U.S. Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

04-AMWTP-006

Mr. J. P. Henschel, Project Director
Bechtel National, Inc.
2435 Stevens Center
Richland, Washington 99352

Dear Mr. Henschel:

CONTRACT NO. DE-AC27-01RV14136 – DISPOSITION OF QUESTIONS FROM PRELIMINARY SAFETY ANALYSIS REPORT (PSAR) UPDATE REVIEW

References:
1. BNI letter from J. P. Henschel to R. J. Schepens, ORP, "2003 Preliminary Safety Analysis Report Update," CCN: 067261, dated September 30, 2003.
2. ORP letter from R. J. Schepens to J. P. Henschel, BNI, "Approval of Preliminary Safety Analysis Report (PSAR) Update," 03-OSR-0450, dated February 2, 2004.

This letter forwards the U.S. Department of Energy, Office of River Protection (ORP) disposition tables on questions/responses from review of the annual PSAR update submitted by Bechtel National, Inc. (BNI) in Reference 1. The PSAR update was approved by ORP in Reference 2. The attached questions and associated responses (or summaries of responses) are part of the review record, and are provided to assist in tracking completion of the commitments made in the responses. If BNI elects to change any of the commitments in theses responses, please advise ORP so that ORP may evaluate whether a corresponding change to the authorization basis or Construction Authorization Agreement is necessary prior to changing the commitment. (It is expected that this prior approval will only be necessary, in most cases, for those commitments which have already been explicitly identified as Conditions of Acceptance for the Construction Authorization Agreement.)

If you have any questions, please contact me, or your staff may contact L. F. Miller Jr., Waste Treatment and Immobilization Plant Safety Regulation Division, (509) 376-6817.

Sincerely,

Roy J. Schepens
Manager

AMWTP:LFM

Attachment

DISPOSITION OF GENERAL INFORMATION QUESTIONS FROM PSAR UPDATE REVIEW

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update GI-001	This question dealt with planned ITS training, and information that was not included in Chapter 12 of the PSAR update. Please discuss how BNI will provide this information, which will satisfy both 96-003 and SC 6.0-1. Please indicate whether this is a Contract deliverable (deliverable number), an Authorization Basis document (title), and the planned issue of this information prior to the start of the initial test program (will this information be required for the writing and approval of test procedures).	ABAR 24590-WTP-SE-ENS-03-412 was not incorporated in this PSAR update. Questions relative to ABAR 24590-WTP-SE-ENS-03-412 will be addressed prior to approval and incorporation separate from the PSAR update.	The response is acceptable. Changes will be incorporated into the PSAR through the ABAR process.
PSAR Update GI-002	This question dealt with use of DOE O 425.1B and a graded approach to initial testing. Section 10.2 of the PSAR, which lists requirements that pertain to the subject chapter (Initial Testing), does not list the Order as a requirement applicable to Commissioning. How and where will this Order be invoked in the Authorization Basis?	The contract change that incorporates DOE O 425.1B is being addressed by ABAR 24590-WTP-SE-ENS-03-412 which was not incorporated in this PSAR update. Questions relative to implementation of the Order will be addressed prior to approval and incorporation of ABAR 24590-WTP-SE-ENS-03-412 separate from this PSAR update.	The response is acceptable. Changes will be incorporated into the PSAR through the ABAR process.
PSAR Update GI-003	This question dealt with two COAs (#2 and #3)from review of Chapter 12 of Rev. 0 of the PSAR. Please indicate the wording that is presently in ABCN 24590-WTP-ABCN-ENS-03-008, which satisfies these COAs.	PSAR Section 12.4.2.3, second bullet addresses COA 2. Review and approval requirements addressing COA 3 are defined in PSAR Section 12.4.1, second paragraph.	The response is acceptable.
PSAR Update GI-004	This question dealt with tailoring of a DOE standard. Since 10 CFR 830 is applicable to DOE nuclear facilities, how does BNI propose to tailor this legal requirement?	The statement “as tailored in Appendix C of the SRD” is an error and should be deleted. 10 CFR 830 is not tailored	The response is acceptable. The statement will be deleted in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update GI-005	This question dealt with COA # 1 from review of Chapter 12 of Rev. 0 of the PSAR. Please explain why the COA was not applied to the Design and Construction phases, given that (1) as originally written, it was not intended to be applied only to the Operations phase, and (2) it clearly should apply to design and field engineers.	A statement addressing this was included in Section 12.4.3.1, *Maintenance of Design and Construction Training*, of the PSAR as part of 24590-WTP-ABCN-ENS-03-008; however, during final editing, it was thought to be redundant to Section 12.4.3.2, *Maintenance of Operational Phase Training*, and inadvertently omitted. As discussed with the Reviewers, the Contractor will include statements similar to the following to address this item. Add to Section 12.4.3.1: "Periodic systematic program evaluations will be conducted every three years to measure the training system's effectiveness in producing qualified employees. Training program evaluations should identify program strengths and weaknesses, determine if worker performance has improved, assess if program content matches current job needs or task lists, and determine if corrective actions are needed to improve program effectiveness." Add the word "task lists" to Section 12.4.3.2. The population of whom the PSAR applies to was not modified and remains as originally described.	The response is acceptable. Changes will be incorporated in the next PSAR update.
PSAR Update GI-006	This question dealt with COA # 5 from review of Chapter 12 of Rev. 0 of the PSAR. Please explain why the COA was not applied to the Design and Construction phases. Also, indicate the milestone for conducting the first training program evaluation in the Design and Construction Phases.	A statement addressing this was included in Section 12.4.3.1, *Maintenance of Design and Construction Training*, of the PSAR as part of 24590-WTP-ABCN-ENS-03-008; however, during final editing, it was thought to be redundant to Section 12.4.3.2, *Maintenance of Operational Phase Training*, and inadvertently omitted. As discussed with the Reviewers, the Contractor will include a statement similar to the following to address this item. Add to Section 12.4.3.1: "Periodic systematic program evaluations will be conducted every three years to measure the training system's effectiveness in producing qualified employees. Training program	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
		evaluations should identify program strengths and weaknesses, determine if worker performance has improved, assess if program content matches current job needs or task lists, and determine if corrective actions are needed to improve program effectiveness." Training program evaluations have been conducted since the review for Partial Construction Authorization.	
PSAR Update GI-007	This question dealt with use of a systematic approach to training (SRD SC 7.2-1). Please explain how the program described in proposed Chapter 12 of the PSAR assures these elements of SRD SC 7.2-1 are met.	As discussed with the Reviewers, the Contractor will include statements similar to the following to address this item: "Required operator and supervisor examinations will be described within implementing project procedures."· "Exceptions from training and alternatives to education will be granted when justified and approved by management; the processes for exceptions and alternatives to education will be controlled by WTP training procedures."	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update GI-008	This question dealt with use of a graded approach to training. (a) What are the attributes that will be used to apply a graded approach to the training program [cite them or where they are found (e.g., implementing standard DOE Order 5480.20A)]? (b) What is the Contractor's basis for revising subsections of the chapter to apply a graded approach to specific areas of the training program?	A modification to the statement in Section 12.4.1, *General Information*, will be made to better align with the description of graded approach stated in DOE-STD-3009, *Preparation Guide for US Department of Energy Nonreactor Nuclear Facility Documented Safety Analysis Report*. This statement will be modified similar to, "This department takes a graded approach to implementing training, meaning the level of training is commensurate with the hazard and complexity level consistent with implementing standards. Guidance related to graded approach in DOE-STD-3009 also states in part, "Discussions can be brief and are limited to summaries of the major features…". The areas denoted in the PSAR seem consistent with the major features discussed in the Chapter 12 section of the 3009 standard.	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update GI-009	This question dealt with use of a systematic approach to training. Please explain how the SAT element of assuring trainee mastery of training material will be achieved in the Design Phase and identify where in the updated PSAR this is described.	As discussed with the Reviewers, the Contractor will include a statement in Section 12.4.1.1 similar to the following to address this item:· "Trainee mastery of personnel who are part of a formal qualification program will be evaluated by various methods, including examinations, quizzes, or by management observation of the trainee's actual job performance."	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update GI-010	This question dealt with exceptions to training of personnel. Please explain why the PSAR provides broader latitude to managers for granting exceptions to training than the implementing standard requires.	As discussed with the Reviewers, the Contractor will include a statement similar to the following to address this item: "Exceptions from training and alternatives to education will be granted when justified and approved by management; the processes for exceptions and alternatives to education will be controlled by WTP training procedures."	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update GI-011	This question dealt with training of personnel who will operate ITS (and non-ITS) systems to support validation of procedures during initial testing. The Contractor should explain why these topics, which are linked to meeting SC 6.0-2 and the Ad Hoc Implementing Standard, are no longer discussed in PSAR Chapter 12.	As discussed with the Reviewers, the Contractor will retain the previously deleted statement to address this item: "Facility control system simulators and prototype melters may be used, as appropriate, to provide a low risk training environment for operational and maintenance personnel to support testing activities."	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update GI-012	This question dealt with inclusion of changes made to the PSAR via the ABCN process. Why doesn't the updated PSAR include the changes to Volume I, Table 8-1, as committed to in ABCN 24590-WTP-SE-ENS-02-008?	The Table 8-1 changes from ABCN 24590-WTP-SE-ENS-02-008 were inadvertently omitted from the PSAR update and will be included in the next update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update GI-013	This question dealt with document references in the PSAR. What action will BNI take to correct the inconsistent callout to documents in Chapter 1, Site characteristics?	These editorial corrections will be incorporated in the next Volume I update.	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update GI-014	Canceled		
PSAR Update GI-015	This question dealt with inconsistencies with identification of extremely hazardous chemicals in the PSAR. What action will BNI take to correct this inconsistency between Section 3.9 and Section 8.5 regarding identification of extremely hazardous chemicals?	Section 8.6.1 and Table 8-1 will be updated in the next PSAR update to reflect the results of the hazardous substances evaluation discussed in Section 3.9.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update GI-016	This question dealt with inconsistencies noted in two chapters of the PSAR. In reviewing the above cited submittal text in Chapter 8, "Hazardous Material Protection," and Chapter 9, "Site Characteristics," of PSAR Volume I, the reviewers found several errors and inconsistencies (noted below). What action will BNI take to correct these?	Section 8.6.2 will be revised to correct the erroneous Section 17.4 references. Section 9.2 will be revised to remove the erroneous statement relative to the state having primacy for the Clean Water Act of 1977. WAC 173-216 and resulting permits will be cited instead. Section 9.3.1 will be revised to remove the sentence relative to ALARA for hazardous material exposure consistent with Section 8.4. Section 9.5.1 will be revised to remove reference to WAC 173-303, subparts AA, BB, and CC and refer directly to -690, -691, and -692.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update GI-017	This question dealt with inconsistencies between Vol. I of the PSAR and Volumes II, III, and IV. This was a six-part question relating to Tables 3-12. 3-13, 3-14, 3-17, 3-18, and 3-19.	The contractor acceptably answered all six parts of the question. As a result of parts (c), (d), and (e) of the question, appropriate changes will be incorporated during the update of the Operational Risk Assessment which will be performed later for the FSAR.	The response is acceptable. Changes will be made in the FSAR.
PSAR Update GI-018	This question dealt with completion of an implementation plan for the WTP fire protection program. a) What is the reason for delay [in putting relevant procedures in place for the WTP fire protection program]? b) What progress has been made to develop and issue the fire protection program assessment plan?	a) BNI submitted CCN 049717 to close Question LAW-PSAR-218 prior to the commitment date (3-01-03). BNI stated, "the WTP Fire Protection Program assessments and issues will be performed and tracked per the WTP Management Assessment procedure, 24590-WTP-GPP-MGT-002". OSR granted partial approval (03-OSR-0217/CCN 063422) of the "Conditions of Approval", which stated, "however, no	The response is acceptable.

Question No.	ORP Question	Contractor Response	ORP Disposition
		objective evidence of the plan for periodic evaluations of the WTP Fire Protection Program performance or for identifying and tracking fire safety issues was provided". OSR further stated that, "pending the receipt and acceptance of such objective evidence, Construction Authorization Condition Of Acceptance No. 2 (PSAR, Volume I, Section 3.18) remains open". BNI, in CCN 067260, stated that a Fire Protection Program Self Assessment Plan would be developed and issued by 12-31-03. The reason for the 12-31-03 commitment date was to allow for the completion of the Facility PFHAs due commensurate with the PSAR. Resources were not available to produce the Facility PFHAs as well as update the Fire Protection Program (including developing a Self Assessment Plan) simultaneously. Even though an assessment plan is not written, the project has been proactive in identifying fire safety issues. Two assessments have already been performed on the WTP Fire Protection Program. One assessment was performed by Bechtel San Francisco (July 2003) and the other by WTP Quality Assurance (August 2003). Results from these assessments are being tracked and incorporated into the Fire Protection Program and implementing procedures. b) Presently, BNI is on schedule for developing a Self Assessment Plan in order to meet the commitment date (12-31-03).	
PSAR Update GI-019	This question was withdrawn.		
PSAR Update GI-020	This was an 18-part question that dealt with WTP control room habitability. Section 4.3, Sheet 7, Table 2, Analysis Inputs 1. What is the justification for using a breathing rate for light activity as an analysis input?	Question 1. As with nuclear power plants the operators will be trained in their response actions and exercises will be held periodically to demonstrate/evaluate operator responses. The combination of training and exercises	The response is acceptable. The Contractor must update the control room habitability

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	Section 6.6.2.7, Sheet 41, Ammonia - 1250 Gallon Tank, 10 Minute Release (Table C-1) 2. If the short term exposure standard is exceeded in less than eight minutes, what is the basis for judging the LAW CR to marginally meet the habitability requirement that the staff have 10-15 minutes to carry out safe shutdown actions before evacuating the LAW facility? 3. What is the definition of marginally in this context? 4. Does a 74 mg/m3 concentration correspond to approaching the ERPG/TEEL2? If so, will the operators be able to take complex safe shutdown actions? 5. What is the basis for not requiring engineered safety features to ensure operators can take safe shutdown actions? Section 6.6.2.7, Sheet 46, Nitric Oxide - Stack (Table C-10), Analysis 6. If the nitric oxide concentration exceeds the short term limit in 10 minutes, what is the basis for determining that the LAW control room remains habitable when the short term concentration limit is exceeded? Section 6.6.2.8, Sheet 48, Ammonia - 1250 Gallon Tank, 10 Minute Release (Table D-1), Analysis 7. What is the basis for expecting that most persons can function reasonably well and carry out actions to protect themselves for some fraction of an hour when the ammonia concentration will be about 218 mg/m3 (the 10 minute limit is 24 mg/m3)? 8. What is the basis for determining that the HLR CR habitability will allow the staff to carry out safe shutdown actions before evacuating in 10-	should not result in strenuous activities or increased breathing rates during emergency response activities. Questions 2-5: ISM activities have not been completed yet to determine operator response actions for their own personnel protection (i.e., whether the operator will evacuate or shelter in place). However, all SSCs within the LAW facility whose failure could result in a release exceeding the thresholds in the SRD are placed in a safe state automatically through the Programmable Protection System (PPJ). There are several Risk Reduction Class (RRC) Systems Structures Components whose failures do not result in unacceptable releases (e.g., slurry transfers between the Concentrate Receipt, Melter Feed, and Melter Feed Preparation Vessels). These SSCs can be placed in a safe state by the operator in either the LAW control room or the PT Main Control Room through the Integrated Control Network (RRC, SC-IV). The PT Main Control room is hardened (SDC, SC-I). Ongoing ISM activities for the PT facility are determining the systems required to ensure that the PT main control room is habitable throughout any Design Basis Event. A summary of the SSCs that are not already SDC or SDS, but are required to place the LAW facility in a safe state, can be found in Memorandum 076581, *ISM Cycle III evaluation of the control and monitoring requirements for the Low Activity Waste facility in the Pretreatment facility main control room.* Within that memorandum, the LAW ISM team determined that control and monitoring of the offgas system's safety functions is an RRC function in PT and that this RRC function can be adequately accomplished through the	calculation (24590-PTF-HAC-C1V-00001) by June 30, 2004 (new COA # 1 under Section 4.1, PT Facility Description in the SER), and the resulting PSAR changes provided as an ABAR to ORP for review and approval.

Question No.	ORP Question	Contractor Response	ORP Disposition
	15 minutes? 9. What is the basis for not requiring engineered safety features to ensure operators can take safe shutdown actions? Section 6.6.2.8, Sheet 48, Ammonia - 1250 Gallon Tank, 60 Minute Release (Table D-1), Analysis 10. What is the basis for determining the HLW CR habitability requirements are satisfied? 11. When a limit (24 mg/m3) is exceeded, how can this be analyzed as marginally meeting the habitability requirement? 12. What is the basis for not requiring engineered safety features to ensure operators can take safe shutdown actions? Section 6.6.2.8, Sheet 48, Ammonia - 500 Gallon Tank, 10 Minute Release (TableD-3), Analysis 13. If 10-15 minutes are required to perform safe shutdown actions, what is the basis for determining the HLW CR habitability requirements are satisfied? 14. When a limit (24 mg/m3) is exceeded, how can this be analyzed as marginally meeting the habitability requirement? 15. When a limit (24 mg/m3) is exceeded, how can this be analyzed as marginally meeting the habitability requirement? Section 6.8.3, Sheet 55, Conclusions 16. If the MCR habitability requirements are exceeded in 6.6 minutes, why are the engineered safety features not recommended? 17. If the LAW CR habitability requirements are exceeded in 12 minutes, why are the engineered safety features not recommended? 18. If the HLW CR habitability requirements are exceeded in 4.4 minutes, why are the engineered	existing ICN. The next update of the LAW PSAR will reflect that control and monitoring of the offgas system's safety functions in the PT main control room is an RRC function. It should be noted that the RRC system is not capable of overriding PPJ control of automated SDS and SDC SSCs. Question 6. The confinement function of the LAW offgas system (including the offgas flue) is SDC/SC-III. Although stack downwash calculations have not been performed, the elevated release should also prevent NOx flow into the LAW control room. Given a Beyond Design Basis Event for LAW and as discussed above, if shutdown activities were required to be performed, these activities can also performed in the PTF control room which is SDC, SC-I. As identified in the response to Questions 2-5 above, ISM activities have not been completed yet to determine operator response actions. That is, evacuation versus sheltering in place has not been determined. Questions 7-15. See response to comments 2, 3, 4, and 5. Questions 16-18. ISM activities have not been completed yet to determine operator response actions. That is, evacuation versus shelter in place has not been determined. As discussed in the calculation, the options being addressed include sheltering in place (shutdown air supply or intake to the facilities and not evacuate) or filtering the air to an acceptable level in the control	

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	safety features not recommended?	rooms.	
PSAR Update GI-021	This was a five part question that dealt with structural aspects of the facilities. 1. What is the basis for using ASME Boiler and Pressure Vessel Code, Section III Appendix F allowable for non-ITS piping and component supports? 2. What is the basis for using SRSS modal combinations? This approach is not in compliance with the SRD's implementation of AISC –4 nor is the approach consistent with BNI's Table 2-6 footnote (e) "SRSS method, including effects of closely spaced modes and residual rigid response." 3. Since ASCE – 7 is referenced in both ASME B31.3 and the SRD, why is ANSI A58.1 used to calculate wind loading on exposed piping? 4. What methodology will be used to design welded attachments to pipe? 5. What methodology will be used to satisfy ASME B31.3 Section 319.2.3 (a) Average axial stresses due to longitudinal forces?	1. For sustained loads and displacements, SC-III (Non-Chemical) and SC-IV pipe stresses comply with ASME B31-3-1996. The SC-III (Non-Chemical) and SC-IV piping does not have to remain operable or intact following a design basis earthquake (DBE). As noted in Section 2.4.10.2.2.4 of the PSAR, "the allowable stresses for SC-III (Non-Chemical) and SC-IV piping systems are increased above those allowed for SC-I, SC-II, and SC-III (Chemical) piping supports, which is logical since these piping systems do not have to remain functional during or following a earthquake. The allowable stresses are defined and controlled in the WTP project pipe support design criteria and are based on the experience and engineering judgment of the stress engineer." While the SC-III (Non-Chemical) and SC-IV piping does not have to remain intact following a design basis earthquake, the ASME Section III, Subsection NF and Appendix F, stress limits are considered large enough to allow deformation, which may preclude operation of the piping, but low enough to ensure that the piping and supports will remain intact following a design basis earthquake. LAW-PSAR-202 was the basis for SER Section 4.1.1.3, COA # 3, and considered the seismic criteria of PC-3 and PC-4 subsystems and components, which are classified as SDC, in the LAW facility, i.e. melter shell, offgas system and stack. The LAW offgas system and stack piping are considered SC-III (Chemical) and comply with ASME B31.3-1996. Since then, RRC components were added to the definition of ITS. RRC piping	The response is acceptable provided the Contractor submits a document that supports the justification for accepting higher allowables permitted by ASME-III for design of the SC-III and -IV piping and pipe supports carrying nonchemical fluids (COA # 2 under Section 5.1, LAW Facility Description) by the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
		and pipe supports in the LAW facility are SC-III (Non-Chemical) or SC-IV. As noted in the response The LAW structure and equipment are categorized as SC-III (PC-2) and the provisions of 1997 UBC govern their seismic design. The UBC seismic design ensures the following during a seismic event: - The structure will not collapse - The equipment will remain anchored to the structure. However, the UBC seismic design does not ensure the following under a seismic event: - The structure will maintain confinement against material release - The equipment will remain functional The LAW equipment required to remain functional during and after an earthquake shall be seismically qualified in accordance with the provisions of DOE STD-1020-94. Section 2.4 addresses seismic qualification of equipment and distribution systems using analysis, testing and experience database with consideration given to anchor motions. If testing is the seismic qualification method, the methodology and acceptance criteria shall be per AC 156 with the appropriate modifications from DOE-STD-1020-94. In paragraph 5(g) of SER Section 4.1.1.2, the DOE noted that BNI should describe the methodology to be used to qualify SDC equipment in the LAW facility. BNI has described in the PSAR that the offgas piping, which is SC-III (Chemical), and associated pipe supports will comply with ASME B31.3-96. In response to LAW-PSAR-201, which formed the	

Question No.	ORP Question	Contractor Response	ORP Disposition
		basis for SER Section 4.1.1.3, COA # 4, BNI noted that Level B allowable applies to SC-III piping systems and supports, which are required to maintain functional during and after DBE. The comment is directed specifically to the LAW offgas system that is designated as SC-III (Chemical), and the design code is ASME B31.3-96. According to the PSAR, the LAW offgas system is required to remain functional and operable during and after DBE event. To properly maintain the system operability during and after DBE event, ASME B31.3 allowables will be used to design the LAW offgas piping with the 1.33 increase permitted for occasional loads. For pipe supports on the LAW offgas system piping and pipe supports that requires operability is SC-III (Chemical), and ASME B31.3-96 requirements are met. For offgas piping systems in the LAW facility, ASME B31.3 allowable for occasional loads and Level B allowable for supports will be used. Appropriate modifications to the PSAR were included in the PSAR update. The RRC piping in LAW is considered SC-III (Non-Chemical) and SC-IV piping. For sustained loads and displacements, SC-III (non-Chemical) and SC-IV pipe stresses comply with ASME B31-3-1996. This piping does not have to remain functional following an earthquake. Level D Service Limits for design of LAW SC-III (Non-Chemical) and SC-IV piping and pipe supports are acceptable to ensure the systems will remain intact based on engineering judgment and NED-21985 and NUREG-1367.	

Question No.	ORP Question	Contractor Response	ORP Disposition
		a. According to Appendix F of ASME Section III Code, the Level D service limits and design rules are intended to assure that violation of the pressure-retaining boundary will not occur. One of the studies is NUREG 1367, Functional Capability of Piping Systems, published November 1992. This report concludes that "piping functional capability" (not just maintaining pressure retaining capability) is ensured by meeting Level D Service limits in the present ASME Section III Code, i.e. $< 3S_h$, but not greater than $2S_y$. Therefore, using Level D Service Limit of $3S_h$ to ensure the functional capability of piping systems is conservative for SC-III (Non-Chemical) and SC-IV piping and associated pipe support designs. b. To meet Level D service limit to ensure the functional capability of a piping system during and after earthquake event is a common industry practice. One of examples is presented in BNL 52361, Seismic Design and Evaluation Guidelines for the Department of Energy High-Level Waste Storage Tanks and Appurtenances, published October 1995. In this report, the piping systems are designed per ASME B31.3. Pipe stress calculations for seismic design (equivalent to WTP SC-1 Piping) are performed per Equation (7.16) on page 7-27. The stress equation is shown as follows: Pipe Stress = $PD/4t + 0.75i(M_D + M_I)/Z \leq 3S_h$	

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		Where $M_D = M_A$ $M_I = M_B$ S_h is from Reference 7.26, which is identified as ASME B31.3-1993. In this report, the allowable stress limit (Level D Service Limit) is the same as that for WTP. However, the stress calculation used in the report is less conservative than WTP stress calculation because it uses stress intensification factor multiplier of 0.75*i* whereas WTP uses full 1.00*i* value. Therefore, the report indicates that using Level D Service Limit in piping design to ensure the functional capability of ASME B31.3 piping systems is justified and is commonly accepted by the industry. c. In the pipe support design, the above report (page 7-30) specifies that the inner piping support stresses shall not exceed $1.2S_y$. Allowable stress limit of $1.2S_y$ is the same as the Level D Service Limit specified in ASME Section III, NF/Appendix F. Therefore, using the Level D Service Limit for the design of pipe support to ensure the functional capability of the support is also justified and accepted by the industry. d. Code Application Comparison from The Other DOE Project	

Question No.	ORP Question	Contractor Response	ORP Disposition
		(nested table below)	

	Savannah River & DWPF	WTP	Remarks
(I) Pipe Stress Allowable Stress Limit			
Seismic Safety Piping (PC-3: SC-I & SC-II, and PC-2: SC-III (Chem))	Less of $3S_h$ or $2S_y$	$1.33S_h$ per B31.3	WTP is per ASME B31.3 and is more conservative.
Non Seismic Safety Piping (PC-2: SC-III (Non-Chem) & PC-1: SC-IV)	Less of $3S_h$ or $2S_y$	Less of $3S_h$ and $2S_y$	Same
(II) Pipe Support Stress Limit			
Seismic Safety Pipe Supports (PC-3: SC-I & SC-II, and PC-2: SC-	AISC N690 (1.6S, in which S is the AISC allowable)	$1.33S_h$ per ASME B31.3	WTP is more conservative.

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<tr><td>III (Chem))</td><td></td><td></td><td></td></tr>
<tr><td>Non Seismic Safety Pipe Supports (PC-2: SC-III (Non-Chem) & PC-1: SC-IV)</td><td>UBC</td><td>ASME Section III NF/Appendix F (1.8S to 2.0S)</td><td>UBC does not specify the allowable stress limits for SC-III/SC-IV pipe support design.</td></tr>
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Notes:

The detail allowable for DWPF pipe supports was AISC N690 and UBC Code for PC-3 and PC-2 systems, respectively. AISC N690 and UBC are for building structural steel design, not for pipe supports. Using these two codes for pipe supports may not be appropriate. ASME Section III NF/Appendix F is solely developed for the design of pipe supports for nuclear power plants. It is more up-to-date and more complete, and it is supported by the results of extensive studies and design practice. As shown above for WTP pipe support design, the allowable for pipe supports are gradually increased as the seismic importance of the piping is decreased. WTP is only allowed to use ASME Section III NF/Appendix F for SC-III (Non-Chemical) and SC-IV piping, which does not have a seismic safety function. This is more than adequate.

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Question No.	ORP Question	Contractor Response	ORP Disposition
		From the above comparison, it is concluded that it is a common practice to design ASME B31.3 piping using various codes based on the best engineering judgment. This is required because ASME B31.3 does not provide sufficient detailed design rules for the design of piping and pipe supports for seismic requirements. Therefore, the design Code rules selected by the designers for ASME B31.3 piping may not be exactly the same in each application. The design rules selected for the plant should be sufficient to ensure the safe operation of the plant. ASME Section III, NF/Appendix F has been used for the design of pipe supports for about 100 operating nuclear power plants. This record should be more than sufficient to support its use for the design WTP pipe supports. For pipe stress allowable, Savannah River/DWPF also used the (3Sh, but not greater than 2Sy) allowable from ASME Section III, Appendix F. 2. BNI agrees that the modal combination response provided in ASCE 4-98 provides more conservative methods of performing modal combination and rigid residual response, than the SRSS method. ASME B31.3 does not identify a method to be used in combining modal responses and SRSS is considered a valid method for ASME B31.3 piping. However, since the method used for performing response spectra analysis in computer program ME101, *Linear Elastic Analysis of Piping Program*, includes closely spaced modes and residual rigid responses, the phrase "including effects of closely spaced modes and residual rigid response" will be added to end of the statement in Section 2.4.9.2.5.2	

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		of the PSAR so that it is consistent with Table 2-6. 3. BNI agrees that ASCE-7-98 should be listed instead of ANSI A58.1, since ANSI A58.1 was revised and redesignated as ASCE-7 in 1988. BNI will revise the second sentence to read: "The method of analysis may be described in ASCE-7, *Minimum Design Loads for Buildings and Other Structures*, or the *Uniform Building Code*." ASME B31.3 requires considering the effect of wind loading in the design of exposed piping. ASME Code B31.3 Paragraph 301.5.2 states that the method of analysis may be as described in ASCE-7, Minimum Design Loads for Buildings and Other Structures, or the Uniform Building Code. The UBC-1997 is generally used as the basis for wind load analysis for the RPP-WTP project. 4. According to Paragraph 321.3 of ASME B31.3, structural attachments shall be designed so that they will not cause undue flattening of the pipe, excessive localized bending stresses, or harmful thermal gradients in the pipe wall. It is important that attachments be designed to minimize stress concentration, particularly in cyclic services. ASME B31.3 does not provide the stress criteria for local stress analysis. The industry practice to ensure the attachment designs meet the requirements is to perform the pipe local stress analysis based on welding Research Council Bulletin No. 107 or use stress intensification factor methods. The rules for localized stresses using the stress intensification factors are provided in Table 2-6 of the PSAR.	

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		5. All ASME B31.3 piping is required to meet the flexibility requirements regardless of whether they are classified as SC-I, SC-II, SC-III (Chemical), SC-III (Non-Chemical), or SC-IV. Piping shall have sufficient flexibility to allow for thermal expansion or contraction or movements of piping supports and terminals. To accept the piping flexibility, a pipe flexibility analysis or engineering judgment is used. The piping is routed based on previous experience with successful service and analyzed as follows: - For piping systems with design temperatures of 150 F or less, no formal flexibility analysis is required. However, the piping stress engineer should review and ensure that there are no significant externally imposed displacements such as the movements due to anchor or nozzle displacements connected piping and building settlements, etc. - For the piping systems with design temperatures of between 150 F and 250 F, no formal flexibility analysis is required since they should be properly routed with adequate flexibility. However, if the piping system is classified as SC-I, SC-II, or SC-III (Chemical), and connected to major/sensitive equipment or with significant externally imposed displacements, a formal flexibility analysis is required. - For piping systems with design temperatures exceeding 250 F, a formal flexibility analysis using ME-101 is required.	
PSAR Update	This was a three-part question that dealt with	1. The safety functions of SC-I, SC-II, and SC-III	The response is

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GI-022	classification of SSCs. 1. When the SADA & PSAR are modified, what method would it require to ensure that the safety function(s) of all important to safety (ITS) SSCs in categories SC-I, SC-II, and SC-III are identified such that the seismic qualification method and acceptance criteria in the Project equipment specification are consistent with the equipment safety function(s)? 2. When the SADA & PSAR are modified, what methodology will be used to ensure that the safety functions(s) of all important to safety (ITS) SSCs identified such that the environmental (temperature, radiation, humidity, aging, fatigue, etc.) qualification method and acceptance criteria in the Project equipment specification are consistent with the equipment safety function(s)? 3. What project process will be used to assure the credited ITS SSCs will be purchased to satisfy the functional design requirements?	components, required to function during and/or following a seismic event, are identified in the Standards Identification Process Database (SIPD) and are summarized in Chapter 4 of the PSARs. ITS SSCs are seismically qualified by analysis or testing as described in 24590-WTP-RTP-ST-01-002, *Seismic Analysis and Design Approach* (SADA). The analysis method is used only if the equipment functional requirements, required during or following a design basis earthquake as stated in the equipment specification, are verifiable by analysis. Unless otherwise stated in the equipment specification, the functional requirements are the same as the operational requirements. The equipment supplier is required to provide a report demonstrating how the equipment is seismically qualified. This report is reviewed to ensure that it meets the project requirements, including seismic qualification method and acceptance criteria for equipment safety functions, before the report is accepted. Part of this review will be to verify that each component of the equipment that has safety functions is able to perform all of the safety functions required both during and following a design basis earthquake unless otherwise specified in the specification. Piping and other distribution system components designated as SDS and SDC have safety functions. Piping components that have seismic safety functions are SC-I and SC-III (Chemical). SC-II components only have a safety function to the extent that they would affect a SC-I component during a design basis earthquake. For piping pressure boundary components, if the stresses are	acceptable. Changes will be made in the next PSAR update.

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		kept within the allowable limits of the applicable code, the pressure boundary components will perform their safety functions. Valves and other components, with extended operators, and other active equipment that have to remain functional following a design basis earthquake will be dynamically qualified to ensure that they remain operable. 2. When the dynamic qualification requirements in SADA are modified, engineering is responsible for ensuring that any affected design documents, such as equipment dynamic qualification specifications, are revised to be consistent with the revised requirements. If the environmental parameters, such as pressure, temperature, radiation, humidity, etc., are changed because of design changes, the new parameters are compared with the parameters used to purchase or qualify the equipment to ensure that the purchase or qualification parameters are at least as conservative as the new design parameters, unless there is justification as to why the changed parameters will not affect safety functions of the components. If the safety function of equipment is changed or new safety functions identified in the PSAR, the revised or new safety function is compared to the safety functions for which the equipment was qualified. If additional qualification information is needed to ensure the equipment is qualified for the revised or new safety function, the project qualification personnel determine the best method to qualify the equipment. SRD Safety Criterion 4.4-1 commits to complying with the aging requirements of I0CFR50.49 and	

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		IEEE-323-83 as tailored in Appendix C for SDS and SDC electrical equipment. BNI will control the environmental qualification of SDC and SDS control and electrical systems and components by issuing a specification, which details the evaluation of electrical equipment for aging mechanisms including radiation, temperature, wear, and vibration, and provide documentation as required by IEEE-323. SDC and SDS electrical equipment and instrumentation considered to be operating in a mild environment requires pre-aging prior to seismic testing only where significant aging mechanisms are known to exist. The equipment or instrumentation shall withstand seismic loads caused by the design basis earthquake in conjunction with other applicable loads, after any required aging without loss of function. SDC and SDS electrical equipment and instrumentation located in harsh environments, or mild environments with significant aging mechanisms, such as radiation, temperature, wear, or vibration, shall be environmentally qualified in accordance with l0CFR50.49 and IEEE-323-1983 as outlined in Safety Criterion 4.4-1 of the SRD. Electrical equipment and instrumentation without a safety function and non-electrical equipment are designed to meet their design life. Part of this design is to use materials that will withstand the aging mechanisms such as radiation, temperature, wear, and vibration. The supplier is responsible for choosing correct materials will provide selected	

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		design documents, which specify the materials and the recommended surveillance, maintenance, and replacement requirements. The aging characteristics the materials used in environments with potentially significant aging mechanisms will be reviewed for material compatibility to withstand the required design parameters and aging mechanisms for the recommended life. 3. The functional safety requirements for ITS SSCs are specified in Chapter 4 of the PSARs. These functional safety requirements and additional functional design requirements for equipment are specified in the specifications and data sheets provided to the supplier. The project reviews selected design documents submitted by the supplier for conformance to the specification and data sheet requirements. Proposed PSAR Additions: SC-1 and SC-II equipment shall be dynamically qualified by either analysis or testing. If qualified by analysis either a dynamic or an equivalent static analysis can be used based on the characteristics and complexities of the system or component. If qualified by testing, testing procedures presented in IEEE 344 shall be followed. The actual mounting of the equipment shall either be simulated or duplicated. All normal loads action on the equipment shall be simulated. The seismic load shall be defined by required response spectrum (RRS) obtained by enveloping and smoothing the in-structure spectra computed at the supports of the equipment by linear elastic analyses and multiplied	

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		by a factor of 1.4. The test response spectrum (TRS) of the shake table shall envelop me RRS. The equipment functional safety requirements are specified in Chapter 4 of the respective PSAR. The seismic qualification shall ensure that all components of the equipment required to ensure the safety function of the equipment, including anchorage, are analyzed. SC-III equipment required to remain functional during and/or after an earthquake shall be seismically qualified by testing or analysis. Acceptance criteria for seismic qualification by testing shall be per AC 156. The analysis method shall be used only if the equipment functional requirements stated in the equipment specification are verifiable by analysis. The equipment functional safety requirements are specified in Chapter 4 of the respective PSAR. The seismic qualification shall ensure that all components of the equipment required to ensure the safety function of the equipment, including anchorage, are analyzed. SDC and SDS electrical equipment and instrumentation located in harsh environments, or mild environments with significant aging mechanisms such as radiation, temperature, wear, or vibration, shall be environmentally qualified in accordance with l0CFR50.49 and IEEE-323-1983 as outlined in Safety Criterion 4.4-1 of the SRD. Other electrical equipment and instrumentation without a SDS or SDC safety function and non-electrical equipment are designed to meet their design life. Part of this design is to use materials	

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		that will withstand the aging mechanisms such as radiation, temperature, wear, and vibration. The aging characteristics the materials used in environments with potentially significant aging mechanisms will be reviewed for material compatibility to withstand the required design parameters and aging mechanisms for the recommended life.	
PSAR Update GI-023	This was a 16-part question that dealt with severity level calculations for the PT, HLW, and LAW facilities. 24590-PTF-Z0C-W14T-00002, July 2003 - Pretreatment Revised Severity Levels - "Revised Severity Level Calculations for the Pretreatment Facility." 1. The first sentence states: "*The purpose of this calculation is to revise the Pretreatment Severity Level calculations.*" The exact same sentence is in the previous revision. What SL calculations changed and why were the pretreatment Severity Level calculations revised for this version. What summary description of the changes and impacts is available? 2. Severity Levels SL-1 and SL-2 doses have increased for Co-located Worker consequence; SL-1 from > 25 to > 100 rem; SL-2 from >5 – 25 to 5 – 100 rem It appears ">" is missing from 5 rem on new SL-2 designation. It appears a ">" is also missing from the SL-2 designation for Public Consequence. Please confirm that this is correct. 3. Equation 2 [ST = (MAR)(ARF)(RF)] in section 5.3 Vessel Spills is a very general equation used	1. The changes to the source term calculation that eventually resulted in the revision to the severity level calculations are contained in CCN 054113. The attached three tables show the changes to the SL's based on the revised source term. 2. The severity levels shown in the text have been taken directly from the SRD. Text is correct as written. 3. An annotation will be added to the text at the next revision of the severity level calculation, stating in Section 5.3: "As discussed in 24590-WTP-GPG-SANA-004, this source term formula is a general equation used to determine the source term for various releases (i.e., equation can be used as identified here or modified to reflect a specific release mechanism)." 4. The previous 2.6E16 Bq Cs-137 was not a "normal" inventory for the column. It was intended to represent a theoretical maximum value [see response to 5 below]. The basis for the normal column loading value is provided in equation 20. The normal loading value is calculated bases on the LAW batch volume and the contract maximum Cs-137 loading for envelope B waste. 5. The resin bed loading estimate in the Rev. A analysis was based on an estimated saturation	The response is acceptable.

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	for much more than simply vessel spills. If this general equation is going to be introduced under the vessel spills section then additional text is needed to explain its general use. What is the additional description of the intended use for this equation? 4. For the <u>Ion Exchange Columns Explosions and Fires</u>, it is not clear why the normal ion exchange column loading is decreased by nearly an order of magnitude in this revision (2.8E15 Bq Cs-137) from the previous version (2.6E16 Bq Cs-137). The only readily apparent change is that the bed volume has decreased from 600 gallons to 415 gallons, which does not appear to account for the decrease. What is the documented reason for the column loading change (e.g., design change or other)? 5. What is the reason for the "double batching" assumption (increasing from 2.8E15 to 5.7E15 Bq Cs-137) for ion exchange columns since this assumption did not appear in the previous revision? The forward reference to assumption 13 (to Chapter 6, page 24) at a minimum does not point out the specific assumption location in the text since the reader has not yet encountered it. Assumption 13 is inadequate in explaining the basis – comment is provided below. 6. Table 5, assumption 11, in the Basis section: What is the relevancy of smoke yield as a basis for selecting polystyrene (e.g., particulate loading of the HEPA filters) and what has changed such that smoke yield is now considered important enough to list on this table? The previous revision included a text discussion of why smoke yield was not	loading value for the resin. Further testing has revealed the saturation loading value is highly variable, depending on the concentration of various competing cations for resin sites, processing conditions during loading, and variations in resin properties from batch to batch. It is therefore difficult to define an upper theoretical loading limit for the resin. The current bed loading limit of 5.55E15 BQ is based on a double-batching of the worst-case envelope B material, as discussed in technically justified assumption # 13. Calculation of normal column loading is provided in equation 20. This value is doubled to give a conservative loading value. This is a conservative loading limit for the purposes of estimating Cs IX severity levels, as multiple additional faults would be required to produce accidents involving a double-loaded column. The 5.55E15 BQ limit is protected by a TSR limit in the 2003 update of the PSAR. Current plans are to establish an upper operating limit of 85,000 Ci (3.1E15 Bq). 6. As this is a severity level assessment, dose consequences are unmitigated. The smoke effect on the HEPA filters is irrelevant to this analysis. The smoke yield reference will be removed from Table 5. The table reference at the end of assumption 11 will be changed to Table 4. 7. The smoke yield is irrelevant and will be removed from the table (see response above). As the severity level assessment is based on a time-integrated dose, the severity level assignment is insensitive to assumed burn rate. The entire resin bed burns in less than a typical 8-h working shift for the co-located worker at the calculated polystyrene burn rate. The time-integrated dose to	

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	particularly important. No information is provided to use smoke yield as a basis for selecting polystyrene. (Also the correct table reference is Table 4, not Table 5). 7. Table 5, assumption 11, in the Sensitivity section: Neither sentence in this section helps describe the "sensitivity of the analysis to this assumption." The basis was selecting polystyrene was its higher burn rate. What is the sensitivity of the analysis to changes in burn rate? If smoke yield is important, what is the sensitivity of the analysis to changes in the smoke yield? 8. Table 5, assumption 13. The basis for this assumption is not adequate; "double batching" is part of the assumption that leads to the 5.7E15 Bq assumption and not part of the basis. What is the basis for this assumption and what correction will occur to specify the assumption? Also, why is activity presented only in curies here, and not include becquerels? 9. Why do consequences and most Severity Levels go down for ion exchange column accidents? This system has the potential for significant external dose consequences to the facility worker and presents dome of the more difficult radiological engineering design challenges. 24590-HLW-Z0C-W14T-00013, July 2003 - HLW Revised Severity Level/Consequences - "Revised Severity Level Calculations for the HLW Facility." 10. The first sentence states: "*The purpose of this calculation is to revise the High Level Waste (HLW) Facility Severity Level calculations.*" The text notes 13 accidents are "updated." The same sentence structure appears in the previous	the co-located worker thus does not vary for burn times between 1 h and 8 h. The atmospheric dispersion coefficient and receptor breathing rate is constant over the time frame. Foe accident less than 1 h in duration, plume meander is not credited and a higher atmospheric dispersion coefficient is thus applied. Only the resin near the top of the bed is exposed to purge air and can burn. The burn time is estimated from the areal burn rate and the cross sectional area of the bed. The uncertainty in this burn rate estimate is not high enough to expect a burn time less than 1 h. A burn rate of greater than 8 h would result in reduced exposure to the co-located worker, due to worker shift change or evacuation before completion of the passage of the contaminated plume. Similarly, the time-integrated public receptor exposure is insensitive up to a 16 h burn time, the point at which the receptor breathing rate is assumed to fall to the significantly lower resting value. For lower burn rates resulting in resin consumption over a time frame greater than 16 h, the current results are conservative. 8. Calculation of normal column loading is provided in equation 20. This value is doubled to give a conservative loading value. This is judged to provide an appropriately conservative loading limit for the purposes of estimating Cs IX severity levels, as multiple additional faults would be required to produce accidents involving a double-loaded column. The 5.55E15 BQ limit is protected by a TSR limit in the 2003 update of the PSAR. Current plans are to establish an upper operating limit of 85,000 Ci (3.1E15 Bq). This ensures the column is eluted before significant breakthrough of Cs occurs,	

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	revision which presents doses and SLs for only 11 accidents of which only 8 are the same as the latest revision. What SL calculations changed and why were the HLW Severity Level calculations revised for this version? What summary description of the changes and impacts is available? 11. Identical to PT, LAW - <u>General</u>: The next to last sentence on this page states: "*It is anticipated that after phase 1 is completed, the contract limits on radionuclides will be revisited for the next series of waste tanks to be processed by the facility*." Is the design of the facility capable of handling waste streams for the entire project duration? Explain. 12. Identical to PT, LAW - <u>Table 3. Severity Level Definitions.</u> ABAR 24590-WTP-SE-ENS-03-032, Rev. 0 submitted to ORP for approval states SRD Appendix A requirements will be clarified so that dose consequences to facility workers will be qualitatively assessed except for certain severe accidents. Where are qualitative assessments of dose consequences to the facility worker documented? Please provide a reference if they will not be documented in the Revised Severity Levels document. How will appropriate control strategies be identified to ensure worker safety during accidents (Section 8; page 54)? 24590-LAW-Z0C-W14T-00003, July 2003 - LAW Revised Severity Level/Consequences - "Revised Severity Level Calculations for the LAW Facility." 13. Equation 2 [ST = (MAR)(ARF)(RF)] in <u>section 5.3 Vessel Spills</u> is a very general equation used for much more than simply vessel spills. If this	The activity units will be converted to becquerels. 9. The inhalation doses go down due to a reduction in maximum column loading as discussed in the response to comment 8 above. The direct dose hazard to the facility worker is beyond the scope of the severity level assessment document. Facility worker doses are determined qualitatively in the ISM process. 10. See response to question 1 above. 11. This sentence has been deleted from the HLW and LAW severity level calculations. This sentence will be deleted from the PT severity level calculation in the next revision to the calculation. As required in the contract flowsheet assessments are performed annually using the latest data from TF an a tank-by-tank feed vector (where the data is available). As new information is received regarding the radionuclide inventories the unmitigated consequences or severity levels will be reevaluated to assess the selected control strategies. If necessary waste acceptance TSRs will be developed. At this time, TSRs are projected for ULD or dose equivalents to protect or ensure inhalation dose consequences are not exceeded. It should be noted that as the design progresses and safety issues are resolved additional TSRs may be required. These will be developed prior to the submittal of the FSAR. 12. As discussed the attachment to CCN: 053624, quantitative facility worker (i.e., workers within a facility) consequence calculations are not required in DOE O 420.1 or in 10CFR830. In addition, the SRD and24590-WTP-GPP-SANA-001 do not require quantitative consequence calculations for accident conditions. This does not imply that	

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	general equation is going to be introduced under the vessel spills section then additional text is needed to explain its general use. What is the additional description of the intended use for this equation? 14. The first sentence states: "*The purpose of this calculation is to revise the Low-Activity Waste (LAW) Facility Severity Level calculations.*" The text notes 13 accidents are "updated." The same sentence structure appears in the previous revision which presents doses and SLs for only 6 accidents. <u>Why</u> were the new SL calculations added and <u>what</u> changes were made in existing LAW Severity Level calculations for this version that resulted in dose consequence changes? What summary description of the changes and impacts is available? 15. Identical to PT, LAW - <u>General</u>: The next to last sentence on this page states: "*It is anticipated that after phase 1 is completed, the contract limits on radionuclides will be revisited for the next series of waste tanks to be processed by the facility*." Is the design of the facility capable of handling waste streams for the entire project duration? Explain. 16. Identical to PT, LAW - <u>Table 3. Severity Level Definitions.</u> ABAR 24590-WTP-SE-ENS-03-032, Rev. 0 submitted to ORP for approval states SRD Appendix A requirements will be clarified so that dose consequences to facility workers will be qualitatively assessed except for certain severe accidents. Where are qualitative assessments of dose consequences to the facility worker documented? Please provide a reference if they will not be documented in the	consequences to the facility worker are not addressed. Where appropriate, based the severity of the accident condition and to establish the acceptability of controls quantitative calculations are performed (e.g., melter offgas releases). For each of the representative DBEs analyzed, the control strategies selected to protect the co-located worker and the public are qualitatively evaluated for effectiveness to protect the facility worker and as required in 24590-WTP-GPP-SANA-002, events with facility worker only consequences or SL-3 or less consequences to the co-located worker are evaluated with respect to the facility worker. As discussed in the attachment to CCN: 053624 and in ORP/OSR-2001-17 inhalation doses to facility workers are difficult to quantify. This is due to the uncertainties associated with the receptors proximity to the release and the actual modeling of a release (e.g., dispersion) in a room. Therefore, as discussed in the documents and the DOE guidance qualitative evaluations are acceptable. As discussed in each of the DBEs the cascade airflow provides adequate protection to the facility worker from airborne releases. C5 is ITS and will maintain cascade airflow, thus protecting the facility worker from airborne releases. The radiation safety organization performs shielding calcs using the bounding source terms developed in 24590-PTF-M4C-V11T-00008, Rev D. Based on the discussion provided above, and DOE requirements/guidance (420.1 and 10CFR835 as implemented in DOE-STD-3009), and CCN:	

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	Revised Severity Levels document. How will appropriate control strategies be identified to ensure worker safety during accidents (Section 8; page 54)	053624 and in ORP/OSR-2001-17, it is acceptable to determine facility worker consequences qualitatively and select controls based on the qualitative consequence determination. In accordance with 24590-WTP-GPP-SANA-002, a review of each of the facilities has been performed by the ISM teams to determine consequences and select controls for those events with only facility worker consequences and those events with SL-3 or less consequences to the co-located worker. These are documented in the following: CCN: 067537, Evaluation of the Low Activity Waste Facility Worker Design Basis Events CCN: 070432, Evaluation of Facility Worker Controls for WTP Pretreatment Facility CCN: 070178, Evaluation of Facility Worker Controls for the WTP HLW Facility 13. See response to question 3 above. 14. See response to question 1 above. 15. See response to question 11 above. 16. See response to question 12 above.	
PSAR Update GI-024	This was a 12-part question that dealt with PT, HLW, and LAW predicted maximum radionuclides. 24590-PTF-M4C-V11T-00008, Pretreatment, HLW, and LAW Vitrification Predicted Maximum Radionuclides Radionuclide issues/questions: 1. Table 6-2, Page 18. Why is 1-129 assumed to be a particle? A significant fraction is likely to be a gas with a HEPA DF of 1 rather than 10,000.	1. The assumption of a 10,000 DF for I-129 (s) is intended to maximize the solids loading on the HEPA to cover potential handling exposure of facility workers. This assumption was not applied to the HLW melter offgas system, as stated in Section 6.1.4, "The vitrification DFs used in the mass balance calculation are conservative. No changes were implemented for the MRC calculation." 2. As stated in the WTP Contract, Section C.7(d)(1)(iii). "Cs Removal: This operation removes 137Cs from the filtered supernate to allow	The response is acceptable.

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	This is why silver mordenite was selected as an iodine adsorber in the HLW melter offgas treatment system. 2. Section 6.1.3, Page 14. Why is the Cs-137 level in ILAW "fixed" at 0.3 Ci/m^3? The contract (assumed to be the latest version) limits the average Cs-137 concentration in ILAW to 3 Ci/m^3. Individual concentrations could be higher. (This would require use of thicker-walled canisters to provide shielding to ensure meeting the 1,000 mrem/h canister surface dose rate limit, however.) 3. What is the basis for using the average concentrations from only Phase I Tanks? What is the impact from considering all the other tanks, (in particular for radionuclides where there is no contract maximum feed specification)? This would appear to not necessarily be bounding for the maximum radionuclide concentrations. It appears that the average concentrations from only Phase I tanks were used in the Predicted Maximum Radionuclides calculation for the following scenarios: • Section 2, Page 2. Where no contract maximum number is specified in the contract. "A composite feed vector was used with the contract limits to maximize waste stream concentration for each of the feed envelopes. Components in the feed vector were derived from the mean value of Phase I tanks." • Section 2.3, Page 7. For nominal feed	for production of an ILAW waste product that meets the Specification 2.2.2.8, Radionuclide Concentration Limitations. In addition, 137Cs will be further removed, to achieve a 0.3 Ci/m3 in the ILAW product, to facilitate the maintenance concept established for the ILAW melter system…" 3. With the exception of the aircraft crash DEB, and the seismic PRA all calculations (i.e., severity levels and DBEs) used contract maximums for the radionuclide concentrations. The wash and leach factors were based on the best available data (see response to question 9). The current source term calculation is based on TFCOUP Rev. 3A, annually the source term will be revisited to determine if changes have occurred in the source term and what the impacts are to the selected controls. 4. The entrainment and decontamination factors in Section 6.1.4 are based on design assumptions used in the mass balance calculation (24590-PTF-M4C-V11T-00006, Table 4) except that they have been modified (i.e., reduced DF) accordingly to increase the source term in the vent system for added conservatism. This approach of applying an "added" margin on top of the design basis to account for operation or equipment performance uncertainties was used consistently throughout the MRC calculation (ex., a 25 wt.% solids concentration was used for MRC versus the 20 wt.% in the baseline design). As stated at the beginning of Section 6.0 in the MRC calculation: "Conservatism is included in these process parameters beyond nominal flowsheet and operating conditions to allow for uncertainties in the inputs. The assumptions in the baseline mass balance calculation (24590-PTF-M4C-V11T-	

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	throughput runs -- average concentrations of the Phase I tanks. • Section 6.1.5, Page 14. For wash factors. "The wash factors used in this calculation were derived by summing the product of the wash factor and reported analyte mass for each tank divided by the total mass of the analyte for all the Phase I tanks." • Section 6.1.6, Page 15. For leach factors. "The leach factors used in this calculation were derived by summing the product of the leach factor and reported analyte mass for each tank divided by the total mass of the analyte for the Phase I tanks," (Page 15). Please address the appropriateness of using the average of Phase I tanks for each of the above scenarios. Issues with wash, leach, decontamination, and entrainment factors: 4. Section 6.1.4, Page 14. What are the bases for the entrainment and decontamination factors, (Section 6.1.4)? What is the basis for the statement on Page 14, "MDRs for the evaporators are increased (DFs decrease) by a factor of 10 for those radionuclides that are not conservative as compared to the mass balance calculation..." What is the basis for the statement on Page 14, "Entrainment factors and release fractions to the vent systems from quiescent sources ... are increased by one order of magnitude ... for the MRC calculation."	00006) were maintained in the MRC calculation and supplemented as appropriate by more bounding assumptions for source term estimate as explained below. Each of these assumptions will require final verification prior to changing the calculation status from Committed to Confirmed." The acronym MDR stands for Mass Distribution Ratios as stated in the 1st sentence in Section 6.1.4. 5. There are unfortunately no good assumptions for "all" tanks since there are no validated waste characterization data for all tanks. There are no technical bases for the use of a maximum wash/leach factor from a single tank to represent all tanks, especially given the large variance reported in the source document (BBI). The wash and leach factors reported in BBI are not based on thermodynamic considerations of the prototype WTP process (i.e., accounting for process parameters and recycle processing). These factors are typically higher than experimental results (see CCN: 030166). Using the maximum reported wash/leach factors for radionuclides may not be conservative in all cases. For example, assuming 100% removal of TRUs from the HLW solids would effective lower the concentrations of these source terms in the feed to HLW vitrification. Conservatism in the MRC calculation is largely maintained by applying contract maximum in the feed for all key radionuclides. 6. As discussed in the meetings addressing this comment, the mitigated consequences for the analyzed events are significantly less than the unmitigated or severity level consequences. Thus, abnormal operations or process upsets which are typically lower in magnitude than accident	

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	5. What is the justification for using a weighted average wash factor instead of the maximum wash factor? Is this a good assumption for all tanks? Perhaps there are certain tanks where the maximum should be used instead of the weighted average. Extreme tank to tank minimum/maximum variance may suggest that maximums should be used for bounding tanks and/or batches. Additionally, the weighted average method for developing wash and leach factors does not appear to be conservative. Wash and leach factors are based on thermodynamic considerations that vary depending on the chemical compositions of individual waste feeds. 6. Section 6.2.3, Page 21. What heterogeneous conditions are credible (for example, solids settling/plating out and later re-suspending), and when will they be evaluated? As stated, "all solid and liquid components of a stream are assumed to be homogeneous". 7. What is the basis in Section 6.1.5 for stating, "In C/D case runs which include application of wash factors, the wash factor for Am is set to zero based on AN- 102 actual waste test data..." A reference is provided - please provide the reference and/or explain why this is a good assumption. Throughout issues: 8. The values for the envelope throughputs appear to be chosen rather arbitrarily. What is the basis	conditions would be bounded. 7. The reference report was provided in the meeting. Experimental washing data performed using actual waste under prototype WTP process condition provides the needed validation in comparison to a predicted wash factor for the "as-received" feed from the tank farm. 8. Revision A of the source term calculation was performed assuming an average throughput. At the time Revision B of the calculation was being prepared and submitted for internal review, a question was raised regarding the 60/6 throughput as a bounding throughput. Subsequently sensitivity studies were performed to determine if the 60/6 was bounding and if not bounding determine a series of throughput runs that would provide bounding consequences, In most instances the determining factor is the ratio of HLW to LAW; however, as the feed is processed in the PTF all throughputs (e.g., radionuclide concentrations) are essentially the same. The initial and final set of throughputs was based on the maximum, expected, and goal throughputs identified in Section C, Table C.6-5.1 of the Contract (dated 2/3/03). To maximize the ratio of LAW to HLW the HLW throughput was changes (i.e., remained 6 MT/D). 9. This assumption is in alignment with the contract where only HLW and LAW waste are defined as the acceptable feed for WTP. Any interstitial phase in the feed will likely be mixed during the waste mobilization/transfer and be treated as LAW or HLW in the WTP. Regardless, the MRC cannot incorporate unknowns or speculations. As discussed in the meeting, the category of "entrained" solids is not well defined in the	

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	for selecting the particular envelope throughputs? Why wasn't an analysis conducted using the same throughput assumed in Rev. A of the source term calc. so that values could be compared to Rev. D? What is the basis for selecting the sensitivity runs? How "representative" of the expected throughput are these sensitivity runs? 9. Section 6.1.5/6. The source term calc. assumes all liquids are LAW feed - why is this a good assumption and why is it realistic? The contract discusses that liquid feed will be going to LAW, but what situations could exist where this is not a good assumption and this could underestimate the consequence of the source stream to LAW due to solids and sludges? What is the impact when assuming less than 100% liquids are LAW feed, (e.g., precipitation of transuranics in PT vessel prior to transfer to LAW), Other issues: 10. Section 2.1.5, Page 5. What is the basis for the 2.6 kg/m^3 density for <u>HLW</u> glass, particularly at the assumed 50 wt% waste oxide loadings? Somewhat higher densities are likely, (and could be as high as 2.8 kg/m^3), which would result in a higher IHLW source term. 24590-WTP-Z0C-W14T-00013, Unit Doses and Unit Heat Loads for Use in Safety Analysis 11. Table 4. Why does the table indicate that	contract, but the impact from which is controlled within the feed specification limits set forth in Specification 7 and 8. 10. A higher glass density would result in a higher source term, however, higher waste loading does not necessarily yield higher density glass. There are 13 different glass formers available with various physical properties, and depending on the type of waste incorporated, the resulting glass density is expected to vary. The 2.6 kg/m3 is a predefined input based on the same simplifying design assumption used in the mass balance calculation (24590-PTF-M4C-V11T-00006). No attempt was made to calculate the glass density as a function of waste loading. Regardless, the 50 Wt.% waste loading assumption is sufficiently conservative even without considering the density effect as evident by the high canister heat load (i.e., >2,500 watts compared to 1,500 watts maximum allowed in the contract, Section 1.2.2.1.3). The high heat load indicates the incorporation of dominant shielding contributions (e.g., Cs-Sr/Y-90) in the upstream process. 11. Based on TIDBT issues meetings it is recognized that it may not be possible to wash and leach all streams within the PTF and send the streams directly to the LAW facility. A TSR on inventory control for the LAW will be implemented at the PTF. This decision was based on the desire to protect the ACD for the LAW. 12. A comparison of the 10 radionuclide based ULD to a ULD based on 26 radionuclides has been performed. With the exception of the	

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	"applying wash factors or wash and leach factors would exceed the LAW design basis" when washing and leaching is the baseline? The assumption that only no wash and leach cases will be considered for finding the LAW MRC is not necessarily conservative, especially for TRU components if the wash pH is lower than the feed pH. 12. Section 8. What evidence exists that the proposal to "increase the unit doses by 10% to account for uncertainties" will bound the uncertainties?	HEPA/HEME filter ULDs, the ULDs based on the 26 radionulcides are bounded by the 10 radionuclide ULD. Three ULDs were calculated for HEPA/HEME filter events. The three calculated ULDs (10 radionuclides + 10%) exceed the calculated ULDs for the 26 radionuclides, the other ULDs were not used in the DBE calculations.	

DISPOSITION OF PRETREATMENT QUESTIONS FROM PSAR UPDATE REVIEW

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update PT-001	This question dealt with calculation 24590-PTF-Z0C-W14T-00002. Why was this boiling event not included in this document? What would the boiling source term be in this event?	The severity level calculation does not analyze boiling events at this level of detail. The severity level calc determined severity levels to be SL-1 to co-located worker and SL-2 to Public for boiling events in the UFP. The consequences due to boiling in the UFP are bounded by other analyzed events (see 24590-PTF-Z0C-W14T-00002, Rev. C, spreadsheet; PT_SLs_BOC.xls; Boiling). As discussed in 24590-PTF-Z0C-10-00002, Rev. B, the steam ejector malfunction evaluated releases at 1474 lb/hr superheated steam, plus steam from the vaporized waste. The controls selected were the PVV HEMEs (SDS) and HEPAs (SDC) and the C5 ventilation system (SDC). As discussed in the boiling DBE (24590-PTF-Z0C-H10T-00002, Rev. B), the design of the UFP vessels and the PVP/PVV system will mitigate releases from the UFP vessels. Additionally, for more vigorous boiling events, the boiling calc refers to 24590-PTF-Z0C-10-00002. The latest estimates for UFP-VSL-00002A/B heating and emptying ejector steam flow rates are 4,784 lb/h and 2560 lb/h, respectively. Based on recent R & T results, the emptying ejector steam flow rate may need to be increased, possibly to near the heating ejector rate.	The BNI response was acceptable. Even though BNI stated that the steam injection rate during heating of the UFP-VSL-00002A for caustic leaching (4,784 lb/hr) is about 3.2 times greater than the steam ejector malfunction heat input rate (1474 lb/hr)that was analyzed and given in calculation 24590-PTF-Z0C-10-00002, Rev B, a three-fold increase in the dose consequence would still be bounded by other vessel boiling and pressurized release event dose consequences in FRP-VSL-00002A as shown in calculation 24590-PTF-Z0C-W14T-00002, Rev C, Tables 12 and 13. Thus, the PVV system would be able

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			to mitigate boiling in the UFP vessel caused by failure of a temperature controller or steam supply valve to the steam heating injectors.
PSAR Update PT-002	This question dealt with calculation 24590-PTF-Z0C-W14T-00002. Will the FRP-VSL-00002A rupture during a detonation, thus spilling all or a portion of the contents to the cell floor? If it ruptures, how much would the source term be increased to account for this result?	Severity levels for H2 deflagration/detonation are SL-1, based on existing analysis. The selected control strategies would not change with the addition of liquid spill due to vessel failure.	The response is acceptable since severity levels are already SL-1 for the public and facility co-worker so that adding liquid spill consequences would not change the severity level.
PSAR Update PT-003	This question dealt with calculation 24590-PTF-Z0C-W14T-00002. Why is the temperature this high? Has loss of tank cooling been assumed such that self-heating raises the tank temperature to this value?	A vessel temperature of 215 F is used in the calculation because that is the vessel operating temperature as shown on vessel data sheet 24590-PTF-MVD-FRP-00005, Revision 4. This data sheet is explicitly identified in Appendix B of the cited calculation as the temperature reference for this vessel. Note: The calculation cited in this question was reviewed as Revision B and has now been updated to Revision C. This does not impact either the reviewer's question or this response.	The response is acceptable since increasing the source term by 22% would not change the severity level, which is already SL-1 to the public and facility co-worker.
PSAR Update PT-004	This question dealt with calculation 24590-PTF-Z0C-W14T-00002. Why wasn't this severity level document revised to include this commitment?	The severity level document calculates the consequences of the hydrogen explosion and resin burn separately. A spill from the column is adequately represented by a spill from the CXP feed	The response is acceptable only because all hydrogen explosion DBEs have

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		vessel. The consequences from the three mechanisms can be added to determine the combined dose should a column hydrogen burn cause the column to rupture, leak liquid, subsequent dry out and start on fire. The receptor doses due to the liquid leak mechanism are small compared to the doses due to the resin media fire. Combining the doses from the three separate mechanisms reported in the severity level document gives a total offsite receptor dose of approximately 1.3 rem, and a co-located worker dose of approximately 1100 rem. These doses correspond to the SL-2 and SL-1 severity level categories for the public and co-located worker receptors, respectively. The SIPD database conservatively assigns a SL-1 ranking for both receptors. The control strategy for the hydrogen explosion meets the requirements for an SL-1 event, including compliance with the single-failure criterion. Redundant ITS purge air supplies ensure flammable gas accumulation is prevented. This prevents the hydrogen explosion and any potential consequent failures that can be postulated due to the hydrogen explosion.	been given SL-1 severity levels for the public and co-worker.
PSAR Update PT-005	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. Section 6.2, sheet 7 gives an assumption that waste with >5 weight percent solids retain hydrogen. This is an assumption that requires verification and the priority to resolve is given as high. The closure method is to verify by testing or modeling whether or not the assumption is valid. There is no schedule given for completing this work. When will the testing or modeling be completed?	Work to be completed 2004.	The response is acceptable since BNI committed to resolve the issue in early 2004 (assumed to be by March 31, 2004).
PSAR Update PT-006	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. Section 7.1.8, sheet 10 gives a	The review was performed on a draft version of Revision B of the cited calculation. Revision B of the	The response is acceptable since the

Question No.	ORP Question	Contractor Response	ORP Disposition
	consequence estimate for a BDBE explosion in vessel FRP-VSL-00002A/B/C/D. Has BNI determined that an explosion (probable detonation at 30% hydrogen) would not rupture the tanks, the PVV filters and/or the C5 filters? If not, what is the justification for assuming that the C5 filters do not fail?	calculation has been approved and issued and the text associated with a Beyond Design Basis explosion (BDBE) has been removed from the calculation. Removal of the text does not change the conclusions of the calculation nor does it change the ITS controls selected for the prevention/mitigation of PTF hydrogen explosions.	BDBE calculation was removed from the draft calculation document and a satisfactory BDBE was included in the updated PSAR.
PSAR Update PT-007	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. Section 7.2.8, Sheet 14 gives a consequence for a BDBE explosion in vessel HLP-VSL-00022 (a vessel with >5 weight percent solids). Has BNI determined that the explosion (probable detonation at 30% hydrogen) would not rupture the tank, the PVV filters and/or the C5 filters? If not, what is the justification for assuming that the C5 filters will not fail?	The review was performed on a draft version of Revision B of the cited calculation. Revision B of the calculation has been approved and issued and the text associated with a Beyond Design Basis explosion has been removed from the calculation. Removal of the text does not change the conclusions of the calculation nor does it change the ITS controls selected for the prevention/mitigation of PTF hydrogen explosions.	The response is acceptable since the BDBE calculation was removed from the draft calculation document and a satisfactory BDBE was included in the updated PSAR.
PSAR Update PT-008	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. Section 7.3.3, sheet 16 gives the selected control strategies to prevent a hydrogen explosion in evaporator FEP-SEP-00001 A/B. The second control strategy is to ensure agitation of solids during the loss of a recirculation pump by transfer of the evaporator contents to a vessel meeting the ITS agitation requirements. Will this transfer be done automatically or manually? If manually, will there be a TSR to initiate this transfer before an acceptable time period expires?	Upon loss of recirculation in the FEP separator vessel due to loss of power or mechanical failure, as indicated by the recirculation pump current indicator, a clock will start in the PPJ system. If recirculation is not restored within a specified time (TBD), the PPJ system will automatically open the redundant ITS drain valves to PWD-VSL-00033. If the normal discharge route is available using the concentrate transfer pump, the operator will have the option to stop the clock to over-ride the drain.	The response is acceptable.
PSAR Update PT-009	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. Section 7.3.8, sheet 17 gives an estimate of the consequences for a BDBE explosion in the evaporator. Has BNI determined that the evaporator and/or C5 filter will not rupture?	The review was performed on a draft version of Revision B of the cited calculation. Revision B of the calculation has been approved and issued and the text associated with a Beyond Design Basis explosion has been removed from the calculation. Removal of the	The response is acceptable since the BDBE calculation was removed from the draft calculation

Question No.	ORP Question	Contractor Response	ORP Disposition
		text does not change the conclusions of the calculation nor does it change the ITS controls selected for the prevention/mitigation of PTF hydrogen explosions.	document and a satisfactory BDBE was included in the updated PSAR.
PSAR Update PT-010	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. Section 7.4.8, sheet 21 gives the consequences for a BDBE explosion in a coaxial transfer line. Has BNI determined that the overburden would not be blown away and the radioactivity release would not occur directly to the environment above the line? If not, what is the credibility of this BDBE consequence?	The review was performed on a draft version of Revision B of the cited calculation. Revision B of the calculation has been approved and issued and the text associated with a Beyond Design Basis explosion has been removed from the calculation. Removal of the text does not change the conclusions of the calculation nor does it change the ITS controls selected for the prevention/mitigation of PTF hydrogen explosions.	The response is acceptable since the BDBE calculation was removed from the draft calculation document and a satisfactory BDBE was included in the updated PSAR.
PSAR Update PT-011	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. The BNI response to question PT-PSAR-199 (from review of Rev. 0 of the PSAR) included a commitment to address ammonia releases and times to LFL, and include the results in the above calculation and in the first revision of the PSAR. The draft document is completely silent on ammonia releases. When will the ammonia release evaluation be included in this document?	Evaluation of potential ammonia explosions will be completed in early 2004 (ref: CCN 067261, Attachment 3). The results of this evaluation may result in a lower LFL for hydrogen explosions; however, the ammonia results will not change the conclusions of the hydrogen explosion Design Basis Event calculation because the ITS controls have been selected to prevent explosions from occurring (i.e., controls are not LFL dependent).	The response is acceptable since BNI committed to resolve the issue in early 2004 (assumed to be by March 31, 2004).
PSAR Update PT-012	This question dealt with calculation 24590-PTF-Z0C-H01T-00002. Section 8, sheet 24 states that hydrogen generation rate calculations are in development. When will these calculations be complete and will they be included in a revision to this document?	Hydrogen generation rate calculations are currently scheduled for completion by February 28, 2003[sic 4]. These generation rate calculations will be used to determine the minimum purge flow rate for hydrogen-generating vessels; however, the generation rate results will not change the conclusions of the hydrogen explosion Design Basis Event calculation because the ITS controls have been selected to prevent explosions from occurring (i.e., controls are not generation rate dependent).	The response is acceptable since BNI has committed to resolve the issue in early 2004 (assumed to be by March 31, 2004).

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PSAR Update PT-013	This question dealt with testing the stability of ion exchange resin with 0.5 M nitric acid, and possible interference from bicarbonate. Will additional tests be run to verify this belief? Potassium bicarbonate will react with nitric acid so why wouldn't its presence affect the test results to reduce the amount of resin dissolved rather than increase it?	Additional testing of this phenomenon in nitric acid/IX resin reactions will be performed in December 2003. The testing will be performed with washed solids; that is, without bicarbonate contamination. The results of the testing will be documented in a report and incorporated in the PT PSAR at the next update.	The response is acceptable since BNI has committed to complete laboratory tests to resolve the issue in a timely manner. Results will be incorporated in the next PSAR update.
PSAR Update PT-014	This question dealt with testing the stability of ion exchange resin with 5 M nitric acid, and possible interference from bicarbonate. Will this test be repeated without the contamination present to demonstrate that the test results were not affected negatively by the presence of the bicarbonate?	Additional testing of this phenomenon in nitric acid/IX resin reactions will be performed in December 2003. The testing will be performed with washed solids; that is, without bicarbonate contamination. The results of the testing will be documented in a report and incorporated in the PT PSAR at the next update.	The response is acceptable since BNI has committed to complete laboratory tests to resolve the issue in a timely manner. Results will be incorporated in the next PSAR update.
PSAR Update PT-015	This question dealt with testing the stability of ion exchange resin with 5 M nitric acid. Since an upper-limit setpoint of 3 M is established for the elution acid concentration, why weren't laboratory tests run at this concentration to determine how rapidly the resin reacts with the acid over a similar temperature range, and whether or not a significant exotherm would be experienced?	Additional testing of this phenomenon in nitric acid/IX resin reactions will be performed in December 2003. The testing will be performed with 3 M acid over a 25 to 90 degree C temperature range. The results of the testing will be documented in a report and incorporated in the PT PSAR at the next update.	The response is acceptable since BNI has committed to complete laboratory tests to resolve the issue in a timely manner. Results will be incorporated in the next PSAR update.
PSAR Update PT-016	This question dealt with COA 4.3.1, Item 2 from review of Rev. 0 of the PSAR on performing additional laboratory tests to establish a safe upper	Additional testing of this phenomenon in nitric acid/IX resin reactions will be performed in December 2003. The testing will be performed with	The response is acceptable since BNI has committed to

Question No.	ORP Question	Contractor Response	ORP Disposition
	limit for nitric acid concentration with new and degraded resin. Will the reaction rate of partially degraded resin (either by radiolytic or chemical degradation) be higher than for fresh resin?	previously cycled (degraded) resin for potential increased reactivity. The results of the testing will be documented in a report and incorporated in the PT PSAR at the next update.	complete laboratory tests to resolve the issue in a timely manner. Results will be incorporated in the next PSAR update.
PSAR Update PT-017	This question dealt with COA 4.3.1, Item 2 from review of Rev. 0 of the PSAR on performing additional laboratory tests to establish a safe upper limit for nitric acid concentration with new and degraded resin. Have sufficient laboratory tests been completed to define a reaction rate equation as a function of nitric acid concentration and temperature? Please provide laboratory test reports and/or additional data to substantiate that the 3 M limit will always prevent a rapid nitric acid/resin reaction up to 90 C.	Additional testing of this phenomenon in nitric acid/IX resin reactions will be performed in December 2003. The testing will be performed with 3 M acid over a 25 to 90 degree C temperature range. The results of the testing will be documented in a report and incorporated in the PT PSAR at the next update.	The response is acceptable. Results will be incorporated in the next PSAR update.
PSAR Update PT-018	This question dealt with COA 4.3.1, Item 2 from review of Rev. 0 of the PSAR on performing additional laboratory tests to establish a safe upper limit for nitric acid concentration with new and degraded resin. Section 3.4.1.7.1.6 of the PSAR says that the temperature limit and response time should be set to ensure the 90 C limit is not exceeded during emergency or normal elution. Will these become TSRs that are currently not included in the PSAR?	The PT PSAR currently states that the emergency elution system is initiated on either low column level or high resin bed temperature (Sections 4.3.9.3 and 5.3.9). Section 5.5.9 also provides the LCO that protects this safety function including the operability requirement: "The column resin bed temperature monitoring instrumentation shall be operable, detecting column resin temperatures above a predetermined value." The predetermined value and response time are parameters that will be established in the TSRs provided with the FSAR.	The response is acceptable. The TSRs will be provided with the FSAR.
PSAR Update PT-019	This question dealt with deletion of DBEs related to facility worker protection. (a) Why is it acceptable to delete these DBEs from which controls for facility worker protection were derived? (b) Without a	(a) Sections 3.4.1.11 and 3.4.1.12 have been deleted, as the content of the PSAR has been revised to better align with the format and content of a documented safety analysis prepared in accordance with DOE	The response is acceptable. By March 31, 2004, the Contractor must

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	qualitative assessment of consequences of facility worker accidents, what would provide a basis for establishing a set of bounding performance requirements for SSCs or programs credited for facility worker protection?	STD 3009 94. Sections 3.4 of the PSAR summarize the quantitative accident analysis performed of DBEs selected to represent the full range of events with potentially significant radiological consequences to the co-located worker and the public, and the set of chemical events above threshold chemical consequences. (b) DBEs for facility workers are qualitatively determined and analyzed as part of the ISM process. Report 24590-PTF-RPT-ESH-02-002, and similar reports for the other facilities, documents the events to be analyzed for the selection of DBEs. The DBEs for facility workers will be presented in the PT PSAR Table 3A-31 along with a description of the other represented events and the selected control strategies. The PSAR will be updated with the facility worker DBE information by March 31, 2004.	identify any control strategies and SSCs in PSAR Rev. 0 that were deleted or were significantly modified as a result of deletion of worker DBEs, and re-identify the DBEs affecting the facility worker and include them in the PSAR (new COA # 1 under Section 3.3, Hazard and Accident Analyses)
PSAR Update PT-020	This question dealt with changes made to the PSAR using ABCN 24590-WTP-SE-ENS-03-419. Given that the driver for these changes [i.e., the referenced ABCN] is to be rescinded, and since the elimination of DBEs for workers is inconsistent with requirements, what action is BNI planning on doing to correct the deficiencies cited above?	The first sentence of the second paragraph of Section 3.3.4 is incorrect and will be revised as part of the next PSAR update. DBEs for facility workers are qualitatively determined and analyzed as part of the ISM process. Report 24590-PTF-RPT-ESH-02-002, and similar reports for the other facilities, documents the events to be analyzed for the selection of DBEs. The DBEs for facility workers will be presented in the PT PSAR Table 3A-31 along with a description of the other represented events and the selected control strategies. The PSAR will be updated with the facility worker DBE information by March 31, 2004.	The response is acceptable. A new COA (COA # 1 under Section 3.3, Hazard and Accident Analyses) was added that requires the Contractor to update the PSAR by March 31, 2004, to include DBEs for facility workers.
PSAR Update PT-021	This question dealt with classification of the PT building. What is the basis for the classification of Pretreatment as a Type II B structure per IBC requirements?	The condition of approval from ABCN 02-033 was properly incorporated in PT PSAR Revision 0A, section 2.7.6.2. Subsequently, the determination of the classification of construction type of the PT	The response is acceptable. The classification will be changed to Type I-B

Question No.	ORP Question	Contractor Response	ORP Disposition
		facility was completed as committed in the ABCN and documented in the PT Preliminary Fire Hazard Analysis Report. PT PSAR Revision 1 was updated to show the classification; however due to an error, the classification was identified in the PSAR as Type II B, not Type I-B. The error will be corrected in the next PSAR update.	in the next PSAR update.
PSAR Update PT-022	This question dealt with completion of COA 4.3.2, Item 1 from review of Rev. 0 of the PSAR. Will BNI identify and examine water hammer hazards during ISM cycle III as previously committed in BNI response to question PT-PSAR 269? BNI's response to this question should provide a revised statement of how the above COA will be satisfied during ISM cycle III	Yes, potential water hammer-initiated events will be identified and evaluated during the ISM Cycle III hazard analysis topography activities as committed in PT-PSAR-269, when plant and piping layout/routing is selected and hazard topography is known. When completed, the results of these activities will be incorporated in the PT PSAR during its next annual update	The response is acceptable. Changes will be incorporated in the next PSAR update.
PSAR Update PT-023	This question dealt with completion of COA 4.3.2, Item 5 from review of Rev. 0 of the PSAR. When will the unverified assumptions used in a DNFSB study, which was performed to calculate the dilution by tank heels of an inadvertent addition of 40 wt% sodium permanganate to the ultrafiltration feed preparation tank with subsequent transfers through the UFP system to the Cs IX system, be verified?	The primary assumption in the calculation (24590-PTF-M0C-UFP-00002, Rev. A) is that the volume of fluid required in UFP-VSL-00001A/B to start pump UFP-PMP-00041A/B is ~11,500 gallons. This volume will effectively dilute the bulk permanganate (2,400 gallons of 3.8M permanganate) to ~0.8M. The ~11,500 gallons is calculated based on 79" of fluid in UFP-VSL-00001A/B. The vessel sizing is final and the vessel is currently being fabricated. From the preliminary isometric drawings for the pump suction lines (ref CCN #042936 - UFP-PX-00007-S14A-3 which is the UFP-PMP-00041A suction line iso), the high point is 12' from the cell floor. Using a vessel clearance of 2.5', we would need 9.5' (114") of fluid to fully flood the suction line (equates to ~18,400 gallons). This is double the volume required to dilute the full 2,400 gallons of 3.8M permanganate to 1M (calculated to be 9,120 gallons). Therefore the	The response is acceptable because the design has progressed to establish that the assumption of adequate tank heels is conservatively met by the design.

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		assumptions in the calculation were very conservative. The isometrics/wall penetration drawings are expected to be completed within the next six months.	
PSAR Update PT-024	This question dealt with completion of a COA 4.3.2, Item 5 from review of Rev. 0 of the PSAR. What is the plan to determine whether or not degraded resin will be more or less reactive to sodium permanganate than new resin?	There are no plans at this time to test sodium permanganate/degraded IX resin reactions. Degraded resin will be tested with 3 M nitric acid in December 2003 to determine whether or not degraded resin is more reactive than fresh resin. The results of this testing will be incorporated in the PT PSAR at the next update. If the nitric acid/degraded resin reaction is greater than the nitric acid/fresh resin reaction, the subject will be revisited and the viability of testing with sodium permanganate will be evaluated.	The response is acceptable. The Contractor has committed to complete lab tests using 3 molar nitric acid as an initial indicator followed by permanganate, if needed.
PSAR Update PT-025	This question dealt with potential for fire in the PT facility. (a) Where is the calculation showing that the cable reel “fire barrier” that has no fire resistive rating and does not completely enclose the reel can be assumed to protect the cable? (b) What documented coordination and concurrence between Operations and ESH exists to the warrant the assumption that the combustible control program can reasonably limit combustibles to a level below that judged in Appendix E-5 (cited above) sufficient to ignite the cable? (c) Why doesn't the PSAR accept the more conservative calculations and basis of the PFHA for a crane cable fire? (d) In the face of the PFHA analysis, how can the event be considered “beyond extremely unlikely?	(a) The accident analysis is based on the PFHA that states the cable can be ignited due to an internal fault or due to flame impingement. The ISM team identified the cable enclosure as a control strategy to preclude flame impingement and overcurrent protection (proposed control) to prevent internal faults. The purpose of the DBE calc is to determine the effectiveness of the barrier and identify performance requirements. The analysis shows that an installed cable enclosure will prevent a fire from impinging on the cable and igniting it. A functional requirement for the cable enclosure is that it needs to withstand the flame. This requirement is expressed in the PT PSAR section 4.4.7.3 (last bullet) as "The crane cable reel flame barriers must prevent a transient external fire from reaching the cables." (b) In the PFHA no credit is taken for preventing the cable from igniting due to transient combustible loading. The cable is assumed to ignite due to the	The response is acceptable. Changes will be made in the next PSAR update.

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		most probable event. In the 0'-0" elevation crane maintenance area the cable reel is located so high above the mezzanine floor, transient combustibles were not thought to be a likely source of ignition. Therefore, it was postulated that an internal cable fault ignited the cable. In the filter cave crane maintenance area, the crane reel is nearer to the floor and a transient combustible fire is a likely source of ignition for the cable on the reel. The result was the same in both cases in that the cable reel ignites and burns. (c) As discussed in 25(a), the PSAR does use the data contained in the PFHA. The PFHA conservatively assess a fire's impact on a building and its occupants based on combustible loading, occupancy type, fire protection features, and expected operational use of the building, whereas the DBE calculations are designed to evaluate the effectiveness of the ITS barriers, to preclude or prevent unacceptable consequences to the receptors. With respect to consequences the DBE calculations use bounding data. (d) The PFHA and the PSAR are performed for two distinct purposes. The PFHA must assume that the probability of fire occurring is 1 for every fire scenario in each Fire Area as well as demonstrating facility safety with respect to fires. Thus conservative initiating event frequencies (i.e., 1) is appropriate. The PSAR or AB is required to demonstrate plant safety based on accident conditions. The acceptability of the consequences due to an accident are based on estimated frequencies of occurrence. This frequency is identified in SIPD and the DBE calculations. The ISM Teams considered the PFHA when establishing the accident frequency. In the	

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		context of the PSAR, the assignment of BEU frequency corresponds to the mitigated scenario in which the credited controls, the cable reel fire barrier in conjunction with the control of combustible material and overcurrent protection, prevent the event from occurring. Note: Currently, overcurrent protection is not addressed via a Safety Case Requirement (SCR). This SCR will be added as a credited control at the next PSAR update. The initial assessment of the consequence of this event (CSD-PC5V/N0007) by the ISM Team was SL-3 to the Co-Located Worker (CLW) based on a qualitative assessment. Within the DBE calculation, the event was determined to be SL-2 to the CLW based on a ratio of the consequences calculated for a similar fire in HLW. The HLW calculation used HLW glass dust/fines as the source term for filter loading. The Severity Level will be reassessed based on a PT source term for the filter loading. This evaluation will be completed in the March 31, 2004 and the Severity Level corrected as appropriate. Additional modeling (HDCRT) of the fire scenario will further evaluate the potential to rupture all primary and secondary filters from smoke loading. This evaluation is scheduled to be complete by June 31, 2004.	
PSAR Update PT-026	This question dealt with the PT Hazards Assessment Report. (a) What was the change driver for increasing the severity level to the public of CSD-PPWD/N0045 from SL-4 in Rev 0 of the PSAR to SL-1 in Rev 1? (b) Why is CSD-PPWD/N0045 binned under the Loss of Contamination Control accident type instead of Vessel Overflow? (c) Why is there no Loss of Contamination Control DBE if the accident type and severity levels of CSD-PPWD/N0045 are correct? (d)	(a) The increase from SL-4 to SL-1 was a result of using the worst case stream for the vessel so as to conservatively estimate severity levels. The current approved severity level calculation (24590-PTF-Z0C-W14T-00002, Revision C) confirms that, for the vessel associated with the cited CSD (i.e., PWD-VSL-00044), the vessel spill severity levels for the worst stream (FRP01) are SL-1 to the public and SL-1 to the co-located worker.	The response is acceptable based on the commitment to correct the errors regarding the accident type for the cited CSD record and the SL to the FW. Changes will be

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	What special conditions make the severity level of this hazard higher for the co-located worker and public than for the facility worker?	(b) Binning this CSD under Loss of Contamination Control rather than Liquid Spill/Overflow was an error. There are two choices of accident types for scenarios involving overflows in SIPD: Overflow and Liquid Spill/Overflow. Version 2 of this CSD was originally binned as an Overflow accident, but it was subsequently decided it should be a Liquid Spill/Overflow accident. In the process of creating Version 3, the wrong accident type was inadvertently selected from the SIPD pull-down menu. That this occurred was corroborated by comparing this scenario to the next two scenarios, whose accident types were correctly changed from Overflow to Liquid Spill/Overflow in the same editing session. A revised record (Version 4) has been completed changing the accident type for the cited CSD to Liquid Spill/Overflow; the SIPD records in the PTF PSAR will be corrected accordingly at the next PSAR update. Changing the accident type of CSD-PPWD/N0045 to Liquid Spill/Overflow does not affect the PSAR overflow DBE conclusions or the ITS control selected. Vessel overflow events are described in PTF PSAR Section 3.4.1.3, which uses the overflow of a feed receipt vessel (FRP-VSL-00002A/B/C/D) as a bounding case. The current approved severity level calculation (24590-PTF-Z0C-W14T-00002, Revision C) confirms that the worst-stream feed receipt vessel spill is over four times more consequential than the worst-stream spill for PWD-VSL-00044, the vessel associated with CSDPPWD/ N0045. (c) As described above, the accident type of CSD-PPWD/N0045 is not correct and should be Liquid Spill/Overflow. Loss of Contamination Control DBEs are specifically limited to facility worker	incorporated in the next PSAR update.

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		consequences. Vessel overflows are covered in PTF PSAR Section 3.4.1.3 and, as shown above, are not affected by the changed accident type for the cited CSD. (d) The facility worker severity level should not be lower than those for the co-located worker or the public. This error has been corrected in SIPD and will be corrected in the PTF PSAR at the next PSAR update. Changing the facility worker severity level to SL-1 will not affect the PSAR conclusions or the ITS control selected. As discussed above, the CSD record in question is for a Liquid Spill/Overflow accident. For such events, the overflow of a feed receipt vessel is bounding and the associated record (CSD-PFRP/N0028) has SL-1 as the severity level for the facility worker.	
PSAR Update PT-027	This question dealt with the SRD requirement for two or more independent physical barriers for SL-1 accidents. What is the second physical barrier (in addition to the cask) to meet the SRD requirements for SL-1 and SL-2 accidents?	PT PSAR sections 3.4.1.1.2.6 and 3.4.1.1.2.8 identify the cask and drum/liner as the credited SSCs for providing shielding and confinement during and after a drop in the truck export bay. The cask and drum provide the two barriers for an SL-1 drop event, and Section 4.3.11 credits them as SDC and SDS SSCs, respectively. This control set was identified in the response to OSR question PT-PSAR-074 during the question/response phase of the PT PSAR Rev. 0. The PT PSAR Rev. 1 defense in depth discussion in Section 3.4.1.1.2.6 does not explicitly state that the cask and drum are the two credited barriers. This section will be corrected appropriately in the next PSAR update. The OSR Cited Submittal Text section refers to PT PSAR Section 3.4.1.1.1.8, which addresses an ultrafilter drop in a C5 ventilated area. For this event, Section 3.4.1.1.1.6 explicitly cites the hoisting equipment and the C5V system as the two	The response is acceptable. Changes will be incorporated in the next PSAR update.

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		physical barriers.	
PSAR Update PT-028	This question dealt with exposures to co-located workers. Why are the results presented in the Table 8-1 summary different from results initially presented in Table 7-1 for the C-5 drop and in Table 7-3 for the unfiltered drop?	In Table 7-1 and 7-3 of the 24590-PTF-Z0C-W14T-00020 - DBE: Pretreatment Facility Drop of Radioactive Materials, and in Section 3.4.1.1.1.5 of PSAR, the unmitigated radiological exposure consequences to co-located worker and public receptor are reported as 13.99 rem and 0.015 rem, respectively. In Table 8-1 of 24590-PTF-Z0C-W14T-00020, and Section 3.4.1.1.1.8 of the PSAR, these values are erroneously reported as 20.96 rem and 0.022 rem, respectively. Table 8-1 of the 24590-PTF-Z0C-W14T-00020, and Section 3.4.1.1.1.8 of PSAR will be corrected by the next PSAR update. Note that the tables in Sections 3.4.1.1.1.5 and 3.4.1.1.1.8 show the severity level for the co-located worker is SL-1, whereas the calculated unmitigated consequence is 13.99 rem, which corresponds to SL-2. The difference in the estimated consequences was caused by differences in the source term volume. The DBE calculation developed a smaller source term than the ISM team assumed. Footnotes were added to Tables 7-1 and 8-1 of the DBE calculation to note the estimates were obtained from different sources. Similar footnotes will be added to the PT PSAR tables the next PSAR update.	The response is acceptable. Changes will be incorporated in the next PSAR update.
PSAR Update PT-029	This question dealt with spray-leak hazards analyses. Does the existing spray-leak hazards analyses bound the spray leak hazards in the modified CNP evaporator, considering concentrations of the waste, pressures, and orifice sizes?	ABCN/SE # 24590-WTP-SE-ENS-SE-ENS-03-509, Rev. 0 . (1) Parameters for the CNP System and for the DBE Calculation - The CNP forced circulation evaporator recirculation loop involves a volume of around 3,500 gallons, a pipe diameter of 16 inches, a flow rate of 3,500 gpm, and a normal operating pressure of about 30-35 psig. The bounding DBE analyzed a spray leak	The response is acceptable. BNI provided convincing evidence that the current bounding leak analysis also bounds a spray leak from the modified CNP

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		through an orifice in a 3-inch diameter pipe at a pressure of 200 psig, for a process stream (FRP01) that involves an order of magnitude higher maximum unit dose than the process stream (CNP10) that feeds into the CNP recirculation loop. This DBE analyzed consequences associated with a ground level release for the collocated worker (8 hours) and for the public (24 hours). (2) Radiological Consequences for the CNP System are bounded by the DBE Calculation. - The entire Cesium concentrate inventory (3,500 gallons) in the CNP evaporator recirculation loop would leak out through an orifice of 0.128-inch diameter in less than about 17 hours, at a pressure of 200 psig. The consequences analyzed in the referenced DBE are based on doses that are an order of magnitude higher than those attainable from a pressurized pipe leak from the CNP evaporator recirculation loop. The estimated mitigated consequences in the referenced DBE are several orders of magnitude below the Radiological Exposure Standards. (3) Piping Size Considerations for Pressurized Leaks - The CNP evaporator recirculation loop piping is larger than the FRP piping, which is the basis for the referenced DBE calculation. However, the flow through the pipe orifice, and subsequent aerosolization and safety consequences, are determined by the pressure, and not by the pipe size. The length of flow through the orifice does depend on the pipe diameter. A larger pipe has a thicker wall, and flow through an orifice in such a pipe involves greater frictional losses. This configuration leads to a lower flow rate, coarser atomization, and a lower fraction of respirable aerosols that have a safety impact.	evaporator. Therefore, the leak event of concern is not a new DBE.

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		(4) Basis for Orifice Size Selection in the Referenced DBE Calculation - The orifice diameter of 0.128 inches and the pressure value of 200 psig used in the DBE analysis were based on maximization of respirable mass fraction, based on the work of Mishima, Schwendiman, and Ayer, as reported in the DOE Handbook, DOE-HDBK-3010-94, December 1994 (page 3-21). The "Revised Severity Level Calculation for the Pretreatment Facility" DBE demonstrated that the Mishima, et al procedure for estimating orifice size leads to a more conservative method for maximization of respirable aerosol fractions than the analytical procedure outlined in the Westinghouse Hanford Company report "A Model for Estimating the Release Rate of Aerosol Droplets from Pressurized Liquid Leaks", WHC-SD-GN-TI-30003, 1992. Based on the arguments outlined here, the referenced DBE calculation provides a conservative and bounding assessment of the consequences from a pressurized pipe leak for the CNP evaporator recirculation loop.	
PSAR Update PT-030	This question dealt with potential cesium contamination of HEPA filters from a spray leak in the CNP evaporator. (a) What are the projected dose rates at the surface of the transportation cask when the solids collected on a loaded HEPA filter consist wholly of cesium-137 nitrate? (b) If dose levels exceed accepted levels for contact handling, what controls will be implemented to protect the workers?	The dose rates at the surface of the waste export cask have not been developed explicitly for this event, as a recovery action. However, the event of primary filters containing higher than expected inventory has been identified via the ISM process and assigned a SL-3 consequence, CSD-PRWH/N0027. The SL-3 estimate is based on the conservative design of the waste export cask for which shielding requirements were determined for the highest expected dose rate during normal operations. PT and HLW casks will be of the same design with the shielding determined for a 55 gallon waste drum containing HLW glass shards. The casks will have approximately 9" of carbon steel	The response is acceptable since the combination of cask design, dose-rate measurement, and compensatory actions likely will assure adequate protection of the workers.

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		shielding (24590-PTF-M0-RWH-00037). Prior to releasing a cask for shipping, the doses rate will be verified to be within acceptable limits. If limits are unacceptable, compensatory actions consistent with the requirements of the RPP will be taken to reduce the dose; such as, removing filters, providing additional external (temporary) shielding, or limiting the time in which operators are in contact or close proximity to the cask.	
PSAR Update PT-031	This question dealt with potential cesium contamination if a rupture of a reboiler tube were to occur. (a) At what velocity would concentrated cesium-137 solution flow into the steam supply line assuming a tube ruptures, the reboiler is operating at the maximum credible differential pressure across the tubes, the evaporator solution temperature is normal, and anticipated automatic controls for injecting steam into the reboiler are employed? (b) What is the distance between the reboiler and the radiation sensor? (c) What is the distance between the radiation sensor and the isolation valve? (d) What is the time to sense contamination after it has reached the sensor, and the time between sensing and fully closing the valve? (e) How do the risks of backflow in the modified CNP evaporator compare to risks of backflow in the FEP and TLP evaporators?	(a) - (d) These parameters have not been established at this time. The location of the radiation monitors and isolation valves will ultimately be a balance between minimizing the amount of contamination that may escape the valve and present a radiation dose hazard in C3 areas and unavoidable plant design constraints. Included as design input will be parameters such as (1) pressure differential across the leak, (2) the effects of steam collapse as the leaked waste spray condenses steam, (3) the locations of the radiation monitor and isolation valve relative to the leak, (4) response time of the leak detection and isolation system, and (5) facility worker dose consequences in the affected C3 areas. These parameters influence the rate, quantities, and distance of Cs-137 draw-back into the steam condensate system. (e) The risk posed by leaks of process fluid into the FEP and CNP reboiler steam condensate systems are about the same, given that the two FEP evaporators operate at about the same or slightly higher pressures than the CNP evaporator, have comparable ULDs, and vastly larger inventories. The risk posed by these same leaks in the TLP system are considerably lower, because of the low activity contained in the system.	The response is acceptable since BNI committed to include design inputs to controls for preventing the draw back of concentrated CNP evaporator solution that leaks from the reboiler into the steam system. Consideration of these parameters is likely to lead to an effective control strategy. The reviewers also confirmed that changes made to the PSAR were consistent with the ABCN and, therefore, the changes to the PSAR are acceptable.

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PSAR Update PT-032	This question dealt with surveillances for seismic isolation valves. Describe, conceptually, the proposed scope and expected frequency of surveillances of the seismic isolation valves, in general. Also, conceptually, explain whether leakage past the valves must be measured to establish the valves' operability, and if so, how that will be accomplished, and at what expected frequency. Answer the same questions for the alternate approach using seismic jumpers (again, conceptually). (At the meeting, there was discussion of the possibility that routine plant operations might be able to be coordinated with these surveillances to achieve limited reduction in plant availability from performance of the surveillance. There was also discussion of the potential for assessing valve leakage through tank level measurements. The responses to these questions are intended to follow-up with substantiation of that discussion, but not to require development of the surveillance programs.) [Note - Questions PSAR-Update-PT-032, -033, -034, and -035 came from a 10-30-03 meeting between ORP and BNI regarding seismic isolation valves.]	Surveillances for the isolation valves are expected to be broken into distinct activities: (1) Verification of valve operability (closure); (2) Verification of the ITS trip to actuate valve closure; and (3) Verification of the ability of the valve to provide bulk confinement. (1) Verification of valve operability (closure) and ITS trip to actuation are expected to be tied to the normal operational cycling of the isolation valves. (2) Valve actuation will be demonstrated as part of the normal process operations as the valve is opened and closed. Formal surveillance testing of the valves is expected to be set periodically (e.g. quarterly) to verify/document closure of the valves as well as to verify/document operability of the ITS trip. See response to Question PSAR Update-PT-033 for additional details on the actuation of the valve. [Note: An attachment file (PSAR UPDATE PT-032 ATTACH.rtf) provides characteristic operating cycles for 9 representative vessels which demonstrates the ability of performing surveillances without undue operability impact. Expected intervals during which surveillances could be performed are shown as flat lines.] (3) Verification of the ability of the valve to provide bulk confinement (minimal through-leakage) will be associated with maintenance activities. [Note: Isolation of the vessels is required for normal operations, therefore, the ability to detect significant leakage through the valve will be required for process reasons. The ability to detect leakage through the valve may be based on level measurement, flow measurement, mass balance, or sampling, depending on the specific vessel being isolated. However, it is	The response is acceptable.

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		not expected that leakage through the valve will be required to be measured to ensure it's ability to provide bulk confinement.] The design of the isolation valves will minimize the potential for leak-through (as specified in 24590-PTF-3PS-PV27-T0001, the valves are seal leakage Class IV with a seal leakage rate of 0.01% of the rated valve capacity). An assessment of the integrity of the valve is expected to be a part of routine maintenance activities on the valve. Valve internals are expected to be inspected and replaced as necessary during maintenance activities related to the actuator. (Per 24590-PTF-3PS-PV27-T0001, the entire jumper can be removed from its service location and placed in a maintenance area to allow necessary work to be performed.) Surveillances for the Jumpers - For jumpers, verification of the ability to provide bulk confinement would be performed visually to detect abnormal leakage. Additional integrity assessments are expected to be performed as required by the Dangerous Waste Permit. Gaskets for seismically qualified jumpers are expected to be replaced whenever a jumper is removed or replaced.	
PSAR Update PT-033	This question dealt with control logic for seismic isolation valves. Describe the conceptual control logic and any required operator actions for the seismic isolation valves in a seismic event. Explain what must happen to cause valve closure, at the level of design currently developed. In particular, would individual operator action be required to initiate closure separately for each valve? What threshold	ITS control of an isolation valve will be accomplished via the Plant Protective System (PPJ). The PPJ will initiate the ITS solenoid valve to vent in response to an operator action. It is expected that a single actuation sequence would be manually initiated by an operator. This actuation sequence would then actuate (vent) all ITS solenoid valves. This actuation sequence would be expected to initiate other ITS or	The response is acceptable.

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	would be used for determining that a seismic event had occurred, and how would operators determine that the threshold had been reached? [Note - Questions PSAR-Update-PT-032, -033, -034, and -035 came from a 10-30-03 meeting between ORP and BNI regarding seismic isolation valves.]	safe state functions as necessary (further identification of these functions will be performed as part of the ongoing ISM Meeting for Control room Monitoring). Operator-initiated actions required following a DBE earthquake will be incorporated in a TSR administrative control. This control will be developed by the next scheduled PSAR update. Specifics on the expected operation logic for the isolation valves are in an attachment file (PSAR UPDATE PT-033 ATTACH.doc). The threshold for a significant seismic event (one requiring operator actions to secure the process operations and verify the facility status) is expected to be significantly lower than the design basis earthquake. For this threshold seismic event, the process of securing the facility and verifying SSC status is expected to be initiated via notification from the Hanford Emergency Operations Center. The process of securing the facility may not require actuation of the shutdown logic above, depending upon the severity of the event. Operator-initiated actions required to terminate processing of liquids following this notification will be incorporated into the above TSR administrative control. For the Design Basis Earthquake, the determination of the seismic event is expected to be accomplished by operator observations (movement, loss of multiple non-safety systems, initiation of safety systems) backed up by notification via the Hanford Emergency Operations Center.	
PSAR Update PT-034	This question dealt with seismic isolation valves. Explain whether any jumpers are located above or adjacent to seismic isolation valves such that their failure could negatively affect the seismic isolation valves, due to impact, leakage, etc. If such jumpers	For the proposed AB Change (Seismically Qualified Isolation Valves): The confinement function extends from the vessel into the hot cell through the isolation valve. The isolation valves are connected to the process piping as a jumper (see 24590-PTF-3PS-	The response is acceptable.

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	exist, how will the comparison in Question 1 be affected? [Note - Questions PSAR-Update-PT-032, -033, -034, and -035 came from a 10-30-03 meeting between ORP and BNI regarding seismic isolation valves.]	PV27-T0001). Thus, the process pipe/jumper connection upstream of the isolation valve provides a bulk confinement function post seismic (SC-I). Downstream of the isolation valves, the jumper connection does not have a direct safety function, but may impact the valve's ability to perform its function. As necessary, these jumper connections will be classified as SC-II. In addition, process equipment, located near the isolation valves which have the ability to affect the isolation valve due to impacts will be SC-II. No impact on the operation of the isolation valve (closure) would be expected due to leakage of jumpers or other process equipment in the vicinity of the isolation valves. For the Revision 0 PSAR case (Seismically Qualified Jumpers): The confinement function extends from the vessel into the hot cell through inline components. Thus, the isolation valve jumpers and all jumpers and other in-line components downstream of the isolation valves have a bulk confinement function (SC-I). In addition, process equipment located near these SC-I components which have the ability to affect the bulk confinement function due to impacts will be classified as SC-II	
PSAR Update PT-035	This question dealt with seismic induced flooding. Conceptually, what would be required to redesign piping systems outside the hot cell to make this seismic induced flooding event incredible? [Note - Questions PSAR-Update-PT-032, -033, -034, and -035 came from a 10-30-03 meeting between ORP and BNI regarding seismic isolation valves.]	Alternatives Evaluated to Preclude Seismic Induced Flooding - (1) Add Loop of Suction piping and discharge piping to vessels such that the top of the loop is above the maximum operating height of the vessel: Piping (black cell and hot cell) - Piping layout with loop requires long radius bends at elbows, insufficient room in some black cells and significant rerouting of pipes in all black cells. Many vessels only have 2-3 ft of clearance with respect to the black cell wall. Based	The response is acceptable.

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		on pipe diameters ranging from 3" to 10", it is estimated up to 5 ft would be required to perform the necessary bends. - An alternative would be to route the loop through the top of the vessel, this would alleviate interferences with respect to the cell wall, however significant piping revisions would still be required within the black cell. Pipe routing and equipment relocation in hot cells would be necessary to accommodate the additional loop and elbows under either black cell arrangement above. Pumps would have to have suction pipe priming capabilities and reserve reservoir(s). Reservoir(s) for pump priming would need to be located at upper elevation [and] would require additional rearrangement to locate. Seismic shutoff of pumps - Siphon break valve (seismically qualified) at the top of the loop (hot cell) Some siphon valves would be above the current maximum crane working height, and would require additional manipulator capability to service valves. As an alternative to a siphon valve, a break pot was also considered. However, a breakpot on the suction line would require a valve or other closure device once the pump is established, otherwise the pump would preferentially pull air into the system. Other considerations: - Vertical rise section of piping in the black cells would be full to liquid level in the vessel. For Non-Newtonian fluids, an additional method to shear the fluid in the pipe would be required. This would be more difficult than the current horizontal runs directly into the hot cell which can be pressurized back to the tank with water connections if required. (2) Add pumps on top of Vessels. Piping reduces number of elbows versus option one. Pumps mounted on top of vessel would require rerouting in more	

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		congested cells. Capability to maintain pumps (turns black cell into maintainable cell (1) Extend cranes capability into black cell. (2) Add shield blocks above vessels (would require shielded area at upper elevation.) The tallest vessels exceed pump suction capabilities and would require In-Tank pumps and an increase in height of shielded area for pump removal and decontamination purposes. (3) Add a root valve to tanks or weld the valve to the piping. The valve would be welded directly to tank nozzle or discharge piping. The valve would be actuated similar to current actuation of isolation valve. This would provide for a passive confinement boundary to the valve, but would still have the same concerns with valve actuation failure and leakage. The valve would require additional supports to floor. The valve internals would be replaceable, however additional mechanical handling capabilities would be required to replace the actuator and internals (in place). If the valve body was damaged or excessively worn it would have to remote cut out the valve and a new valve installed. This would require additional mechanical handling capabilities. Mechanical handling doubts the ability of placing the valve within the required tolerances for remote welding with current technology. As noted above, maintaining the root valve and actuator would require either access through the hot cell or shield blocks from upper elevations.	
PSAR Update PT-036	This question dealt with water ejectors for vessel emptying. ABNC 24590-WTP-SE-ENS-03-629, Rev. 0 is listed as a driver for changes to the PT PSAR. It is stated on page 2 of 24590-WTP-SE-ENS-03-093, Rev.0 that Section 2.4.13.1 of PT PSAR Rev. 1 was	Water ejectors were omitted inadvertently, they will be included in Section 2.4.13.1 in the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.

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	updated as follows; "Added water ejectors as well as steam ejectors for vessel emptying". The cited submittal text does not list water ejectors for vessel emptying. Why are there no water ejectors listed in PT PSAR Rev. 1, Section 2.4.13.1 as required by References 1 and 2?		
PSAR Update PT-037	This question dealt with suspended ashfall loading for the WTP project. HLW PSAR Rev 1 has a detailed discussion in Section 2.6.6, titled; "Ashfall Impact to Confinement". For example, there is a discussion on shutting down certain equipment during an ashfall event. There is also discussion of how many ventilation system filters would be required, based on filter loading. PT ventilation systems have similar confinement requirements, so, similar to what was done for HLW PSAR Rev. 1, a discussion of ashfall impact to confinement should be discussed in PT PSAR Rev. 1 as well. Why is there no detailed discussion in PT PSAR as to the effects of ashfall on equipment operation?	The discussion of ashfall impact to PT confinement was omitted inadvertently. A discussion comparable to HLW PSAR Section 2.6.6 will be included in the PT PSAR during the next annual update.	The response is acceptable. Changes will be made in the next PSAR update. In response to Question PT-PSAR-257 during review of Rev. 0 of the PSAR, BNI committed to include a discussion of ashfall controls required for PT.
PSAR Update PT-038	This question dealt with a cited HEPA filter standard. 24590-WTP-SE-ENS-03-093 is the reference for changes to the PT PSAR. It is stated on pages 33, 37, and 39 that text in PT PSAR Rev 1 was changed to delete HEPA filter Standard FC 1130 and replace it with standards FC 4200 and 5140. The reason given is that FC 1130 provides definitions and was replaced with standards that provide performance requirements. A keyword search was performed for PT PSAR Rev 1, and still lists standard FC 1130 in Section 4.4.10.4 (pages 4.4-14), and Section 4.4.11.4 (page 4.4-16). Why does the PT PSAR Rev. 1 still list FC-1130 as a required standard when 24590-	Failure to replace standard FC-1130 with FC-4200 and 5140 in Sections 4.4.10.4 and 4.4.11.4 was inadvertent, the replacements will be completed in the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
	WTP-SE-ENS-03-093 stated that the standard should be replaced?		
PSAR Update PT-039	This question dealt with radiation exposure standards. Why is it appropriate to reclassify the treated LAW evaporator and reboiler vessels to RRC given that the vessel hazard is SL-3 and vessel spill accidents in the current PSAR update are "anticipated"?	The components that are the subject of the ABAR [24590-WTP-SE-ENS-03-377] (i.e., the evaporator/separator vessel and the reboiler) are located in C5 areas that are inaccessible to facility workers. Since the C5V system itself is SDC, the requirement for a single physical barrier is met. The ABAR will be revised to clarify this. The RRC designation is then appropriate for the TLP components, since the radioactive inventories in these components is comparable to the inventories in other RRC items (e.g., the LAW facility Feed Concentrate Receipt Vessels). An RRC designation for the reboiler condensate radiation monitor is appropriate because, according to Table 2 of the SRD Appendix B, administrative controls are adequate for events affecting only the facility worker. In the case of TLP reboiler tube leaks, the condensate piping is located in restricted access areas.	The response is acceptable based on the commitment to revise ABAR 24590-WTP-SE-ENS-03-377.

DISPOSITION OF LAW QUESTIONS FROM PSAR UPDATE REVIEW

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update LAW-001	This question dealt with citation of IEEE standards in Section 4.3.3.4 of the LAW PSAR. What is the basis for not citing IEEE 628 and IEEE 741 in the LAW PSAR Section 4.3.3.4?	It is agreed that standards IEEE 628 and IEEE 741 are applicable to the LAW SDC power system supporting the offgas exhausters. The LAW PSAR already implements these standards through the existing references in Section 4.3.3.4, as described below; The LAW PSAR, Section 4.3.3.4, (Page 4.3-6, 3rd para., 1st and 2nd bullets) lists IEEE 308 and IEEE 384. IEEE 741 and IEEE 628 are daughter standards referenced in IEEE 308 and IEEE 384, respectively. Even though IEEE 628 and IEEE 741 are not specifically listed in Section 4.3.3.4 of the LAW PSAR, the LAW is committed to implement these standards as required in their parent standards (IEEE 308 and IEEE 384). Therefore, it was determined that no change to Section 4.3.3.4 was necessary to support closure of LAW-PSAR-208.	The response is acceptable because the Contractor has provided an acceptable explanation of why IEEE-628 and IEEE-741 are not separately listed in the PSAR section 4.3.3.4. No changes to the PSAR are necessary.
PSAR Update LAW-002	This question dealt with references to PSAR sections. What are the correct PSAR section references for the change driver 24590-WTP-ABCN-ENS-02-007?	There are inadvertent typographical errors in the document [Crosswalk of Change Driver(s) vs. Section Number(s)] listed in the Cited Submittal Text above. The PSAR Section Numbers specified on Page 28 of the Crosswalk document against the Change Driver 24590-WTP-ABCN-ENS-02-007, Rev.1 should be 3.4.1 and 3.4.2 instead of 3.3.4.1 and 3.3.4.2 respectively. These errors do not affect the contents of the PSAR.	The response is acceptable because it provides the correct information regarding PSAR sections affected by ABCN-ENS-02-007. No changes to the PSAR are necessary.
PSAR Update LAW-003	This question dealt with references to PSAR sections. What are the correct PSAR section references for the change driver 24590-WTP-ABAR-ENS-02-001?	There is an inadvertent typographical error in the 2nd item on Page 40 of the document [Crosswalk of Change Driver(s) vs. Section Number(s)] listed in the Cited Submittal Text above. The PSAR Section Number specified against the Change Driver 24590-	The response is acceptable because it provides the correct information regarding PSAR sections affected

Question No.	ORP Question	Contractor Response	ORP Disposition
		WTP-ABAR-ENS-02-001, Rev.0 should be 5.4.2 instead of 5.4.4. Section 5.4.2 (Page 5.4-2) of the LAW PSAR, 6th para. has been revised to provide the appropriate location reference for the "Human Factors" information. This error does not affect the contents of the PSAR.	by ABAR-ENS-02-001. No changes to the PSAR are necessary.
PSAR Update LAW-004	This question dealt with documentation of accident analyses. How does the cited text meet the requirements specified in the cited reference?	The LAW chemical exposures as reported in the seismic analysis (24590-LAW-Z0C-W14T-00006) were taken directly from the LAW melter offgas design basis event calculation (24590-LAW-Z0C-LOP-00001 and PSAR section 3.4.1.1). Hence, no chemical source terms were determined for the seismic calculation. Likewise, the seismic analysis (24590-LAW-Z0C-W14T-00006) uses the LAW severity level calculation (24590-LAW-Z0C-W14T-00003) unmitigated exposure results directly and does not determine any additional radioactive source terms. For the cited text, the Glass Container Drops subsection will be revised to clearly state that the results reported in Tables 3A-37 and 3A-43 are taken from the LAW severity level calculation (24590-LAW-Z0C-W14T-00003). For the second cited text, the source terms and consequences reported in the fire design basis event (24590-LAW-Z0C-20-00002) are taken from the melter offgas design basis event (24590-LAW-Z0C-LOP-00001 and summarized in PSAR section 3.4.1.1). To clarify the fire design basis event discussion, the PSAR will be revised to clearly indicate that the source term and consequence development for this event are reported in PSAR section 3.4.1.1.	The response is acceptable because it provided an adequate explanation for the level of detail in Section 3.4 of the PSAR and commits to including additional clarifying information regarding the basis of the Glass Container Drop event and the LAW Fire DBE. Changes will be incorporated in the next PSAR update.
PSAR Update LAW-005	This question dealt with classification of the SSC for the CCB fuel handler. Since the proper operation of	The original design concept for lowering consumable changout boxes (CCBs) onto the melter employed a	The response is acceptable because it

Question No.	ORP Question	Contractor Response	ORP Disposition
	the CCB handler downward overdrive protection mechanism is required to prevent damage to the melter shell which is an SDC SSC, why is the overdrive protection not classified as SDS?	screw jack configuration in lieu of a wire rope. The screw jack design created the potential to overdrive the CCB through the melter shell. This configuration was later abandoned and replaced with a traditional wire rope crane configuration. The wire rope design prevents the crane from exerting downward force on the CCB while it is located on the melter (or at anytime for that matter). However, there was no issued design media to validate the conceptual change. As such, a design assumption was entered into the SIPD notes field. Specifically, that the LSH process crane (CCB handler) will not be driven by screw jacks. As committed in response to DNFSB Issue #12 (see WTP-03-024), the LAW ISM teams reviewed SIPD to identify design features and assumptions whose incorporation in the design is beneficial to safety. To close the DNFSB issue, critical assumptions were protected with Safety Case Requirements (documented in 24590-WTP-SE-ENS-03-094, *LAW - 2003 Update for Volume III of PSAR*). The CCB handler overdrive protection was an assumption protected by *SCR-LMECH/N0013 Design Feature: CCB handler shall be designed such that downward overdrive of the load into the melter is not possible.* Since this SCR was created to protect an assumption, it was not connected to any specific SDS equipment (CCB Handler is SDS for seismic protection only). The LAW Process Crane Specification (24590-WTP-3PS-MJKG-T0006) confirming the wire rope design configuration has been developed. However, the specification was not issued until September 9, 2003 and therefore the confirmation that the design does not have the capability for downward overdrive was not reflected in this revision of the LAW PSAR. With	provides an acceptable explanation regarding the CCB handler downward overdrive protection mechanism and commits to removing the related safety case requirement and text from the PSAR. Changes will be incorporated in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
		the Revision 0 issuance of 24590-WTP-3PS-MJKG-T0006, this design is now confirmed and it is no longer necessary to protect the "overdrive" assumption through a Safety Case Requirement. SCR-LMECH/N0013 and its associated text will be removed from the LAW PSAR. Any future design changes with the potential to re-introduce an overdrive hazard will be captured through the WTP internal AB maintenance and ISM processes.	
PSAR Update LAW-006	This question dealt with elimination of RRC items from the PSAR. a) For the attached table of Risk Reduction Class (RRC) items from Rev. 0a, what is the basis for eliminating them as ITS? b) Where is the safety evaluation justifying elimination of this as an RRC item documented?	(a) Attached find a summary of the justification for the elimination of the cited RRC items. The unifying driver for changes to RRC SSCs has been the application of 24590-WTP-GPP-SANA-002, *Hazard Analysis, Development of Hazard Control Strategies, and Identification of Standards*. Therein, RRC is defined as [text paraphrased]; <u>Risk Reduction Class</u> RRC SSCs are ITS SSCs that are neither SDC nor SDS. For example, an SSC that is neither SDC nor SDS and whose function is necessary to ensure the integrity of boundaries retaining radioactive materials is classified as RRC only when the SSC contains a significant amount of radioactivity. Other examples of RRC SSCs include the following: (1) SSCs that are provided to bring the facility to a safe state. These SSCs may provide automatic system response to such events or may be SSCs such as monitors or alarms that alert operators to the necessity of taking manual action. (2) SSCs not designated as SDC or SDS that comprise the primary boundary retaining chemicals classified as extremely hazardous substances. (3) SSCs that are identified as significant contributors to safety by the analyses that confirm the facility accident risk goals are met. The deleted SSCs did not meet the definition of RRC or were adequately	The response is acceptable. An acceptable basis was provided for eliminating several RRC items from Table 3A-6.

Question No.	ORP Question	Contractor Response	ORP Disposition
		covered by existing SCRs. (b) Changes to the RRC SSCs are discussed in 24590-WTP-SE-ENS-03-094. The RRC SSCs were updated to reflect the approved definition of RRC (24590-WTP-ABCN-ESH-01-029) as committed to in OSR PSAR Question/Responses (e.g. LAW-PSAR-024). The commitments made through OSR PSAR Question/Responses are considered part of the existing scope of the Authorization Basis. These changes have been evaluated through the ISM process and have been determined to provide adequate safety (CCN#s 043734, 043735, 043738, 043744, 049912, 051256, 055513, 057503).	
PSAR Update LAW-007	This question dealt with classification of cranes. Why are LAW cranes LSH-CRN-00011, LSH-CRN-00012, and RWH-CRN-00008 that will be operated over the SDC off-gas system not designated as SDS, SC-III? Why are these cranes not listed in Table 4A-2?	(a) LSH-CRN-00011, LSH-CRN-00012, and RWH-CRN-00008 have been designated as SDS, SC-III for their seismic safety function to not impact the SDC offgas system. These cranes are discussed in Section 4.4.1.3, Functional Requirements. The seismic safety function of the crane is closely related to the seismic safety function of the structure. Pursuant to the last paragraph in Section 4.4.1.3, the bulleted items listed therein are designated as SDS and will meet SRD Safety Criteria 4.1-2 and 4.1-3, as applicable. However, to clarify the seismic safety function of the cranes and to highlight their ITS subclassification, text will be added to the PSAR to explicitly state this information (i.e., SDS, SC-III) (see part b). (b) The cranes and other components that are topography-related (i.e. present a collocation hazard) are identified in the applicable functional requirements/system evaluation sections (Chapter 4 of PSAR) - DX cooling for the ITS UPS batteries (Section 4.3.3.5)	The response is acceptable because the response commits to including text in the PSAR to clarify the ITS function of the cranes and to include these cranes in Table 4A-2. Changes will be incorporated in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
		- LAW cranes LSH-CRN-00011, LSH-CRN-00012, and RWH-CRN-00008 (Section 4.4.1.3) - Select LAW platforms located in the wet process cells and melter gallery (Section 4.4.1.3) - Offgas crane-load impact barrier (Section 4.4.1.3) - Process Area floor and floor plugs (Section 4.4.1.3). These ITS SSCs are listed throughout the Functional Requirements sections of the primary ITS SSCs as they are credited to not impact the safety function of primary ITS SSCs. However, in order to clarify and highlight these controls, the bulleted SSCs will be added to Table 4A-2.	
PSAR Update LAW-008	This question dealt with clarification of a safety case requirement (SCR). What does BNI mean by the caveat "that the requirement assumes a normally functioning melter" in various SCRs cited in Appendix A?	The specific SCR referred to is SCR-LVENT/N0001 RRC: The melter enclosure ventilation system is designed to prevent leakage of melter offgas into the melter gallery during the maximum expected offgas release (assuming a normally functioning melter) into the enclosure, considering a blocked offgas flow path. This SCR is provided as a defense-in -depth, or secondary barrier, for Control Strategy Development records in which the melter offgas system is credited as the primary means of transporting offgas to the stack. Assuming failure of the flow path, the melter enclosure ventilation will prevent exfiltration from the melter into the melter gallery. However, the melter enclosure ventilation is not designed to accommodate both an obstructed offgas flow path and a surge condition in the melter (non-normally functioning melter). The generation rate of gases within a melter varies due to the dynamic nature of the interaction	The response is acceptable because it provides an acceptable explanation of the phrase "a normally functioning melter," and commits to including explanatory language in the PSAR, Appendix A. Appendix A of the PSAR will be updated by March 31, 2004.

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		between the cold cap and molten glass. The term "a normally functioning melter" means that this variation is within the usual range that is expected in routine operations. The PSAR will be updated by March 31, 2004 to replace the phrase "a normally functioning melter" in Appendix A with "a normal or average offgas generation rate (no significant surge) from the melter."	
PSAR Update LAW-009	This question dealt with completion of a COA dealing with analysis of a mis-feed event. Condition of Acceptance 4.1.2 -2 required among other things inclusion in the PSAR update, the "analysis of the mis-feed hazardous situation identifying control strategies that include..." SSCs related to this event can be found in the PT PSAR or LAW PSAR. Where is the analysis of the mis-feed event provided?	The scenario is captured in Appendix A, record CSD-LLCP/N0006. The hazard is stated as "Receipt of radioactive material with dose exceeding ALARA shielding design criteria for the LAW Wet Process Cells (L-0123/L-0124)." Six controls were identified for this event. In addition, the four ITS control strategies were selected by the ISM team. DBEs for Facility Workers are qualitatively determined and analyzed as part of the ISM process. Memorandum 067537, Evaluation of Low Activity Waste Facility Worker Design Basis Events, documents the adequacy of the controls selected for the mistransfer event. Consistent with the Question/Responses presented in the other facilities (e.g., PT-019 and PT-020), all LAW Facility Worker DBEs (including the mis-feed event) will be presented in the PSAR Table 3A-24 along with a description of the other represented events and the selected control strategies. The PSAR will be updated with the Facility Worker DBE information by March 31, 2004.	The response is acceptable because the response commits that LAW Facility worker DBEs will be presented in the PSAR, along with a description of the other selected events and selected control strategies. The PSAR will be updated with the Facility Worker DBE information by March 31, 2004.

DISPOSITION OF HLW QUESTIONS FROM PSAR UPDATE REVIEW

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update HLW-001	This question dealt with completion of COA 4.2.2, Item 1 from review of PSAR Rev. 0. (a) Where in the HLW PSAR Volume IV, Rev. 1 and BNI Calculation No. 24590-HLW-Z0C-H01T-00001, Rev. B are the responses to the condition of acceptance (CCN 067261, Attachment 5, Safety Evaluation Report Conditions of Acceptance – HLW Facility) documented? (b) Why wasn't Table 3A-4 corrected to show ammonia to be a flammable/explosive gas as committed in the response to Question/Response HLW-PSAR-240, subpart c)?	The reviewer should note the delayed items addressed in CCN 067260. As noted in CCN 067260, on Pages 3 and 6 of 9 of the attachment, the flammable gas issue has not been closed. The revised hydrogen generation rate calculation will be completed early 2004. The hydrogen generation rate will be based on Hu 2002. R&T is currently evaluating the applicability of the Hu correlation given WTP process flowsheet. The Hu correlation will replace the model currently used in the AB to calculate hydrogen generation rates and times to LFL. Where necessary, based on a flowsheet evaluation, R&T is performing literature reviews and experiments to validate or to identify changes to the Hu correlation. The calculation of the hydrogen generation rates and the times to LFL (assuming other flammable species) will be completed early 2004, based on the proposed schedule for the R&T activities. The calculations will be based on conservative assumptions (i.e., temperatures, TOC). Regarding Table 3A-4 of the PSAR, the Table will be revised to show ammonia to be flammable. These changes will be included in the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update HLW-002	This question dealt with a wet glass spill event. Why is this event and other events addressed in Calc. 24590-HLW-Z0C-HMP-00001, Rev D not labeled as BDBEs (Beyond Design Bases Events) and included in Section 3.4.4 of the HLW PSAR?	The BDBEs contained in Appendix B of the Attachment to the calculation (24590-HLW-Z0C-HMP-00001, Rev D) were inadvertently missed and not summarized in the PSAR. However, the missing BDBEs did not result in the need for controls beyond those identified in Section 3.4.1.4. The BDBEs in question [will] be summarized and included in the next [annual PSAR] update.	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update HLW-003	This question dealt with identification of standards. (a) What is the basis for not citing IEEE 338 in HLW PSAR sections 4.4.9.4 and 4.4.10.4? (b) What is the basis for not citing IEEE 308 and other emergency power standards (as identified in PSAR section 4.3.12.4) in HLW PSAR sections 4.3.5.4, 4.3.6.4, 4.3.9.4, 4.3.10.4, and 4.3.11.4?	The clarifying revisions requested in the question will be incorporated into the PSAR at the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update HLW-004	This question dealt with completion of COA 4.2.2, Item 12 from review of PSAR Rev. 0. Where in the two referenced calculation documents above is the commitment to complete the COA documented?	The reviewer should note the delayed items addressed in CCN 067260. As discussed in CCN:067260, on Pages 3 and 6 of 9 of the attachment, the flammable gas issue has not been closed. The revised hydrogen generation rate calculation will be completed early 2004. The hydrogen generation rate will be based on Hu 2002. R&T is currently evaluating the applicability of the Hu correlation given WTP process flowsheet. The Hu correlation will replace the model currently used in the AB to calculate hydrogen generation rates and times to LFL. Where necessary, based on a flowsheet evaluation, R&T is performing literature reviews and experiments to validate or to identify changes to the Hu correlation. The calculation of the hydrogen generation rates and the times to LFL (assuming other flammable species) will be completed by March 31, 2004, based on the proposed schedule for the R&T activities. The calculations will be based on conservative assumptions (i.e., temperatures, TOC).	The response is acceptable. By March 31, 2004, the Contractor must revise calculations 24590-HLW-Z0C-W14T-00013 and 24590-HLW-Z0C-H01T-00001 to more conservatively account for radiolytic effects (new COA # 7 under Section 6.2, HLW Facility Hazard and Accident Analyses). BNI has committed to prepare an ABAR in early 2004 to obtain DOE approval of the final hydrogen mitigation system design since waiting until the next PSAR update will be too late to support the design and

Question No.	ORP Question	Contractor Response	ORP Disposition
			construction schedule.
PSAR Update HLW-005	This question dealt with an inconsistency in the PSAR. Why is HLW PSAR, Section 3.4.1.4.2.6 inconsistent with Calculation No. 24590-HLW-Z0C-HMP-00001, Rev. D, *Design Basis Event: High Level Waste Glass Spills,"* concerning the control strategy elements for molten glass spill events?	The drip tray is identified in the DBE calc as a final control strategy in Sections 7.2.1.2 and 7.2.4.1, and Table 11 for an unplanned pour. The calculation reviewed was a preliminary version of the DBE calculation.	The response is acceptable.
PSAR Update HLW-006	This question dealt with deletion of DBEs. (a) Why is it acceptable to delete these DBEs from which controls for facility worker protection were derived? (b) Without a qualitative assessment of consequences of facility worker accidents, what would provide a basis for establishing a set of bounding performance requirements for SSCs or programs credited for facility worker protection?	Sections 3.4.1.10 and 3.4.1.11 have been deleted, as the content of the PSAR has been revised to better align with the format and content of a documented safety analysis prepared in accordance with DOE STD 3009-94. Sections 3.4 of the PSAR summarize the quantitative accident analysis performed of DBEs selected to represent the full range of events with potentially significant radiological consequences to the co-located worker and the public, and the set of chemical events above threshold chemical consequences. DBEs for facility workers are qualitatively determined and analyzed as part of the ISM process. Report 24590-WTPRPT-TE-01-002, and similar reports for the other facilities, documents the events to be analyzed for the selection of DBEs. The DBEs for facility workers will be presented in the HLW PSAR Table 3A-24 along with a description of the other represented events and the selected control strategies. The PSAR will be updated with the facility worker DBE information by March 31, 2004.	The response is acceptable. A new COA (COA # 1 under Section 3.3, Hazard and Accident Analyses) was added that requires the Contractor to update the PSAR by March 31, 2004, to include DBEs for facility workers.
PSAR Update HLW-007	This question dealt with designation of hazardous materials. (a) Why is the basis for not showing a "yes" for ammonia in the flammable/explosive column? (b) Why is sodium hydroxide listed as an	(a) Table 3A-4 will be revised to indicate that ammonia is flammable. (b) Table 3A-4 will be revised to show that sodium hydroxide is not an oxidizer.	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
	oxidizer in Table 3A-4? (c) Why is footnote (8) listed under the ammonia/nitric acid chemical interaction matrix in Table 3A-5? (d) Why doesn't footnote (5) also state that ceric nitrate will react with sucrose as shown in the matrix? (e) What is the technical basis for the matrix statement that ceric nitrate will not react with sulfur-impregnated carbon?	(c) Footnote (8) will be deleted under the ammonia/nitric acid chemical interaction matrix in Table 3A-5. A new footnote (9) will be added to indicate that ammonia can react with nitric acid to form ammonium nitrate which can be explosive. (d) Footnote (5) will be revised to also state that ceric nitrate will react with sucrose. (e) Ceric nitrate is a slow oxidizer at room temperature. It will react slightly with sulfur (or carbon) at room temperature, but not to a significant or dangerous extent. At higher temperatures (decon uses 149°F for 6 hours), the oxidation reaction is faster, but is still not significant if properly monitored. Also, ceric nitrate is used up in the reaction, so a small amount of ceric nitrate will only react with a small amount of sulfur (or carbon), then stop. HDH uses 20 gallons of ceric nitrate and removes only 10 mm from the canister. The ceric nitrate is at 0.5M, or 20%, in the solution. The revisions identified in items (a) through (d) above will be made in the next annual PSAR update.	
PSAR Update HLW-008	This question dealt with potential hydrogen explosions in the HLW process vessel. (a) What is the basis for the statement above in HLW PSAR Section 3.4.1.7.2.1 that the ITS circulation pumps will provide adequate agitation? (b) Why is no credit given to the air spargers (shown to be present in Figures 2A-24 and 2A-25) in ensuring adequate mixing in HLW vessels? (c) What is the basis for the statement in Calc. No. 24590-HLW-Z0C-H01T-00001, Rev. B, Sections 7.1.1 and 7.2.1 that the hydrogen burn will not rupture the vessel? (d) Where are the results of the HADCRT modeling incorporated in 24590-HLW-Z0C-H01T-00001 as stated in Section	(a) At the time the PSAR and the DBE Calculations were being prepared, the selected control strategy was the recirculation pump. However, this has since been shown to be ineffective. ISM meetings are scheduled to address/select alternative controls. (b) It was determined that the spargers would not provide adequate mixing. They are required to support the recirculation pump (i.e., fluidize the waste). (c) The control strategies selected prevent a hydrogen deflagration/detonation. Assuming that there is a deflagration/detonation and the vessel ruptures would make the event a BDBE.	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
	3.4.4.2 and as committed to in the response to HLW-PSAR-197?	(d) The HADCRT Calculation, 24590-HLW-U0C-30-00004, was not incorporated into the calculation (24590-HLW-Z0CH01T-00001). Incorporation of the HADCRT calculation into the DBE calculation is not considered to be necessary. The HADCRT calculation (24590-HLW-U0C-30-00004) is, however, referenced in PSAR section 3.4.4.1. Additionally, the last sentence in HLW PSAR Section 3.4.4.2 will be deleted and two references to 24590-HLW-Z0C-H01T-00001 in PSAR Section 3.4.4.21 will be deleted. The revisions indicated in the above items will be completed for the next annual PSAR update.	
PSAR Update HLW-009	This question dealt with potential hydrogen explosions in the HLW Process Vessel. (a) Where are the results of the BDBE and HADCRT modeling incorporated in Calc. No. 24590-HLW-Z0C-H01T-00001, as stated in HLW PSAR Section 3.4.4.2 and as committed to in the response to Question HLW-PSAR-197? (b) Why isn't the decontamination factor for the C5 HEPA filters included with the PVVS HEPA filters in determining the mitigated dose consequences?	(a) See the response to the Update question HLW-008, part (d). (b) 24590-HLW-U0C-30-00004 evaluated a BDBE to determine impacts to the PVVS, assuming the pressurized release would be vented to the vessel vent system. The analysis demonstrated that the filters would not be impacted, thus the consequences would be mitigated. However, some portion of the release would be vented through the overflow to the cell and eventually out C5. These conclusions are included in the last two bullets of PSAR section 3.4.4.1.2 and C5 will be added to the PVVS HEPA discussion in two places in PSAR Section 3.4.4.2.1. These revisions will be completed for the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update HLW-010	This question dealt with ammonia releases. Why does the Safety Evaluation, 24590-WTP-SE-ENS-03-095, HLW – 2003 Update for Volume IV of PSAR, state that the change does not result in more than a minimal (≥10%) increase in frequency or consequence of an	At the time the calculation was prepared, a trend was submitted to increase the size of the tank (# 24590-02-0084). This trend was not approved pending a decision to increase the tank size to 6000 gallons and the number of tanks to 2. The approved	The response is accepted based on the clarification provided regarding the ammonia tank size.

Question No.	ORP Question	Contractor Response	ORP Disposition
	analyzed DBE when the unmitigated consequence to the public and co-located worker increased by a factor of three due to the increase in the capacity of the anhydrous ammonia tank from 500 gal to 1500 gal?	tank is 500 gal; therefore, the calculation was bounding. A change to the larger volume will be processed and the PSAR will be updated once the revised tank sizes and locations are finalized and the revised DBE calculations are complete. Anticipated completion and submittal for approval is March 31, 2004.	
PSAR Update HLW-011	This question dealt with change drivers for changes made to the PSAR. What are the change drivers associated with the changes made to the updated HLW PSAR sections identified above, as detailed in the explanations below, and why were these drivers and associated changes not identified in Attachment 1 to 24590-WTP-SE-ENS-03-095, Rev. 0?	(1) At the time Revision 0 of the PSAR was submitted, the definition of Risk Reduction Class (RRC) had not been approved by the OSR. Accordingly, the responses to several OSR questions on the initial PSAR submittal (e.g., question numbers HLW-PSAR-250, -251, and -252) committed to conduct an ISM Process to re-evaluate previously identified RRC SSCs and to reflect any changes to the list of identified RRC SSCs in the consolidated PSAR update upon approval of ABCN 24590-WTP-ABCN-ESH-01-029, Rev. 1. The driver for deletion of the Area Radiation Monitors (ARMs) and Continuous Air Monitors (CAMs) is 24590-WTP-SEENS- 03-184, Rev. 1. As noted in Part 3 of that safety evaluation, Section 3.3.3.6 of the HLW Facility-Specific PSAR (24590-WTP-PSAR-ESH-01-002-04) was affected by the change, specifically, elimination of SCR-HRAD/N0001 (among others). In the current version of the Standards Identification Process Database (SIPD), the description of SCRHRAD/ N0001 states that ARMs/CAMs have been eliminated as RRC controls, since it was not identified as such in the Integrated Safety Management (ISM) meeting documented in CCN 043747. The Changes field of this SCR record states that the "SCR should be deleted. Area radiation and contamination monitoring will be accomplished through the Radiological	The response is acceptable based on the clarification provided.

Question No.	ORP Question	Contractor Response	ORP Disposition
		Protection Program…" As noted in Change 2 of the "Description of design change" section of 24590-WTP-SE-ENS-03-184, Rev. 1, the list of RRC items in HLW PSAR Table 3-9 (now labeled Table 3A-9 in the Updated PSAR) has been revised in accordance with OSR comment responses HLW-PSAR-250, -251, and -252, and the ISM meeting documented in CCN 043747. Furthermore, it is noted that the last sentence of Updated HLW PSAR Section 3.3.3.6 states: "Shielding design and the Radiation Protection Program are the primary control strategies to prevent facility workers from being exposed to high radiation sources." (2) The driver for the addition of the RRC control strategy (i.e., stop flows) for vessel and piping failures was the OSR's approval of the definition of Risk Reduction Class (RRC) discussed in part 1) of this response. (3) (a) Consideration of a potential hydrogen deflagration in battery rooms is not a new event. The ITS batteries are needed to ensure the operability of control strategies that are already identified as SL-1 events; for example, maintaining purge air flow to the HLW Concentrates receipt Vessels to prevent the buildup of potentially explosive hydrogen. Note that it is not the hydrogen deflagration in a battery room itself that results in SL-1 consequences. Therefore, there is no specific driver identified in Attachment 1 to 24590-WTP-SE-ENS-03-095, Rev. 0. (b) The classification of ARMs and CAMs is discussed in part 1) of this response. (c) Deletion of RRC controls for filter rupture is listed in Attachment 1 to 24590-WTP-SE-ENS-03-095, Rev. 0. As noted on page 18 of Attachment 1 to that safety evaluation, the driver for removal of filter	

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		rupture RRC controls is 24590-WTPSE- ENS-03-184. Note that updated HLW PSAR Section 3.3.3.1, "HLW Common Area Hazard Evaluation Results," states that fire-induced rupture of the C5 or C3 HEPA filters results in SL-4 consequences to co-located workers and the public. Per Appendix B Table 1 of the Safety Requirements Document (SRD) (24590-WTP-SRD-ESH-01-001-02), controls for SL-4 events consist of physical design features and administrative controls per 10 CFR 835.1001. Such controls are covered by the WTP Radiation Protection Program for Design and Construction and are not described in detail in the PSAR. (d) The ventilation system to the ITS UPS battery room and the cooling/ventilation system(s) for the ITS UPS and emergency battery rooms (CSD record CDS-HC1V/N0002) are ITS, as discussed in item 3(a) above.	
PSAR Update HLW-012	This question dealt with potential chemical accidents. (a) Where in Volume I is the beyond design basis chemical accident summary found as committed to in Item 1 of the cited submittal text? (b) Why is the Volume I quantity of ammonia stored given as 500 gallons and Volume IV as 1500 gallons? What ABAR or ABCN provided the safety evaluation for the apparent 3-fold increase in the quantity of ammonia stored as committed to in Item 5 of the cited submittal text? (c) Since the main control room would be not be habitable from the ammonia releases shown in Table 3-27, how is the outside air intake to be isolated or ammonia to be filtered out of the inlet air to the MCR? (d) Why are the chemicals, sulfur-impregnated activated carbon and silver mordenite, which are shown in Tables 3A-3 and 3A-5 of Volume	(a) As discussed in the letter, the ESH analysis was not performed as a BDBE. However, the analysis methodology is similar (i.e., no controls). The analysis was not specifically identified as a BDBE, but was summarized in section 3.9.2 of Volume I. (b) See the response to Update question HLW-010. (c) The ISM process has not been completed and is awaiting final design of system (i.e., increase in size of Ammonia Tank). Anticipated completion and submittal for approval is March 31, 2004. (d) The determination as to updating Tables 3-25 and 3-26 of Volume I will be made and tracked in association with the Volume I questions. The ABAR adding the activated carbon column was ABAR-SE-ENS-03-033.	The response is acceptable.

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	IV, not also shown in Tables 3-25 and 3-26 of Volume I and 24590-WTP-ESH-01-001? What ABAR or ABCN provided the safety evaluation for the addition of these chemicals?		
PSAR Update HLW-013	This question dealt with shielding in the melter cave. (a) Why wasn't the use of joggled penetrations included as an ITS SSC or part of the ITS tables for Chapter 4? (b) Are sumps still considered RRC and should they be included in Table 3A-9?	(a) Joggled penetrations are considered to be part of the structures (e.g., cell walls) in which they are located. As such, they typically are not identified in the PSAR as unique ITS SSCs. Table 4-1 does list the HLW structure, including cells, caves and tunnels as an ITS control. Updated HLW PSAR section 4.3.1.1 states that a credited safety function of the wet process cell structure and bulges is to provide shielding. Section 4.3.7.2 states that the concentrate receipt vessels, feed preparation vessels, melter feed vessels, and plant wash and drain vessel are located in shielded cells. Section 4.3.2.2 notes that the melter caves are reinforced concrete with shielding steel access doors, as required. This section also notes that the cave walls and floors have penetrations, including shield windows, wall boxes, and ventilation penetrations, and refers to section 4.4.1 for the discussion of shield doors and hatches. Section 4.3.2.5 states: "The design of the cave structure will incorporate joggled paths (or equivalent shielding mechanisms) for through-wall penetrations, minimizing radiation streaming. These SSCs will be seismically qualified, as appropriate, to prevent a catastrophic loss of shielding." Finally, section 5.6.1 states that a design feature of the R5/C5 cells, caves and tunnels structure and the wet process cell bulges is to provide shielding from radioactive materials. It should be noted that shielding is SDS to provide for normal operations to reduce radiation to exposure limits.	The response is acceptable and consistent with the OSR approved definition of RRC.

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		(b) At the time Revision 0 of the PSAR was submitted, the definition of Risk Reduction Class (RRC) had not been approved by the OSR. Accordingly, the responses to several OSR questions on the initial PSAR submittal (e.g., question numbers HLW-PSAR-250, -251, and -252) committed to conduct an ISM Process to re-evaluate previously identified RRC SSCs and to reflect any changes to the list of identified RRC SSCs in the consolidated PSAR update upon approval of ABCN 24590-WTP-ABCN-ESH-01-029, Rev. 1. Sumps are not considered to be RRC, and they should not be listed in Table 3A-9. Removal of the PSAR references to RRC sumps, level detection, sump liner, and sump ejector is listed in Attachment 1 to 24590-WTP-SE-ENS-03-095, Rev. 0, page 17. The driver for removal of RRC sumps from sections 3.3.3.2 and 3.3.3.6 of the HLW PSAR is 24590-WTP-SEENS- 03-184. As noted in Change 2 of the "Description of design change" section of 24590-WTP-SE-ENS-03-184, Rev. 1, the list of RRC items in HLW PSAR Table 3-9 (now labeled Table 3A-9 in the Updated PSAR) has been revised in accordance with OSR comment responses HLW-PSAR-250, -251, and -252, and the ISM meeting documented in CCN 043747.	
PSAR Update HLW-014	This question dealt with exposure of the public to chemicals. What is the basis for the difference between the exposure consequences cited in the CSD record (i.e., the exposure to the public for an ammonia release is below the allowable threshold) and the hazards analysis (HLW PSAR, Section 3.4.1.12.1.4) which states that the exposure is above the threshold?	The text of updated HLW PSAR Section 3.4.1.12.1.5 is correct. Calculation 24590-HLW-Z0C-HOP-00002, Rev. B, Design Basis Event - HLW Ammonia Release, Sections 7.1.3 and 7.1.5, demonstrates that the potential public exposure from an ammonia release exceeds the ERPG-2 standard is 110 mg/m3. Section 7.1.6 of calculation 24590-HLW-Z0C-HOP-00002, Rev. B, states: "The SSCs credited in the analysis include the ammonia storage tank, the	The response is acceptable. Changes will be made in the next PSAR update.

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		ammonia transfer lines, and all connections and in-line valves. These components must reliably maintain confinement of the ammonia." Accordingly, CSD record CSD-HAMR/N0001 will be revised in the Standards Identification Process Database (SIPD) and in Appendix A of the updated HLW PSAR to indicate that the hazard is worker and public exposure to toxic ammonia gas and that the exposure to the public is above threshold (AT). Furthermore, the description of the Control Strategy Elements for this CSD record should be revised to match that in Section 7.1.6 of the DBE calculation (i.e., include the ammonia storage tank and all connections and in-line valves, as well as the piping). These revisions will be made in the next annual PSAR update.	
PSAR Update HLW-015	This question dealt with ABAR changes to the PSAR. (a) Why does the HLW PSAR update (Rev. 1) not include the changes to the PSAR section cited above that were shown as impacted by ABAR 24590-WTP-SE-ENS-02-045? (b) Why were these and other changes omitted from the crosswalk (24590-WTP-SE-ENS-03-095) provided with the PSAR update?	The HLW PSAR will be revised to include the changes to those sections shown to be impacted by ABAR 24590-WTP-SE-ENS-02-045, following DOE approval. As noted by the question, there were some minor changes that were inadvertently not incorporated in the update. There was a global statement in the crosswalk that PSAR Section 4.4 was updated to reflect ABAR 24590-WTP-SE-ENS-02-045. These revisions will be made in the next annual PSAR update.	The response is acceptable since it commits to change the PSAR text upon ABAR approval. Changes will be made in the next PSAR update.
PSAR Update HLW-016	This question dealt with treatment of offgas from the WESP. Why are the descriptions of the offgas system design different between ABAR 24590-WTP-SE-ENS-02-045 and the updated HLW (Rev. 1) PSAR, Section 2.5.3.1.5?	The apparent discrepancy between the ABAR and the PSAR is related to the manner in which the HEME is, and has been, referred to in the PSAR. In Rev. 0 of the PSAR, Section 2.4.12.1.5 clearly states that there are two HEMEs in the melter cave. One HEME is in service; the second in standby. Thereafter, in Section 2.5.3.1 as well as others, the term HEME is used to refer to the singular HEME in service. This same	The response is acceptable.

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		approach is used in the ABAR. However, in an effort to clarify that there are in fact two HEMEs in each melter cave, the PSAR text (Rev. 1) included specific mention of two HEMEs in each melter cave. This is not as stated in the ABAR but was intended as an editorial clarification. Section 2.4.12.1.5 of Rev. 1 of the PSAR also states that there are two HEMEs in each melter cave. Again, subsequent mention of a singular HEME is actually referring to the in-service HEME.	
PSAR Update HLW-017	This question dealt with autosampling capability. Why was the PSAR text not changed to indicate that the Melter Feed Preparation Vessel; Melter Feed Vessel; Acidic Waste Storage Vessel; Plant Wash and Drains Vessel; and the Decon Effluent Collection Vessel have autosampling capability?	The initial response identified vessels having autosampling capabilities. Providing this information was not interpreted as a commitment to revise the PSAR. However, PSAR Section 2.4.21 will be revised to identify those vessels having autosampling capabilities i.e., Melter Feed Preparation Vessels (2); Melter Feed Vessels (2); Acidic Waste Vessel; Plant Wash and Drains Vessel; and the Concentrate Receipt Vessels (s). These revisions will be made in the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update HLW-018	This question dealt with control strategy for service penetrations. Where in the PSAR is the control strategy identified above discussed?	In addition to the PSAR sections cited in the OSR question, the control strategy to route service penetration piping above the minimum barometric head of 34 ft to protect facility workers against a direct radiation hazard is discussed in Table 4A-2, Design Feature Section 5.6.14, and Appendix A CSD records CSD-HHCP/N0014 (SCR-HPIPN/N0003) and CSDHHFP/N0027 (SCR-HPIPN/N0003). Furthermore, in addition to CSD record CSD-HHLW/N0003, the control strategy for CSD-HHLW/N0005 states that service penetrations into high radiation areas will be offset, joggled, or appropriately shielded to prevent shine paths. As	The response is acceptable. Changes will be made in the next PSAR update.

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		discussed further in the response to OSR question PSAR-UPDATE-HLW-013, joggled penetrations are considered to be part of the structures (e.g., cell walls) in which they are located. As such, they typically are not identified in the PSAR as unique ITS SSCs. Additionally, PSAR Sections 4.4.7, 5.6.14, and Table 4A-2 will be revised to specifically mention that the design function includes the prevention/minimization of radiation streaming. These changes will be incorporated by the first annual PSAR update.	
PSAR Update HLW-019	This question dealt with removal of reference to zirconium. Why is the reference to Zirconium powder still in Table 3A-4?	Table 3A-4 will be corrected to delete reference to Zirconium powder since it is not a HLW facility process chemical. This revision will be made in the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update HLW-020	This question dealt with chemical exposures. (a) Why doesn't the statement in HLW PSAR Section 3.3.3.2 indicate that the largest dose to the public is SL-1, consistent with the results in Section 3.4.1.7? (b) Why don't the statement in HLW PSAR Section 3.3.3.7, the exposures in the two cited CSD records, and the information in Section 3.4.1.12.1.5 agree with regard to the exposures of the facility worker, co-located worker and the public from an ammonia release? (c) Why doesn't Table 3A-24 include an Industrial Safety Program to protect facility workers from chemical releases and exposures?	(a) The text of updated HLW PSAR Sections 3.4.1.7.1.3 and 3.4.1.7.2.3 is correct. Calculation 24590-HLW-Z0C-W14T-00013, Rev. B, Revised Severity Level Calculations for the HLW Facility, Table 19 lists the public dose consequences from postulated hydrogen explosions in various HLW facility vessels. These calculation dose consequences depend on the hydrogen concentration assumed to be present in the vessel headspace at the time of ignition. The two cases that produce SL-1 consequences to the public are a hydrogen explosion in the HLW Concentrate Receipt Vessel HCP-VSL-00001/000002 (10.4 rem) or in the HLW Plant Wash and Drains Vessel RLD-VSL-00008 (7.3 rem); in both cases, the assumed headspace hydrogen concentration was 30%. Accordingly, CSD records CSD-HHCP/N0004 and CSD-HHCP/N0005 will be revised in the Standards Identification Process Database (SIPD) and in Appendix A of the updated HLW PSAR to indicate	The response is acceptable. Changes will be made in the next PSAR update.

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		that a hydrogen deflagration in the HLW Concentrates Receipt Vessel presents an SL-1 hazard to the public. This correction should also be made to updated HLW PSAR Section 3.3.3.2. (b) The text of updated HLW PSAR Section 3.4.1.12.1.5 is correct. Calculation 24590-HLW-Z0C-HOP-00002, Rev. B, Design Basis Event - HLW Ammonia Release, Sections 7.1.3 and 7.1.5, demonstrates that the potential public exposure from an ammonia release exceeds the ERPG-2 standard of 110 mg/m3. Section 7.1.6 of calculation 24590-HLW-Z0C-HOP-00002, Rev. B, states: "The SSCs credited in the analysis include the ammonia storage tank, the ammonia transfer lines, and all connections and in-line valves. These components must reliably maintain confinement of the ammonia." Accordingly, CSD record CSD-HAMR/N0001 will be revised in SIPD and in Appendix A of the updated HLW PSAR to indicate that the hazard is worker and public exposure to toxic ammonia gas and that the exposure to the public is above threshold (AT). Furthermore, the description of the Control Strategy Elements for this CSD record should be revised to match that in Section 7.1.6 of the DBE calculation (i.e., include the ammonia storage tank and all connections and in-line valves, as well as the piping). (c) The SIPD CSD records dealing with potential ammonia releases - CSDHAMR/N0001 and CSD-HHOP/N001 - include SCR-HINDS/N0001 as part of the selected control strategy. Updated HLW PSAR Table 3A-24 will be revised to include a reference to the Industrial Safety Program to prevent or reduce facility worker exposures to ammonia or other hazardous chemicals. The revisions identified for items (a), (b), and (c) above will be made in the next	

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		annual PSAR update.	
PSAR Update HLW-021	This question dealt with consequences to the public from a hydrogen explosion. Why are the cited references inconsistent regarding the severity level consequences to the public for unmitigated hydrogen explosions?	The text of updated HLW PSAR Sections 3.4.1.7.1.3 and 3.4.1.7.2.3 is correct. Calculation 24590-HLW-Z0C-W14T-00013, Rev. B, Revised Severity Level, Calculations for the HLW Facility, Table 19 lists the public dose consequences from postulated hydrogen explosions in various HLW facility vessels. These calculation dose consequences depend on the hydrogen concentration assumed to be present in the vessel headspace at the time of ignition. The two cases that produce SL-1 consequences to the public are a hydrogen explosion in the HLW Concentrate Receipt Vessel HCP-VSL-00001/000002 (10.4 rem) or in the HLW Plant Wash and Drains Vessel RLD-VSL-00008 (7.3 rem); in both cases, the assumed headspace hydrogen concentration was 30%. Accordingly, CSD records CSD-HHCP/N0004 and CSD-HHCP/N0005 will be revised in the Standards Identification Process Database (SIPD) and in Appendix A of the updated HLW PSAR to indicate that a hydrogen deflagration in the HLW Concentrates Receipt Vessel HCP-VSL-00001/000002 presents an SL-1 hazard to the public. This correction should also be made to updated HLW PSAR Section 3.3.3.2. However, Table 19 of calculation 24590-HLW-Z0C-W14T-00013, Rev. B, shows that the worst-case dose consequences to the public from a hydrogen explosion in the HLW Feed Preparation Vessel HFP-VSL-00001 (4.5 rem) or the HLW Melter Feed Vessel HFP-VSL-00002 (3.9 rem) represent SL-2 events. The lower doses are due to the smaller volume and lower radiological source term. Accordingly, CSD records CSD-HHFP/N0019 and CSD-HHFP/N0020 will be revised in SIPD and in Appendix A of the	The response is acceptable. Changes will be made in the next PSAR update.

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		updated HLW PSAR to indicate that a hydrogen deflagration in the HLW Feed Preparation Vessel HFP-VSL-00001 or the HLW Melter Feed Vessel HFP-VSL-00002 present an SL-2 hazard to the public. These revisions will be made in the next annual PSAR update. As an additional note, the project has agreed to apply SL-1 consequences to the public for hydrogen explosions. However, although the consequences are considered SL-1 for analysis purposes, the actual results of the severity level calculation will be carried over to SIPD (and therefore to Appendix A of the PSAR as well). Therefore, there will remain an apparent inconsistency between the DBEs and the Appendix A values.	
PSAR Update HLW-022	This question dealt with deletion of portions of the PSAR. (a) Why is it acceptable to delete the "loss of contamination control" and "direct radiation" DBEs from which controls for facility worker protection were derived? (b) Without a qualitative assessment of consequences of facility worker accidents, what would provide a basis for establishing a set of bounding performance requirements for SSCs or programs credited for facility worker protection? (c) Why was CSD record CSD-HHDH/N0023 deleted? (d) Why doesn't CSD record CSD-HHDH/N0024 credit the cable troughs as a facility worker control as committed to in ABCN 24590-WTP-ABCN-ENS-02-029? (e) Why doesn't Table 3A-24 list the cable troughs as a facility worker control as referenced in Table 4A-2?	(a) and (b) Please refer to the response provided for PSAR Update HLW-006. (c) The cable reel design was changed such that the bogie cable reel no longer crosses the boundary between the maintenance area and the tunnel. See also 24590-WTP-ABCN-ENS-02-029. (d) This was inadvertently removed and will be replaced. CSD-HHDH/N0023 will be corrected. (e) Table 3A-24 will be corrected to show cable troughs as a facility worker control as referenced in Table 4A-2. These revisions identified above will be made in the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update HLW-023	This question dealt with ashfall loadings on the HLW facility. What is the technical basis for considering only the highest average ashfall loading (0.174	Consideration of the maximum ashfall loading for the full duration of the event is overly conservative, since it will only occur for part of the time, and is	The response is acceptable because the response stated

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	gm/m3) rather than the maximum ashfall loading (0.220 gm/ m3) as the design criteria load rate for the duration (20 hours) of the ashfall event?	accounted for in the average ashfall over 20 hours. Under an actual ashfall event, the concentration would be expected to vary. The effects of the maximum concentration occurring part of the time are considered. The current control strategies for accommodating ashfall rely on filtering and filter changeout. The total number of filters required is based on the average over the event duration. The timing of the filter changeout will be based on monitoring dP across filters or other observations. These strategies for ashfall loading control would not be adversely affected by the maximum part time loading (~25% greater), as long as there is adequate time to complete any necessary actions. Total filtering needs will not change. If later control strategies are developed that are sensitive to the part time maximum concentration, they will be evaluated accordingly.	that the effects of the maximum concentration of ashfall occurring part of the time are considered in filter loading. The response also stated that if later control strategies are developed that are sensitive to the part time maximum concentration, they will be evaluated accordingly.
PSAR Update HLW-024	This question dealt with limiting conditions of operation for the bogie interlocks. (a) Why isn't the LCO described in Section 5.5.10 included in Table 5A-1? (b) Why isn't there a similar LCO applicable to the Cask Transfer Bogie to prevent the Solid Waste Transfer Cask from being moved into the Cask Import/Export Area without a lid or improperly seated lid?	(a) The LCO described in Section 5.5.10 will be added to Table 5A-1. Additionally, Section 5.5.10 will be revised to show that this control is based on facility worker safety as identified in Table 3A-24, rather than Section 3.4.1.5. (b) An LCO applicable to the Solid Waste Cask Transfer Bogie will be added to Section 5.5.10 and included in Table 5A-1. CSD record HRWH/N0003 appears in SIPD and includes the SCRs. These revisions identified above will be made in the next annual PSAR update.	The response is acceptable. Changes will be made in the next PSAR update.
PSAR Update HLW-025	This question dealt with incomplete information in the PSAR. (a) Why didn't BNI include Posting Box information and its function in HLW PSAR Section 2.4.12.1 as stated in the 24590-WTP-ABCN-ENS-02-	(a) The Posting Box information including its function will be included in Section 2.4.12.1 of the HLW PSAR as stated in the 24590-WTP-ABCN-ENS-02-028.	The response is acceptable. Changes will be made in the next PSAR update.

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	028? (b) Why didn't BNI include Decontamination Pit information and its function in HLW PSAR Section 2.4.16.1 as stated in the 24590-WTP-ABCN-ENS-02-028? (c) Why didn't BNI include the Decontamination Pit in the list of the systems served by C5 (HLW PSAR Section 2.4.16.1) as stated in the 24590-WTP-ABCN-ENS-02-028? (d) Why don't HLW PSAR Sections 2 and 3 (control strategies) address the ITS cable misreeving detection discussed in PSAR Sections 4 (4.4.9.4, 4.4.10.2) and 5 (5.6.16, 5.6.17)?	(b) The Decontamination Pit information including its function will be included in Section 2.4.16.1 of the HLW PSAR as stated in the 24590-WTP-ABCN-ENS-02-028. (c) The Decontamination Pit will be included in the list of systems served by C5 (HLW PSAR Section 2.4.16.1) as stated in the 24590-WTP-ABCN-ENS-02-028. (d) A discussion of the cable misreeving detection will be included in HLW PSAR Section 2.4.20.1. In Chapter 3 of the PSAR, crane design is credited, which includes misreeving detection. Therefore, no additional text regarding misreeving detection will be added to Chapter 3. These revisions identified above will be made in the next annual PSAR update.	
PSAR Update HLW-026	This question dealt with incomplete information in the PSAR. (a) Where did BNI document the hazard considerations associated with placing a source of electric power (radar-based level monitoring) in close proximity to the H2 mitigation vessels? (b) Where did BNI document the ability to maintain, calibrate and implement Technical Safety Requirement (TSR) surveillances for radar-based level monitors placed inside black cells? (c) Why was Table 4-1 not updated to shown the radar-based level monitoring? (d) Why, with the exception of the CSD-HHOP/N0035 (Offgas Release), is the use of radar-based level detection as an ITS control strategy not discussed elsewhere in the HLW PSAR, Revision 1 (e.g., Chapters 2, 3, 4, and 5)? (e) Why does CSD-HHOP/N0035 list pneumatic bubblers in addition to the ITS radar-based level monitoring, since the stated reason for 24590-WTP-ABCN-ENS-02-048 was to replace the bubbler-based level	(a) The radar-based level monitoring system does not introduce electric power inside the HLW process cells. The radar transponders are located outside the process cells; electric power terminates at the transponder. The only portion of the system inside the cell is the waveguide jumper, which directs the radar beam to and from the vessel. Thus, there is no reason for BNI to document a hazardous condition associated with placing a source of electric power due to radar-based level monitoring in proximity to hydrogen generating vessels. In response to the concern that the radar-based level monitoring may result in a hazardous interaction between the radar energy and hydrogen (similar to the one of gasoline vapor and the cell phone), the following information is provided: The proposed RADAR level devices are approved for Class l, ll, & lll, Div 2 Groups A, B, C, D, E, F & G hazardous locations (Class I, Division 2, Group B identifies approved for operation in an	The response is acceptable.

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	monitoring with the radar-based level monitoring?	environment that may contain, due to accident or failure, flammable quantities of hydrogen [Ref: NEC Article 500]). The transmitter itself is located in a non-hazardous area and radar energy is transmitted through a waveguide and into the vessel via remotely mounted 6" diameter horn with a 20 degree beam angle. Hazardous area approvals apply to the transmitter and the use of the transmitter to monitor levels of flammable liquids with corresponding hazardous vapors. Additionally, the waveguide acts as a path for the radar energy preventing premature dispersion (attenuation) of the energy. There is no energy added to the radar signal by the jumper. Regarding post installation maintenance, calibration, etc., for the waveguide jumper, the following information is provided: Since the waveguide acts as a transmission path for the radar energy it is important that it be designed to minimize both attenuation and reflection of the radar energy. Attenuation is minimized via the waveguide layout by minimizing the number of bends and by maximizing the radius of bends. Reflections are reduced by ensuring smooth transitions at flanges and welds. After design and installation, routine maintenance of the waveguide is not required. A hose fitting for off-normal air or water blow down of the waveguides is provided to clean the waveguide or horn of any obstructions that may collect. The RADAR level measurement technique calculates level via the change in the arrival time of the reflected signal. As the liquid level raises and lowers, the reflected signal returns to the transmitter at different times, relative to the time of pulse origination. Obstructions in the waveguide and in the vessel may cause energy to be reflected that can interfere with the level measurement. The arrival	

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		time of reflections from stationary objects do not change with level movement so they can be 'learned' by the transmitter and filtered from the level measurement. Training the transmitter to the waveguide and the vessel takes place during system setup after installation. For waveguides that are jumpered 'training' may have to be redone after jumper removal and replacement. The technique may be used to ensure proper jumper fit up. (b) Those portions of radar-based level monitors requiring maintenance or calibration are not located inside black cells. Methodology exists which permits maintenance and calibration of the transmitters (located outside of the black cell) without requiring entrance into the black cells. The exact methodology has not yet been selected and will not be formalized until procedures are prepared. (c) Updated HLW PSAR Table 4A-1 includes the high-high liquid level detection interlocks in the Concentrate Receipt Vessels and Plant Wash and Drain Vessel. These are the credited controls for prevention of vessel overflow and hydrogen mitigation (protection of headspace volume assumptions) – see sections 3.4.1.2.1.6 and 4.3.9. Updated HLW PSAR Table 4A-2 includes the high-high liquid level detection interlocks in the SBS and SBS Condensate Receiver Vessels. These are the credited controls for prevention of offgas blockage– see sections 3.4.1.8 and 4.4.4. As noted in section 4.3.9.5, this interlock comprises the entire instrumentation loop, not just the radar portion; thus, the radar-based level monitoring is not addressed uniquely in the PSAR. (d) As noted in part (c) of this response, the credited controls for prevention of HLW vessel overflows,	

Question No.	ORP Question	Contractor Response	ORP Disposition
		protection of headspace volume assumptions for hydrogen mitigation, and prevention of offgas blockage are the high-high level interlocks, which encompass the radar-based level monitors; thus, the radar-based level monitoring is not addressed uniquely in the PSAR. The high-high vessel interlocks are credited controls in the following Appendix A CSD records: CSD HHCP/N0020, CSD HHCP/N0021, CSD HHCP/N0040, CSD HHFP/N0028, CSD HHFP/N0029, CSD HHOP/N0017 CSD HHOP/N0035, CSD HRLD/N0041, CSD HRLD/N0042, CSD HRLD/N0043, CSD HRLD/N0049, CSD HRLD/N0050, and CSD HRLD/N0051. Therefore, the control strategy is discussed elsewhere in the updated HLW PSAR. (e) The SBS vessel radar-based level monitors provide the ITS function of preventing blockage of the offgas path. The non-ITS bubbler-based level monitors were retained primarily for density measurement, but also to provide an independent non-ITS level display. Thus, the pneumatic bubbler level detection provides defense-in-depth but is not credited in the accident analysis. The radar-based system replaced only the ITS function, not the bubbler-based system itself, as stated in part II.D.2 of 24590-WTP-ABCN-ENS-02-048.	
PSAR Update HLW-027	This question dealt with completion of COA 4.2.3, Item 7 from review of PSAR Rev. 0. Why didn't BNI include a slope requirement for the coaxial spare process piping in accordance with Condition of Acceptance 4.2.3.7?	The second and third sentences of updated HLW PSAR Section 4.3.7.6 state: "In addition, the secondary piping of the concentrate receipt vessel coaxial containment piping will be sloped and routed to the wet process cell. These requirements are considered passive design features." The last bullet of updated HLW PSAR Section 5.6.2 states: "The	The response is acceptable.

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		secondary piping of the concentrate receipt vessel coaxial containment piping will be sloped and routed to the wet process cell." Furthermore, the crosswalk to the SER Conditions of Acceptance for the HLW facility provided in Attachment 5 of CCN 067261 (Contract No. DE-AC27-01RV14136 - 2003 Preliminary Safety Analysis Report Update, 9/30/2003), item #7 states that the appropriate changes to PSAR Sections 4.3.7.6 and 5.6.2 have been made, as committed in response to Question HLW-PSAR-260. The actual slope requirement for coaxial pipe located in HCP- Bulge-00026 and -00027 is 1:20. The slope back to PT for cross facility transfer pipe is also 1:20. The slope values appear on the P&IDs.	
PSAR Update HLW-028	This question dealt with elimination of RRC items. (a) For the attached table of Risk Reduction Class (RRC) items from HLW PSAR, Rev. 0a, where is the documented technical basis and safety evaluation for eliminating them as Important to Safety (ITS) Structures, Systems, and Components (SSCs)? (b) What category of ITS SSCs are the wet process cell sumps, level detection, and ejectors considered (i.e., SDC, SDS, or RRC); and why are these defense in depth items not included in one of the HLW PSAR, Rev. 1, tables (Tables 3A-24, 3A-9, 4A-1, or 4A-2)? (c) Why has the Safety Case Requirement (SCR) record for radiation monitoring been eliminated from Appendix A?	(a) At the time Revision 0 of the PSAR was submitted, the definition of Risk Reduction Class (RRC) had not been approved by the OSR. Accordingly, the responses to several OSR questions on the initial PSAR submittal (e.g., question numbers HLW-PSAR-250, -251, and -252) committed to conduct an ISM Process to re-evaluate previously identified RRC SSCs and to reflect any changes to the list of identified RRC SSCs in the consolidated PSAR update upon approval of ABCN 24590-WTP-ABCN-ESH-01-029, Rev. 1. Sumps are not considered to be RRC, and they should not be listed in Table 3A-9. Removal of the PSAR references to RRC sumps, level detection, sump liner, and sump ejector is listed in Attachment 1 to 24590-WTP-SE-ENS-03-095, Rev. 0, page 17. The driver for removal of RRC sumps from Sections 3.3.3.2 and 3.3.3.6 of the HLW PSAR is the responses to OSR comments which were implemented by 24590-WTP-SE-ENS-03-184. As	The response is acceptable. Changes will be incorporated into the PSAR through the ABAR process. Changes will be made in the next PSAR update.

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		noted in Change 2 of the "Description of design change" section of 24590-WTP-SE-ENS-03-184, Rev. 1, the list of RRC items in HLW PSAR Table 3-9 (now labeled Table 3A-9 in the Updated PSAR) has been revised in accordance with OSR comment responses HLW-PSAR-250, -251, and -252, and the ISM meeting documented in CCN 043747. (b) The wet process cell sumps, level detection, sump liner, and sump ejector are not classified as ITS, partly on the above basis and they are not credited as ITS controls in the DBE analysis for vessel spills. Calculation 24590-HLW-U4C-U78T-00001, Rev. D, Design Basis Event-HLW Liquid Spills, identifies, as one of the defense-in-depth barriers, that the wet process cell sump is provided with level detection and steam ejector to eventually remove the spilled liquid from the cell. Since the sump boundary is part of the cell structure, the confinement safety function of the SDC wet process cell includes the sump boundary (first item in updated HLW PSAR Table 4A 1). (c) The identification of an inconsistency between the PSAR tables and Appendix A is correct. The procedure for making changes to SIPD is to hold the ISM meetings and then to update SIPD. Only after SIPD has been updated and approved is the ABAR submitted. When the SER for the ABAR is received, the PSAR is revised. The controls identified in Table 3A-24 and Table 4A-2 related to the cooling water loop radiation monitoring are being eliminated per ABAR 24590-WTP-SE-ENS-03-059, which has not yet been submitted to OSR. However, the necessary SIPD changes have been identified and they are now included in Appendix A as approved changes in SIPD. However, release of the applicable design drawings will require approval of the ABAR.	

Question No.	ORP Question	Contractor Response	ORP Disposition
		Submission of ABAR 24590-WTP-SE-ENS-03-059 has been delayed several times, so it has taken longer to process than normal. This has resulted in an inconsistency between Appendix A and the PSAR. This inconsistency will be eliminated once the ABAR is completed. A December 2003 submittal date is forecast.	
PSAR Update HLW-029	This question dealt with protection of the vessel headspace. (a) What is the change in headspace volume being protected for the (1) concentrate receipt vessel and (2) the wash and drains vessel and how does this affect time to LFL? Is the space being protected by the overflow lines resulting in an adequate time to LFL? (b) What is the size of the overflow line and what is the size of the inflow line? Are the overflow lines sufficiently larger than the inflow lines to ensure the headspace is adequately protected? How much fluid head above the overflow line will occur under steady state conditions are achieved and will this head significantly diminish the time to LFL?	(a) and (b) The approved design addressed in PSAR, as clarified by PSAR revision 0 questions HLW-PSAR-051, HLW-PSAR-098, HLW-PSAR-189, and HLW-PSAR-190 indicated that the HCP and RLD vessel High-High Interlock was only relied on for overflow projection which is SDS. The protection of the headspace for these vessels was based on the overflow. Specifically HLW-PSAR-098 indicated that: "High-High liquid level interlocks are used in the HLW facility to control three distinct accident scenarios, H2 deflagrations, overflows, and offgas releases. For vessels with a small headspace (HFP-VSL-00002, HFPVSL-00001), the High-High interlock is used to protect the time to LFL assumptions. For the remaining H2 vessels of concern (RLDVSL-00008, HCP-VSL-00001, HCP-VSL-00002), the overflow line protects the headspace assumptions. The PSAR incorrectly merged these safety functions among the SL-1/SL-2 dose consequence producing vessels." Thus the original approval was based on the overflow providing the required protection for the HCP and RLD vessels, rather than the High-High Level interlock. The volume changes in the vessels are summarized in the table below. There has been a decrease in the headspace, however, there is still sufficient headspace to allow the credited hydrogen preventative controls to preclude this event. Note, the headspace in these	The response is acceptable. Changes will be made in the next PSAR update.

Question No.	ORP Question	Contractor Response	ORP Disposition
		tanks is large (i.e., 2000 to 3000 gallons). This headspace is sufficient to allow the effective implementation of the preventative measures for hydrogen mitigation before the hydrogen concentrations exceed the LFL. The overflow and hydrogen mitigation DBE calculations associated with Revision 1 of the PSAR reflect the current headspace volume, which verifies the acceptability of this design. Responses to the PSAR questions that discuss the High-high interlock function and classification for the Concentrate Receipt vessels and Plant Wash and Drains vessel are attached (for convenience). The responses to these questions were incorrectly implemented in the revision 1 PSAR and will be corrected by the next annual PSAR Update. Attached is a table of the vessel volumes for HCP-VSL-00001, HCP-VSL-00002, and RLD-VSL-00008. Also included in this table are the inlet line sizes and overflow line sizes for the vessels. The flow rate of the feed into the HCP vessels is also given. The HCP volumes are from 24590-HLW-M6C-HCP-00001 and the RLD vessel volumes are from 24590-HLW-M6C-RLD-00005. The flow rates are from V&ID 24590-HLW-M5-V17T-00001. ABAR 24590-WTP-ABAR-ENS-03-004 and the associated safety evaluation 24590-WTP-SE-ENS-03-031 discuss the vessel volume changes to the HCP vessels. This ABAR and safety evaluation also address changes to the headspace volume. 24590-WTP-ABCN-ENS-02-033 and safety evaluation 24590-WTP-SE-ENS-02-042 address vessel volume changes to RLD-VSL-00008. The safety evaluation also addresses the change to the headspace volume. Additionally, CCN: 067260 identifies the calculation of the hydrogen generation rates and times to LFL as a delayed item.	

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update HLW-030	This question dealt with differences between an ABAR and a DBE calculation. (a) What is the technical/design basis for ABAR 24590-WTP-SE-ENS-03-731 and why isn't it supported by the associated DBE calculation (Calc. No. 24590-HLW-Z0C-HOP-00001, Revision C)? (b) On what basis is BNI confident that this discrepancy between the DBE calculation and the PSAR description is an isolated occurrence?	(a) As discussed in ABAR 24590-WTP-SE-ENS- 03-731, the automatic switch from the on-line HEPA filters to the standby HEPA filters is being changed to an operator action. This change was incorporated in the annual update to the High Level Waste Facility Preliminary Safety Analysis Report (PSAR). To support this change, references to the automatic switch to the standby HEPA filters were deleted from the HLW melter offgas design basis event calculation (24590-HLW-Z0C-H0P-00001, Rev. C). However, references to the automatic switch were overlooked in Sections 7.4.4.2 and 7.4.6 of the calculation. These references to the automatic switch will be deleted in the next revision of the design basis event calculation. This has been documented in CCN: 072542. The DBE was completed assuming the manual switch from the on-line HEPA filters to the standby HEPA filters. The technical basis for the change is presented in ABAR 24590-WTP-SE-ENS-03-731. (b) The procedures that are currently in place are intended to minimize such errors. However, there is always the potential for errors of this type (essentially editorial in nature) to occur. The DBE analysis results and the PSAR do both reflect the manual switch. It was the reference to the automatic switch that was overlooked in Sections 7.4.4.2 and 7.4.6 of the calculation. Note: The mitigated consequences credit the C5 ventilation system as the selected control strategy.	The response is acceptable. Calculation 24590-HLW-Z0C-HOP-00001 should be changed to state that the mitigation is being provided by the C5 system in which case the difference of the manual switchover vs. automatic for the Off Gas System is a moot point.
PSAR Update HLW-031	This question dealt with ABCN changes not being made in the PSAR. (a) Why wasn't the first sentence of PSAR Section 2.4.11.1.5 revised in accordance with ABCN 24590-WTP-ABCN-ENS-02-023? b)	(a) PSAR Section 2.4.11.1.5 will be modified to reflect the changes in 24590-WTP-ABCN-ENS-02-023. (b) PSAR Section 2.4.12.1.5 will be modified to	The response is acceptable. Changes will be made in the next PSAR update.

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	Why wasn't the density measurement identified for the HEMEs in PSAR Section 2.4.12.1.5 deleted in accordance with ABCN 24590-WTP-ABCN-ENS-02-023? c) Why were the second and third sentences of PSAR Section 2.5.3.2.3 ("Offgas passing through the SBS will have part of the NOx removed. NOx removal will be completed in the SCR.") not included in accordance with ABCN 24590-WTP-ABCN-ENS-02-023? Also, why weren't the bullets after the sixth paragraph of this section revised in accordance with ABCN 24590-WTP-ABCN-ENS-02-023?	reflect the changes in 24590-WTP-ABCN-ENS-02-023. (c) PSAR Section 2.5.3.2.3 changes attributable to 24590-WTP-ABCN-ENS-02-023 were superceded by the incorporation of 24590-WTP-SE-ENS-03-033. The revisions identified for items (a) and (b) above will be made in the next annual PSAR update.	
PSAR Update HLW-032	This question dealt with seismic analysis of SSCs. (a) In view of the significantly higher acceleration responses observed at many modal locations, especially at nodes representing steel structural components (i.e., high than the weighted average acceleration values provided by BNI San Francisco to BNI Richland for use as input to R0 GTSTRUDL model), what is the justification for using such weighted average values to calculate the design forces (moments, shears, axial forces, etc.) in (1) steel structural components, (2) anchors of steel structural components to concrete, and (3) concrete structural components in the vicinity of the steel-concrete interfaces? If the above is not justified, what method will be used to determine these design forces? Please describe in detail. (b) In view of the significant multimode response of the steel structural components observed in the SASSI analysis results, what is the justification of using equivalent static acceleration values provided by BNI San Francisco for designing (1) steel structural components, (2) anchors of steel structural components to concrete, and (3) concrete structural	For SC-1 and SC-2 primary building structural components (which are modeled in SASSI), the Contractor commits to using a time-history or a response spectrum analysis method to calculate the design basis seismic loads for the steel structural components, anchors of steel structural components, and concrete structural components to ensure that the multi-mode response effects are accounted for. Before any other method is used, the Contractor must perform and document a safety evaluation justifying the method. Although this new COA was identified during the review of the HLW PSAR, the issue also applies to the design of the PT facility, and therefore the COA also applies to PT.	The response is acceptable. A COA (new COA # 2 under Section 6.1, HLW Facility Description) was identified for this action.

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	components in the vicinity of the steel-concrete interfaces? If the above is not justified, what method will be used to account for the multimode response of the steel structural components? Please describe in detail. (c) Since the present R0 GTSTRUDL model is not refined enough for determining design loads (moments, shears, etc.) for the floor slabs subjected to vertical seismic motion (and other vertical loads), what model and/or method will be used to determine these design loads? Please describe in detail.		
PSAR Update HLW-033	This question dealt with overflows in the HLW facility. (a) Where in the HLW PSAR and supporting calculation is the event involving the leak of demineralized water from the cooling jacket/coil to the SBS condensate vessel with appropriate control strategies, including stopping the flow of cooling water, as required in the SER, Condition of Acceptance 4.2.2.3 and as committed to in BNI's response to Question HLW-PSAR-127? (b) What is intent of the statement in HLW PSAR Volume IV, Rev. 1, Section 3.4.1.2 that "the controls are universally applied to all initiators of the overflow event in the HLW facility." (c) Why didn't BNI revise calculation 24590-HLW-Z0C-H01T-00002 to address that only a single pressure boundary exists between the cooling water and the process fluids in the vessels, as required in the SER, Condition of Acceptance 4.2.2.3 and as committed to in BNI's response to Question HLW-PSAR-127? (d) What are the indicators, alarms, administrative controls, etc. that implement Assumption 6.2.9 of Calculation 24590-HLW-Z0C-H01T-00002?	(a) The leak in the cooling coil/jacket for the SBS condensate vessel is addressed in CSD-HHOP/N0023 in Appendix A. Section 3.4.1.2.1.6, item 4 High-high Interlock, states in the second paragraph that "the high-high interlock must automatically isolate incoming flow, and trip all feeds." This is intended to include this inadvertent feed from the cooling water system. It is specifically described in CSD-HHOP/N0023. (Any inconsistencies between CSD control strategies and the SCRs will be resolved consistent with this response at the next annual PSAR update.) (b) The statement that "the controls are universally applied to all initiators of the overflow event in the HLW facility" applies to large vessels with overflow and indicates that: - The controls developed would be applicable to the vessels identified in Section 3.4.1.2 of the PSAR. - The controls being addressed are specified in Section 3.4.1.2.1.5 of the PSAR. - However, the controls identifying "Vessel overflow lines provide pathway to other vessel or sump" as a control would not be applicable to the SBS Condensate Vessel. This is a closed system and is	The response is acceptable. Changes will be made in the next PSAR update. Calculation 24590-HLW-Z0C-H01T-00002 will be revised (at the next calculation revision) to state that the analysis bounds events associated with cooling system leaks and that no credit is taken in the analysis for multiple pressure boundaries in the cooling systems.

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		addressed in CSD-HHOP/N0023 and the associated ISM evaluations. (c) Consequences to the CLW are SL-3 and to the Public are SL-4. As required per 24590-WTP-GPP-SANA-002, the event was reviewed and determined to be bounded by the overflow of the HCP vessels. The controls selected to prevent the event are identified in SIPD (see Appendix A). Given an overflow event, the controls identified in Table 8-1 of the calculation are applicable to all bounded events for those events requiring ITS controls. Calculation 24590-HLW-Z0C-H01T- 00002 will be revised (at the next calculation revision) to state that the analysis bounds events associated with cooling system leaks. Additionally, no credit is taken in the analysis for multiple pressure boundaries in the cooling systems. (d) The specific details of the indicators, alarms, and administrative controls, etc. that implement the Assumption 6.2.9 are still being developed. SIPD and Chapters 4 (Section 4.4.4.) and 5 (Section 5.5.13.9 and Table 5A-1 [for overflows and ensuring adequate flow through the SBS]) of the PSAR provide criteria for this implementation. The detailed indicators and alarms will be developed as part of the continuing control system design and software specification development for the controls system and during the implementation of the ISM for the identification of the control and monitoring system. The administrative controls associated with overflows will be developed as part of the control identification process and the development of the Conduct of Operations manual and implementing procedures.	
PSAR Update HLW-034	This question dealt with completion of COA 4.2.2, Item 6 from review of PSAR Rev. 0. Why didn't BNI	The revised calculation does address the volumes of flush water from PTF as well as from HLW.	The response is acceptable.

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	revise Calculation 24590-HLW-Z0C-H01T-00002, Assumption 6.2.6 as committed to in the response to item b) of Question HLW-PSAR-188, consistent with SER Condition of Acceptance 4.2.2.6?	However, the quantity of material, approximately 250 gallons of HLW normal flush water, is not significant when compared to 18,000 gallons of waste feed. The calculation does address the worst case overflow event that bounds the consequences from all other HLW in-facility mistransfer events. The overflow is identified as an "anticipated event" which would encompass human error. The high-high liquid level interlock is identified as ITS. The controls identified will prevent (high-high liquid level interlock) and mitigate (C5 ventilation system) any releases associated with the event.	
PSAR Update HLW-035	This question dealt with completion of COA 4.2.2, Item 7 from review of PSAR Rev. 0. (a) Where in the HLW PSAR and calculation 24590-HLW-Z0C-W14T-00017 is the sensitivity study comparing respirable releases from a crack to an orifice addressed, as committed to in response to item a) of Question HLW-PSAR-128 and consistent with Condition of Acceptance 4.2.2.7? (b) Why are different vessel numbers addressed in calculation 24590-HLW-Z0C-W14T-00017 (HCP-VSL-00001 and HCP-VSL-00002) than those addressed in PSAR Section 3.4.1.3, Design Basis Event: Spray Leak in Transfer Line to V31001/V31002 Feed Receipt Vessels? (c) If the vessel numbers in the PSAR or calculation 24590-HLW-Z0C-W14T-00017 are incorrect, on what basis does BNI conclude that this is an isolated occurrence?	(a) At the time the calculation was submitted for approval, the assessment of the crack vs. orifice was in internal review. The assessment is documented in CCN 048412. The assessment concluded that given a crack with the same width as the orifice diameter, and adjusting for pressure changes, the orifice results in a larger respirable release. The CCN will be revised to incorporate the methodology discussed in Rev. 1 of NUREG-0800, Section 3.6.1. This will include the development of a slit/crack for a moderate energy system in a 2" diameter pipe for comparison to the orifice aerosol release. Based on preliminary results, the 2" diameter pipe crack is shorter and slightly wider than the slit/crack characterized in the memo. Assuming the quantity of material released is proportional to the length of the crack the analyzed release in the memo would bound the NUREG-0800 based results. The revised CCN will be incorporated into the next revision of the facility specific severity level calculations. (b) and (c) The vessel names and numbers are correctly identified in the DBE calculation but the PSAR requires revision. The	The response is acceptable. Changes will be made in the next PSAR update. CCN 048412 (which documents the assessment to compare respirable releases from a crack to an orifice) will be changed to incorporate the methodology discussed in Rev. 1 of NUREG-0800, Section 3.6.1 and to incorporate the revised CCN in the next revision of the facility severity level calculations. Vessel number discrepancies

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		calculation title shown in the PSAR text was the title used for Revision A. Because vessel numbers have changed (and the potential for future changes also exists), the DBE calculation title was changed. These corrections will be incorporated for the next annual PSAR update.	between Calculation 24590-HLW-Z0C-H01T-00002 and the PSAR will also be changed in the next PSAR update.
PSAR Update HLW-036	This question dealt with completion of COA 4.2.3, Item 9 from review of PSAR Rev. 0. (a) Why didn't BNI revise HLW PSAR Section 3.4.1.2 and Tables 4A 1 and 4A 2, as committed to in the response to Question HLW PSAR-190 and consistent with SER Condition of Acceptance 4.2.3.9? (b) Why does CSD-HHFP/N0019 list as a control strategy element "headspace protection is provided by the vessel overflow, which provides an alternate path for hydrogen purge" and not the high-high liquid level interlocks for the melter feed and melter feed prep vessels?	(a) The revisions to the PSAR text and Tables were not completed as indicated. Revisions to the PSAR will be completed such that the PSAR reflects the design. It should be noted, however, that there is currently an ABAR with DOE for review and approval which addresses these changes. ABAR 24590-WTP-SE-ENS-03-161 proposes changing the high-high liquid level interlock from SDC to SDS. This ABAR also includes changes to RLD and HCP vessels that were not previously implemented. The passive vessel overflow line will then be credited as an ITS SDC SSC to maintain the required headspace. The high-high liquid level interlock retains the ITS SDS control to prevent the occurrence of vessel overflows. When approved, the changes indicated in the ABAR will be implemented. (b) CSD-HHFP/N0019 lists as a control strategy element "headspace protection is provided by the vessel overflow, which provides an alternate path for hydrogen purge" and does not list the high-high level interlocks for the melter feed and melter feed prep vessels for this function. This occurred because the SIPD change process is designed to update and approve SIPD prior to submitting the ABAR. Therefore, SIPD and the PSAR can be out of sync until the ABAR is approved and the PSAR changes are implemented.	The response is acceptable. The ABAR was reviewed and approved by ORP. The BNI response is consistent with the approval of the ABAR. Changes will be made in the next PSAR update.

DISPOSITION OF BOF QUESTIONS FROM PSAR UPDATE REVIEW

Question No.	ORP Question	Contractor Response	ORP Disposition
PSAR Update BOF-001	This question dealt with use of IEEE standards for ITS ductbanks. Why aren't IEEE Standards 384, 628, 690, and 338 included as implementing standards in Section 4.4.4.3 of the updated (Rev. 1) BOF PSAR?	IEEE Standards 338, 384, 628, 690, among others are listed in Section 4.3.1.3 of the BOF PSAR for the ITS switchgear. In addition to the ITS switchgear, these standards were meant to apply to all SDC/SDS electrical SSCs making up, or in direct support of, the SDC electrical distribution system. The ductbank Section 4.4.4.3 was meant to address the structural elements of the ductbank. As clarification, the following standards will be added to the specified sections of the BOF PSAR in the next update: IEEE Std 628, as tailored in the SRD for the WTP project, pertains to the design of the SDS duct bank or raceway and will be added to Section 4.4.4.3 of the BOF PSAR. IEEE Std 384, as tailored in the SRD for the WTP project; and IEEE Std 690 pertain to the SDC cable and will be added to Section 4.3.4.3 of the BOF PSAR. IEEE Std 338, as tailored in the SRD for the WTP project, is applicable to all class 1E electrical systems and is listed in Section 4.3.1.3 as the main component of the SDC electrical distribution system with the intention that it applies to all sub components of the electrical distribution system.	The response is acceptable because it will clarify the applicability of the IEEE standards to the electrical design, construction, installation, and testing aspects of the ITS ductbank Changes will be incorporated in the next PSAR update.
PSAR Update BOF-002	This question dealt with design of berm areas to control nitric acid or sodium nitrite. (a) What value of the berm surface area will the design actually provide, for margin from the requirements of SRD SC 2.0-2? (b) What value of the tank internal diameter will the final design actually provide, for margin from the requirements of SRD SC 2.0-2? (c) What procedures or other mechanisms exist to ensure that the design includes the intended margin?	(a) and (b) - The design of the wet chemical storage facility will be done as a design/build subcontract, and is not completed. Therefore, the actual berm area and tank diameters have not been determined. The use of conservative design margin is included in the design of the berm and tanks themselves, to ensure that they perform their containment function. The dimensional requirements are readily verifiable and can be assured by accounting for fabrication/construction tolerances,	The response is acceptable on the basis that the ISM process will be relied upon to ensure an adequate margin of safety and the RL/REG-97-13 process will be used

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		corrosion allowance, etc. The vendor design will be reviewed by the ISM team, to ensure that an appropriate safety margin is provided. (c) - The ISM process and performance of accident analysis as prescribed in project procedures such as 24590-WTP-GPP-SANA-002 *Hazard Analysis, Development of Hazard Control Strategies, and Identification of Standards* and 24590-WTP-SANA-001, *Accident Analysis*, ensure intended margin is maintained.	to review the design change when it is completed.