring or test pit with subsequent sample analysis (~10%). Currently, only six of the 24 representative sites/TSD units have characterization data available.

Concern 4. The DQO summary report prematurely identifies contaminants of potential concern (COPCs) and contaminants of concern (COCs) based on historical information, process history, and limited characterization data. Process history can be used to help identify broad contaminant classes for identifying suites of analytes to determine analytical methods, but it cannot be used to identify or screen out individual contaminants. Sufficient characterization data are not currently available, because most of the representative waste sites identified within the 200-BP-5 OU have not been characterized. Any text in the DQO report suggesting that COCs can be identified based on process data should be struck.

Section 1.4.2 states the following: "Thus, the inventory data provide a best estimate for establishing COPCs for the various liquid waste streams disposed to waste sites overlying the 200-BP-5 OU. These estimates are an indicator of potential inventory and may be compared to the vadose zone characterization data and groundwater monitoring data for various waste sites to roughly estimate the balance of inventory that may have been released or that could be released to the groundwater." This statement is correct, however it does not appear that this approach was followed.

Vadose zone and groundwater COPCs and COCs can only be confidently identified through the risk assessment process that will be conducted as part of the remedial investigation for 200-BP-5. The DQO should analyze the universe of contaminants as identified through broad analytical suites of contaminants until the risk assessment has been conducted. This is supported by the 200 Areas Implementation Plan (DOE/RL-98-28) which states that the DQO process will be used to define the chemical and radiological constituents to be characterized and details regarding number, type, and location of samples at representative sites within the waste group. Additionally, the universe of constituents will include CERCLA hazardous substances (including radionuclides), MTCA hazardous substances, and dangerous waste constituents. The DQO process will then

be used to further refine the list and determine which of these constituents should be consider COPCs for the waste group.

However, if a risk assessment has previously been conducted for the 200-BP-5 groundwater OU and underlying vadose zone soils, then this assessment should be appropriately referenced and summarized as the basis for the selection of COCs.

Concern 5. The DQO summary report requires a discussion of how existing groundwater and vadose zone characterization data will be evaluated to confirm it is adequate for remedial investigation and risk assessment purposes. This should include a determination of whether the data are adequate for spatially, temporally, chemically, or radiologically representing potential exposure. This type of assessment is necessary to determine if existing information are acceptable and determine the nature and type of information that is still required. Similarly, a discussion is needed about vadose zone decision units which ultimately determines how analytical data will be aggregated and analyzed? The DQO should describe how the data (both vadose zone and groundwater) will be grouped and evaluated; for example on a source unit, geographical , geological, or operable unit basis?

Concern 6. Current and historic groundwater monitoring samples have primarily only been analyzed for specific radiological isotopes, and only limited data are available for general suites of analyses (i.e. total metals or organic solvents). .The absence of suites of contaminants from groundwater must be confirmed through risk evaluation, before they can wholesale be eliminated from consideration. However, if this evaluation has been performed in the past, then it requires discussion in the DQO.

According to the *Groundwater Sampling and Analysis Plan for the 200-BP-5 Operable Unit* (DOE/RL-2001-49), the current monitoring program does not analyze groundwater samples within 200-BP-5 OU for any organic compounds (except methylene chloride) or total metals. Organic solvents and total metals are reported to have been released according to the referenced remedial investigation/feasibility reports for the waste site operable units (see Table 3-2). Therefore, the groundwater monitoring list of contaminants should be expanded to include total metals and select solvents. This information is needed to adequately estimate exposure and evaluate cumulative risk from multiple contaminants and multiple exposure pathways.

Specific Comments:

Statement on Page 1-2. The distribution of contamination present in the vadose zone needs to be better understood, as well as the potential for future impacts to groundwater that may arise from the transport of this contamination from the vadose zone to the unconfined and confined aquifers. This knowledge can be used to perform a risk assessment evaluation of remedial action alternatives and subsequent performance monitoring for the 200-BP-5 Groundwater OU.

Comment: One of the general objectives of the DQO process is to support baseline risk assessment. A baseline risk assessment is performed with the assumption of a "no action" alternative to determine if remediation is necessary. A risk assessment is not performed for the purpose of evaluating remedial action alternatives, however it can be used as a tool to determine if the alternative can potentially achieve the remedial action objectives.

Table 1-1 Define Boundaries. Data generated during the 200-BP-5 Groundwater OU (investigations) will be fully integrated with data and decision making (e.g. risk assessments) with the River Corridor OUs.

Comment: How can the 200-BP-5 Groundwater OU risk assessment be integrated with the River Corridor OU? The draft 100 and 300 Area BRA is scheduled for completion in June 2007. Based upon schedule, it may be more accurate to state that the River Corridor OUs will require integration with the BP-5 Groundwater OU.

Table 1-1 Risk assessment and modeling. Uncertainties in characterization data, modeling results, and risk calculation will be addressed, defined/quantified and significance indicated in the RI/FS work plan, the RI/FS report, and the CERCLA proposed plan.

Comment: Where will the methodology and approach for the groundwater BRA be defined? Uncertainties associated with the risk assessment (including modeling and risk calculations) cannot be identified until the methodology has been approved. Similarly, the methodology and approach that will be used for the BRA must clearly define how modeling results will be used to estimate future risks which is an important component in selecting appropriate remedial alternatives.

Table 1-1. Existing vadose zone Kd values may be used to exclude low-mobility COCs for groundwater.

Comment: Why would Kd values be used to exclude low-mobility COCs from groundwater? The risk assessment must use the concentrations currently measured in groundwater to estimate risks to receptors and use modeling to predict future groundwater concentrations. It may be more appropriate to use Kd values to include or exclude contaminants from the groundwater protection pathway. If Kd values are used for exclusion purposes, will Kd values be obtained from studies performed from other source areas or will new studies be conducted?

Table 1-1 Risk assessment and modeling. ORIGEN2 modeling may be used to approximate the concentration and exclude COCs.

Comment: The RI/FS work plan must define how ORIGEN2 would be used in the RI/FS. For purposes of conducting a BRA, current concentrations of contaminants measured in groundwater and future estimated concentrations must be used to estimate cumulative risks from exposure to groundwater. Would the model be used to estimate future groundwater concentrations from migration of contaminants in the vadose zone to groundwater? If so, the work plan must clearly define the assumptions (input parameters) that go into the model that would be used to predict future concentrations in groundwater and the types of decisions that would potentially be made using these estimated concentrations.

Table 1-1 Risk Assessment and modeling. Modeling will include impacts for 1,000 years after closure. In addition, modeling will include peak concentrations for COCs considered to have potential impact beyond 1,000 years. The modeling will provide points of calculation at the following: waste boundaries, TSD unit boundaries, core zone boundary, mutually agreed to intermediate boundaries, and the river.

Comment: How will the model provide a point of calculation? Does this mean that groundwater concentrations will be estimated at the points of calculation that were listed?

Section 1.3.2, p. 1-8 first bullet. The input of the DQO process needs to be specific in terms of contaminants of potential concern that must be considered and in identification the COCs that are of most concern.

Comment: Under the CERCLA process, contaminants of potential concern are defined as any constituent reasonably expected to be of concern or present. In addition to the ten COCs listed in this bullet, the list should be expanded to include those radiological and nonradiological contaminants classes that are known to reside in the vadose zone (Table 1-11) and are likely to migrate to groundwater (see global concern 6).

One of the primary objectives of this DQO is to support a baseline risk assessment. The COCs identified in the DQO can be used to identify general classes of contaminants (tritium, gamma emitters, metals, VOAs) for laboratory analysis but it cannot exclude specific contaminants. The primary purpose of the BRA is to estimate cumulative risk based on multiple contaminants and multiple exposure pathways and to identify those contaminants that are the primary contributors to cumulative risk. The focus of the feasibility study is to identify remedial alternatives that mitigate those risks. Exclusion of contaminants at this initial phase would not follow the CERCLA process and would not allow the identification of risk-based COCs.

Section 1.3.2 p. 1-9 4th bullet. Boundaries need to be established so compliance goals can be defined. The vertical boundary is the water table, which can go up or down with time. Common points of horizontal compliance also need to be identified and cumulative risk evaluated at the following locations: waste site boundaries; treatment, storage, and disposal (TSD) unit boundaries; core zone boundary; mutually agreed to

intermediate boundaries; and, the river. Risk assessments will be updated as new characterization information and more refined modeling results become available.

Comment: For the purpose of the RI/FS, a baseline risk assessment is conducted once for the purpose of evaluating the selected remedial action alternatives against the nine CERCLA criteria. The effectiveness of the preferred alternative can be evaluated upon updated characterization information and as refined modeling results become available (in addition to updates in regulations and guidance) during the 5-year review period.

Table 1-9, p 101. Contaminants listed as SVOAs.

Comment: Herbicides that are applied through the spraying program should be separated from those contaminants that are SVOAs and pesticides. Provide rationale (other than herbicide program) for excluding pesticides and carcinogenic polynuclear aromatic hydrocarbons (PAHs) or include them as contaminants of concern.

Section 1.8.7, p107. Final List of COCs for Groundwater

Comment: In addition to the ten COCs listed in Table 1-14, the list should be expanded to include those nonradiological contaminants that are known to reside in the vadose zone (Table 1-11) and are likely to migrate to groundwater. As described in the *Groundwater Sampling and Analysis Plan for the 200-BP-5 Operable Unit* Rev. 1, in addition to the filtered metals (Section 2.3), all groundwater samples should also be analyzed for total metals concentrations (unfiltered). Groundwater must be evaluated in the BRA under the assumption that it will be restored to it's highest beneficial use (i.e. consumption) and water would not be filtered prior to consumption.

Section 1.9, p 1-108. Current and Potential Future Land Use

Comment: Current and potential future land use (or reasonably anticipated future use) influences the degree to which surface contamination (0 to 15 ft bgs) is remediated, however land use is independent of beneficial groundwater use. As this is a DQO for groundwater and the protection of groundwater, beneficial groundwater use should be discussed in addition to land use. Therefore, the statement that groundwater contamination under the core zone will preclude beneficial land use for the foreseeable future is inaccurate. Rather, contamination in the groundwater precludes the beneficial use as a drinking water source.

It is acknowledged that groundwater is not a current source of drinking water (or irrigation use) nor is it expected to be used in the reasonably anticipated future. However, remedial alternatives must be selected on the basis of restoring groundwater within the boundaries of the 200-BP-5 operable unit to its highest beneficial use. Therefore, exposure scenarios considered in the baseline risk assessment must assume the drinking water pathway is complete (hypothetical resident, tribal subsistence user, industrial worker). Similarly, the groundwater protection pathway must be evaluated with the assumption that groundwater will be restored to its highest beneficial use. Evaluation of unrestricted groundwater use will also provide the basis for understanding the level to which groundwater can be restored and the time frame to achieve restoration, both assist in assessing the level of injury to this resource.

Table 1-17, p 1-112 – Exposure Scenario footnote.

Comment: The groundwater 200-BP-5 operable unit should limit the BRA to the evaluation of the groundwater protection pathway and groundwater. Exposure to surface contamination (0 to 15 ft bgs) should be evaluated in the appropriate waste site operable unit. Therefore complete exposure pathways would be limited to direct contact with groundwater (ingestion and dermal contact) and inhalation of volatile contaminants and tritium and evaluation of the groundwater protection pathway assuming unrestricted groundwater use.

Table 3-3, p 3-13. Preliminary Action Levels.

Comment: At this time, it is premature to identify a preliminary action level and a list of COCs for groundwater. Data of sufficient quantity and quality are not yet available to determine contaminants that are of potential concern on a cumulative risk basis.

Tables 3-4 and 3-5, p 3-15.

Comment: Explain how Hanford site soil background levels are considered a performance requirement.

Table 3-6 and 3-7, p 3-23.

Comment: How are Hanford site soil background levels considered appropriate for comparison to groundwater and how are they considered a performance requirement. Background values and groundwater concentrations representative of "upgradient conditions" (not been impacted by Hanford site activities) are not appropriate for use in a groundwater risk assessment. Why are soil precision and accuracy limits applied to groundwater? Precision and accuracy control limits should be tighter than those listed for soil.

Table 5-3 pp. 5-3 to 5-5.

Some of the decision rules do not capture the appropriate use or "action level" for the population parameter.

DR#1. Decision rule should say that "If historical vadose zone contaminant data (both radiological and nonradiological) adequately characterizes the nature and extent of contamination within the boundaries of the 200-BP-5 OU, then no additional data are required. If not, then more characterization data are required".

DR#2. Decision rule should say "If historical and current vadose zone soil contaminant data (both radiological and nonradiological) adequately characterizes the nature and extent of contamination within the boundaries of the 200-BP-5 OU, then no additional data are required. If not, then more characterization data are required". Is 2 years an adequate time frame for collection and analysis of vadose zone data to fill data gaps?

DR#3. Decision rule should say "If groundwater data representative of current groundwater concentrations are available to adequately characterize the nature and extent of contamination (both radiological and nonradiological) in the unconfined aquifer of the 200-BP-5 OU, then no additional monitoring data are required. If not, then collect more data."

NOTE THAT action levels cannot be developed until a baseline risk assessment has been conducted and cumulative risks have been estimated using current groundwater concentrations and using future predicted groundwater concentrations. Generally groundwater data older than five years are not considered representative of current conditions and should not be used.

This DQO needs to define the number of sampling rounds required to estimate risks from each monitoring well and how the data will be grouped to estimate cumulative risks for the operable unit. Historic groundwater data are only useful in confirming that the appropriate analytical suites have been identified for future sampling and analyses. For monitoring wells with insufficient analytical data, explain how two years of data are considered adequate for characterization purposes?

DR#4. Decision rule should say "If saturated zone model input parameters are available to accurately predict future groundwater concentrations, then additional input parameters are not needed. If not, then obtain appropriate input parameters. Additionally, action levels should include availability of relevant and appropriate studies.

DR#5. Should be the same as DR#3.

DR#6. Decision rule should say "If groundwater data representative of current groundwater concentrations and hydrological characteristics are available to adequately characterize the nature and extent of contamination (both radiological and nonradiological) in the confined aquifer of the 200-BP-5 OU, then no additional monitoring data are required. If not, then collect more data."

DR#7. Should be the same as #4.

Section 7.1.2.1 suggests that additional contaminants will be analyzed in wells in high-concentration areas of the plumes and/or at wells immediately downgradient from selected waste sites. Table A-2 lists the wells selected for this "additional analysis", but they are only the "new wells" that have not been installed yet. Monitoring wells within the existing monitoring network should be selected to confirm the absence (or presence) of contaminants for the purpose of accurately evaluating cumulative risk within the operable unit.

Comment: Some reports were not available on the ARPIR website, therefore the conclusions drawn in the DQO report could not be independently validated. These documents include:

- *Remedial Investigation Report for the 200-TW-1 and TW-2 Operable Units*, DOE/RL-2002-42, Rev.0. Note that only draft A is available and the results of the GWP pathway were not presented in this version and could not be verified.
- *Feasibility Study for the 200-CW-1 and 200-CW-3 Operable Units and the 200 North Area Waste Sites,* DOE/RL-2002-69.
- *A Summary and Evaluation of Hanford Site Tank Farm Subsurface Contamination,* (HNF-2603)