

**Black Cell Review Recommendations and Open Items - CLOSURE PLAN**

| Report No. | RITS No. | Recommendation / Open Item   | BNI Lead                 | ORP Lead (Notes 1 and 2)              | Closure Plan   | Deliverable  | Closure Date | Minimum ORP Closure Verification  |
|------------|----------|--|--------------------------|---------------------------------------|--|--|--------------|---|
| R-1        | 04-166   | <p>BNI should prepare a procedure (or design guide) that completely defines the process conditions and materials selection process. This procedure should describe the process from the preparation of the material balance through the preparation of the corrosion evaluation report. BNI should reevaluate the process conditions and material selection process as part of the upcoming revision of the material balance (March 2004) to ensure:</p> <p>a. Documentation of the tracability of all chemical species from the WTP Contract requirements through the Corrosion Evaluation.</p> <p>b. Normal and bounding conditions are identified for the process chemistry.</p> <p>c. Normal and off-normal expected operational conditions are identified.</p> <p>d. A clear rationale for the material selection is documented.</p> <p>e. Wear allowance associated with both corrosion and erosion are separately identified.</p> <p>[LOI 1.1, 3.3, 3.4 ]<br/>[OI-10, 18, 20, 21, 22, 24]</p> | Duncan / Obenauer / Vail | Hamel [Holton, Miller, Brasel, Hamel] | <ol style="list-style-type: none"> <li>1. Prepare material selection design guide (2/6/04A)</li> <li>2. Revise Design Guide on Preparation of Corrosion Evaluations (3/8/04A)</li> <li>3. Prepare integrated mass balance calculation that includes bounding conditions (4/2/04A)</li> <li>4. Issue draft corrosion evaluations using new design guides and meet with DOE to ensure that design guide meets needs (4/15/04A)</li> <li>5. Update PCDSs</li> <li>6. Update CEs and reconcile with vessels, piping.. procurement</li> <li>7. Blue Ribbon Panel Review</li> </ol> <p>Note: Preliminary assessment indicates no change in materials</p> | <ol style="list-style-type: none"> <li>1. Material Selection Design Guide</li> <li>2. Updated Design Guide on Preparation of CE's</li> <li>3. Integrated Mass Balance Calculation</li> <li>4. Updated PCDSs</li> <li>5. Updated CEs</li> <li>6. Blue Ribbon Panel Report Out</li> <li>7. RITS closure</li> </ol> | 6/30/04      | <ol style="list-style-type: none"> <li>1. Review and comment on preliminary BNI assessment of the ORP concerns and recommendations from the black cell review that concluded no immediate action was required to address those concerns other than develop the response plan contained in this table.(Complete)</li> <li>2. Review and comment on Material Selection Guide and Design Guide on Preparation of Corrosion Evaluations</li> <li>3. Review and comment on integrated mass balance calculation.</li> <li>4. Review every corrosion evaluation prepared for black cell vessels and piping including the revised PCDSs. Confirm that the material of attached piping and components is consistent with the vessel material. This latter effort will be coordinated with the piping classification review, item R-5.</li> <li>5. Review and comment on the Blue Ribbon Panel report.</li> <li>6. Prepare ORP response and conclusion on closure of this item</li> </ol>       |
| R-2        | 04-169   | <p>BNI should re-assess the technical basis for the erosion wear rates to determine if they are adequate and document this reassessment. BNI should determine if waste processing in WTP has the potential for increasing the erosion potential of the waste.</p> <p>[LOI 3.5]<br/>[OI-17, 19, 20, 22, 23]</p>   | Duncan / Vail / Rangus   | Hamel [Holton, Miller, Brasel]        | <ol style="list-style-type: none"> <li>1. Assess adequacy of erosion wear rules               <ol style="list-style-type: none"> <li>1a. Collect additional information from CHG regarding the basis for corrosion/erosion allowance (3/11/04A)</li> <li>1b. Collect additional information from Tank Farms regarding the hardness of compounds present in solids (3/19/04A)</li> </ol> </li> <li>2. Evaluate production of erosive products in process stream</li> </ol>  | <ol style="list-style-type: none"> <li>1. Respond in letter if no new information that impacts design is available<br/>Incorporate into R1 products as appropriate</li> <li>2. Revised calculation, if needed</li> <li>3. RITS closure</li> </ol>  | 4/30/04      | <ol style="list-style-type: none"> <li>1. ORP expects that BNI will review and revise, if needed, the calculation developing the erosion wear rules (i.e., the rules applied to ensure adequate wear allowances are specified) so that these rules are traceable to supporting documentation. ORP will review the calculation to ensure that the bases for the erosion wear rates are defensible, sufficient and complete.</li> <li>2. Verify that the waste feed hardness properties used by BNI in erosion evaluations are representative of tank farm waste information provided to BNI.</li> <li>3. Verify that BNI has evaluated appropriately the erosivity of the process waste streams.</li> <li>4. Validate that the Corrosion Evaluations have been adequately updated to account for erosion.</li> <li>5. Review the need for modifications to the design required to accommodate erosion.</li> <li>6. Prepare conclusion and reponses on closure of this item.</li> </ol> |

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| R-3        | 04-170   | BNI should develop design guidance on redundancy and spares and re-assess the current black cell design against that guidance to determine if additional redundancy or spares should be provided. Design features resulting in single or common mode failures of the process system should be addressed. This assessment should be documented and justified. [LOI 3.12, 3.13, 3.17] | Duncan / Hoffmann / Eichorn | Hamel [Holton, Miller, Brasel] | <ol style="list-style-type: none"> <li>1. Put criteria for redundancy and spares in BOD.</li> <li>2. Identify where only one flow path in process exists and communicate to DOE for further direction (4/15/04A)</li> <li>3. Provide GAP analysis between design and criteria in letter</li> <li>4. Address common mode failures in letter</li> </ol>   | <ol style="list-style-type: none"> <li>1. BODCN</li> <li>2. Letter to DOE</li> <li>3. RITS closure</li> </ol> | 5/17/04      | <ol style="list-style-type: none"> <li>1. ORP expects that BNI will develop and apply criteria on redundancy and spares for the process and equipment design. ORP will verify that the updated guidance is clear, comprehensive and appropriate.</li> <li>2. Verify that sufficient reviews have been performed to establish if additional redundancy or spares should be provided in the WTP facilities.</li> <li>3. Evaluate information regarding single flow path and determine if additional redundancy or spares are desired.</li> <li>4. Prepare conclusions and response for closure of this item.</li> </ol> |
| R-4        | 04-172   | BNI should evaluate the feasibility of modifying existing black cell openings such as HVAC or construction openings for future access to support unforeseen maintenance [LOI 3.8] [OI-12]   | Braccia / Petrusha          | Treadwell / Hamel [Treadwell]  | <p>Establish task team (complete) to prepare white paper that:</p> <ol style="list-style-type: none"> <li>1. Identifies all existing access openings to black cells (4/20/04A)</li> <li>2. Receives DOE criteria for size and location of openings (eg. three foot opening in current construction opening) (2/19/04A)</li> <li>3. Evaluates feasibility of modifying them</li> <li>4. Provides cost / schedule impact (ROM)</li> </ol> | <ol style="list-style-type: none"> <li>1. Report</li> <li>2. Trend</li> <li>3. RITS closure</li> </ol>        | 5/31/04      | <ol style="list-style-type: none"> <li>1. Develop criteria for size and location of openings</li> <li>2. Review and comment on BNI report and identify where BNI should develop Trends for modifications to provide these access openings.</li> <li>3. Evaluate and provide recommendations on Trends.</li> </ol>   |

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| R-5        | 04-171   | BNI should establish design process “rules” for consistently and explicitly ensuring that black cell requirements are implemented that:<br>a. Identify black cell boundaries on primary drawings and documents.<br>b. Identify black cell requirements on physical fabrication and construction drawings, and collateral databases.<br>c. Identify black cell requirement in procurement specifications and datasheets.<br>d. Establish and document the requirements for black cell HVAC systems and components.<br>[LOI 3.2, 7.2]   | Duncan / Roth / Myatt / Hoffmann | Treadwell [Adams]        | Establish task team of Mechanical and Plant Design (Complete) to:<br>1. Document Black Cell boundaries in BOD<br>2. Determine where there is a benefit for documenting Black Cell notation on design documents (4/15/04A)<br>3. Document rules in a design guide / checklist for clearly documenting black cell requirements on design deliverables and procurement documents<br>4. Assess pipe released for fabrication and determine schedule for documents that require update.<br>5. Address black cell HVAC requirements | 1. BODCN<br>2. Design guide / checklist for black cell requirements<br>3. RITS closure        | 4/30/04      | 1. It is expected that once BNI has established guidelines for documenting black cell boundaries and documentation has been updated that BNI will perform a review to ensure that all components located within a black cell have been appropriately identified in the design output documents, e.g., piping lists, specifications, procurement documents, inspection requirements.<br>2. ORP will review and comment on the BNI guidelines for documenting black cell boundaries to ensure that they are comprehensive and will minimize the potential for failure to identify and correctly specify a black cell component.<br>3. ORP will review the results of the BNI review of conformance with the guidelines and confirmation that no component has been missed.<br>4. Prepare conclusions and response to close this item.   |
| OI-1       | 04-228   | BNI should continue to inform ORP on their progress in development of the AUT method. BNI should address the concerns identified in LOI 7.4.<br>a. BNI intends to demonstrate that the proposed AUT method will have the capability to detect all the required weld imperfections at the detection levels specified for RT in Table 341.3.2 of B31.3 versus the less stringent criteria specified in Section 344.6.2 of B31.3. While this is not a specific B31.3 Code requirement, the Team believes this would provide increased confidence in the integrity of the welds for the 40 year plant design life. It also understood that the requirements of ASME Section V, Article 4 will be met. [LOI 7.4]<br><br>b. BNI intends to consider the requirements added by the 2002 addendum to Section V, in Article 4, Subarticle T-421.1 for the examination of austenitic stainless steel welds and its' applicability to this project. It is the Oversight Teams understanding that BNI will also evaluate complying with the non-mandatory Appendix E to Article 4, Section V, ASME for the Computerized | Petrusha / Vail / Rangus         | Treadwell [Adams]        | 1. Prepare plan and schedule for program, procedures and qualification of AUT method and personnel.<br>2. Award AUT subcontract (3/16/04A)<br>3. Mobilize AUT subcontract at site<br>4. Confirm V&V of AUT software<br>5. Prepare AUT test plan<br>6. Perform AUT demonstration<br>7. Issue report on AUT demonstration   | 1. Qualification plan and schedule<br>2. Test procedures<br>3. Test report<br>4. RITS closure | 7/29/04      | 1. Confirm that BNI has demonstrated that the proposed AUT method will have the capacity to detect the required weld imperfections that could lead to through wall leaks and meet the detection levels specified for RT in Table 341.3.2 of ASME B31.3 versus the less stringent criteria specified in Section 344.6.2 of ASME B31.3. Review the BNI procedures that implement AUT and observe the demonstration of the ability of AUT to consistently and reproducibly detect flaws that are rejectable using RT.<br>2. Verify that BNI is complying with the 2002 Addendum to ASME Code, Section V, Article 4, Sub-article T-421.1 for the examination of austenitic stainless steel welds and its applicability to WTP by reviewing the procedures(s) which implement AUT.<br>3. Evaluate “compliance” with the non-mandatory Appendix E to Article 4, Section V, ASME Code for the Computerized Imaging Techniques by confirming completion of AUT V&V. Confirm BNI has invoked the requirements of NQA-1 for software V&V. If BNI does not fully satisfy NQA-1 for software V&V, then confirm that an ABAR is being processed. |

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| OI-1<br>Cont. | 04-228<br>Cont. |  |          |                                |   |   |              | <p>4. Review the BNI training plans to train, examine and certify field welding and quality control engineers for performance of AUT examinations and verify that the NQA-1 requirements for independence are being met.</p> <p>5. Confirm that the AUT demonstration can detect the welding imperfections listed in Table A-110 of Section V of the ASME Code, e.g., burn through, cracks, excessive/ inadequate reinforcement, slag/tungsten inclusions, incomplete fusion, incomplete penetration, misalignment, porosity, root concavity and undercut.</p> <p>6. BNI's stated intention is to examine 100% of the Black Cell pressure containing welds. Confirm that there is a plan for engineering review of any pressure containing welds that are not volumetrically examined and what controls are invoked approving such a decision.</p> |
| OI-2          | 04-174          | BNI should document the operating conditions (and limitations) that were identified in the materials selection process for a vessel/component in the System Description for the respective system. The System Description should be placed under configuration control. [LOI 3.16] | Pisarcik | Hamel [Holton, Miller, Brasel] | <p>1. Revise System Description (SD) procedure to add operating conditions and limitations derived from material selection process.</p> <p>2. Describe adequacy of existing SD change control.</p> <p>3. Determine when SD should be placed under CM.</p> | <p>1. Revised SD procedure</p> <p>2. RITS closure</p> | 5/6/04       | <p>1. Confirm that the modification of the System Description procedure captures the operational and other limitations identified in the Corrosion Evaluations.</p> <p>2. Confirm that the operations organization uses the System Descriptions in a manner that ensures development of operating procedures will include these limitations.</p> <p>3. Confirm that the System Descriptions are appropriately controlled under BNI change control.</p> <p>4. Confirm that the System Descriptions have the appropriate priority in the document hierarchy to be up-to-date at testing and commissioning.</p>   |

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| OI-3       | 04-229   | BNI should brief ORP on the development of vacuum box leak testing and obtain ORP concurrence for the proposed usage. BNI should address the suggestions identified in LOI 7.5.   | Petrusha / Vail / Rangus | Treadwell [Adams]         | <ol style="list-style-type: none"> <li>1. Prepare plan and schedule for program, procedures and qualification of Vacuum Box method and personnel.</li> <li>2. Obtain specimens with known leak rates (4/1/04A)</li> <li>3. Fabricate vacuum box prototypes (3/16/04A)</li> <li>4. Issue vacuum box leak test procedure</li> <li>5. Prepare leak test plan</li> <li>6. Perform leak test demonstration</li> <li>7. Issue vacuum box test report</li> <li>8. Issue ABAR and safety evaluation to PSC</li> <li>9. Issue ABAR and safety evaluation to DOE</li> </ol> | <ol style="list-style-type: none"> <li>1. Qualification plan and schedule</li> <li>2. Test procedure and report</li> <li>3. ABAR and Safety Evaluation on Vacuum box test application on WTP</li> <li>4. RITS closure</li> </ol> | 6/15/04            | 1. Review the ABAR and safety evaluation revising SRD Appendix C.26 and Appendix H to allow use of the vacuum box leak testing. If the information can be obtained, the ABAR should include a comparison discussion of the bases of the ASME B31.3 Code development of hydrostatic and pneumatic test pressure requirements and the bases for the Code specified vacuum box leak test sensitivity of 1E-3 atm-ml/sec. The ability to identify leaks with the vacuum box at the Code specified leak test sensitivity of 1E-3 atm-ml/sec and BNI's planned 7 psig vacuum and 20 second hold time should be compared with the ability of finding leaks at hydrostatic or pneumatic test pressures. The acceptability of utilizing the vacuum box testing when using AUT should be developed in the ABAR since ASME B31.3 allows use of partial AUT or RT in concert with hydrostatic or pneumatic testing. Determine the acceptability of the AUT combined with vacuum box leak testing based on the technical case in the ABAR, a review of the vacuum box leak test procedures and the demo test on known leak rate specimens. |
| OI-4       | 04-196   | BNI should evaluate the permissible configurations for black cell piping related to socket welds, branch connections, welded reinforcement pads and other welded attachments to piping. BNI should evaluate the required nondestructive examination for the permissible configurations. BNI should update Appendix A to shop fabrication and field piping specifications regarding inspection requirement for black cell piping as appropriate. [LOI 3.2, 7.2, 7.4] | Myatt / Vail             | Treadwell [Adams]         | <ol style="list-style-type: none"> <li>1. Identify the permissible configurations for black cell piping</li> <li>2. Determine appropriate NDE for these configurations</li> <li>3. Revise Appendix A weld inspection table accordingly</li> </ol>   | <ol style="list-style-type: none"> <li>1. Issue 24590-WTP-3PN-PS02-00018</li> <li>2. RITS closure</li> </ol>   | 4/2/2004<br>Closed | Review 24590-WTP-3PN-PS02-00018 and Appendix A, Weld Inspection Table, revisions addressing shop fabrication and field piping specifications for permissible socket weld, branch connections, welded reinforcement pads and other welded attachments to piping including the specified NDE for these configurations to confirm that it is consistent with the ASME B31.3 Code requirements.   |
| OI-5       | 04-209   | BNI should evaluate the air flow balance interaction of the Pretreatment Vessel Vent Process system with the vessel overflow system (PWD). [LOI 3.2]  | R. Smith / Julyk         | Shrader / Hamel [Ballweg] | Perform dynamic analysis  | RITS closure   | 5/3/04             | 1. Verify that BNI has adequately addressed the issues associated with the Pretreatment Vessel Vent Process system with the vessel overflow system as identified in LOI 3.2.  |

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| OI-6       | 04-198   | BNI should evaluate the overpressure / vacuum protection for the FRP system including system operational scenarios and equipment failure scenarios to determine the limiting design case. Describe how that was factored into establishing the vacuum design pressure for the FRP vessels, large diameter piping and other devices connected to the vessel vent header and system. [LOI 3.2]   | Duncan / Hoffmann / Slater | Shrader / Hamel [Ballweg]   | Check vessel design basis for absolute vacuum and review design provisions for vacuum conditions.   | RITS closure   | 5/26/04             | 1. Verify that BNI has adequately addressed the issues associated with the FRP/Pretreatment Vessel Vent Process system with the vessel overflow system as identified in LOI 3.2. This appears to be the closure plan for Open Item 5.   |
| OI-7       | 04-175   | BNI should identify the design pressures basis for lines that may be used for unplugging fluidics components or other components than may become plugged. [LOI 3.2]  | Duncan / Hoffmann          | Shrader / Hamel [Ballweg]   | Provide design pressure and unplugging recovery action  | RITS closure   | 3/26/2004<br>Closed | 1. Review the bases for the design pressures for these lines and confirm that the design pressures are consistent with the design code requirements.  |
| OI-8       | 04-197   | BNI should advise ORP on how independence will be maintained for weld acceptance as required by NQA-1. [LOI 7.4]   | Petrusha / Esminger        | Thomas [Treadwell]          | Review existing QC program with ORP   | RITS closure   | 4/2/2004<br>Closed  |   |
| OI-9       | 04-207   | BNI should consider relocating the C5V volume dampers in the black cells to a place where they can be physically adjusted in the future or devising volume dampers that can be adjusted from the hot cell side. [LOI 3.2]  | Duncan / Garcia            | Orchard / Shrader [Ballweg] | Evaluate design change to move dampers out of black cells and make them adjustable, and provide rationale to DOE  | RITS closure   | 5/28/04             | 1. ORP concern is that re-balancing of the HVAC flow will be difficult or not possible if required during plant operation due to the inaccessibility of these dampers. ORP will review and evaluate the BNI bases for the decision on the location and adjustability of the dampers in light of this concern.<br>2. Provide recommendation for concurrence of modification of the decision. |
| OI-10      | 04-201   | BNI should provide the engineering rationale for placing stainless steel pipe directly in contact with painted carbon steel support steel (w/o SS shims), using carbon steel bolts, carbon steel U-bolts, within black cells especially at lower levels which may be wetted by the cell wash/spray system or potentially rinsed with nitric acid solution for decontamination. [Reference requirement of 24590-WTP-GPG-ENG-005 Rev 1 item 10, page 42 of 163.] [LOI 3.2] | Myatt / Coutts / Rangus    | Treadwell [Ballweg]         | 1. Identify coating requirements for black cell pipe support systems<br>2. Revise materials / coatings, if required   | 1. Specify black cell coating requirements in coatings table<br>2. Provide direction to engineers and designers<br>3. Revised design, if required<br>4. RITS closure | 4/30/2004<br>Closed | 1. Monitor resolution of these issues and any required modifications of the selected materials or coatings to ensure that the corrosion potential in these dissimilar material interfaces are adequately addressed.<br>2. Ensure that BNI coating requirements appropriately address these conditions in general.   |
| OI-11      | 04-212   | BNI should evaluate the approach for modular construction to ensure that significant deflections that will result from placing concrete and upper levels of steel are anticipated. [LOI 3.2]   | Petrusha / Braccia / Myatt | Treadwell [Ballweg]         | This open item is part of normal design process for future design of piping modules.<br>1. Develop design criteria and approach to address tolerances and deflections for piping modules in PTF. Consider later placement of concrete floors, removal of temporary supports, addition of other modules. | 1. Design criteria and approach to address tolerances and deflections for PTF piping modules<br>2. RITS closure  | 5/17/2004<br>Closed | Confirm that all conditions that could affect the final configuration of the piping module, (e.g., later placement of concrete floors, removal of temporary supports, addition of other modules) are adequately considered in the design requirements documents.  |

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| OI-12      | 04-208   | BNI should conduct a system engineering approach to assign functional requirements to the current Black Cell access openings (e.g. spray wand, camera viewing, shield plugs above separators). [LOI 3.8]   | Braccia / Myatt             | Treadwell / Hamel [Houghton, Ballweg, Barnes, Treadwell] | 1. Identify current black cell access openings (see R-4)<br>2. Add access functional requirement in BODCN if directed by DOE                           | 1. Trend<br>2. BODCN<br>3. RITS closure | 6/15/04             | -ORP will review and approve necessary changes to the BOD.   |
| OI-13      | 04-200   | BNI should evaluate the inclusion and formal documentation of thrust loading/fatigue in the design of the vessels. [LOI 5.2]   | Duncan / Slater             | Treadwell [Ballweg]                                      | Document the process of inclusion of thrust loading/fatigue in vessel design   | RITS closure                            | 5/31/04             | 1. ORP expects that thrust loadings and fatigue are considerations in the vessel and piping design, required in procurement specifications and included in the documented design analyses for these components.<br>2. ORP will review the documentation for the black cell vessels and attached piping to confirm that these loads have been appropriately considered in the design. |
| OI-14      | 04-192   | Due to the importance of items and/or materials destined for black cells, BNI should evaluate using independent testing laboratory services to verify quality requirements of materials and welding have been met. [LOI 5.5]   | Myatt / Oldfather / M Watts | Thomas [Treadwell]                                       | Review existing PMI program for piping with DOE  | RITS closure                            | 3/31/2004<br>Closed | ORP will review the PMI program and evaluate the adequacy for verifying the quality requirements of the materials.   |
| OI-15      | 04-193   | BNI should evaluate the adequacy of the 24590-WTP-3PS-PS02-T-00003 Rev 1, Section 3.6.6, regarding pipe slope and determine if slope verification is adequately addressed for process lines requiring sloping. [LOI 3.2, 7.2]  | Petrusha / Myatt            | Treadwell [Adams]  | Construction to revise procedure to specifically state that pipe slope will be verified.   | 1. Revised procedure<br>2. RITS closure | 3/31/2004<br>Closed | Review revised procedure.  |
| OI-16      | 04-202   | BNI should identify what provisions have been incorporated into breakpot design and the design of other internals to make them sufficiently robust to assure that a forty year service life? Include an evaluation of fluid flashing, impingement or other transients have been considered in the design of these vessels and internals. [LOI 3.2]   | Duncan / Hoffmann           | Gilbert / Shrader [Ballweg]                              | 1. Review breakpot suitability with flashing for 40 year life.<br>2. Describe code required aspect of the design of internals to support 40 year life. | RITS closure                            | 4/30/2004<br>Closed | Confirm that the methods and results of the BNI evaluation support a 40 year design life for break pots and other vessel internals.  |
| OI-17      | 04-194   | BNI should evaluate the erosion wear allowance for vessels with PJMs accounts for the higher wear rate of stainless steel when the surface to particle angle is small, [e.g. ~<30 degrees] such as observed during site inspection of the perimeter PJMs in FRP-VSL-00002A/B/C/D. This should be evaluated for all other vessels with PJMs. (WSRC-TR-2001-00156, RPP-WTP Slurry Wear Evaluation Literature Search) [LOI 3.2] | Duncan / Vail               | Hamel [Ballweg, Holton]                                  | Re-iterate how this is accounted for in design.  | RITS closure                            | 3/31/2004<br>Closed | 1. Verify that the methods and results of the BNI evaluation and design support a 40 year life for PJMs that are exposed to high velocities, with particular consideration of erosion wear in the nozzles that are exposed to particles at low impact angles.<br>2. Coordinate this review with that of OI-19.   |

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| OI-18      | 04-204   | BNI should update the MSDS for FRP-VSL-0002A/B/C/D, the PT Waste Feed Receipt Vessels, 24590-PTF-N1D-FRP-00001 Rev 2, to have a minimum solids concentration consistent with the WTP contract value of 3.8 wt%. [LOI 1.1]   | Duncan / Obenauer        | Gilbert / Shrader / Hamel [Miller, Holton] | 1. Update PCDS to align with revised contract and wear calculation (see R-1)<br>2. Preliminary review of information (3/8/04A)  | 1. Updated PCDS<br>2. RITS closure  | 5/7/04              | 1. As part of the closure of R-1, ORP will review all updated PCDS and Corrosion Evaluations for vessels and piping, where available, located in black cells.<br>2. ORP will confirm that the PCDS for PT Waste Feed Receipt Vessel has the appropriate waste concentration specified.   |
| OI-19      | 04-205   | BNI should present the results of the erosion testing (non-Newtonian fluid applications) for the PJM nozzle materials ORP for review and evaluation. The design impacts associated with application of the testing results should be identified. [LOI 3.3, 3.4]   | Duncan / Hoffmann        | Hamel [Holton, Miller, Brasel]             | 1. Conduct corrosion test for PJM inserts (2/26/04A)<br>2. Select material options (2/26/04A)<br>3. Conduct agitator blade erosion tests  | 1. Corrosion test report<br>2. Agitator blade erosion test letter report<br>3. RITS closure | 5/14/04             | 1. Review the results of the corrosion tests and the bases for the selected materials.<br>2. Confirm that the results of the tests and other information support the selection of the materials for PJMs. This Open Item is just to provide test results.<br>3. Coordinate this review with that of OI-17.   |
| OI-20      | 04-233   | BNI should assess the materials selection (corrosion evaluation-24590-PTF-N1D-UFP-0003) for the UFP feed Vessels (UFP-VSL-00002A/B) and other affected vessels based upon the proposed use of these vessels for oxidative leaching of the HLW sludge. These vessels will be used in process operations in which hard precipitates are produced (e.g. MnO <sub>2</sub> ). This assessment should account the procurement and fabrication of the affected vessels. [LOI 3.3, 3.4] | Duncan / Vail / Obenauer | Hamel [Holton, Miller, Brasel]             | Oxidative leaching is not part of the design basis nor required by contract.<br>1. Notify DOE of potential conservatism in erosion and material selection for hard precipitates.<br>2. Erosion precipitates addressed in R-2<br>3. Review preliminary R&T results and estimate impact on material selection of affected vessels | 1. Letter to DOE<br>2. RITS closure   | 5/31/04             | 1. Evaluate potential conservatism in erosion and material selection for hard precipitates in UFP vessels.   |
| OI-21      | 04-206   | BNI should add the information presented in their response to LOI 3.4 on a corrosion assessment under acidic conditions for vessels as appropriate to the respective MSDS's and Corrosion Evaluations. [LOI 3.3, 3.4]   | Duncan / Vail / Obenauer | Hamel [Holton, Miller, Brasel]             | Update PCDS's and CE's for off-normal conditions (see R-1).   | 1. Updated PCDS's and CE's<br>2. RITS closure   | 5/17/04             | 1. As part of the closure of R-2, ORP will review all updated PCDS and Corrosion Evaluations for vessels and piping, where available, located in black cells.<br>2. ORP will confirm that acidic conditions have been appropriately considered in the updated PCDS and CEs. This review will identify and focus on vessels exposed to both acidic and alkaline conditions as part of normal and off-normal operations. |
| OI-22      | 04-199   | BNI should reconcile the discrepancy between the SRD based requirements for corrosion/erosion wear allowance with the erosion "rules" contained in the wear allowance calculation (24590-WTP-M06-50-00004, Rev B). [LOI 3.5]  | Duncan / Vail            | Hamel / Miller [Miller]                    | Submit to PMT an ABAR to align SRD with wear allowance calculation  | 1. ABAR<br>2. RITS closure  | 4/15/2004<br>Closed | 1. Resolution of Item R-2, above, may result in a change to the wear allowance calculation. ORP will ensure that BNI resolution of R-2 and the OI result in consistency in the requirements of the SRD and the design basis calculations.  |

**Black Cell Review Recommendations and Open Items - CLOSURE PLAN**

| Report No.        | RITS No. | Recommendation / Open Item   | BNI Lead                 | ORP Lead (Notes 1 and 2)       | Closure Plan  | Deliverable  | Closure Date        | Minimum ORP Closure Verification  |
|-------------------|----------|--|--------------------------|--------------------------------|---|--|---------------------|---|
| OI-23             | 04-191   | BNI should document the "rules" established for the erosion allowance (24590-WTP-M06-50-00004, Rev B) in a formal design guide. [LOI 3.5]  | Duncan / Hoffmann        | Hamel [Holton, Miller, Brasel] | Revise existing design guides on pipe sizing for erosion rules on maximum velocities  | 1. Revised design guides for erosion rules<br>2. RITS closure                                | 3/24/2004<br>Closed | 1. ORP expects that the revision of the existing design guides will be an outcome of the BNI resolution of item R-2, above. ORP will confirm that the updated wear "rules" are incorporated into the appropriate design guides.   |
| OI-24             | 04-195   | BNI should ensure that Black Cell Vessels have nozzle internals so that fluids entering the tank extend inside the vessel to assure that chemical additions drop freely into the vessel rather than dribble along the vessel wall. This reduces the risk that concentrated chemicals added to the vessel will attack the vessel locally. [LOI 3.2] | Duncan / Slater          | Hamel [Ballweg]                | 1. Review all black cell vessels to assure this good design is implemented, as practicable.<br>2. Revise design and procurement documents accordingly for awarded procurements. All others as scheduled   | 1. Revised design and procurement documents, as required<br>2. RITS closure                  | 3/31/2004<br>Closed | 1. Review the results of the BNI assess of the status of vessel chemical addition penetration design to ensure that the nozzle internals have been specified to have sufficient penetration through the wall to prevent flow down the interior of the vessel wall.<br>2. ORP expects that this is a design feature that should apply to all vessels; not just those in the black cells. ORP will confirm that this is part of the general specification for WTP vessels, as applicable. |
| OI-25             | 04-210   | BNI to advise what provisions are being made to preclude seismic interaction of three vessel applications (TCP-1, TLP-9A&9B and CNP-4) were identified as SC-III items with SC-I items in the black cells. [LOI 3.2]   | R. Smith / Julyk / Lowry | Treadwell [Ballweg]            | Conduct a meeting w/ participants to get concurrence on path forward.<br>1. Conduct ISM / Hazard Topography meeting to evaluate the 3 Cat III vessels for appropriate seismic categorization and impact to Cat I designed equipment and systems in the black cell, as necessary. (4/8/04A)<br>2. Revise design and procurement documents, if required | 1. ISM / Hazard Topography meeting minutes and action items, as necessary<br>2. RITS closure | 4/22/2004<br>Closed | 1. Review the results of the BNI assessment on the seismic classification of the TCP-1, TLP-A&B and CNP-4 vessels to ensure the seismic classification is appropriate.  |
| OI-26             | 04-203   | BNI should evaluate the method of installing, tightening and securing pipe support bolts, u-bolts and other mechanical fasteners to ensure they will remain secure for the entire service life of the facility. [LOI 3.2]  | Myatt                    | Treadwell [Ballweg]            | 1. Review Black Cell connection requirements for piping systems<br>2. Provide written direction to engineers and designers, if required<br>3. Revise design, if required  | 1. Written direction, if required<br>2. Revised design, if required<br>3. RITS closure       | 4/30/2004<br>Closed | Review revised design guidance.   |
| Executive Summary |          | It is suggested that BNI prepare a "Black Cell Management Strategy" that clearly delineates the Design, Operations, and Maintenance Standards for the WTP Black Cells  | Duncan / Roth            | Hamel [Hamel, Naft]            | Add Black Cell requirements and criteria as a new section to the Basis of Design (BOD) rather than a separate stand-alone document  | 1. BODCN<br>2. RITS closure  | 5/17/04             | Review BODCN.   |
|                   |          | <b>Note 1: The original members of the Black Cell Review Team will be consulted for verification of BNI closure actions depending on availability.</b><br><b>Note 2: Names in brackets denote originators of recommendation/open item</b>  |                          |                                |   |  |                     |   |

**Black Cell Review Recommendations and Open Items - CLOSURE PLAN**

| Report No. | RITS No. | Recommendation / Open Item  | BNI Lead | ORP Lead (Notes 1 and 2)          | Closure Plan  | Deliverable           | Closure Date | Minimum ORP Closure Verification  |
|------------|----------|---|----------|-----------------------------------|---|-----------------------|--------------|---|
| DOE-1      | NA       | ORP should evaluate the benefits of providing erosion hardening design features (e.g. PJM nozzle hardeneing and PJM jet wear plates) to the black cell vessels that are expected to be used for the storage of Newtonian fluids to provide future flexibility in waste processing. These tanks include the LAW and HLW fee receipt vessels.<br>[LOI 3.3, 3.4] | NA       | Hamel<br>[Holton, Miller, Brasel] | Perform evaluation  | Documented evaluation | 4/30/04      | NA  |
| DOE-2      | NA       | ORP should evaluate increasing the utilization of Government Acceptance Inspection on field welding performed on black cell piping.<br>[LOI 7.3]  | NA       | Thomas<br>[Treadwell]             | Perform evaluation  | Documented evaluation | 8/1/04       | NA  |
| DOE-3      | NA       | ORP should add to their design oversight schedule an assessment review of BNI's vacuum testing program and AUT implementation.<br>[LOI 7.2, 7.4]  | NA       | Treadwell<br>[Hamel, Treadwell]   | 1. Develop draft AUT/Vacuum Test oversight plan (3/3/04A)<br>2. BNI review comments on plan and schedule input.<br>3. On-site test observation.<br>4. Prepare report. | Technical Report.     | 8/1/04       | The important NDE issues for black cells were identified in detail in the WTP Black Cell Design Adequacy Oversight Report. Elsewhere within this closure plan, DOE has identified the minimum NDE review attributes that are necessary and will be verified for closing the identified items including the AUT and Vacuum Box development plans, procedures and demonstration test. |
| DOE-4      | NA       | ORP should perform a follow-up design oversight that focuses on the resolution of any remaining recommendations and open items from this design oversight, design and construction processes for vessels and components in the WTP Black Cells, and the modular piping sections.  | NA       | Hamel<br>[Hamel]                  | 1. Add follow-up design oversight to ORP design oversight schedule (5/31/04)<br>2. Perform follow-up assessment (TBD)   | Documented evaluation | TBD          | NA  |