
Addendum 2 – Issue Manager Background Notes

August 15, 2012

Addendum 2 is an unedited, relatively ‘unpolished’ reference document synthesized by the Board’s Site-Wide Permit issue managers that provides additional context and background for the advice points and Addendum 1.

Note: References to advice in this “Issue Manager Background Notes” document are obsolete. The sole purpose for this document is to facilitate Ecology’s review of the Board’s advice on the Site-Wide Permit.

Although the Hanford Advisory Board has not previously developed advice for the Hanford Site RCRA permit, indirectly the HAB has developed many pieces of advice pertaining to the Hanford site cleanup. The Board’s first piece of advice in June 1994 to the Tri-Party agencies spoke of supporting the integration of characterization and cleanup. The Board has previously urged (#133) that DOE “*stop disposing of offsite wastes in the low level waste burial grounds (LLBG) until they are fully investigated for disposal of hazardous or dangerous wastes (including liquids, flammables, solvents, etc.) and for releases of hazardous substances (consensus advice # 98 and #103). It is vital that the groundwater monitoring around the burial grounds be substantially upgraded and vadose zone monitoring be instituted as part of this investigation. Many of the wells are dry, or soon will be, and the burial grounds lack any leachate monitoring and collection system.*” Again, most recently regarding the 200-SW-2 Radioactive Solid Waste Burial Grounds (#243) with the statement “*the Permit should recognize that vadose zone monitoring is an early warning system which should trigger corrective action via enforceable contingency plan requirements in the permit. Monitoring should be shifted from interim indicators to specific regulatory standards for potential chemical and radionuclide releases.*” HAB advice (#s 173,174) also spoke to a preference of characterization & RTD with engineered barriers as a last resort with the need to monitor for failures. Advice also spoke to the need to include requirements for an analysis of likelihood and consequences of failure or imminent failure of barriers past active control of Institutional Controls.

NOTES SUPPORTING THE DIFFERENT SECTIONS OF THE DRAFT PERMIT:

GENERAL ADVICE:

Original Point 1: Ultimately deleted, included in this document to note the IM concerns : The Board advises Ecology to revise the Permit to address a general lack of clarity, rationale and logic presented in the document(s) The Board finds no rationale or logic presented in either the overarching or unit-specific Fact Sheets or the unit-specific Permits to support Ecology’s decision-making process. (e.g. Modified/Partial closure of an individual unit is not authorized under WAC 173-303- regulations [*see* 1325-N]). More examples: Introduction page 6; Reorganization of tank farms reorganized into 7 WMAs

Point 1: TPA milestones referenced not the actual dates, include specific Mile Stone dates; listing of other applicable laws, etc.

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Point 2: It is difficult to track permitting actions in referenced rather than attached/include documents.

- The training sections of the Permit refer reader to the Hanford Emergency Management Plan and/or a unit specific training plan. The latter is unavailable unless a Request for Public Information is filed with Ecology.
- Suggests use of a matrix approach whereas the applicable sections of the CERCLA documents are directly included in the permit is more transparent and publicly accessible. Concerns regarding “double jeopardy” are eliminated by including only those sections of the CERCLA documents needed to fulfill RCRA DW permitting requirements and modification process. CERCLA documents could contain a table of contents identifying these area and/or separate chapters for the permit requirements. This would also not be “duplication of efforts” as two separate documents are not necessary.

Point 3: SST draft permit was released after the initial beginnings of public review. It was difficult for the public to recognize there was another portion of the permit needing review.

Point 6: HAB advice # XXX previously addresses our concern of shift of RCRA authority responsibilities to CERCLA. CERCLA work activities will be ongoing and possibly completed before a closure plan is even submitted; there is uncertainty that these plans will contain all the required RCRA criteria.

Point 7:

- HAB advice # 133 addresses our concern of allowing off-site waste to be stored at Hanford.
- Concern that waste may come to Hanford in general and Permit could ban importation of mixed waste.
- Concern that Permit over-relies on Final TC&WM EIS to impose a moratorium on the importation of offsite waste until 2022 when the WTP is operational according to the TPA, and that this moratorium may change, and we won't be able to see the EIS until the end of the Permit comment period if it comes out in “late summer” 2012.
 - TC & WM EIS not finished
 - May allow GCC waste disposal
- Offsite waste coming here remains a possibility because there's no formal agreement.
 - Ecology states they are confident in the current language in the Permit in just the individual unit permits. They do not propose to add a condition barring offsite waste into the Part I & II conditions. Current waste moratorium till 2022. Whether DOE will allow it to come here again remains unknown. It will depend upon the level of total cumulative risks at Hanford and public into the permit needed permit modification.
 - If Permit conditions are to be based/established on results from the EIS [risk budget tool results, etc], then the EIS should be finalized prior to the permit conditions or finalization of the permit.
 - Outstanding question remains on the classification of ‘debris’ since most wastes have not been characterized. Question remains on whether none of the solids actually contain liquids or not.

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Point 8: Several of the Part A forms have incorrect process codes or volumes listed (D83 Surface impoundment vs. D84). Washington State Department of Ecology (Ecology) needs to review each unit's Part A form for compliance with unit(s) specific Dangerous Waste Regulations (WAC 173-303) requirements.

Permit Section: PART A Forms – is part of each unit

- Each unit permit should have an attached Part A form found with the link to that unit.
- Why do we need a Part A Form?: Any person seeking a final facility permit must complete, sign, and submit an application to the department (Ecology-NWP for the Hanford site). It must consist of a Part A permit form and the contents of Part B as specified in WAC 173-303-806(4). How much of Part A information is applicable or enforceable in a Permit? How is a Part A used to “finalize unit closures?” Volumes quoted: Do they make sense when compared to other information listed on the Part A form? Compare with the fact sheet.

Point 9: WAC 173-303-640(3)(a) text specifically uses the words ‘*must include*’.

Point 10: Ex: Changes in the ETF waste acceptance criteria is anticipated but there is no path for Public Involvement reviews provided in its Permit conditions.

Point 11: Ex: The 242-A Evaporator is anticipated to be running campaigns in excess of its current design functions in support of future WTP facility needs. The 242-A Evaporator's permit does not have a permit condition which addresses likelihood of equipment replacement needs.

Point 12: Both Ecology & the HAB recognize the need for a Risk Budget Tool and the necessary funding needs. The following was edited into advice points #12 with remain text placed in the Notes document: The Board advises Ecology to include a Permit condition requiring the use of a Risk Budget Tool to model cumulative effects to groundwater. The Board advises Ecology not to base the Risk Budget Tool on un-validated models. The Board advises Ecology to include impacts from nearby waste sites/ trenches to bound cumulative impacts to groundwater in the model used in the Risk Budget Tool. The Board advises this condition be included in the Part II conditions. This was subsequently edited during the COTW meeting as now drafted[8-8-2012 COTW]

Point 13: The Board notes that use of Method A and C to meet cleanup standards is inconsistent with previous commitments by DOE to unrestricted residential use along the River Corridor.

Point #19: For regulations, see WAC 173-303-806 and 810; tanks, containment systems, piping, drip pads, and many other units referenced throughout WAC 173-303 must be independently evaluated and certified by qualified, registered professional engineers attesting to structural integrity....

Point 20: Other clarification moved into Notes : (and that avoids plating, crud bursts and other phenomenon known to interfere in accurate air sampling).

Additional supporting information for advise point on Vadose Zone condition: Associated Risk to the Vadose Zone & groundwater:

- **All 12 single-shell tank farms have impacted groundwater**
- **Current plumes are 50-300ft deep which will be technically difficult to remediate. However the 50ft depth is not unmanageable using techniques similar to mining.**
- **One million gallons of tank waste has leaked to the soil, causing extensive soil contamination**

Discussions/Comments on the Fact Sheets:

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Fact sheet should include an explanation of need for a Part A form: Any person seeking a final facility permit must complete, sign, and submit an application to the department (Ecology-NWP for the Hanford site). It must consist of a Part A permit form and the contents of Part B as specified in WAC 173-303-806(4). Each unit permit should have an attached Part A form found with the link to that unit.

Discussions/Comments on the Introduction:

Notes:

The IM Permit review team suggests to Ecology the need to rewrite the Introduction to clarify the following:

- who the regulatory agencies are,
- the process for incorporation of TPA schedule changes in the RCRA Permit,
- what portions of the Permit are ‘enforceable’.

HAB member review comments on Introduction:

- Introduction should be re-written to clarify acronyms, and relationship of terminology of the work that needs to be done.
- Goose chase to find information.
- Lack of clarity – here is an example - Part 4 – rather than point reader to TPA, direct reader to Part 4 and edit this section to clearly identify which of the OU’s are CPP’s and R-CPP’s for cleanup.
- TPA action plan is referenced, can’t make comments on the action plan – have to comment on the Permit. It is a sign post pointing to other documents. Can’t comment on and change the TPA action plan. We don’t appreciate reviewing the Permit having to constantly go to other documents for information.
- Example of lack of clarity: Who the lead regulatory agency is not clear. Even agencies say it is difficult to understand.
- Suggestion that there is a permit that will be issued – but changes to schedules won’t be publicly accessible.
- Schedule changes as they are made in the TPA are just assumed, incorporated in the permit without a formal process. Without public comment.
- Introduction is misleading to the public – public will not be able to comment in the future.

1. Comments on Introduction:

Comment #1: Section 1.2.1 Waste Site Categories listed 7 categories defined as RCRA facilities, TSD units, DWM units, SWM units, OUs, PP units and inactive portions of Hanford. Unless the reader deals with these acronyms every day, further understanding of these acronyms in this “Category” when no waste was ever on the inactive portion.

- #### 2. Comment #2: I found the discussion of the two cleanup processes in Section 1.2.2 (Cleanup Processes) to be confusing and extremely difficult to follow. One suggestion is to provide examples of different kinds of waste sites and different kind of facilities rather than adhering to Ecology RCRA/CERCLA acronyms and Ecology jargon of which the public may not be familiar. The CPP and R-CPP process discussion became difficult to follow.

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3. Comment #3: Sections 1.2.2.1 (OUs subject to CPP process) and 1.2.2.2 (OUs subject to the R-CPP process) both tell the reader that he/she must go to Appendix C of the HFFACO Action Plan to find out which OUs are included. This permit ought to be able to save the reader and permittee time by listing those OUs without referring to the HFFACO Action Plan. In addition, the HFFACO Action Plan is not subject to review in this exercise. That means if the reader has problems with how the OUs have been organized, this permit is not the agenda to comment. This leads to the larger concern that the permit is dependent on other documents outside the scope of this review. That is frustrating because it isolates the permit from critical review. The permit is essentially a signpost containing signs pointing to other documents which cannot be reviewed or changed.
4. Comment #4: Section 1.2.3 on the Lead Regulatory Agency was difficult to understand. Since the criteria for assigning the lead agency came from the HFFACO Action Plan, the criteria appears to be off-limits for comment and revision.
5. Comment #5: Section 2.1.1 (Purpose) states that the draft permit must work in coordination with the HFFACO (which is not subject to public review at this time). This future coordination does not appear to be subject to public review. That suggests that while the public is allowed to comment on certain aspects of the draft permit at THIS time, the public is NOT allowed to comment on the implementation of the permit as the permit is “coordinated with the HFFACO.” Such language in Section 2.1.1 seems to further distance the public from the process of cleanup at Hanford.
6. Comment #6: Section 2.1.2.1 (Conditions) elaborates on Section 2.1.1. The statement is made that “Some conditions establish compliance schedules or use information from other documents,” and “Schedule changes are incorporated into the permit without a formal process.” Both statements allude to the point that the permit contains information NOT SUBJECT TO PUBLIC REVIEW. Such information pours into the permit and cannot be challenged by reviewers because it is from a source that is not open for public comment.
7. Comment #7: Near the end of the Introduction, after the overview of the permit contents, the statement is made, “Permittee will comply with enforceable portions of the Permit’s attachments, addendums and appendices.” The question then arises as to how the Permittee will know which portions are enforceable.

Notes:

- Reviewer did not find anything that had to be changed.
- Section 1.2.1 lists seven waste categories. RCRA, TDS, etc. Inactive portion of Hanford is not an active waste unit, is it? Orchards count even though no waste sites.
- RCRA Facilities – is that different than TSD units? Jean says – they overstate it. Good to ask for clarification.
- Language about what each unit is, is unclear. Members of the public will be confused. Clarify acronyms.
- Section 1.22.1 – Why can’t permit list which operable unit is which.
- Section 1,2,3 two cleanup processes, lead reg authority comes from TPA action plan, copying criteria, very difficult to understand.
- 2.11 – Purpose – Permit working in coordination with TPA. Public is not able to comment on implementation of the permit.

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- Section 2.2.1 – Conditions – Ecology doesn't have authority to do this.

Discussions/Comments on the Hanford Emergency Management Plan:

- Ecology needs to review advice points under the WTP Facility as many are relevant to the editing needs of the Hanford Emergency Management Plan.
- Fig. F1-1: Places portions of SR 240 and the B Reactor museum **INSIDE** the public access limit; Places one arm of LIGO almost fully **INSIDE** the public access limit; Places the Gable Mountain and Gable Butte sacred sites **INSIDE** the public access limit; Places the Dunes monument area **INSIDE** the public access limit.

Discussions/Comments on the Parts I and II Conditions: Self-explanatory. Also review over-arching advice points.

Discussions/Comments on the Part III: Operating Units: Also review over-arching advice points.

LERF & 200 Area Effluent Treatment Facility: Self-explanatory. Also review over-arching advice points.

Other notes:

Issues:

- What agreements are in place for sending effluents to ETF? If WTP is going to send effluents to ETF does its waste acceptance criteria allow this?
- What other WTP interface agreements exist? (DOE & Contractor interface control document # 19 was cited by Ecology as the answer to the ETF effluent question).
- ETF will also need upgrades for the volumes received and how/when it puts this waste stream into a 2nd waste form acceptable for disposal [probably in ERDF].
- What's the "Pre" to Pre-Treatment Facility going to look like if there's one in the planning? What type of permit will this facility have if built?
- How is the waste acceptance criteria enforced for ETF?
- Public review issue.
- Not clear that receiving facility is able to accept new waste streams – assumptions that facilities are able to accommodate those new waste streams.
- Example: garnet in tanks

Notes:

- Need to get more information from Ecology – answers to these questions.

HAB reviewer notes & comments:

- the failure for hazard identification and hazard mitigation in the permit.
- Comment: The Permit claims to protect human health. Regarding LERF and ETF, there is no definition of the hazards which must be controlled to protect human health.
- The Permit fails to describe the abnormal feed streams which would threaten human health. Therefore, the actions necessary to deal with abnormal feed streams are not documented.
- The Permit is written like both the LERF and ETF always receive non-hazardous waste and that no precautions are required for safe operation of LERF and ETF.
- For example, if organics from the 242-A Evaporator are dangerous wastes which must be carefully controlled, the Permit does not acknowledge the need for special controls.

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- The permit is oblivious of any hazardous materials which may enter LERF and ETF and eventually cause damage to human health.

Other HAB reviewer comments:

- Comment: The Permit claims to protect human health. Regarding LERF and ETF, there is no definition of the hazards which must be controlled to protect human health.
- The Permit fails to describe the abnormal feed streams which would threaten human health. Therefore, the actions necessary to deal with abnormal feed streams are not documented.
- The Permit is written like both the LERF and ETF always receive non-hazardous waste and that no precautions are required for safe operation of LERF and ETF.
- For example, if organics from the 242-A Evaporator are dangerous wastes which must be carefully controlled, the Permit does not acknowledge the need for special controls.
- The permit is oblivious of any hazardous materials which may enter LERF and ETF and eventually cause damage to human health.

242-A Evaporator: Also review over-arching advice points.

Other notes:

Issues:

- How is the evaporator going to handle all the extra campaigns when WTP comes on line?
- Did the TC&WM EIS address this question?
- Is there a replacement facility for the 242 Evaporator?
- Fact Sheet: Does not address major upgrades recently made with stimulus money, new off gas system
- Conditions: Ignore the ammonia issue – not addressed. Ammonia has been sent to evaporator in excess of feed criteria limits. Is that going to continue? That is not at all reflected in this permit. The impact of ammonia – off gas.
- Unit description should have included new information.
- Part A should include new upgrades.
- Fact Sheet: Does not address need for equipment replacement. 35 yr old evaporator has had equipment failures on established frequency which will continue into the future. Needs to work for another 20 years. Key is the boiler system. Loss of the main boiler unit will put it down – 1-2 years to replace it.
- HAB is concerned about the reliability of facilities that have to operate on an interconnected schedule.
- Accumulation of organics in condensate tank, potential explosion. This was not recognized as a safety issue in the permit. Have recognized the need to overflow the condensate tank at the end of each campaign, BUT if organics keep going back to the tank, then you have a major build up of organics in the underground tank.
- Is there State concurrence for changing procedures for organics?

Additional Notes:

- If WTP starts in 2019 there is a pinch point in 2022 evaporator running more campaigns than it has ever run in its history. Manager says, we don't think it can do that. If main boiler unit goes down, WTP shuts down.

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- 3.7.1 Tank Waste Acceptance Criteria – requirements for limiting volatile organics. Inaccurate samples to reflect organics in the waste. Organics stay at top, don't get pumped to evaporator. Sampling doesn't reflect true organic levels in the tanks.
- LERF issue too – can't take organics. Before were pumping to ETF from the bottom of the tank including organics. Surprised that there were so many organics. They are supposed to overflow back to the underground tank.

HAB reviewer notes & comments:

- The fact sheets omits an important aspect of the evaporator which is that the evaporator is 35 years old and requires continual maintenance. The fact sheet omits the fact that the evaporator has a frequency of equipment failures (pumps fail etc) which have not been carefully tracked and are not carefully planned for in the future.
- The fact sheet omits the fact that the 35-yr old control systems were gutted and replaced with up to date systems in the past 5 years. The fact sheet omits the fact that stimulus money was used to make several other upgrades to the system.
- The fact sheet omits the fact that ammonia specifications for evaporator feed have been routinely ignored resulting in corrosion in the off-gas system, and replacement of those pieces of equipment using stimulus money. The projected failure into the future is a certainty but has not been planned for.
- The fact sheet omits any of the events which have yielded unplanned contamination. In other words, the permit pretends that there are no events to be concerned about...because, perhaps, the state is not aware of past events where contamination and hazardous waste have been unconfined inside the evaporator building.
- The most important element which is needed for the fact sheet is that historical equipment failures need to be placed on a timeline and projected into the future, so that equipment replacement can be planned using historical failure frequency.
- The biggest concern is failure of the primary evaporation vessel which would require a major shutdown with a long duration. A shutdown with a long duration would adversely affect the WTP.
- If you had a 35-yr old car and expected to drive the car hard every year for another 50 years, you would be expecting to replace the transmission and the engine periodically. The fact sheet does not reflect the fact that the evaporator needs to be operated another 50 years and will have many mechanical breakdowns in that time period.

325 Hazardous Waste Treatment Units: Also review over-arching advice points.

Central Waste Complex: Also review over-arching advice points.

Other Notes:

Issues:

- Non-compliant facility – what is being done to address this?
- Why have the upgrades needed to bring it into compliance with the Dangerous Waste Regulations not been included as Permit Conditions?
- Ignitable wastes maybe stored next to corrosive wastes; what are the applicable regulations? Do the Dangerous Waste Container regulations apply?
- Ignoring waste treatment requirements

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- Compliance schedule???
- Worker safety issues.
- When will CWC close? Unknown; will operate until all wastes are done. Also unknown is whether it will include anything from the closure of WTP...to far into the future.

Notes:

- Are they going to require building a new facility?

Additionally received comments on the CWC:

- Waste stored at the CWC should be cataloged and properly labeled. The drums are currently labeled as debris, which has a legal definition of “dry” waste.
- There have been multiple, documented leaks of toxic liquid from “dry” drums.
- We urge Ecology to issue an order to have all wastes properly characterized to ensure that explosive or flammable chemicals are properly stored, and that all the wastes are removed for treatment on an aggressive schedule in an enforceable permit.
- RCRA requires:
 - Dams, berms, and containment be present that equal the content of the drums
 - That there be segregated and designated storage areas
 - No outside storage
 - Characterization and designation of what waste is actually being stored in the CWC
 - Corrosive, incompatible wastes not be stacked on top of one another.
 - Any new permit should include this language and make sure that existing conditions are brought into compliance with RCRA
 - A new permit needs to include a strict schedule to remove all wastes to be tested, characterized and properly designated
 - Strict schedule to remove waste for treatment.
 - A HAB advised plan to fund removal and treatment as important compliance activity
 - All outside waste needs to be removed and properly stored.
 - Must either close the current facility or bring it up to compliance with the law.
 - Waste currently on site needs to be characterized
 - No new waste should be admitted

Refers to Over-arching advice point #24 –IM -G Pollet :

There are formally documented exceedances of standards for groundwater contamination from existing wastes, existing waste site contamination release projections; and, on-site cleanup generated projected waste disposal releases, including cumulative impacts from all units in the Central Plateau, which SEPA requires Ecology to consider and mitigate.

- 1) Apply the principle of “Clean-Up first”, if the wastes already at Hanford are projected to cause contamination in excess of groundwater and health standards, then the permit must bar adding any more offsite waste.
- 2) It is not adequate to apply a bar on offsite waste solely on a unit by unit basis utilizing a risk budget for that unit, without considering the cumulative impacts from releases to groundwater from all units and contamination sources in the area.

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3) The failure of existing storage facilities to be compliant makes it important to have a general condition barring offsite waste additions. Barring waste additions to the existing facility is not adequate to prevent USDOE from adding new facilities which could accept offsite waste while failing to have the existing wastes and facilities brought into compliance.

Waste Receiving and Processing Facility (WRAP): Also review over-arching advice points. HAB reviewer notes & comments:

- The WRAP facility was designed to package TRU waste to meet waste acceptance criteria at WIPP. The permit does not discuss this function with TRU even though mixed waste can contain plutonium. **ADVICE:** Edit this section of the permit to point out the function of the WRAP is to package TRU waste for shipment to WIPP, and that mixed waste can have TRU components and be called mixed TRU waste or MTW.
- Given the various sections of the permit for the WRAP facility, the operative part is the Waste Analysis Plan (compared to the Fact Sheet and other sections which say very little). No guidance is given to sampling a waste drum with unknown and different waste in each package. Many drums were filled over a period of operating shifts and various people put various waste into the waste drums. The permit acts like this waste is described perfectly, but usually there is no information available, and the WRAP operator has to exercise personal judgment as what to sample and what not to sample. When there are many different containers in a drum, the prudent step is to sample each container. However, the Waste Analysis Plan appears to avoid providing insight as how to sample every bottle in the waste drum. **ADVICE:** Provide guidance on how to obtain representative samples from a drum when the drum contains multiple containers of waste, with no process information which shows the waste is linked (typical of most drums produced in the 1970s, 1980s and 1990s.)
- **MISCELLANEOUS COMMENTS ON WRAP SECTION OF PERMIT:**
 1. The Part A Form is too complex to decipher. The coded information should be provided in plain English so that the public understands what is going on.
 2. The **FACT SHEET, UNIT DESCRIPTION** Lines 13-15 describes the wastes to be handled as dangerous or mixed waste. Transuranic waste is not specifically mentioned leaving the reader wondering how TRU waste fits into the WRAP function. Line 20 says that WRAP treats mixed LLW or mixed TRU. **Suggestion:** Add a sentence or two to explain how TRU within the WRAP facility fits into the permit.
 3. Page 2 of the **FACT SHEET** states that waste is sorted at WRAP. There is no clue as to what dangerous chemicals might be present in the waste. **Suggestion:** provide insight into the kinds of dangerous chemicals that are found in TRU drums being handled in the WRAP. This should be consistent with the information in the Waste Analysis Plan.
 4. In the **FACT SHEET**, the General Waste Management Requirements are defined by WAC 173-303-300(2) which requires a detailed chemical, physical or, if necessary, a biological analysis of the dangerous waste **BEFORE** such wastes are stored, treated or disposed in WRAP. At Hanford, WRAP receives waste drums from the 1970s, 1980s and 1990s without knowing much about what is inside. **SUGGESTION:** Add

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- sentences which explain how WRAP can accept unknown wastes without violating WAC 173-303-300(2).
5. In the CONDITIONS SECTION, page 5, lines 6&7 state that WRAP provides storage and treatment for DW and/or MW. Nothing is said about TRU. Suggestion: Add an explanation of how TRU is handled under the heading of mixed waste.
 6. The CONDITIONS SECTION point to some other document for every single condition. By failing to provide conditions, this section raises a policy question of how the authoring agency can be trapped into writing a CONDITIONS SECTION which does not contain any conditions. SUGGESTION: Put the conditions in the CONDITIONS SECTION.
 7. The Waste Analysis Plan contains 40 pages of which the singular most important activity is to determine if liquids are present. If no liquids are present, it appears the waste can be repackaged for WIPP without further thought. If liquids are present, the need for sampling is left to the operator except that one in ten drums, or one in ten bottles, need to be sampled. Suggestion: Provide clearer instructions for the operators.
 8. Section B.1.1.1.2 of the WAP, entitled the Waste Acceptance Process: Line 24 states that a percentage of waste containers will be subject to chemical screening as spelled out in B.2.4.3. How does one know what dangerous chemicals will be there given the wide range of possibilities?
 9. Section B.1.1.1.2.2 of the WAP states there is a committee of people who perform evaluations for each waste. Suggestion: Explain how the people on this committee determine what to sample and what to sample for.
 10. Section B.2.1.1.1, the WASTE STREAM APPROVAL PROCESS depends on WRAP operators conducting a review of the waste information provided by the permittee. This information can be vague and general with no specifics. Most of the time the permittee will guess what went into the drums, especially if the drums were filled over different shifts performing different activities. SUGGESTION: The permit must be more realistic and realize that specific information is not available on all drums of waste, and that operators will have to “wing it” regarding the sorting of waste and sampling of waste, especially when no liquids are present. The permit must be more realistic regarding the questions facing operators as they pull out packages of waste with unknown chemical contamination.
 11. SAP Section B.2.1.1.3.1 GENERAL KNOWLEDGE REQUIREMENTS: This requires the waste generator to use on-site labs to obtain data that will be used as a basis to certify that the waste meets LDR standards. This shifts the responsibility for characterizing the dangerous waste from the WRAP facility to the Waste Generator. SUGGESTION: There seems to be an inconsistency in different parts of the permit as to whom is responsible for characterizing the waste as DW or MW. This responsibility should be made clear throughout the permit.
 12. Section B.2.1.3.1 of the Waste Analysis Plan states that 10% of the containers need to be verified by physical screening and chemical screening. Sampling only 10% of the containers when each container is different will not provide an accurate characterization of the waste. Suggestion: This requirement should be made clear if it applies to 1 in every 10 drums, or 1 in every 10 waste packages inside a drum. The

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- 10% rule should only be applied to where it is absolutely known that the material inside the drums is exactly the same.
13. Section B.2.1.3.3 of the Waste Analysis Plan recognizes that a sample from one package on top of a drum may not represent the 15 other packages located near the bottom of the drum. The Analysis Plan does not tell the reader exactly how to proceed. SUGGESTION: The Plan should provide more guidance to the WRAP operator.
14. Section B.7.3 Waste Treatment, discusses a single treatment of neutralizing a liquid and then mixing the liquid with cement, forming a grout for burial as a mixed waste. SUGGESTION: The treatment of DW and MW should allow for some flexibility such as outlined for treating peroxides, oxidizers, sulfides, cyanides and halogenated organic carbon.

WTP:

Issues:

- WTP concerns – How will the Permit ensure that the WTP will work?
- Stack Emissions
- Characterization of Waste
- Air Permitting – separate for Hanford Site with DOH and Benton Clean Air Authority. It is listed as another permit that they have to have. Part A form. Need someone to look at this. When WTP operates, will have big air release concerns. Make sure that the conditions are adequately addressing those issues.
 - WTP: Technical info not easily found. Technical issues will require decisions to be made in a very short time period. How do the Permit conditions address this concern?
 - Examples: WTP Pulse jet mixers are a problem not yet resolved; Equipment (tanks, etc) are already being purchased; Corrosion is an issue; Criticality issues not understood.)
 - Waste Incidental to Processing Reclassification (WIR): Solely a DOE responsibility, the tank farm soils would still be under RCRA whatever the WIR process determines.
 - Tank Farm Vadose Zone is being handled under the RCRA Corrective Action process. A RIF/CMS report is required.

Notes:

- When's the natural gas pipeline going to be installed? [Ecology response: Not in the WTP baseline. Steam boilers are for 'comfort heating.' They are designed to use diesel. They are a part of the Balance of Facilities. They are not considering it. When the EIS comes out, they will have to consider it. However, the 'safety & authority' basis is a very big deal; all designs will need review because of nuclear safety concerns.]
- What agreements are in place for sending effluents to ETF?
- Concern that the design is still being changed.
- How do you permit a facility that is still being designed.
- Not sure what the requirement is, the diagrams in the permit, engineering docs are not stamped by a registered engineer. Not sure what these drawings really are. Flows coming in from low level waste, high level waste, condensate, all join together and go to a common tank, there is no valve. Exhaust headers issue.

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- Lots of valves and control system absent from drawings and may be absent from design. Not clear until see where they are going with the plant.
- Secondary containment on piping from tank farms. Disclaim that they didn't look at corrosion resistance on pipes. In Oregon, if you look at a system you look at it all, can't be selective.
- Emergency Plan as relationship to this – these are rough thoughts:
 - Don't set standards or criteria for incidents and events.
 - Everything is deferred to emergency management plan which is outside the permit.
 - Include a few new things – B-Reactor museum etc. inside public exclusion area
 - Natural phenomena is talked about – but not many modes of failure. For example losing offsite power for a month at the WTP.
 - Do talk about volcanic stuff. Didn't look at lessons learned about doors being taped shut and people trapped inside from mt. saint Helens.
 - CO2 fires, deadly near high voltage equipment – didn't look at this in the emergency plan
- Wastes that are too difficult to treat: Need to be designed for now.
- Off-gas melters – removed systems to save cost, but changes operator training requirements.
- Pulse Jet Mixer Design: using stellite 12 for alloy for metal, looked for renolds number in the parameter of something to turbulent. Stellite is good for.....
- Nothing in diagrams that warrants them not being in the publicly released version. Nothing that seems like it is top secret.
- How can you have a permit for review that you can't see?
- Can't read the documents in paper copy – diagrams – Part 3 Operating Unit 10-C-1-24 – taken a big diagram and shrank it – impossible to see the details. Need to look at the electronic copy to see it.

Additional HAB reviewer notes & comments:

- Reviewer suggests to Ecology to link to documents III.F...
- Reviewer suggests to Ecology to revise the Emergency Management Plan in the following ways:
 - - 1) Part III, Section F – defers to Hanford Site Emergency Plan.
 - a) Does not set standards or criteria. (F1 Section F5.0 FACILITY HAZARDS). These are deferred to later. (Chemical and radiological constituent hazards that could occur at the WTP will be identified and evaluated in the hazards assessment required by the Hanford Emergency Management Plan (DOE-RL 4 94-02, 2006), Section 1.3.3.2.)
 - b) Does not require early identification to allow for design change or mitigation
 - 2) Part III F1, Emergency Response - Figure F1-1 – inappropriately sets the public access limit
 - a) Places portions of SR 240 and the B Reactor museum **INSIDE** the public access limit
 - b) Places one arm of LIGO almost fully **INSIDE** the public access limit
 - c) Places the Gable Mountain and Gable Butte sacred sites **INSIDE** the public access limit
 - d) Places the Dunes monument area **INSIDE** the public access limit

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- 3) Part III F1, Emergency Response - Section F1 - F5.4, F6.1.9 and F7.2.7 Criticality
 - a) Inaccurately assert that criticality events are not credible. Based on plutonium particles and mixing issues, these are now known to be credible events. (Analyses have shown that there is no credible criticality event that can be postulated to occur at the WTP (BNI 2001b).)
 - b) Even were no credible events postulated, the emergency plan is derelict if it doesn't plan for response to such events.
- 4) Natural phenomenon (e.g. Cascadia seismic events) need not severely damage the plant to result in severe releases within the plant. The emergency plan would be derelict not to plan for response to potential events.
- 5) The Emergency Plan does not reference, postulate or plan for suffocating CO2 release events from the cooling systems.
- 6) As evidenced by the eruption of Mt. St. Helens, the damages and difficulties associated with volcanic events go far beyond those identified in F6.2.2 Volcanic Eruption/Ash fall. These include highly abrasive ash infiltration into operating spaces, equipment failures from polishing, added entry controls to minimize ash entry resulting secondarily in failure of exit safety equipment to perform (e.g. exit doors being so taped shut as to be unusable in an emergency).
- 7) The emergency plans should include an assessment of various modes of failures and their impacts on the emergency plans (e.g. common, cascade, sequential, parallel and other modes; age related failures through erosion, wear, corrosion, etc...)
- 8) Section 9.2 should include specific actions to ensure that CO2 fire extinguishers are not used on or near high voltage equipment, nor in areas that are or may become "confined spaces".

Other notes on the review of WTP

- 1) ADDENDUM B1 WASTE TREATMENT PLANT WASTE ANALYSIS PLAN
 - a) Section I Introduction, Part III, Operating Unit Group 10-B1.1, Paragraph at line 31. NRC has not agreed to classify the ILAW waste as incidental to reprocessing. They said they will likely agree provided a set of conditions are met (removing key radionuclide to the maximum degree practicable, meeting Class C waste limits and conditions, etc...), but that if they are not met, the reclassification may not be allowed.
- 2) Though the Appendix makes extensive reference to several documents, they are not included in the permit as attachments.

9.1 Project Documents

Waste Treatment Plant Quality Assurance Project Plan for the Waste Analysis Plan, Rev. 0.

26 24590-WTP-RPT-MGT-04-001, Rev. 0, Regulatory Data Quality Objectives Optimization Report RPT-W375LV-EN00002, as amended. Approach to Immobilized Hanford Tank Waste Land Disposal Restrictions Compliance.

- 3) The appendix defers requirements for analysis and frequency to these documents and fails to set or require standards for these requirements or frequencies. The required analytes, methods, frequencies, and locations should be detailed as permit conditions as is partly done in III.10.C.e.ii

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- 4) Permit conditions III.10.C.2.n.i through .iv detail requirements that must be completed in the past (June 30, 2010). These should either be changed to future dates, or should detail the results reported and the actions required that flow from these.
- 5) Permit Conditions III.10.C.2.o.i and later require compliance with the Waste Acceptance Criteria and should be amended to include the NRC provisional criteria for delisting of the ILAW as other than HLW. If the wastes fail to meet these criteria, they are not subject to near surface disposal at Hanford.

Additional Reviewer Notes:

1. Refers to Advice Point # 27: Following the eruption of Mt. St. Helens many industrial facilities protected critical equipment and occupied spaces by taping doors. Only later when they went to remove the tape did they realize that the emergency exits could not be opened from the inside. Similarly, emergency systems no longer worked as expected in some cases.
2. Refers to Advice Point # 32: The NRC provisionally identified three criteria they would use to evaluate whether ILAW waste could escape being classified as High Level Waste requiring disposal in a deep geologic repository. Among these were requirements to remove key radionuclides to the greatest degree practicable, and to meet NRC LLW performance criteria. Various DOE decisions about how the waste treatment plant is designed (e.g. removing technetium removal capability) may cause the ILAW waste to fail to meet the NRC criteria.
3. Refers to Advice Point # 1: These either should be changed to future dates, or should detail the results reported and the actions required that flow from these events.

Refers to Advise point #27: *Notes: Failures can occur from single direct sources, or from more complex means, such as Cascadia seismic events or coronal mass ejections resulting in massive electrical grid and electronics failures. Complex systems are particularly vulnerable to cascading failures where single mode failures propagate causing later failures (e.g. explosions causing shrapnel to damage or destroy other systems leading to additional failures). Parallel trains of equipment if operated equally in parallel tend to reach end of life failures at nearly the same times. Failure of one such system leads to reliance on the next which in turn fails under pressure.*

4. Refers to Addenda with comments on the WTP unit permit: *Note: Addendum B-1 the Waste Treatment Plant Quality Assurance Project Plan for the Waste Analysis Plan, Rev. 0., 24590-WTP-RPT-MGT-04-001, Rev. 0, Regulatory Data Quality Objectives Optimization Report RPT-W375LV-EN00002, as amended Approach to Immobilized Hanford Tank Waste Land Disposal Restrictions Compliance defers requirements for analysis and frequency to these documents and fails to set or require standards for these requirements or frequencies.*

Refers to Addenda with comments on the WTP unit permit: With reference to... Addendum B-1 to the Waste Treatment Plant Quality Assurance Project Plan for the Waste Analysis Plan, Rev. 0., 24590-WTP-RPT-MGT-04-001, Rev. 0, Regulatory Data Quality Objectives Optimization Report RPT-W375LV-EN00002, as amended Approach

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to Immobilized Hanford Tank Waste Land Disposal Restrictions Compliance defers requirements for analysis and frequency to these documents and fails to set or require standards for these requirements or frequencies. Reviewer suggests to Ecology these required analyses, methods, frequencies, and locations should be detailed as permit conditions as is partly done in III.10.C.e.ii .

IDF:

Issues:

- Risk Budget Tool; IDF Risk Budget will model cumulative affects to GW but it doesn't include impacts from nearby waste sites/trenches. [Ecology-good comment; need for a risk budget tool to be developed, utilized & funded.] Ecology further stated that they would expect modeling from the EIS would be rolled into modeling for permitted unit's risk budget. Parameters from the EIS modeling will be taken into account. Ecology is happy with the modeling approach in the EIS]. Is HAB satisfied with the EIS modeling?
 - IDF =landfill and final disposal of waste. Ecology needs to know impact of waste streams to HH & E. If close to exceeding the risk budget for any COC, the Permit would have a condition to limit/restrict disposal.
 - HAB needs to understand how cumulative risks from the EIS may have impact on RCRA permitted units.
- What will it take to have IDF accept 2nd waste from WTP?

Notes:

- Pretty straight forward – conditions for behavior are simple. Leachate system.
- Disturbed that materials permitted in the trench are 50 cans of bulk vit from the so-called demonstration program that hasn't happened. Should be taken out – shouldn't be allowed to have those cans in the trench.
- Risk Budget Tool – program and mechanisms to produce values so the input is acceptable. This is a long ways from being available as far as Dick can tell. Should apply to currently open burial trenches. Anywhere you are going to plant waste in the ground, the risk budget tool should be active. Didn't see it anywhere. Risk Budget Tool needs to be in place before we start putting anything in IDF.
- Anything they plan to put into IDF, put in allowable inventory of things, not sure how that process is played out. Propose a nominal amount of stuff over period of time and show through risk budget tool that it is acceptable.
- That facility is designed for offsite waste, primarily it is designed for LAW. Current problem is fixation on finding ways to solidify secondary waste in a non-glass form, not acceptable. Haven't proposed that yet or change permit yet to incorporate that material. Likely to rear its ugly head.
- Tools they use to develop tank waste EIS, best we have in hand, use the best you can get a hold of, may want to upgrade it over time. Have a lot of work and effort in developing methodology used in EIS. Still doesn't represent reality. Better than guessing.
- Trenches and risk budget tool?

More notes from Ecology PP presentation to the HAB: The HAB supports use of a Risk Budget Tool and conditions requiring them. The HAB wants a validated model used for the Risk Budget Tool.

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Integrated Disposal Facility Permit; Waste acceptance criteria tools are built into Permit conditions

III.11.C.8 ILAW Waste Form Technical Requirements Document (IWTRD) For any ILAW glass form(s) that the Permittees intend to dispose of in IDF, the Permittees will provide to Ecology for review an IWTRD.

III.11.C.6 Modeling – Risk Budget Tool The Permittees must create and maintain a modeling - risk budget tool, which models the future impacts of the planned IDF waste forms including input from analysis performed as specified in Permit Condition III.11.C.8 (IWTRD) and their impact to underlying vadose and groundwater.

DST & 204-AR:

Issues:

- Tank Waste Retrievals and Closure Schedule
- Vadose Zone
- Characterization of Waste
- Non-compliant tanks
- Technical issues affecting design and safety basis are not acknowledged.
- Lack of budget to maintain instruments and working conditions is not acknowledged.

Notes:

- No hazard analysis for WTP for example.
- Lots of systems non-functional.

Additional reviewer notes & comments:

- The DST permit requires that wastes meet specifications or it would be a violation of the permit. Since radiolysis destroys hydroxide, the hydroxide level of certain tanks has dropped to levels below providing the corrosion protection required by specifications. Hanford contractors have left tanks out of specification for years due to lack of budget. **POLICY CHANGE REQUIRED:** The permit needs to address waste going out of specification due to changes in chemistry.
- The permit deals with the DSTs and radioactive waste like we live in a perfect world. Occasionally there are leaks to the ground from transfer lines and leaks inside diversion boxes. The Permit is silent on radioactive mixed waste that gets outside of tanks or pipes. **POLICY CHANGE REQUIRED:** The permit needs to address waste that has escaped into the environment from tanks and transfer lines.
- Condition III.12.D.3 requires the Permittees to submit a report annually to Ecology identifying changes in the compliance status of DST System noncompliant components as identified in H-14-107346. **POLICY CHANGE REQUIRED:** DOE should change their policy and provide copies of the DST system noncompliant components to the Hanford Advisory Board and to the public.

Additional notes edited from advice points:

- The Board is concerned with dropping levels of hydroxide and the resulting jeopardy of tank corrosion protection. The Board supports Ecology's efforts to deal with corrosion protection here and at the WTP

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Additional notes referring to DST #5: Part of the cleanup plan involves transferring the waste from the leaky tanks into other more reliable vessels. As they transfer the waste, workers face the risk of exposure to chemicals that may harm their health. Exposure to radioactive waste can lead to nausea, vomiting, diarrhea, fever, hemorrhage, increased risk of several types of cancer, and, in cases of high dosage, death.¹ The tanks also contain nonradioactive substances (i.e. silica, heavy metals, beryllium, acids) that come with a host of other health risks, including lung disease, decreased cell function in kidneys and nervous system, sensitized immune system, and burns.²

Certain conditions at the Tank Farms make worker exposure more likely than it should be. Much of the tank waste is uncharacterized, making it almost impossible to know to what workers have been exposed when an exposure incident does occur. The monitoring equipment currently used tests only a small amount of the more than 1200 potential chemicals coming out of the tanks, and this monitoring only occurs a small amount of the time that the workers are out there potentially exposed to the vapors.³

On September 29, 2008, the Hanford Concerns Council released an independent review report⁴ prepared by an expert panel selected by the Council. The expert panel was asked to evaluate the tank farm contractor's Industrial Hygiene Chemical Vapor Technical Basis. The evaluation was commissioned at the joint request of CH2M HILL and Hanford Challenge. The expert panel concluded, "The committee is unable to conclude that the protective measures are sufficiently conservative to protect worker health."

The Hanford Advisory Board advises the Department of Ecology to use its authority under the Resource Conservation Recovery Act (RCRA)⁵ to better regulate and protect Hanford workers from exposure to chemical vapors at Hanford, specifically with reference to those chemical vapors emanating from the high-level nuclear waste stored in Hanford's underground radioactive waste tanks.

¹ National Economic Council, "Occupational Illness Compensation for DOE Contractor Personnel," (2000).

² Sumner, D., H. Hu, and A. Woodward, "Chapter 4: Health Hazards of Nuclear Weapons Production," *Nuclear Wastelands*, (MIT Press, 1995).

³ Government Accountability Project, *Knowing Endangerment: Worker Exposure to Toxic Vapors at the Hanford Tank Farms* (Sept. 2003), 7. [hereinafter, *Knowing Endangerment*]

⁴ "The Industrial Hygiene Chemical Vapor Technical Basis Review," June 2008, J.N. Breyse, PhD,

Franzblau, MD, H. Witschi, MD, available at

http://www.hanfordconcernscouncil.org/download/report_techreviewfinal_20080929.pdf

⁵ 42 U.S.C. § 6973(a)

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400 Area Waste Management Unit:

Notes:

- Sodium hydroxide issues

LLBG & Trenches 31 & 34 & 94:

Issues:

- Risk Budget Tool
- What characterization was done of nearby trenches?
- Why not call it all mixed waste since it's all within the boundary of the unit?
 - Categorizing trenches within the unit boundary as RCRA and elimination other trenches. Question posed as to why all trenches are not called RCRA until characterized as non-RCRA ? Are these trenches to be characterized and if RCRA, will they be included in the permit through a modification? [Ecology's response was "no" they won't be modified into the permit because they can be RTD under CERCLA.]
 - No closure plans; deferred to a compliance schedule. Some of the Milestones for submittal of closure plans for some of the burial ground units in the Central Plateau have dates that are very far out into the future.
 - Barrier/Cap designs are not yet finalized.
 - Have Waste and Analysis & Sampling and Analysis Plans be informed by results of a Risk Budget Tool? Risk Budget Tool is a permit condition; however it has not been developed. It will probably use the modeling & parameters from the TC&WM EIS risk budget.
 - Land Disposal Regulations are applicable; they prevent placements of liquids in landfills-grout contains liquids. Permit wants to allow in-trench treatment of wastes using grout.
 - Container regulations: Permit wants to allow containers to be stored next to trenches. Permit wants to allow these on a non-compliant RCRA design in-lieu of building a compliant facility.
 - Waiver of liner requirements at Trench 94-reactor burial area.
 - GW: unclear how current interim monitoring plan meets final status permit requirements; needed new RCRA well installation is out in FY 2015. Use of 200-PO-1 OU rather than RCRA –the application of alternative standards is unclear.
 - Part A form information is questionable [vols.]
 - SEPA: ?
 - Modeling: Ecology has approved the 'codes for STOMP-1D' but not the application of the results but say they have approved the Graded Approach which does use these results. How can Ecology not really be agreeing?

Notes:

- LLBG permit condition states this unit will have a Risk Budget Tool developed. This tool is anticipated to be developed from the parameters & modeling approach used in the TC-WM EIS.

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- Additional information and reference to 200-SW-2 OU document included in permit but these documents are not finalized. Permit is based on results of as of yet finalized document(s). Workplan draft for 200-SW-2 OU is not due for submittal to Ecology until sometime in 2014.
- Where do the alpha caissons and PFP fit?

Additional reviewer's comments:

- Reviewer suggests to Ecology to revise the Permit Part A Forms and Permit conditions to reflect current operational needs and the waste volumes and appropriate waste codes for currently stored in these units.
- Moved up to be included in the over-arching general advise points but it remains a concern. Reviewer suggests this as an advice point: The Board advises Ecology to revise/include a Permit condition requiring continued use of the Risk Budget Tool. Furthermore the Board advises Ecology require in a Permit condition submittal of the parameters used in the Risk Budget Tool and their basis subject to the WAC 173-303-830 process
- Reviewer suggests as an advice point: The Board advises Ecology to revise the Permit Part A Forms and Permit conditions to reflect current operational needs and the waste volumes and appropriate waste codes for currently stored in these units
- Reviewer suggests as an advice point: The Board advises Ecology to include a Permit condition requiring demonstration of adequate characterization of all trenches/cribs/and ponds. The Board advises Ecology this condition to include/revise a permit condition for statistically based sampling design.

Additional reviewer comments & notes on Trenches 31 & 34

- The waste needs to be dug up and characterized
- Monitoring of the entire 40 miles of unlined trenches needs to take place
- Simply building a dirt cover does not solve the problem and makes it significantly harder to remedy the problem in the future
- It is noted that there is mixed opinions on allowing expansion of Trenches 31&34.
- It is noted that there is mixed opinions on whether there is an incorrect application of WAC 173-303-815(3)(b)

Trench 94:

HAB reviewer comments & notes:

Trench 94 permit should clearly identify the groundwater protection standards that satisfy WAC 173-303-645(4), (5), (6), (7), (8), and (9). Permits are supposed to clearly identify dangerous constituents (yes, lead and mercury should be included), concentration limits, point of compliance, compliance period (at a minimum, it should be specified to be the entire time the permit is in effect – 10 years), and general groundwater monitoring requirements.

Additional HAB reviewer comments and notes:

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Comment #1: Trench 94 is included in the RCRA Site-Wide Permit because it contains defueled, decommissioned, nuclear submarine reactor compartments each sealed in containers filled with over 91 metric tons of lead for shielding purposes. Lead is a dangerous waste and the dangerous waste is pure, not diluted with debris or other chemicals. The permit states there are at least 55 reactors (The first 55 reactors are mentioned in Section C.1.2, but the actual number is not provided) for a minimum amount of lead of 5,000 metric tons of lead. This is the greatest weight of pure, undiluted dangerous waste in any site at Hanford, and perhaps anywhere in the State of Washington. This huge amount of lead should be on everybody's radar screen, considering that these reactors are expected to be at Hanford forever. And the amount of lead will increase to between 10,000 to 20,000 metric tons or more once the actual number of reactors is obtained.

Addendum C of the Trench 94 Permit, Section 3.2.1, Containment, states that the lifetime of the outer container holding the lead is 500 years for the older reactors, 750 for the newer reactors and an estimated 1,500 to 2,000 years for the newest reactors (These numbers are rounded off for general discussion purposes.) The obvious conclusion is that between 500 and 2,000 years, at least 5,000 metric tons of lead will be exposed to the environment and will be subject to movement into the vadose zone and into the groundwater beneath Trench 94.

Section C.2, "Releases From Trench 94," projects there will be no lead leachate until 600 to 2,000 years. The projection is that it will take hundreds of thousands of years for the lead to reach the Columbia River.

POTENTIAL ADVICE: Ecology must explain which model was used to determine how it arrived at "hundreds of thousands of years." Ecology needs data to project movement through the vadose zone and predict when lead will reach the groundwater. Ecology needs to clarify when drinking water standards for lead in the groundwater will be exceeded. Ecology needs to clarify when groundwater entering the Columbia river exceeds the drinking water standards. Ecology is taking credit for protecting human health, so it must explain what it intends to do now, while the reactor compartments are uncovered to ensure that human health BEFORE lead reaches the groundwater and BEFORE lead reaches the Columbia River. The permit needs to explain what Ecology is doing to protect human health regarding the lead shielding around the naval reactors.

Comment #2: The fact sheet talks about inspection requirements in Addendum I (follows Addendum H) which are merely look-see at the surface of closed Trench 94. There is a requirement to drive by and assess run-on and run-off after rainstorms exceeding 0.5 inch of rain. There is a requirement to drive by and assess wind-blown damage every time the wind exceeds 35 mph. There is a requirement to ensure there is a fire extinguisher located at Trench 94. These are Ecology requirements that are supposed to continue for how long? Hundreds of thousands of years? While most of the inspection requirements seem reasonable, the weekly (routine inspections) and 24-hr time requirements (after wind or rain) will likely be ignored.

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POTENTIAL ADVICE: Review the drive-by requirements to assess if they are reasonable to be maintained for thousands of years.

Comment #3: Groundwater monitoring beneath the largest collection of lead at Hanford in Trench 94 is non-existent. Existing wells have gone dry as the water table drops, meaning there is no monitoring of Trench 94. **And lead and mercury** were removed from the analyte list of analytical requirements of the remaining wells around the 218-E-12B Burial Ground which includes Trench 94. DOE was supposed to respond with four new wells in 2010 and 2011, but the permit does not make it clear if they were installed. Furthermore, only two of the four wells are downstream from Trench 94. There are no wells upstream from Trench 94 as required.

According to Addendum D, Groundwater, there is a debate over which way the groundwater flows under Trench 94. The Trench 94 Fact Sheet, page 5, line 7 states: “Wells have gone dry. Past groundwater characterization may no longer be valid for a groundwater monitoring program ensuring compliance with WAC 173-303-645.” Line 18 goes on to explain that Ecology requires DOE to complete geophysical investigation activities by Sept 30, 2014. DOE has been asked whether new groundwater monitoring wells are feasible.

POTENTIAL ADVICE: The permit should explain whether new wells have been installed. The permit should clarify why the simple requirement of two wells upstream and two wells downstream of trench 94 cannot be implemented.

FURTHER POTENTIAL ADVICE: The permit should contain language about deepening wells as the groundwater drops. DOE should have an on-going process of well evaluation and well renewal such that Ecology will not have to force DOE to put in a well here and a well there to stay in compliance. In other words, DOE should be deepening wells without the threat by Ecology of enforcement action.

POTENTIAL ADVICE: The permit should explain why lead and mercury were removed from the analyte list for groundwater samples beneath the 218-E-12B burial ground. Lead should be analyzed in every groundwater sample near Trench 94 to establish a baseline for the time that lead reaches the groundwater.

POTENTIAL ADVICE: The permit admits that lead from Trench 94 is expected to contaminate the Columbia River. The permit also states that the purpose of the permit is to protect human health. The permit thus needs an explanation of how Ecology plans to protect human health from lead leaching from Trench 94 into the groundwater and into the Columbia River. Ecology needs to take action now, not after lead has reached the groundwater.

Part IV Corrective Action Units:

HAB reviewer comments & notes:

- Are upgradient wells and their COCs included in the GW SAPs for RCRA permitted units?
- Not paying much concern to other than primary COCs.

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- Plumes overlap; treated by 200-ZP-1 OU. However not all COCs get treated
- Corrective Action permitting details for GW OUs (and soil units) Part IV units are not there, but deferred the II.Y. Conditions. Appendix C of the TPA lists the GW OUs as RPPs/CPPs however, this was from an early permit, and this designation was eliminated, and now included.
 - Unclear & question posed as to how II.Y. conditions are applicable to GW OUs
 - CERCLA process and actions will be used to do all RCRA corrective actions for units in Part IV. However needed documents have not been approved yet Ecology is agreeing these will meet the needs/requirements of CA for RCRA. See WAS 173-303-645.
 - GW wells are dry or will go dry. Many not useful resulting in less and less monitoring wells for typical RCRA monitoring needs particularly around the Surface Impoundments/Liquid Waste Disposal sites [crib/trenches].
 - Lack of characterization; unclear as to what was the method used to characterize either the COCS in soils or in the GW.
 - How are permit changes made to GW SAPs. [Modifications are allowed to be made to SAPs during project manager level meetings outside of the regular RCRA modification process outlined in WAC 173-303-830/840]
 - Ex. Use of injection wells vs. monitoring well. This issue is covered through the RD/RD Workplan and Ecology would first ask EPA to take care of it.
- Groundwater is very simple – needs to be spelled out better in the permit, how they are dealing with it.
- Wish they were taking a more active role – not letting CERCLA take care of groundwater.
- At workshop there are monitoring wells going dry, how will they monitor groundwater if the wells are dry? Not spelled out in the Permit. Could be in the permit as something to think about. RCRA Monitoring wells for groundwater could be sent.
- Changes on injection wells. Can change the plan, contaminants of concern, wells. Doesn't have to go out for public comment and review anymore.

Background: Under the Dangerous Waste closure regulations (WAC 173-303-610), alternative requirements are allowed. However, the director (Jane-Ecology) has to have, 1) determined that the proposed approach will protect human health and the environment, and 2) also determined that both the dangerous waste unit and one or more of the solid waste management units or areas of concern are likely to have contributed to the release.

1) Ecology has not provided this determination, and Jane has actually said “Ecology, while recognizing and approving the use of this code [STOMP-1D], has not specifically approved the modeling results of the current STOMP-1D application as an alternative fate and transport model as described under MTCA 173.340.747(8). This is because Ecology has yet to receive the actual data for the parameters used in the model and other documentation required by MTCA. The Tri-Parties agreed to start the model approval process with the parameters used in the Technical Guidance Document from the TCWM EIS, but allow use of other parameters with adequate documentation. Cleanup levels for Ecology sites may be different for the same COC than at EPA

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lead sites due to site-specific modeling.” STOMP-1D has not yet been evaluated by Ecology per the regulatory criteria.

2) If Ecology cannot show that this criteria is met, the RCRA Permit can be legally challenged for making a capricious & arbitrary decision as it cannot be applied to the whole site’s groundwater.

Additional HAB reviewer notes on Waste Management Units:

Issues:

- Use of CERCLA, II Y Condition; Ecology is using CERCLA documents and associated cleanup actions to meet many RCRA permit requirements. Question: Who is making the choices in these CERCLA documents? Ecology or EPA or DOE?
- Leaves reader with no actual information about how corrective action decisions are going to be done.

Notes:

- See previous HAB advice on II.Y
- Are all RCRA corrective actions under CERCLA
- II.Y.2.a: CA for releases to the environment. GW decisions are under CERCLA actions. Ecology will review and approve of these actions to see if they meet the Dangerous Waste Requirements. Ecology should also ‘sign off’ on EPA RODs
- Refers to Advise Point 1 of the Part IV: The BOARD does concur with the statement that the majority of CERCLA work actions [in theory] will fulfill the Dangerous Waste Regulations – WAC 173-303-645 requirements.
- Refers to Advise Point 4 of the Part IV: The Board does not support the groundwater recharge value DOE uses (~ 4 to 8 mm/y range) or some Kd values utilized in the Model.
- Refers to Advise Point 4 of the Part IV: The Board suggests this condition be included in Part II of the Permit
- Refers to Advise Point 3 of the Part IV units comments in the addendum which have all been turned into comments and not advice points: The Board notes that a majority of the groundwater corrective action conditions and monitoring plans and much of the rest of the Permit refers to other (CERCLA, DOE or Contractor-generated) management as satisfying RCRA requirements. The Board advises Ecology to simply remove the RCRA portions from the CERCLA documents, to write their own Groundwater Monitoring Plan, and include this in the RCRA Permit.
- Refers to Advise Point 9 of the Part IV: The Board advises Ecology that vadose zone contamination is the direct link between disposed waste and groundwater plumes.
- Refers to Advise Point 10 of the Part IV: The Permit states that “Wells that are no longer sampled due to water table decline (i.e., “dry wells”), and for which there is no future use, must be decommissioned” (e.g., V.4.C.4.d).

Discussions/Comments on the Part V: Closure Units:

- Refers to Advise Point 4 of the ‘in general applicable’ Part V advise points: Inconsistency is evident throughout the Permit(s) Conditions and Addendums; some units contain references to ‘interim status’ regulations. Hanford is permitted as ‘final status’ facility.

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- Refers to Advise Point 4 of the ‘in general applicable’ Part V advise points The Board advises Ecology that EPA memorandum on compliance schedules state a compliance schedule cannot be used to allow a facility additional time to provide Part B application information after the permit is issued.
- Refers to Advise Point 7 of the ‘in general applicable’ Part V advise points: The BOARD has previously stated a preference for use of the methods-based approach.
- Refers to Advise Point 8 of the ‘in general applicable’ Part V advise points: Any new wells need to be RCRA compliant wells.
- In some permits, there is an incorrect application of MTCA [173-340-410]. If alternative requirements are to be applied, then an enforceable action issued pursuant to MTCA must be done and Ecology is required to incorporate these into the permit at the time of permit issuance [WAC 173-303-646(3)(b) & (c)]. This has not been done. See general over-arching advise points.
- The Board advises Ecology that some Permits cite use of a wavier [variance] to regulations (WAC 173-303-645(11) identified without justifications [no references to supporting documentation]). See general over-arching advise points.
- Refers to original Advise Point 17 of the ‘in general applicable’ Part V advise points :When the SEPA checklist was submitted with the permit application, this should have been a part of the submittal. If not, Ecology should have indicated so in their decision and called out a MDNS

HAB reviewer comments & notes:

- No closure plans in the new RCRA permit; use of the CAD/ROD approach to integrate TSD closure with CERCLA for the Central Plateau TSD units and delay of development of closure plan/contingency plans/post-closure plans until after remedy selections. That’s out to ~2020.
- Application (implied) of use of alternative requirements for cleanup of releases to soils rather than the default/modified parameters under MTCA without identification of an ‘enforceable document’ or demonstration of meeting RCRA requirements to do so.
- Comments by Ecology on the draft A RFI/CMS/RI/FS workplan on limited data on potential pipeline contaminants for the 200-IS-1 OU. Lack of details of how RCRA closure requirements will be met & documented, use of incorrect method C for groundwater and for biota/plants. SEPA determinations yet to be made.
- Use of ‘plug-in’ ROD approach (not clear what this means) stated in WP draft A.
- No proposal to do additional pre-CAD/ROD characterization included in draft A of the workplan for the 200-IS-1OU
- Use of confirmatory sampling post-CAD/ROD as one of the remedy components (good) but not so good to refute or confirm the assumptions used in the BRA and FS (assumptions should have already had a solid basis)
- Inclusion of federal WIR determination and citation process in the critical path of the Work Plan schedule. Unclear why this is a concern for known contaminated soils.
- Incorporation of future SST Permit updates in the 200-IS-I WP (not clear what this means)

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- The Board advises Ecology to remove the permit condition [e.g.V.11.B.1.a.] – requirement for a cultural and biological report as this would have been a part of the SEPA checklist submittal.

Additional HAB reviewer comments & notes:

Example of Part IV Surface Impoundment Unit-Permit issues. All Closure units which are Surface Impoundments have the same or similar issues as these are ‘cookie-cutter’ permits:

1301-N Liquid Waste Disposal Facility:

The Board advises Ecology to do something about the fact that the permit is empty.

Fact Sheet:

- Basis for permit conditions rather than identified as requirements under the Dangerous Waste regulations is incorrectly stated as coming from CERCLA & TPA Milestone requirements
- Facility identified by what occurred at the site rather than by the appropriate Dangerous Waste Regulatory basis. Unit is subject to regulations under WAC 173-303-650 for Surface Impoundments.
- Statements in the Fact Sheet inconsistent with the Dangerous Waste Regulations. Partial closure of an individual unit is not authorized under WAC 173-303- regulations. Implication that there’s been an approved Closure Plan without the public review process.
- Wavier [variance] to regulations (WAC 173-303-645(11) identified without justifications [no references to supporting documentation]).
- No list of other applicable laws.
- Nothing addresses or references cleanup of PCBs.
- Incorrect reference to other parts within the permit [e.g. Saying Post Closure will be done under the Addendum for Closure rather than the appropriate addendum containing the plan].

Permit Conditions:

- Description of unit as a liquid waste disposal unit instead of a Surface Impoundment per the applicable WAC 173-303- Dangerous Waste Regulations.
- No Performance Standards included in permit. Required by WAC 173-303-283
- Conditions for submittal of documents which were or should have been included in the Permit Application in accordance with DW closure requirements [see Attachment #41 of 2004 submittal]. Required by WAC 173-303-806.
- Conditions directing closure actions to be done under a CERCLA work plan authority rather than the RCRA permit.
- Reference to closure actions under non-existent CERCLA document violates DW closure regulation requirements to have these details in an approved Closure Plan. Required by WAC 173-303-610(3).
- Incorrect application of MTCA [173-340-410]. If alternative requirements are to be applied, then an enforceable action issued pursuant to MTCA must be done and Ecology is required to incorporate these into the permit at the time of permit issuance [WAC 173-303-646(3)(b) & (c)]. This has not been done.

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- No compliance schedule.
- No list of other applicable laws.
- Focused Feasibility Study needed to deal with hexavalent chromium concerns
- Nothing addresses or references cleanup of PCBs
- Difficult to track permitting actions in referenced rather than attached/include documents.

A matrix approach whereas the applicable sections of the CERCLA documents are directly included in the permit is more transparent and publicly accessible. Concerns regarding “double jeopardy” are eliminated by including only those sections of the CERCLA documents needed to fulfill RCRA DW permitting requirements and modification process. CERCLA documents could contain a table of contents identifying these area and/or separate chapters for the permit requirements. This would also not be “duplication of efforts” as two separate documents are not necessary.

Addendums: All required information should have been submitted with Permit Application in 2004. Ecology deemed the application complete when in fact the draft permit contradicts this determination. Inconsistency is evident throughout the permit conditions and the addendums.

- B: Addendum H cites a Sampling and Analysis Plan outside the permit; regulations require inclusion of this within the permit while permit says “Reserved”.
- C: Reserved but information was submitted with application and should be included.
- D: Discussion within this addendum does not meet the requirements of WAC 173-303 for groundwater monitoring. As presented, this is for an interim status permitted facility; Hanford is permitted as a final status facility.
 - Statements made that Ecology has accepted data from non-RCRA compliant wells for years does not make it acceptable in this permit.
 - Submittal dates for required GW monitoring plan activities not included.
 - The groundwater monitoring plan referenced cites very old QA/QC documents instead of Ecology’s more direction [Ecology Publication # 04-03-030, Guidelines for Preparing Quality Assurance Plans for Environmental Studies.].
 - List of wells for groundwater monitoring is short & with 3 out of 5 wells not RCRA compliant and should also include 119-N-002, 199-N-017,199-N-018,199-N-021,199-N-027,199-N-028,199-N-31, 199-N-041,199-N-054, ,199-N-059,199-N-064,199-N-067,199-N-070,199-N-072,199-N-073,199-N-075,199-N-076,199-N-077,199-N-080,,199-N-092A,199-N-096A, 199-N-099A ,199-N-103A, and 199-N-106A 199-N-16, 199-N-19, 199-N-21,199-N-26, 199-N-56, 199-N-57, and 199-N-64.
 - List of Contaminants of Concern is short and should also include antimony, arsenic, barium, beryllium, boron, cadmium, carbon tetrachloride, (a rad concern-cobalt-60), gross alpha, gross beta, hydrazine, iron, lead, manganese, magnesium, nickel, nitrate, phosphates ruthenium-106, sulfate, tetrachloroethene, tin, tritium, uranium-235, vanadium, and zinc (and those from the expanded ICP Metals list not previously listed).
 - Methods based approach is not used.
 - Filtered sampling is use instead of non-filtered per regulations.

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- Repairs & replacement of monitoring wells is per ‘approved contractor procedures’ rather than WAC 173-160-. Any new wells need to be RCRA compliant wells.
 - Lack of Ecology oversight is evident.
- E: Reserved but information was submitted with application and should be included. Required by WAC 173-303-310
- F: Reserved but information was submitted with application and should be included. Required by WAC 173-303-340
- G: References an unavailable document rather than including it within this addendum. Information was submitted with application and should be included. Unit specific training requirements are not sufficient for Samplers and should include an annual review in the following areas.
 - Collecting groundwater level data (training will include pump description and operation of the three types of pumps (used by the field personnel), operational procedures for the generators and the pumps used to gather groundwater samples)
 - Collecting packaging, and shipping groundwater samples to field and offsite laboratories, including special requirements for collecting and packaging samples containing volatile organic materials that require acid preservatives or special filtering
 - Sampling and monitoring equipment operation and maintenance
 - Monitoring and reporting on groundwater well security and maintenance
 - Providing sample chain of custody to the laboratory
 - Location, integrity, and inspection of groundwater wells (to include inspection of the cap and casing of each well to ensure that it is locked, pulling and inspecting the pump, brushing the inner walls of the casing and screen, and conducting a down-hole television survey)
 - Erosion damage (around wells and obvious signs of erosion, proper drainage, settlement, and sedimentation)
 - Surface inspections (as necessary to identify and correct the effects of settling, subsidence, erosion or other events)
 - Vegetative cover condition
 - Procedures regarding emergency and monitoring equipment (to include procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment).
- H: Statement that the Closure Plan presents the physical remedial activities and sampling and analysis required to comply with WAC 173-303-610 but there is no Closure Plan for public review included in Addendum H which meets these requirements. Addendum H text is outdated and incomplete and needs extensive revision. 1325-N and other discussion regarding ‘Alternatives’ should be deleted.
 - Modified Closure option discussed. This is not allowed per DW regulations.
 - Document cites use of Method C instead of Method B cleanup levels.
 - Closure Schedule is old and non-compliant with closure requirements.

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- References an unavailable document which is to direct RCRA closure activities rather than permit conditions which require unit specific closure actions to be performed. Statement made that the Permit will need to be consistent with CERCLA remedial actions instead of direction to CERCLA as to what specific actions/ARARs are to be included in the ROD for these actions.
- Incomplete list of constituents of concerns (COCs) and should include antimony, arsenic, barium, beryllium, boron, cadmium, carbon tetrachloride, gross alpha, gross beta, hydrazine, iron, lead, manganese, magnesium, nickel, nitrate, phosphates ruthenium-106, sulfate, tetrachloroethene, tin, tritium, uranium-235, vanadium, and zinc (and those from the expanded ICP Metals list not previously listed).
- Sampling and analysis plan identified [DOE 2000a] should be included and sent out for public review. Document is currently not available; incorrect citation or reference to a non-existent document.
- Statements made that verification sampling to determine MTCA compliance for direct soil contact will not be required is inconsistent with the requirements for RCRA closure. Statements made that ancillary equipment [i.e. piping] may be left in place is neither acceptable nor correct and must be removed/treated/disposed. Soils underneath piping must also be sampled in addition to being surveyed.
- Reference is made to non-compliance with Land Disposal Restrictions. If must first be determined that the sites will need to closure under the Landfill regulations [WAC 173-303-665].
- Very old QA/QC documents instead of Ecology Publication # 04-03-030, Guidelines for Preparing Quality Assurance Plans for Environmental Studies.
- I: Okay but should also coordinate and incorporate requirements listed for the 100-NR-2 OU inspection requirements. Suggest following:
-

Inspection Schedule for the 1301-N Ditch Operable Unit	
Surface Inspections	Quarterly
Security control devices: well caps, and locks	Quarterly
Well condition	Quarterly
Subsurface well condition	3 to 5 years

- J: Reserved but information was submitted with application and should be included. Required by WAC 173-303-310
- K: Identified as Recordkeeping and Reporting but draft permit identifies it as Appendix K-Post Closure Plan.
 - As a Post-Closure Plan, it discusses Modified Postclosure/Institutional Controls and Periodic Assessments and cites several non-existent Part II conditions.
 - Document refers and includes discussion of the 1325-N unit.

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- Postclosure groundwater monitoring program cited does not consistent with nor reflect use of alternative requirements.
- Incorrect application of MTCA [173-340-410].
- Some of information within this document on personnel training, inspection, security, etc belongs in this draft permit's Addendums.

Single Shell Tank System:

The Board supports Ecology's efforts to have leak detection during retrievals.

HAB reviewer notes & comments:

General Comment: In order to be understandable to the interested parties, especially the general public, the documents and addenda should be hyperlinked so that instead of having to search for item referred to but not necessarily found by putting the reference into Google, one is directed automatically to the information required to make sense of the permit section in question. In its present form the permit is a nightmare of complexity completely inaccessible to the public at large.

The Single-Shell Tank System Closure Unit Group 4 (CUG-4) addenda include D: through J: that are reserved. These reserved documents will contain information (D- Groundwater monitoring plans, E- Security, F- Tank Waste Retrieval work plans, etc.) that will impact public evaluation of CUG-4. The public comment period should not begin until these documents are completed and published.

Why were the tank farms reorganized into 7 WMAs? An explanation of the reasons for the additional level of classification might contribute to understanding of the document.

THE FOLLOWING IS FROM SST "CONDITIONS"

V.4.B.3.f The process information for each WMA, including 200-IS-1 OU in accordance with Permit Condition V.4.G.5.c, will include, at a minimum, and as known at the time of submission, the following:

- e) A description of releases to soil and groundwater through overflows, spills, releases, and leaks
- f) A detailed diagram of piping, and process flow for each tank and related waste transfer lines, vaults, pits, diversion boxes, waste plies, and miscellaneous structures and other components located inside the WMAs; WMA specific tank system instrumentation;
- g) Inventory or source contaminant concentrations of activities associated with each item listed in f) above and m) below, including references to sampling data or process knowledge
- h) A summary of tank integrity assessment and tank integrity status for each tank
- i) Description of the marking and labeling of the tanks
- j) Topographical maps with sufficient scales to show components included. Insert or call-out maps may be used if necessary
- m) Identification of all non-tank system structures (e.g. septic systems, utilities, groundwater wells, dry wells, buildings) that are located within the WMA boundary and must be decommissioned before WMA closure.

Comment: with respect to e) and h) above, this section of the permit should specify methodology to be used in determining how releases and tank integrity are detected.

V.4.G.5.b All SST components located within 200-IS-1 OU will be closed to meet the clean closure performance standards specified in Permit Condition V.4.G.2.b., unless Permittees

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demonstrate that such components cannot be practicably removed or decontaminated under the “Impracticability Demonstration” outlined in Permit Condition V.4.G.2.c.i, in which case the components must be closed in compliance with the landfill closure performance standards of Permit Condition V.4.G.2.c.

Comment: The potential loophole embodied in the “unless Permittees demonstrate that such components cannot be practicably removed or decontaminated under the “Impracticability Demonstration” outlined in Permit Condition V.4.G.2.c.i” provision needs to be spelled out in detail. I was not able to find the practicability definition alluded to in the document.

V.4.B.3.g The process information for each component listed for a WMA will include the following items, if applicable (components may be grouped, with justification):

j) Release history (spills, leaks, overflows, or other incidents) including information available through historic records regarding: the date, location, duration, type of waste, and quantity of the release and mitigation measures and remedial actions taken, if any. More detailed information will be provided by the deliverables associated with HFFACO milestones M-045-61 and new deliverables established by M-045-84 and M-045-85;

k) Integrity status

l) Retrieval status

Comment: It is necessary to specify how k) and l) will be determined

Issues:

- Tank Waste Retrievals and Closure Schedule: Also: Are a tank retrieval documents included in the SST permit? How does the SST permit integrate closing with operations? What’s the permitting structure look like?
- Are there still drainable liquids in the SST?
- C-farm closure due in 2015; it will be used as a template for rest of tank farm closures.
- “Not pumpable” is still leakable
- Where’s all the leaks gone? The permit should have a Condition to deal with events like the ST-tank farm spill, is there one?
- Better characterization of wastes needed for WTP acceptance and systems function.
- Can DOE actual meet the MS for all tanks in 31 yrs.? [New consent decree violations will require DOE to go to court and present case to a judge. \$ penalties can be imposed by Ecology.]
- Tank retrieval schedule isn’t realistic. Permit needs a condition to specify tanks/year to meet the TPA schedule.
- Is Ecology going to let DOE leave more than 360 gals in the tanks? Do Tank Farm closures need review by the Nuclear Regulatory Commission before a tank is closed?
- Do we need to remove any tanks to get to the vadose zone cleanup?
- Vadose Zone: Is there a Permit Condition dealing with the vadose zone remediation?
- Characterization of Waste
- Non-compliant tanks
- Monitoring: Are SST retrievals being monitored for leaks during retrievals? How is the SST vadose zone being monitored? How are the tanks being monitored for leaks?
- Failed instrumentation not being replaced.

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- Lack of instrumentation – be specific about what is important for safety.

Notes:

- How are retrievals monitored for leaks?
- Tank retrievals/'closures' are proceeding outside of permitting closure requirements. Have the documents which are guiding the retrievals/closures of tanks meeting all the requirements of tank closure under the Dangerous Waste regulations of WAC 173-303 for tanks?
- How are tanks monitored for leaks?
- Although considered meeting the "360 gals. removal of liquids" fluids are still being noted in month reports.
- What are the operating conditions & the closing conditions and do they meet WAC -173-303 regs?
- Is there a permit condition which deals with the SST vadose zone?
- Refers to Advise Point 2 of the SST: The Board is concerned as the SST system [including all components & ancillary equipment) is not equipped with secondary containment leak detection capabilities.
- Refers to original Advise Point which was incorporated into over-arching point on use of performance standards and method B: The Hanford site is a complex site and does not qualify for use of Method A standards.
- Refers to original Advise Point which was incorporated into over-arching point: The Board notes the SST are so designed that they would be unable to comply with Landfill Regulations without waivers. The Board is concerned that such waivers as currently identified in the Permit, allow for continued and future releases of hazardous substances into the environment while doing nothing to reduce their toxicity or volume. See general over-arching advise on use of waivers.
- Refers to original Advise Point incorporated into over-arching point requiring PI: The Board is concerned that Ecology will make changes to the Corrective Action Performance Monitoring by-passing Public Involvement opportunities afford by WAC 173-303-830/840.
- Refers to an original Advise Point which was incorporated into an over-arching point: The Board advises Ecology to review previously identified over-arching general concerns as many apply to the SST Permit [Examples: Links to referenced documents; lack of required documents which should have been submitted with the Part B application and ought to be included within this Permit's addenda; Tier 2 Closure Plans should be included within this Permit

Additional comments on the SST permit: Some made into advice points; other text is info:

- V.4.C.2.a The following permit conditions are premised on HFFACO Action Plan Section 5.5, which provides: "Ecology, EPA, and DOE agree that past-practice authority may provide the most efficient means for addressing mixed waste groundwater contamination plumes originating from a combination of TSD and past-practice units." Ecology reserves the authority to impose additional conditions through permit modification if groundwater monitoring specified in RD/RA Work Plans incorporated through the following conditions is found to be inadequate to meet corrective action

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performance monitoring requirements.

- Comment: What does this mean?
- From TPA milestone M-045-91I: DOE shall provide, to Ecology, an IQRPE certification of SSTs structural integrity for the remainder of the mission, or for such time as the IQRPE believes he/she can reasonably certify. The analysis supporting the certification shall be performed in accordance with the requirements identified for analysis in WAC 173-303-640(2) and will include a due diligence review of RPP-10435. IQRPE certification of the SST leak integrity is not required. A work plan and schedule for additional integrity assessment activities will be submitted as a change package to cover any time period between the end date of the IQRPE certification and the end date of the mission.
- **Comment:** Highlighted sentence needs clarification – seems to conflict with earlier requirement for IQRPE certification.

V.4.F TANK WASTE RETRIEVAL REQUIREMENTS

- V.4.F.1.a.i
- c) Sections 2.1.4, 2.1.5, and 2.1.6 of HFFACO Appendix I, as they are defined to be applicable under Appendix C, Part 3, of the Washington v. Chu Consent Decree, which are incorporated by reference under the terms of Permit Condition I.A.4, and
- Comment: above is too convoluted to be understandable – should be re-written so that an intelligent citizen can make sense of it.
- M-045-70 Lead Agency: Ecology
- Complete waste retrieval from all remaining single-shell tanks. Retrieval standards and completion definitions are provided in milestone M-045-00.
- The schedule reflects retrieval activities on a farm-by-farm basis. It also allows flexibility to retrieve tanks from various farms if desired to support safety issue resolution, pretreatment or disposal feed requirements, or other priorities.
- 12/31/2040 Or Earlier As Established By M-62-45
- Comment: Need to specify a year by year schedule that will achieve this goal. We know that DOE plans to empty 3 tanks this year and 3 next year, but an average of 5 tanks per year emptied would be required in order to achieve the goal set in the milestone. The permit should require DOE to set a year by year schedule that complies with the milestone and specifies the increases in personnel equipment and budget that will be necessary to accomplish this work.

Additional comments on the SST permit: Some made into advice points; other text is info:

V.4.F.3.d.i

Under following conditions, liquid level measurement may be used for leak detection and monitoring during waste retrieval:

- . a) The tank level gauge must be an ENRAFTM gauge or equivalent of the type normally used in tank farms;
- . b) There must be a liquid surface under the ENRAFTM gauge or equivalent plummet or tape;
- . c) There are no active retrieval operations being performed;
- . d) The tank is not being actively exhausted;

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. e) The measured waste level is not increasing.

Comment: Does any of this apply since the pumpable liquids have been removed from the SSTs? If not, what requirements are now appropriate?

V.4.G.2.a.i

The Permittees must close SST System in a manner that achieves the following closure objectives, in accordance with WAC 173-303-610(2)(a):

a) Minimizes the need for further maintenance.

b) Controls, minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere.

c) Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

Comment: The determination of “the extent necessary” and “the degree possible” should be determined by ECY based on health risk data and consultation with stakeholders.

V.4.G.2.c.ii

a) exceptions (second bullet)

. The post-closure care period under WAC 173-303-610(7)(a) is designated as 500 years.

Comment:

1) The time specified is arbitrary. Some contaminant may still be a risk after 500 years. Re-evaluation after 500 y would be appropriate.

2) WAC 173-303-610(7)(a) actually specifies 30 years as the required period of post closure care. This discrepancy should be addressed.

Additional comments on the SST permit: Some made into advice points; other text is info-maybe duplicates:

V.4.F TANK WASTE RETRIEVAL REQUIREMENTS

V.4.F.1.a.i

c) Sections 2.1.4, 2.1.5, and 2.1.6 of HFFACO Appendix I, as they are defined to be applicable under Appendix C, Part 3, of the Washington v. Chu Consent Decree, which are incorporated by reference under the terms of Permit Condition I.A.4, and

Comment: above is too convoluted to be understandable – should be re-written so that an intelligent citizen can make sense of it.

M-045-70 Lead Agency: Ecology

Complete waste retrieval from all remaining single-shell tanks. Retrieval standards and completion definitions are provided in milestone M-045-00.

The schedule reflects retrieval activities on a farm-by-farm basis. It also allows flexibility to retrieve tanks from various farms if desired to support safety issue resolution, pretreatment or disposal feed requirements, or other priorities.

12/31/2040 Or Earlier As Established By M-62-45

Comment: Need to specify a year by year schedule that will achieve this goal. We know that DOE plans to empty 3 tanks this year and 3 next year, but an average of 5 tanks per year emptied would be required in order to achieve the goal set in the milestone. The permit should require DOE to set a year by year schedule that complies with the milestone and specifies the increases

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in personnel equipment and budget that will be necessary to accomplish this work.

V.4.F.3.d.i

Under following conditions, liquid level measurement may be used for leak detection and monitoring during waste retrieval:

- . a) The tank level gauge must be an ENRAFTM gauge or equivalent of the type normally used in tank farms;
- . b) There must be a liquid surface under the ENRAFTM gauge or equivalent plummet or tape;
- . c) There are no active retrieval operations being performed;
- . d) The tank is not being actively exhausted;
- . e) The measured waste level is not increasing.

Comment: Does any of this apply since the pumpable liquids have been removed from the SSTs? If not, what requirements are now appropriate?

V.4.G.2.a.i

The Permittees must close SST System in a manner that achieves the following closure objectives, in accordance with WAC 173-303-610(2)(a):

- a) Minimizes the need for further maintenance.
- b) Controls, minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere.
- c) Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

Comment: The determination of “the extent necessary” and “the degree possible” should be determined by ECY based on health risk data and consultation with stakeholders.

V.4.G.2.c.ii

- a) exceptions (second bullet)

. The post-closure care period under WAC 173-303-610(7)(a) is designated as 500 years.

Comment:

- 1) The time specified is arbitrary. Some contaminant may still be a risk after 500 years. Re-evaluation after 500 y would be appropriate.
- 2) WAC 173-303-610(7)(a) actually specifies 30 years as the required period of post closure care. This discrepancy should be addressed.

Notes; from emails on the SST advise points:

Jean, My concerns were 1) I thought there was a conflict between the 500 year post closure period in the permit and the 30 year period in the law. I later realized that the law allowed ECY to select a longer post closure period. 2) the 500 year post closure period in the permit seemed to imply that there would be no further requirement after that time. I think that what would be appropriate is that there should be some kind of periodic (perhaps decadal) re-check on the adequacy of the post closure arrangement (protections?) and that the post closure period should be at least 10 half lives of any isotope that is a COC (if it's plutonium that would be 240,000 years) or as long as there are potential health risks from any non-radioactive COCs.

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P.S. If your suggested edits are "require an additional review at 30 years as well as throughout the future 500 years on a decade by decade basis" I'm in agreement but I think an every decade review from the git-go would be better and I would still prefer the total post closure period to be as stated above.

On Aug 3, 2012, at 1:48 PM, Jean Vanni wrote:

John, could you take a look at my suggested edits below and let me know what you think? I copied Dale because this is a groundwater issue too.

John, Let's talk about this tomorrow. We could edit it to require an additional review at 30 years as well as throughout the future 500 years

V.4.G.4.a.i The Permittees will develop and submit closure plans (also called Closure Action Plans under the HFFACO) in a timely manner to support the closure schedules specified in Permit Condition V.4.G.3.

Comment: "Timely manner" is not good enough – should specify how many days – maybe this should be added to the overarching advice that suggests changing "should" and "may" to "shall" and "must".

Additional notes referring to SST#23:

Part of the cleanup plan involves transferring the waste from the leaky tanks into other more reliable vessels. As they transfer the waste, workers face the risk of exposure to chemicals that may harm their health. Exposure to radioactive waste can lead to nausea, vomiting, diarrhea, fever, hemorrhage, increased risk of several types of cancer, and, in cases of high dosage, death.⁶ The tanks also contain nonradioactive substances (i.e. silica, heavy metals, beryllium, acids) that come with a host of other health risks, including lung disease, decreased cell function in kidneys and nervous system, sensitized immune system, and burns.⁷

Certain conditions at the Tank Farms make worker exposure more likely than it should be. Much of the tank waste is uncharacterized, making it almost impossible to know to what workers have been exposed when an exposure incident does occur. The monitoring equipment currently used tests only a small amount of the more than 1200 potential chemicals coming out of the tanks, and this monitoring only occurs a small amount of the time that the workers are out there potentially exposed to the vapors.⁸

On September 29, 2008, the Hanford Concerns Council released an independent review report⁹ prepared by an expert panel selected by the Council. The expert panel was asked to evaluate the

⁶ National Economic Council, "Occupational Illness Compensation for DOE Contractor Personnel," (2000).

⁷ Sumner, D., H. Hu, and A. Woodward, "Chapter 4: Health Hazards of Nuclear Weapons Production," *Nuclear Wastelands*, (MIT Press, 1995).

⁸ Government Accountability Project, *Knowing Endangerment: Worker Exposure to Toxic Vapors at the Hanford Tank Farms* (Sept. 2003), 7. [hereinafter, *Knowing Endangerment*]

⁹ "The Industrial Hygiene Chemical Vapor Technical Basis Review," June 2008, J.N. Breyse, PhD,

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tank farm contractor's Industrial Hygiene Chemical Vapor Technical Basis. The evaluation was commissioned at the joint request of CH2M HILL and Hanford Challenge. The expert panel concluded, "The committee is unable to conclude that the protective measures are sufficiently conservative to protect worker health."

216-A-29; 216-B-36B; 216-A-37-1; 216-S-10 P&D; 216-B-63; 216-B-3 Pond:

Notes:

There are several permits which are "cookie cutter copies" (i.e., the trenches & cribs & pond & basin)

Additional HAB reviewer notes & comments; many applicable to the Permits for all these Part IV closure units:

Hexone Storage & Treatment Facility:

- The Board advises Ecology to review the advice points noted for the Surface Impoundments as several are applicable concerns for the Hexone Storage and Treatment Facility.
- It is noted that the Fact Sheet contains confusing and inconsistent with SEPA, the part A form or the DW regs information.
- It is noted that the Part A contains inconsistencies.

241-CX Tank System:

- Reviewer suggests Ecology that SEPA says continuing management of waste and clean closure and permit says otherwise; No performance standards
- Refers to Advise Point 3 of the 241-CX in the addendum: The Permittee must first attempt to clean close the unit; then proceed to (b) and (c). The permittee must demonstrate that clean closure can't be done per the requirements, submit this information to Ecology, Ecology must review it & concur prior to any modifications to either the closure plan or the contingency plan or the post-closure plan. Ecology makes the permitting decisions in accordance with WAC 173-303-830 regs
- Refers to Advise Point 2 of the 241-CX in the addendum: The attached SAP contains inappropriate text citing use of Method C rather than Method B and Ecological protection values are missing. Performance Standards are missing
- Refers to Advise Point 1 7 3 of the 241-CX in the addendum: The Board notes SAP [DOE/RL-2002-14, Appendix C], does not meet the WAC 173-303-300.
- Reviewer suggests that the Part A contains inconsistencies (volumes and codes).
- Reviewer suggests to Ecology the Permit Conditions do not accurately reflect WAC 173-303-640(8)(a) or (b) or (c).
- Reviewer notes that the DW regulations do not allow partial closure of a tank system as indicated with cleanup of ancillary facilities [piping, etc] for the 241-CX-72 tank and deferment of the tank closure.

Franzblau, MD, H. Witschi, MD, available at

http://www.hanfordconcernscouncil.org/download/report_techreviewfinal_20080929.pdf

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NRDWL:

Issues:

- Lack of complete cover/barrier designs; Closure conditions reflect approval of only a conceptual design and the lack of complete cover design
- No approved source of soils for use in the construction of landfill cap
- What is the source of “landfill caps” or barrier cover soils?

B Plant Complex:

Notes:

- In Situ vit – never proven to work anywhere. Tanks in a canyon facility. In Part A form.
- One quarter acre will undergo in-situ vitrification....hm. This is in all of the canyon facilities.
- North of 300 area had a demonstration and had a fire. Electrodes into the ground.

Just because it is in the Part A Form, doesn't mean Ecology is allowing it.

PUREX:

Issues:

- Presumption that since the discarded process vessels were designed to manage whatever was in them, so now they are assuming they are still capable of managing residual waste that is in them forever.
- Assumption that all containers amenable to flushing were sufficiently flushed such that final rinse did not exhibit signs of corrosivity. Did not verify in records that anyone ever did that.
- Adequate characterization. If it was rinsed out and cleaned why did it need to go into PUREX tunnel?
- No secondary containment, no leak detection
- What is the stability of acid absorber?
- No reevaluation of waste in tunnels will occur – or in the canyon containment and there are 21 rail cars in tunnels, but room for up to 40 rail cars.
- Institutional controls issue – electrical system, water in doors, pumping system
- Unquantified volumes of mercury, chromium, cadmium, barium, silver, silver salt, mineral oil. Without knowing those volumes, can't figure out site wide load limits.
- Not planning to remove any of this, planning to leave it. Do walk around.
- Lead is not mentioned in the permit as hazard.
- Failure to observe closure best practices.
- Plutonium recoverable. Need to get at it.

Notes:

- Huge questions about tunnels. Unidentified materials in the tunnels
- PUREX received a bunch of waste out of 300 area, non-compliant waste with RCRA, now it is being considered RCRA past practice
- Tunnel system is dependent on a water source. Water filled doors. Electrical system and pumping system. Have to pump the water in the door out before you can open the door.
- Tunnels don't run in only one direction.
- Only planning visual inspection.

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- Only two tunnels, they have water shield doors in front because dose is so high. Have to drain water because doors are too heavy. These have lots of lead in them for shielding.
- They have an inventory, rail car by rail car. Drawings exist.
- Weather problem when they were building tunnels, actually collapsed the tunnels.

Notes from the advice points for PUREX:

- Refers to Advise Point 3 of PUREX in the addendum: Reviewer suggests does not believe grouting in place is appropriate given that this is not a RCRA compliant engineered disposal facility. (it is hard to put a liner under it)

LLBG Green Islands:

Issues:

- Characterization
- Does the CERCLA 5-Year Review have any affects on the RCRA permit?
- Closures & closure plan submittals dependent upon TPA Milestone documents and actions under CERCLA
- Why not call it all mixed waste?
- Where do the alpha caissons and PFP fit?
 - In certain section. Request from DOE to Ecology to remove portions of Low level burial grounds from the permit. Where caissons are is something they want to remove.

Notes:

1. Caissons are super hot.
2. Have to expect there are pieces of spent fuel in the burial grounds.

Discussions/Comments on the Part VI: Post Closure Units:

300 Area Process Trenches:

Issues:

- Groundwater monitoring plan is inadequate. Only indicates parameters. Not sure if it is in the Permit or not.

Notes from the advice points for 300 APT:

- The Board has advised Ecology that the remedy selected for groundwater remediation at the 300 Areas is not a proven technology. The BOARD advises Ecology that is it inappropriate to prospectively accept CERCLA work via the II.Y conditions as satisfying the Dangerous Waste WAC 173-303-645 corrective action permit requirements

183-H Solar Evaporation Basins:

Issues:

- Groundwater issue - chromium

Notes from the advice points for 183-H:

- Supports advice point 17: It is noted that there Permit conditions requiring submittal of updated post-closure plan to include placement of a cover; placement of a cover should

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have been a closure action. There is also uncertainty regarding Ecology's acceptance of closure certification in question as there doesn't seem to be an approved closure plan.

1325-N:

Issues: Groundwater issues.

Notes: Closure was cited per Method C standards which are in conflict with Dangerous Waste regulations & Ecology has not accepted the closure certification submitted by DOE as meeting the Performance Standards under WAC 173-303-610 & no determination has been made by Ecology for the use of Landfill regulations.

1324-N & NA:

Issues:

- No post-closure groundwater monitoring plan in accordance with WAC 173-303.
- Groundwater issues.
- Have to look at CERCLA to see what they are doing. Interim status monitoring plan to see.

Discussions and comments on Other Permit related documents or issues:

SEPA:

Issues:

- How determinations are made
- Availability of SEPA Checklists
- Eventual use of TC&WM EIS as SEPA coverage
- Determinations need to be made new, shouldn't be looking at old determinations and carrying them forward.
- Mitigation should be in the Permit, not just the SEPA determinations.

Notes:

- Why is there one determination for the entire permit that is "Determination of Non-Significance" even though there are significant impacts for some units and DMNS for other units?
- Concern that SEPA determinations for units say DNS when there are issues for those units. All the units need to be mitigated.
- The methodology of using a phased approach is not clear.
- Supporting SEPA checklist documents not readily available.
- SEPA: Ecology can adopt a NEPA document as fulfilling SEPA needs [an EA or EIS] but it does not adopt a CERCLA document like an RI/FS. If a CERCLA action is being done, there are some aspects which are considered 'functionally equivalent' to what's being required under a DOE NEPA evaluation, so DOE's NEPA needs are met by CERCLA work.
- NEPA: Triggered either by RCRA or if it is a proposal that costs over a certain \$ amount.
- Compliance Schedules: If these don't satisfy HAB priorities, then we should tell the Tri-Party Agencies [Ecology].
- The SEPA Checklists are old – they are from the 90's and early 2000.

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Additionally received review comments:

- Until Ecology knows what the mitigation plans will be, they need to withdraw their determination of non-significance regarding the current phase.
- Ecology can't truly know what the impacts of these sites will be until they take the time to characterize the waste at each site.
- Ecology also misuse "Phased Review." They seem to think that it allows them to give sites a determination of non-significance before mitigation plans have come in. A more accurate description would be that phased review may allow them to leave certain units out of the current permit. However, it does not allow them to make determinations that aren't supported by a plan. Also, under WAC 197-11-060, SEPA specifically says that phased review can't be used if it would just split up units and allow an agency to ignore the cumulative impacts of the units.

Additionally received comments from Gerry Pollet:

And as to SEPA comments on the permit--I recall strong divisions at the HAB meeting over whether the HAB should "advise" or "encourage", and you raised the concern about whether the HAB could give legal advice. I am not very familiar with the HAB's role. But to my mind, recommending a particular threshold determination, such as one of mitigated-significance, is close to legal advice. So is a recommendation that Ecology clearly identify opportunities for public involvement, which is required by law. Or that ecology use enforceable words such as "shall" and "must," because by law they are required to have an enforceable document. It seems as though the majority of HAB recommendations have a basis in RCRA, the State Dangerous Waste Act, and SEPA/NEPA.

But perhaps re-wording the bullet to summarize the NEPA and SEPA requirements, and explain what the alternatives there are when there are documented and significant environmental impacts, such as those documented at the Hanford site, is softer than legal advice. It provides permit applicants the necessary information about relevant regulations to guide their decisions, but doesn't direct them. I realize that's a fine line. But I think it could be pursued even with concerns about criticism and advice

I have one final follow-up to the comment I made at yesterday's meeting regarding the SEPA determinations. I really think the HAB is correct in stating a site-wide determination of non-significance is inappropriate. But I understand the HAB's concerns that the larger board may not be willing to demand an EIS. A mitigated determination of significance is certainly better than a determination of non-significance, because it would require actual mitigation plans to be researched and developed. But there are a few flaws that I see. 1) This determination assumes units, such as the SST unit, can be completely mitigated so there is no environmental impact during the closure process, but the permit applicants have provided no such evidence. 2) Any mitigation plans would have no EIS to confirm the extent or nature of the damage they purport to address, and would be stabs in the dark. 3) A mitigated determination can be slightly deceptive: it assumes that once a permit in place, there is no environmental impact, while at the same time it does not require mitigation plans be implemented.

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So my suggestion: First, state that as things stand, a determination of significance is warranted. Second, citing NEPA and SEPA, explain that Hanford has two legal options open to it: either to research and develop mitigation plans that eliminate the present and significant environmental impacts from *individual* units and the *cumulative* environmental impacts from all units, to satisfy a determination of mitigated significance, or conduct a comprehensive EIS.

This way, you lay out their legal alternatives. You hit the point that there are significant impacts, and this should be the determination. You hit the point that as things stand, an EIS is warranted. But you also give them a third option, of proving there are mitigation measures to eliminate the environmental impacts of units, individually and cumulatively.

324 Building:

Additional comments from CTUIR HAB representative:

Attached is the list of COCs for the B-cell sampling and analysis plan. In addition to the radionuclides, it contains the metals barium, cadmium, chromium and lead, as well as pH. Ecology's main objection may be that the 324 building waste site contains only radionuclides, thus it need not be included in the RCRA. However, the list of COCs says otherwise. Additionally, according to DOE, the 324 facility will reopened to remediate the spill under B-cell, and as part of the oversight for operating this facility, which presumably will generate hazardous waste as well as radioactive waste, it should be included in the RCRA permit.

The statements below are excerpts from PNNL-21214.pdf:

In October 1986, a spill of a highly radioactive waste stream containing cesium (137Cs) and strontium(90Sr) occurred in the B-Cell of the 324 Building in the 300 Area of the Hanford Site. The spill is estimated to have contained approximately 1.3 million curies of radioactivity. An unknown fraction of this spill was lost to the subsurface through a leak in the sump in the floor of B-Cell. To characterize the extent of contamination under the 324 Building, a pit was excavated on the north side of the building in 2010 by Washington Closure Hanford LLC (WCH). Horizontal closed-end steel access pipes were installed under the foundation of the building from this pit and were used for measuring temperatures and exposure rates under the B-Cell. The deployed sensors measured elevated temperatures of up to 61 °C (142 °F) and exposure rates of up to 8,900 R/hr. Field data and simulation results suggest that the pit excavated on the north side of the 324 Building to provide access for direct-push sampling efforts is resulting in increased moisture under the building, due to exposure to natural precipitation that is infiltrating into the subsurface. If excavation of the contaminated sediments under the B-Cell proceeds relatively quickly, say within 1-2 years, then this increasing moisture may be of little or no consequence. However, if the excavation and removal of contaminated sediments under the B-Cell takes longer, then the increased moisture could eventually resulting mobilization and transport of contaminants to groundwater. There are currently no groundwater monitoring wells near and downgradient of the 324 Building.

In general, site decommissioning and demolition activities in the 300 Area and elsewhere at Hanford have the potential for increasing natural groundwater recharge rates due to surface

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disturbance. Recharge is the primary driving force for transporting contaminants in the vadose zone to the underlying aquifer.

Attached COC listing for the 324 Building:

Introduction

DOE/RL-2011-51
Rev. 0

Table 1-1. 300-296 Waste Site Contaminants of Potential Concern List.

Contaminants of Potential Concern	
Radiological Constituents	
Isotopic americium	Am-241
Isotopic cesium	Cs-135, Cs-137
Isotopic uranium	U-234, U-235, U-238
Isotopic plutonium	Pu-238, Pu-239, Pu-240
Total radiostrontium	Sr-90
Nonradiological Constituents, Metals	
ICP metals	Barium, cadmium, chromium, lead
Nonradiological, Physical	
pH	

ICP – inductively coupled plasma

1.4 DATA QUALITY OBJECTIVES

A DQO process was performed for the intrusive characterization of the 300-296 waste site (WCH 2011). The project team felt it prudent to develop a sampling strategy supported by a DQO to improve the understanding of the radiological and nonradiological constituents and the extent of contamination prior to selection of the remediation methodology for the highly contaminated portion of the plume. The data and information collected by use of this SAP, coupled with data collected during the nonintrusive characterization phase, will be used to develop the final decision logic for the removal of the 300-296 waste site contamination. This section includes the key results of the DQO completed to support the intrusive sampling of the 300-296 waste site.

Planning for remediation requires a better understanding of the type, quantity, and condition of the contaminated materials associated with the 300-296 waste site. Record searches about projects and therefore materials that may have been present within B-Cell have been performed. However, because the breach in the liner of B-Cell was unknown until November 2009 there is no literature that defines what materials may have migrated through the breach into the subsurface.

1.4.1 Statement of the Problem

The exact nature, condition, and retrievability of highly radioactive contamination below B-Cell is unknown and requires characterization by physical sampling. The risks and expenses associated with retrieval, transportation, analysis, and disposal of highly radioactive samples

*Sampling and Analysis Plan for Intrusive Characterization of the 300-296,
Soil Contamination Under the 324 Building B-Cell*
April 2011

1-7

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More Notes Regarding the 324 building - from a recent Tri-city Herald article:

Washington Closure had been expected to issue a request for bids this spring for a major project on the 324 Building, which sits over contaminated soil just north of Richland. Radioactive cesium and strontium leaked from a hot cell in the building to the soil below. Radioactivity in the soil, which is about 1,000 feet from the Columbia River, has been measured at 8,900 rad per hour. Direct exposure for a few minutes would be fatal, according to Washington Closure. The request for bids now is on hold, McKenna said.

It would have sought a subcontractor to design remotely operated equipment to be installed inside the hot cell where the leak occurred. Using the equipment, the subcontractor then would take out the hot cell's floor, dig up the contaminated soil beneath it and transfer the contaminated soil to nearby hot cells to be grouted in place.

Clean up of the building is required to be completed by the end of this year under the legally binding Tri-Party Agreement. However, DOE and the Washington State Department of Ecology, the regulator on the project, already have been in negotiations for new deadlines because of the leaked waste beneath the building, which was discovered in late 2010.

From a recent PNNL report (PNNL-21214):

Finally, field-measured water content distributions and simulation results suggest that the pit excavated on the north side of the 324 Building to provide access to the subsurface is resulting in increased water contents under the building due to infiltration of natural precipitation. If the contaminated sediments underlying the B-Cell are excavated and removed relatively soon (1–2 years), then this increasing moisture will likely have little or no consequence. However, if the remediation effort is delayed, the increasing moisture could eventually result in mobilization of contaminants under the B-Cell and transport to groundwater.