

July 29, 2019

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Daina McFadden
Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, WA 99354

Department of Ecology
NWP - Richland

Dear Ms. McFadden:

I am writing in response to the Department of Ecology's public comment period for the Waste Treatment and Immobilization Plant Project Proposed Operating Permit for the Low-Activity Waste Facility and Effluent Management Facility (in support of DFLAW). This comment period extends from July 1, 2019 to August 30, 2019.

1. Ecology Should Review LAW Vulnerability Closure Actions - DFLAW is not Likely to Start On-Time or Safely

The Fact Sheet states that the permit modification establishes requirements to ensure that waste management activities are protective of human health and the environment. The 2015 Low Activity Waste Design and Operability Report identified approximately 362 "vulnerabilities" that were expected to result in unacceptable risk to the overall project mission. Has Ecology reviewed the effectiveness of the "closures" of the vulnerabilities? ORP prepared a set of closure letters from 2015 to 2018 (per the table below, which contains some excerpts). The "verified closure" letters often kick the issue down the road to startup and commissioning, or reject the issues all together based on future promises or because the FPD *accepted* the risk on the behalf of workers, taxpayers, and the environment. The table shows that these letters referred to "commissioning" at least 111 times. The accepted risks were apparently not used to add time for schedule margin or to add contingency for cost overruns.

The risk is further illuminated in the discrepancy between DOE statements and the objective schedule evidence. ORP management expressed a lackadaisical attitude towards making any corrections per page 15 of the February 7, 2019 TPA PMM Meeting Minutes¹. In these minutes DOE indicated they were happy with the current Bechtel team; content with the chronic delays – *and were not working on them*.

On June 14, 2019, DOE replied to the Department of Ecology (in Letter 19-ORP-0004) that the DFLAW treatment facility is *on schedule* to meet the startup milestone for the LAW facility. The ORP Field Office Manager further insisted (on page 4) that schedules change "through no fault" of DOE. As a result, it appears the DOE has no interest in looking for the root causes of the delays, or the root causes associated with the failed fast track design-build/phased permitting/black cells instead of a canyon building decision. I believe DOE should be held accountable for long-recommended improvements that have

¹ <https://pdw.hanford.gov/document/AR-01146>

been ignored.

Contrary to ORP's confidence in the startup schedule, the Consent Decree Monthly Reports for April and May, 2019, for example, show multiple unfavorable "variances" for the LAW and EMF facilities, a euphemism for cost overruns and delays. Safety risks and poor cost and schedule performance continue.

I would appreciate if Ecology would review the incomplete or closed to future work LAW D&O "closures" in the letters listed below to verify the risks are actually addressed and resolved **before** granting permission to operate the plant. In addition, GAO has pointed out that 13 LAW systems were not reviewed in the Design and Operability Report. The 13 additional systems should have been reviewed as an extent of condition evaluation, given the number and significance of the problems that were found in the D&O report, and the unreviewed systems create additional safety and operating risk. Note that the D&O expert panel was not consulted regarding the path to closure.

2. **Single Shell Tank Farm Barriers are Needed**

As shown in item 1 above, Ecology is correct that there is a good probability that the DFLAW facilities will not start on time. Nor is it likely that the equipment will have very good performance if it ever starts up. As a result, I believe Ecology should not allow DOE to "negotiate" and waste more time over the installation of additional interim surface barriers in the single shell tank farms. (See DOE "disapproved" change form M-45-19-03 and the article in the July 13, 2019 Tri-City Herald²). Such barriers should be installed *immediately* as they are the only practical means of preventing migration of waste to the groundwater due to infiltrating precipitation. Barriers break the pathway to the groundwater. Void space fill should also be considered to prevent subsidence. DOE rejection of new barriers in favor of endless negotiations demonstrates the ongoing hypocrisy. There is enough "crisis" to fund Bechtel, but not enough concern to protect the groundwater from past and future events due to precipitation. Based on past performance, barriers are sorely needed. In addition, Ecology should consider curtailing single shell tank waste retrievals – since SST retrievals serve only to add water and contribute to risk. Single shell tank retrievals appear to be "speculative accumulation" given the uncertainty about waste processing and the expected additional delay to the WTP pretreatment facility. Why pile up risk and waste when the treatment processes aren't available?

3. **IQRPE Reports are Still Preliminary**

The Washington Administrative Code requires an Independent Qualified Registered Professional Engineer to certify structural integrity and *suitability for handling dangerous waste* for each tank system, as required under WAC 173-303-640 [see WAC-173-303-806]. The IQRPE cannot make such a certification if the design and the flow sheet are

² <https://www.tri-cityherald.com/news/local/hanford/article232604387.html?>

incomplete. For example, the recent resubmittal of an IQRPE report for the LAW Catalytic Oxidizer/Reducer (19-ECD-0056) continues to show that IQRPE reports rely on draft documents. In this case there are drawings at Rev B00 for the general assembly and also a reference to 24590-WTP-M4C-V11T-00004, **Rev. C**, Calculation of Hydrogen Generation Rates and Times to Lower Flammability Limit for WTP, including ECCN # 24590-WTP-M4E-VI IT- 00009. Letter revisions are not final design. Ecology should ensure that DOE *never* sends an IQRPE report that contains draft information, because the resulting IQRPE certification is therefore also not final. This is true regardless of “phased” permitting because it is “draft permitting” and not a genuine certification.

There are also draft documents in the current permit modification request (19-ECD-0047) – including *multiple* citations of 24590-LAW-DBC-S13T-00028, **Rev. A**, *Elevated Slab Design @ Elev. + 28'-0"*; and 24590-LAW-DBC-S13T-00034, **Rev. A**, *Elevated Floor Slab Design @ 48'-0"*.

4. **LAWPS Actions Should Be Completed Before Issuing the LAW/EMF Permit**
DFLAW Operations rely on the design and operation of the Low Activity Waste Pretreatment System (LAWPS). Ecology should require that the LAWPS permit be completed first, so that the source facility and *its waste ion exchange columns* are addressed before issuing a permit for LAW/EMF. Otherwise we will have more orphan waste. Actions from letter **19-NWP-103** should be completed prior to issuing the permit modification for LAW/EMF operations.

5. **Ecology Should Insist on Design Verification for Dangerous Waste Equipment**
ASME Standard NQA-1, which applies to the WTP, requires designs to be verified **“in all cases” prior to relying on the component, system, or structure, or computer program, to perform its function.** As a result, Ecology should require DOE to provide objective evidence of design verification for all of the LAW and EMF components prior to issuing an operating permit. This may be difficult, given that DOE and Bechtel have, in a number of cases, elected to defer design verification until commissioning, when the plant will be charged with non-radioactive hazardous chemicals or hazardous chemical precursors. Some of the safety functions of the LAW/EMF equipment are precisely to handle the hazardous chemicals. As a result, design verification should have been performed long ago (before cold commissioning) in an integrated pilot plant. DOE and Bechtel elected to not perform some technology maturation tests and elected not to perform integrated testing or mockups for verification prior to completing design and installation. Testing has been stove-piped or put off. As a result, significant cost and safety risks have been pushed to the very last activities, after a lot of money has been spent. Ecology should not issue an operating permit until ALL of the design verifications are complete for equipment that handles hazardous chemicals and off-gases to the satisfaction of an independent-of-ORP QA organization (per an open recommendation from the GAO³).

³ Per GAO-19-311SP, <https://www.gao.gov/assets/700/698600.pdf>

6. Process Flow Diagrams Should Include Data Tables

The process flow diagrams in the package omit mass balance tables for the hazardous chemicals (Chapter 4). This prevents a complete understanding of how safety and the environment are protected. I would appreciate if some data tables could be added.

7. No WTP or ETF Secondary Waste or Effluent Should be Sent to Richland

Ecology should ensure that no WTP or ETF waste is sent into the City of Richland for treatment, including EMF evaporator bottoms or ETF brine. The contractual scope of the WTP was to treat the waste in the 200 Areas of Hanford. The risk should not be transferred so that it is directly upwind of city residents and food storage and processing businesses.

8. Ecology Should Verify Piping Integrity

Piping at WTP has for years been subject to Cathodic Protection System operations that were out of specification. Out of specification cathodic protection can actually destroy the piping it is intended to protect. Ecology should verify the integrity of affected piping before it is allowed to handle hazardous chemicals.

Thank you for the opportunity to comment on the proposed permit modification.

Table of Examples from LAW Design and Operability Report Vulnerability “Closures”

LAW D&O “Verified” Closure Letter	Item Refers to Commissioning	Examples of Topics Mentioning Commissioning
15-WTP-0192 December 8, 2015	1	LAW Container Leak Tests to be performed early in startup and commissioning to mitigate issues. Previous tests had incorrect methodology.
16-WTP-0007	0	
16-WTP-0030	1	Control System software settings to be “tuned” during startup and commissioning .
16-WTP-0047	2	<p>BN1 states in the response that the (uninterruptible power supply) UPS SDD requires startup/commissioning testing of the "Safety" UPS to verify sufficient capacity...</p> <p>Demonstration of ILAW container loading activities during cold commissioning will support completion of Operational Readiness Reviews prior to the start of Hot Operations</p>
16-WTP-0066	2	<p>Activities will be completed prior to the start of commissioning to address replacement of a failed melter...</p> <p>Adequate mock-up/testing facilities are not available/planned to support high risk contact maintenance activities (such as pump/agitator replacement) and testing/run-in of mechanical equipment...work control process will be evaluated both by the contractor and DOE for ISMS phase 1 and phase 2 reviews prior to commissions.</p>
16-WTP-0089	5	<p>the ASME AG-1 code requires the airflow distribution testing to be performed (for each [C5V] housing) during commissioning, so the testing that passed at the suppliers facility will be confirmed once again in the actual installation</p> <p>HVAC- 52-4, C2, C3 and C5 HEPA Filter replacement strategy has not been developed for LAW commissioning. ...BNI Review of this vulnerability concluded that "HEPA filter qualification is being tracked under Technical Issue 2011-0001, Reference 24590-WTP-TIES-ENG-14-0004 Rev. 0. The filter is currently being designed. The plan for use of filters in commissioning would be developed and tracked under this effort."</p>

LAW D&O "Verified" Closure Letter	Item Refers to Commissioning	Examples of Topics Mentioning Commissioning
		<p>HVAC- 55-1, LAW C2V, C3V and C5V Cascade Low Air Flow HVAC System Causes Control Systems to be Complex... All systems do not need to be in place and on line before the ventilation system startup. If all the ventilation system needs to be tested then the controllers (shown above) and the related servers will have to be in place and online before the system can be tested. The ventilation system does have inputs from other systems for functionality such as CHW, PCW, LVP, LOP and ISA which are not limitations of the control system as the entire plant cannot be controlled by a single controller. Functionality of the system overall if wanting all inputs would require several other controllers to be available to support these inputs into the ventilation system. Additionally, changes to the ventilation control system or any of the other control systems has the potential to cause delays in startup and commissioning in order to verify changes to one system do not affect any of the other systems.</p> <p>The design for the LFH system is not in compliance with the requirements flow down as described in the Technical Baseline. ...It is not clear how requirements flow from the Mechanical Sequence Diagram or the Mechanical Handling Diagrams to the J3 Logic Diagrams, Function Diagrams and Sequential Function Diagrams....There is no way to verify that interlocks have been passed down to the J3 Logic Diagrams and no way to verify that they are implemented correctly...Start-up and commissioning should include exhaustive testing of both success and failure paths and Off-Normal operations to "wring out errors and identify improvements in operations and operator/control interfaces before operations begin.</p> <p>No safe access by personnel to delivery truck trailer (non-radiological safety and health)...Bechtel's response: "This is future work. To be completed during support to Startup 3EL4880062 [2016 anticipated work]."... The reviewer obtained a print out of <i>the BNI project level 4 schedule</i> (attached version 417/2016) and verified that the activity for schedule ID 3EL4880062 is LAW- ZM support Startup & Commissioning Phase with an expected start date of 8/3/2016 and a finish date of 11/3/2016.</p>
16-WTP-0115	6	<p>"The C2/C3 DP monitors, as currently designed, will not work....The Foxboro instruments selected have a maximum span of -30"Wg to +30"Wg. The individual instruments are spanned to values much less than the maximum span...BNI Review of this vulnerability concluded that "BNI project engineering is <i>currently investigating</i> possible resolutions to this issue and have initiated a condition report (CR) to track for resolution. Tracking document number is 24590-WTP-GCA-MGT-15-</p>

LAW D&O "Verified" Closure Letter	Item Refers to Commissioning	Examples of Topics Mentioning Commissioning
		<p>00744."...The risk associated with this vulnerability is the zone pressure set points and alarm and interlock set points <i>may have to be adjusted again as commissioning progresses</i> [how can you adjust them if they will not work?] if the current set points prove to be too sensitive. This is expected to be addressed in instrument and control tuning.</p> <p>C5V Radial HEPA filter design does not include the ability to balance air flow through the filter housing...ASME AG-I code requires the airflow distribution testing to be performed (for each housing) during Commissioning..</p> <p>Adequacy of design to support control of integrated system equipment/components under various expected operating conditions (e.g. startup, shutdown, low flow, melter surges, etc) and abnormal operating conditions not demonstrated."... Additionally, all interlocks will be functionally tested as part or <i>commissioning/start-up</i>. Dynamic responses of the offgas system will be observed as part of this testing."</p> <p>"Lack of functional testing of LOP equipment performance at vendors... Remaining testing is the MACT performance testing to be conducted as part of the contractual requirements. These testing is scheduled in the baseline schedule <i>commissioning phase.</i>"</p> <p>The inspection platforms cannot be located as close as possible to the empty container being inspected..."<i>This is future work.</i> To be completed during support to Startup 3EL4880062 [2016 anticipated work]." ...The reviewer obtained a print out of the BNI project level 4 schedule (attached version 4/7/2016) and verified that the activity for schedule ID 3EL4880062 is "LAW- ZM support <i>Startup & Commissioning Phase</i>" with an expected start date of 8/3/2016 and a finish date of 11/3/2016.</p> <p>Potential for Contamination to Migrate Due to Adjacent Contamination Zones and Low Flow Ventilation Design... It does appear worth-while to document the projected process for the design to support completion of Commissioning...</p>

LAW D&O "Verified" Closure Letter	Item Refers to Commissioning	Examples of Topics Mentioning Commissioning
16-WTP-0133	3	<p>LAW production container volume weight, and center of gravity calculation, 24590-LAW-MOC-LRH-00004, does not include overpack condition...Operational approaches will be developed and demonstrated during commissioning operations, as required.</p> <p>Length and travel of Container Present Sensor of Lidding and Decontamination Bogies may not be adequate for detecting an Overpack...Operational approaches will be developed and demonstrated during commissioning operations, as required.</p> <p>"There is no indication of the location and size of the area available on the Load Dock for staging non-acceptable containers, which may be a challenge in this busy area."... "This is future work. To be completed during support to Startup 3EL4880062 [2016 anticipated work]" The reviewer obtained a print out of the BNI project level 4 schedule (attached version 4/7/2016) and verified that the activity for schedule ID 3EL4880062 is "LAW - ZM support Startup & Commissioning Pha" with an expected start date of 8/3/2016 and a finish date of 9/3/2016.</p>
16-WTP-0158	9	<p>The D&O basis, from ROR-HVAC-02 explains that "a depression of -0.0703'WG is very close to zero and leaves little margin for upsets caused by normal plant operation. It seems with routine opening and closing of hatches and doors during normal plant operation will result in system upsets that could exceed the 0.073"WG available and the C2 areas could go positive...Under the current philosophy it is anticipated that the <i>controllers will compete</i> to maintain the prescribed differential pressures. The probability for this competition can be reduced or prevented through <i>rigorous tuning</i>. Identification of this competition is expected through system performance tracking or verification of flow via flow detectors already installed....Closure of this vulnerability is based on BNI response and required component tuning during start up and commissioning is adequate.</p> <p>There is a danger that the Motoman® decontamination robot and PLC control go obsolete before the 40 year life of the WTP project is over. Further, KTECH, the robot vendor may go out of business or get bought out by another company. ... Summary: Commissioning Plan 24590-VVTP-PL-COPS..15-005, Rev A has been prepared in draft. This draft will be updated and finalized per BNI contract requirements 12 months prior to the start of WTP Cold Commissioning. In this plan (and prior developed commissioning planning) the strategy for commissioning the finishing line including the C02 decontamination line is to complete finish line in parallel with melter commissioning and early on in the commissioning schedule.</p>

LAW D&O "Verified" Closure Letter	Item Refers to Commissioning	Examples of Topics Mentioning Commissioning
		<p>The design provides no method of verifying compliance with Waste Affecting Criteria regarding temperature before the container is exported for transport to the disposal facility... This evolution will be demonstrated during cold commissioning of the WTP LAW facility which will address any operational considerations to include <i>additional temperature measurement requirements</i>.</p> <p>"The LAW container lid seal is vulnerable to damage as observed in DOE surveillance report 09-WTP-077... Additional integrated testing to be performed as part of commissioning."</p> <p>"There several requirements of the lidding jib crane specification (24590-WIP- 3PS-MJKJ-T0003) that were not tested during FAT and are not covered by a test acceptance criteria in the LFH System Description (24590-LAW-3YD-LFH-00001). The items/functions not tested can impact commissioning or future production when called on to perform. Of the item tested, the FAT does not validate the performance requirements adequately."... BNI documentation 24590-WTP-PIER-MGT-1 3-0483 shows that they <i>have a planned</i> to address this vulnerability.</p> <p>The robot is programmed to swab the curved bottom, vertical sides, and tops of the ILAW containers, but no provisions (i.e., alternate swabbing patterns and programs) have been developed to swab a lower container over pack. The inability of the swabbing robot to handle a lower container over pack could cause significant production delays. [See Note LFH-SWAB-1-6]... LAW D&O Recommendation: Create and test swabbing programs for the lower container over packs prior to commissioning activities... <i>Issues specific to development of swabbing test procedures associated with overpack containers are not pertinent [when the dose rate is 14.7 mrem per hour?].</i></p> <p>LAW production container volume, weight, and center of gravity calculation, 24590-LAW-M0C-LRH-00004, does not include over pack condition. An abnormal condition could occur if the container cannot be decontaminated and overpacking is required to be added to the container, [See Note LFH-TOOL-2-1]... Operational approaches will be developed and demonstrated during commissioning operations, as required.</p> <p>Equipment and attachment points are not determined for recovery of the Process Area Bridge Crane to its maintenance position. From the LAW D&O report states, "The System Description talks to</p>

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		<p>"recovery features" but no specific method or equipment is identified. "... In 3EL4880062 the activity name is LAW- ZM Support Startup & Commissioning Phase 1 (FY 2016)...BNI documentation shows that they address vulnerability LRWH-O-03-V-01 with a <i>planned to get it done</i> before the baseline due date.</p> <p>"Commissioning major pieces of equipment is a difficult and usually lengthy effort. LAW Facility Systems are often complex, with many interacting components. Installed plant equipment that has not been through the commissioning process or otherwise turned over to operations will <i>very likely require rework</i>, delaying the completion of the Facility System startup and commissioning. Current startup and commissioning plans <i>begin after construction</i> is complete, which will place all component rework on the critical path to startup/commissioning. "... <i>BNI plans to address this issue on time if they can.</i></p>
16-WTP-0194	2	<p>The OR Model Design Document (MDD) and the Flowsheet Bases, Assumptions, and Requirements document do not contain the same process steps and times for the LEH system. The OR MDD does not contain RAM information for the cameras mounted on the LEH- CRN-00003. [See Note OR-6] Incorrect data input into the OR Model will result in facility availability estimates that are not accurate... OR model documentation updates will be accomplished following procurement and testing of transporter prototype as part of WTP <i>commissioning testing</i>.</p> <p>The existing refractory vendor has ceased production. Refractory production for a new melter will require 1 1/2 years lead time plus waiting-list time once a new vendor has been selected... Activity number 1D9055 identified in the DFLAW program integrated schedule provides for DOE to develop a melter assembly approach. This activity is currently scheduled for FY17 and will be needed prior to the initiation of LAW cold commissioning currently scheduled for FY20.</p>
16-WTP-0216	6	<p>The complex abatement system design with numerous safety and permit affecting controls is likely to impact ability to sustain operations and meet throughput requirements. Abatement system equipment/unit operation selection decisions made early in project (circa 2001) based on preliminary and evolving process information (flowsheet). ...Abatement system results in postulated safety events with Hg off-site consequences that otherwise would not exist (e.g. carbon bed fire event)... Failure to pass MACT/DRE testing during commissioning or during operations could lead to prolonged project delays (months)...Negotiations with Ecology <i>will result</i> in development of the environmental performance test (EPT) plan to meet the requirements of MACT including DRE testing.</p>

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		<p>"Durability of Park/Export Stand thermal insulation material over a 40-year operating life is not documented... Modify the existing Park/Export Stands prior to commissioning to provide a way to facilitate the replacement of the insulation material blocks."... The SDD cites an assessment/evaluation of the design as a method of verification that the design meets requirements. BNI does not plan to develop any further documentation with regard to the environmental conditions associated with the park/export stands.</p> <p>"There is a risk that liquids, tools, or various debris fall accidentally into an open container standing on the conveyors in Room L-0117 (and may remain unnoticed)...This is future work... The reviewer obtained a print out of the BNI project level 5 schedule (attached version 41712016) and noted that the activity for schedule ID 3EL4880062 is "LAW-ZM Support Startup & Commissioning Phase" with an expected start date of 8/3/2016 and a finish date of 11/312016. Due to the lack of detail in the schedule ID, the reviewer requested via Review Comment Record (RCR) a more detailed response than that provided in CCN 276214. BNI provided the following response in the RCR following a meeting with the reviewer: "BNI does not intend to incorporate the design change proposed as an Opportunity for Improvement by the D&O team. The current design would not be a candidate for a change as it currently meets safety and functional requirements.</p> <p>Heat-up / Cool-down rates for the melter glass pool have not been calculated for the actual case while doing System LSH maintenance evolutions... WTP commissioning operations are planned to demonstrate evolutions required to be performed to support LAW operations.</p> <p>Conduct of Operations Principles have not been adequately factored into the facility. No single shortcoming will lead to an Incident but taken as a whole the Operator is not being placed in a position that is success oriented... WTP operations will be conducted in accordance with Conduct of Operations principles. Conduct of Operations principles will be demonstrated during the performance of commissioning operations prior to the Initiation of hot operations.</p> <p>Lack of a simulation , mockup, training facility increases the risk of error In performing new and/or complicated evolutions. The complexity, work environment, PPE, and extensive hands on nature of the work warrants a simulator or mockup facility to dry run evolutions and accommodate training... WTP</p>

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		commissioning operations are planned to demonstrate evolutions required to be performed to support LAW operations.
16-WTP-0245	5	<p>The complex abatement system design with numerous safety and permit affecting controls is likely to impact ability to sustain operations and meet throughput requirements... Pilot testing indicates the highest known potential for experiencing a carbon bed fire occurs, as indicated by carbon bed temperature increases, during MACT/DRE testing when high concentrations of organic are intentionally introduced to the melter feed. Other operating periods with higher fire risk is after replacement of the carbon bed material and during transition from an idled melter to steady state operation... Operations of the necessary safety and permit affecting equipment and control systems will be demonstrated during the Environmental Demonstration Test (EPT) performed during cold commissioning.</p> <p>The D&O basis explains that the "The Vendor's submittal does not provide evidence that the selected insulation material will maintain its insulating properties and protect the floor for over 40 years in the conditions of its application inside the Transfer Corridor 1-8025B." The D&O report further provided as opportunities for improvement, "Resume contacts with Pittsburgh Coming Corp and obtain documented evidence of the durability of the selected insulation material over 40 years at 460F. Modify the existing Park/Export Stands prior to commissioning to provide a way to facilitate the replacement of the insulation material blocks."... although there may be some risk in the insulation material not lasting the 40 year life, there have not been any means of insulation degradation identified that would bring into question the ability of the FOAMGLAS® blocks to perform their function. The ability to inspect, maintain, and replace as necessary help to mitigate the risk mentioned above.</p> <p>"There is a risk that liquids, tools, or various debris fall accidentally into an open container standing on the conveyors in Room L-0117 (and may remain unnoticed). It may be necessary to provide a cover/shield over the staging conveyor area to eliminate the chances of material falling into containers that have already been inspected."... BNI provided the following response in the RCR following a meeting with the reviewer...."BNI does not intend to incorporate the design change proposed as an Opportunity for Improvement by the D&O team...<i>Model review</i> and walkdown of the room L-0117 concludes there is no reasonable avenue for introduction of free liquid or pyrophoric/explosive materials into the canisters once received within the facility. [No prevention method was identified for the future, either].</p>

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		<p>Maximum heat up rate is derived from expected limit to prevent foaming problems. As a consequence, system LSH maintenance evolutions will have uncertain durations. LAW D&O Recommendation: OFI LSH-F-17-0FI-04: Perform pilot melter tests that simulate actual conditions during melter consumable change out: melter idle and simulated C5V and C3V airflows to the plenum space from a bubbler hole. Scale up the results for the full- scale LAW Melter using Computational Fluid Dynamics simulations... WTP commissioning operations are planned to demonstrate evolutions required to be performed to support LAW operations.</p> <p>No single shortcoming will lead to an incident but taken as a whole the Operator Is not being placed in a position that is success oriented. The equipment and facility logistics have not been developed with a Conduct of Operations perspective lending the situation to a condition where Operator error is more probable with the resultant equipment damage and delays... Conduct of Operations principles will be demonstrated during the performance of commissioning operations prior to the initiation of hot operations. [operator success will be un-demonstrated starting with cold, hazardous chemicals].</p> <p>Lack of a simulation, mockup, training facility increases the risk of error In performing new and/or complicated evolutions. The complexity, work environment, PPE, and extensive hands on nature of the work warrants a simulator or mockup facility to dry run evolutions and accommodate training... WTP commissioning operations are planned to demonstrate evolutions required to be performed to support LAW operations. These Include hands on demonstration of activities such as bubbler change out which require work to be completed in an adverse environment and require the use of PPE. Demonstrations will be subject to an Operational Readiness Review during cold commissioning prior to starting hot operations.</p>
17-WTP-0057	4	<p>Vulnerability LOP/LVP-11 Description: The impact of solids accumulation and the effectiveness of their removal within the SBS and SBS Condensate Vessel is not demonstrated other than over limited pilot scale test durations...DOE agrees with BNI's response. During system performance testing as defined in the commissioning plan which is drafted and to be delivered to DOE next year the strategy for commissioning the SBS as part of the off gas system is defined and the performance criteria and removal capability of solids will be demonstrated If the performance criteria is not met changes in system operations may be necessary to achieve the desired results. Furthermore DOE through its</p>

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		<p>authority in approval of the commissioning plan and its oversight ensures adequate testing as this is the only method for evaluating full scale results.</p> <p>"The eyes of the inspector standing on top an inspection stepped platform will be at 130 above the floor of the Load Dock when the top of the container will be at 108 above the same floor This distance doesn't allow any view of the inside of the container through the 15" diameter container opening... "This is future work... The reviewer obtained a print out of the BNI project level 4 schedule (attached version 4/7/2016) and verified that the activity for schedule ID 3EL4880062 is LAW - ZM support Startup & Commissioning Phase with an expected start date of 8/3/2016 and a finish date of 11/3/2016. [Did the correction happen?]</p> <p>The access to the container top opening by the inspector is challenged as the platforms will be located between positions P1 and P2 of the Receipt Conveyors which increases the distance between the inspector and the container vertical axis... This is future work... To be completed during support to Startup 3EL4880062 [2016 anticipated work] The reviewer obtained a print out of the BINI project level 4 schedule (attached version 4/7/2016) and verified that the activity for schedule ID 3EL4880062 is LAW - ZM support Startup & Commissioning Phase with an expected start date of 8/3/2016 and a finish date of 11/3/2016... BNI does not intend to incorporate the design change proposed... Operational procedures <i>may identify</i> other tools (e.g. inspection mirrors) to facilitate the inspection process. BNI Engineering determines this Vulnerability to be very low risk to existing design and project schedule because of the existing design features and the Operational capacity to supplement with additional tools as deemed necessary." [Risk extended to startup]</p> <p>There is no indication of the location and size of the area available on the Load Dock for staging non-acceptable containers which may be a challenge in this busy area... This is future work To be completed during support to Startup 3EL4880062 [2016 anticipated work]" ... The reviewer obtained a print out of the BNI project level 4 schedule (attached version 4/7/2016) and verified that the activity for schedule ID 3EL4880062 is "LAW - ZM support Startup & Commissioning Pha" with an expected start date of 8/3/2016 and a finish date of 9/3/2016... BNI does not intend to incorporate the Opportunity for Improvement... It is anticipated that LAW Containers will be inspected for compliance with Engineering/Procurement specifications prior to shipment to the WTP site thus</p>

LAW D&O "Verified" Closure Letter	Item Refers to Commissioning	Examples of Topics Mentioning Commissioning
		reducing probability of discovering non-acceptable containers during receipt... [What is the basis for the "anticipation?" How many vessels have actually arrived correctly designed/constructed previously? How many were unsatisfactory before?]
17-WTP-0112	8	<p>Incompatibility of campaign strategies... Melters idled for another reason, such as. work on LOP or LVP, can't be used to "campaign" System LSH consumables... ORP acknowledges that maintenance procedures have yet to be written. Coordination of maintenance activities is not fully understood and may not be until startup and commissioning. ORP acknowledges and accepts the risk that simultaneous maintenance operations may not be able to be performed in campaigns. The commissioning work control process will prioritize and schedule competing work activities. [Issue closed to a promise of future action.]</p> <p>Access to the top of the CCB needs to be provided while it is on the melter, import station, or export station for routine and recovery operations... In response, BNI addressed LSH-F-20-V-01 by attachment 3 to CCN 276214 as, "During cold commissioning access needs will be addressed and commercial ladders etc. will be purchased according to specific needs, frequency and storage capabilities..." The reviewer review Schedule ID 5HLC3J1A0370. Schedule ID 5HLC3J1A0370 stated, "Activity Name: LAW-ops-Develop Systems Procedures-Part 5, Current ME Start: 23-Sep-19, Current ME Finish: 12-June-20, Baseline Start: 23-Sep-19, and Baseline Finish: 12-Jun-20." [Closed to future unfinished work.]</p> <p>Designated space for storage and local maintenance of contaminated equipment and tools in the melter gallery needs to be defined and maintained consistent with operational travel routes. Storage of lifting equipment needs to be provided in the truck bay and the melter gallery... In response, BNI addressed LSH-F-20-V-03 by attachment 3 to CCN 276214 as, "During cold commissioning storage needs for ancillary equipment and tools will be developed." At the time of the review, the reviewer agrees with this path addressing vulnerability LSH-F-20-V-03 with a <i>plan Schedule ID 5HLC3J1A0370</i>.</p> <p>Some maintenance activities on the Process Crane must be performed using the crane maintenance platform at the east end of the melter gallery, trapping the CCB Handler Crane, resulting in no crane coverage of the melter gallery while servicing the Process Crane.... ORP acknowledges that maintenance procedures have yet to be written. Coordination of maintenance activities is not fully</p>

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		<p><i>understood and may not be until startup and commissioning. ORP acknowledges and accepts the risk that simultaneous maintenance operations may not be able to be performed in campaigns. The commissioning work control process will prioritize and schedule competing work activities. [How does this affect the Operations Research Model and predicted throughput?]</i></p> <p>"Melter consumables will frequently require placement (e.g. 36 bubblers per melter per year, 2 film cooler wash nozzles per melter per year, etc.}. Currently, there is <u>not an adequate number of consumable spares</u> available to support commissioning and startup."... The reviewer comments about this D&O: Having the WTP Operations and Maintenance Group to address this issue is a reasonable approach. <i>The risk is not that great of a factor and can be addressed by a schedule ID.</i> [There was no analysis of the lead time needed to obtain spares, yet closed to future work]</p> <p>Plant operation on a 24 hour per day, 7 days per week schedule is in jeopardy if maintenance failure modes and incidents are not known and understood... In response, BNI addressed LSH-M-16-V-01 by attachment 3 to CCN 276214 as, "The Project OR model collects critical failure modes and consequences."... In WTP Contract No. DE-AC27-01RV14136 section C stated, "Item Number. 2.5, Deliverable: Operational Research Assessment, and Contract Due Date: 12/19/2008, 6/19/2010, February 2012, May of (310) 2014 and December of 2017 and after completion of cold commissioning and completion of hot commissioning." In CCN 276214, BNI considered this vulnerability as a Category 5 (Not Credible). At the time of the review, the reviewer agrees with this path addressing vulnerability LSH-M-16-V-01. [Of note is that there have been multiple observations that the WTP OR model does not contain all of the systems or data needed to accurately assess down times] Issue ignored.</p> <p>Hazard Analyses and ALARA Reviews are inadequately addressed for spent consumable handling. Spent bubblers are enclosed within a plastic sleeve at the export/bagging station. The described bagging operation is a hands--on activity including <i>'pig-tailing' the bottom end of the plastic sleeve while the component is suspended from the crane.</i> These activities will require personnel to work under a suspended load and to be in very close proximity to the portion of the bubbler that was in the melt pool and now has a coating of ILAW glass. This is not consistent with ALARA principles... ORP acknowledges that the ALARA review for LSH are documented and the equipment in the facility will be maintained with both hands--on and remote maintenance techniques. ORP acknowledges and accepts</p>

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		<p>the risk that maintenance procedures have yet to be written and will be addressed during startup and commissioning. [Closed to future action].</p> <p>Inadequate Lift Capability in Consumables Import/Export Area... ORP acknowledges and <i>accepts the risk</i> that several lifting options may need to be available for disposal box lid lifting operations. Shortcomings in lifting options presents minimal risk and will be addressed during startup and commissioning. [No risk analysis provided. Closed to future action.]</p>
17-WTP-0154	8	<p>Lidding Bogie interlocks listed in the Mechanical Sequence Diagram (MSD) 24590-LAW-MI-LFH-00001 are not sufficient to protect the equipment from damage A thorough LFH devices interlock document design review and testing to assure Lidding Bogle will work properly is required... Agree that Start-up and commissioning should include exhaustive testing of both success and failure paths and Off-Normal operations to wring out errors and identify improvements in operations and operator/control interfaces before operations begin This comment is very generic in nature with a generic concern that the system is not enough to protect the damage without any specific deficiency example. [Closed to a vague future effort with less than a specific look].</p> <p>Inadequate material of construction... The coil airline connecting the hard pickup assembly to the facility air is not high temperature material The hose material cannot be operated reliability at temperatures above 180-200 deg F The air supply hose will only see high temperature when the shard pickup assembly is at its lowered position and the air supply is turned off <i>However this condition will occur often enough to cause premature airline failure...</i> In CCN 276214 BNI considered this vulnerability as a Category 5 (No Credible) At time of the review this vulnerability is a minor issue That can be addressed during start up and Commissioning If changes are needed. ... At time, of the review the reviewer agrees with BNI's path addressing this vulnerability LFH-SSS-1-V001. [Superficial review did not even evaluate the risks or availability of other materials. Put the risk off for others to experience]</p> <p>"While drawing 24590-LAW-DD-S13T-00029 is showing the back of the Elevators Insulated with 6" of insulation nothing appears to be Insulating the sides of the Elevator Per calculation 24590-LAW-M4C-C5V-00001 Figure 38, sheet 107 the Elevator metal temperatures will be a minimum of 150 F."... BNI responded "Reviewers concern is noted. The pour cave elevator rooms such as L-8012 are not occupied</p>

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		<p>for normal operations They will be accessed for maintenance or recovery operations during commissioning and remedial actions will be investigated at the time if necessary. Elevated surface temperatures of running equipment is a common hazard in Industrial facilities and would typically be mitigated with an orientation-type training prior to allowing entry In the facility or with signage... The ORP reviewer concluded that the potential for elevated temperatures of facility equipment during operations <i>is a reasonable hazard</i>. [Industrial Safety/OSHA was not consulted – nor was there a review of how personnel well be prevented from occupying the room. Are the procedures established?]</p> <p>"Tests need to be done on a thermally hot melter to ensure problems as a result of thermal growth are considered and especially for any component replacement to ensure Industrial hazards are considered before doing it on a radioactively hot melter... Modification can be addressed on an as needed basis during cold commissioning This would have little impact on the schedule. [Based on what analysis?]</p> <p>No plans have been developed for cleaning glass spall and drips from the melter shielded enclosure, melter port consumable seating surfaces, bubbler air supply ports, CCB lid/interior gamma gate or bagging station surfaces... ORP acknowledges and accepts the risk that if this situation occurs it will be addressed during startup and commissioning. [Glass is a source of radioactive dose. Were the impacts evaluated? Added to the risk register? Added to the schedule contingency?]</p> <p>The design of the bubbler air supply port requires a neoprene gasket/O-ring between the bubbler and the melter air supply port To ensure this rubber gasket/O-ring does not gall or roll during installation in the bubbler air supply port ""Apply Super-O-Lube silicone grease to gasket prior to installing into the melter." The last opportunity to apply a lubricant is prior to insertion into the CCB when the bubbler is in the Consumable Import Cart or as it is lowered into the Import Station However requirements for installation of the gasket and appl of the silicone grease have not been specified... ORP acknowledges and accepts the risk that criteria and specifications for bubbler change-out and installation have yet to be written and will be addressed during startup and commissioning.</p> <p>During consumable changeout both the clean and spent CCBs have the potential to become pressurized vessels. The +/- vessel pressures introduce the potential for the spread of contamination CCB equipment damage and/or operations production impact... ORP acknowledges and accepts the risk</p>

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		<p>that the consumable changeout box may become a pressurized vessel during bubbler changeout operations. Tests have been conducted which show there is a vacuum with minimal deflection after the bubbler cools. [No discussion for before the bubbler cools.] Additional requirements or modifications will be addressed during cold commissioning on an as needed basis.</p> <p>Two air supply bottles are mounted on the top of each bubbler. Disposal restrictions require that such items be rendered incapable of holding pressure There are no provisions for preparing the bottles for disposal... Detailed operating procedures is part of operations to-go scope... [This time there was not even a reference to a schedule item to complete the work] ORP acknowledges and accepts the risk that procedures will be developed during startup and commissioning for proper disposal of air bottles on spent bubblers after bubbler change out.</p>
17-WTP-0176	9	<p>Risk of contamination backflow in a Swabbing/ Finishing Line... The resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is balanced <i>and actual configuration is understood.</i></p> <p>HVAC-12-3: 15 doors have been identified to have less than 100 fpm velocity through C2/C3... The resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is balanced and actual configuration is understood... [No action was taken to determine if any of a study's recommendations was carried out]</p> <p>No airflow parameter identified for the open doors between 03 and 05 zones... The resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is balanced and actual configuration is understood... [No action was taken to determine if any of a study's recommendations was carried out]</p> <p>Airflow through open doors and hatches between C3 and C5 areas not evaluated... The resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is balanced and actual configuration is understood... [No action was taken to determine if any of a study's recommendations was carried out]</p> <p>Airflow through the canister import hatch has not been evaluated... The resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is</p>

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		<p>balanced and actual configuration is understood... [No action was taken to determine if any of a study's recommendations was carried out]</p> <p>Airflow through the finishing line with doors and hatches in the open position has not been evaluated... The resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is balanced and actual configuration is understood</p> <p>ORP review of the study including independent expert review as documented in ORP letter 17-WTP-0078 concludes the actions completed are adequate to disposition this vulnerability. [However, this is only a model review – and the model contains limitations and assumptions.] The independent expert concluded that "CONTAM is restricted to time and arrangement independent results This combined with the scenario implementation - restricting the study to discrete scenarios - serves to limit the applicability of this study to a first order guidance document. <i>Detailed design confirmation especially once time sequencing and actual component performance are imposed will be necessary.</i> ORP's reliance on the 17-ORP-0078 appears premature.</p> <p>Basis/definition of acceptable gear oil leakage rates and process impacts is not evident... Maintenance plans have yet to be developed... ORP acknowledges and accepts the risk that maintenance procedures have yet to be developed and will be addressed during startup and commissioning. Proper fill of oil levels for the agitators will be addressed during the startup and commissioning phase as prescribed per the operations manual. ORP also concurs that excessively filling the agitators with oil would contribute an insignificant amount of organics to the feed vessel and does not warrant establishing acceptance limits for oil leakage. It should be emphasized that not overfilling the reservoirs precludes any oil leakage.</p> <p>Vendor's calculation for bogie bumper selection is based on incorrect gross weight and bogie speeds... As an opportunity for improvement the D&O team suggested "Re-run the LFH Bogie Bumper Selection Calculator for the corrected weights and operating speeds to verify that the bumpers mounted on the fabricated and installed bogies are adequate prior to commissioning... BNI Review of this vulnerability concluded that the present analysis is bounding with the use of speeds in excess of the design speed since energy is proportional to velocity squared the smaller discrepancy in mass is more than compensated for in the conservative velocity used. No specific design criteria was listed in the</p>

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		<p>procurement specification therefore the resulting deceleration felt by the bogie has no pass/fail criteria.</p> <p>Opportunities for Improvement ... The review team recommends DOE issue a contract to perform a facility power study using SKM Power Tools for Windows so that operations has useful input files to use in the facility during commissioning and operations. DOE has informed the review team that the Hanford Site standard software may be changing to ETAP, if that change takes place this vulnerability will go away. However at the time of the review a discrepancy between software products used for the WTP project and at the Hanford Site exists therefore this will remain listed as a low consequence vulnerability... No requirement exists in the WTP contract to use SKM software The migration from ETAP to SKM would be expensive and also necessitate significant baseline changes to the electrical system In addition the Hanford contractors are considering transitioning from SKM to ETAP software which would eliminate the integration issues ETAP and SKM both are credited software and have similar installation basis but many other DOE facilities are using ETAP. Keeping WTP with ETAP is probably more cost effective than re-port the calculations to the SKM model... Conclusion ROR-ELEC-4 Vulnerability #2 is acknowledged but not accepted.</p>
17-WTP-0199	2	<p>The effects from other unit operations on the startup and shutdown of caustic scrubber have not been fully analyzed/determined... Subsequent to the D&O vulnerability LOP / LVP Equipment Technical Manual, Wet Electrostatic Precipitator, 24590-LAW-PERC-PENG-1 5-00015, was completed. The caustic scrubber technical manual provides parameters for startup and shutdown of the caustic scrubber. These will be incorporated into the off-gas system operating procedures as they are developed and will be further refined during startup and commissioning.</p> <p>The criterion for the consumable cooling rate and time while being raised into a CCB has not been determined... ORP has reviewed 24590-101-TSA-W000-23-09F Pilot Melter Bubbler Consumable Changeout Box Test Results Report and concurs that maximized efficiency between loose glass vs bubbler change-out duration will be addressed during startup and commissioning... The LAW FPD has reviewed this report, <i>is aware of the risk</i>, and concurs with the closure of this vulnerability on design.</p>
17-WTP-0214	12	<p>"Adjusting of subchange dampers along with opening and closing doors causes changes in C5V flow."... The resulting risk is considered low and will be realized during startup and commissioning as</p>

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		<p>the ventilation system is balanced and actual configuration is understood... ORP review of the study, including independent expert review as documented in ORP letter 17-WT-P-0078, concludes the actions completed are adequate to disposition this vulnerability... ORP review of the study including independent expert review as documented in ORP letter 17-WTP-0078 concludes the actions completed are adequate to disposition this vulnerability. [However, this is only a model review – and the model contains limitations and assumptions.] The independent expert concluded that "CONTAM is restricted to time and arrangement independent results This combined with the scenario implementation - restricting the study to discrete scenarios - serves to limit the applicability of this study to a first order guidance document. <i>Detailed design confirmation especially once time sequencing and actual component performance are imposed will be necessary.</i> ORP's reliance on the 17-ORP-0078 appears premature. [page 2]</p> <p>"Off-normal operations analysis not performed." [page 3]... the resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is balanced and actual configuration is understood. ORP review of the study including independent expert review as documented in ORP letter 17-WTP-0078 concludes the actions completed are adequate to disposition this vulnerability. [However, this is only a model review – and the model contains limitations and assumptions.] The independent expert concluded that "CONTAM is restricted to time and arrangement independent results This combined with the scenario implementation - restricting the study to discrete scenarios - serves to limit the applicability of this study to a first order guidance document. <i>Detailed design confirmation especially once time sequencing and actual component performance are imposed will be necessary.</i> ORP's reliance on the 17-ORP-0078 appears premature.</p> <p>"Loss of site power operation analysis not performed."...[page 4] The resulting risk is considered low and will be realized during startup and commissioning as the ventilation system is balanced and actual configuration is understood. ... ORP review of the study, including independent expert review as documented in ORP letter 17-WTP-0078, concludes the actions completed are adequate to disposition this vulnerability. ORP Reliance on 17-WTP-0078 is premature. The model neglects "non-ideal" performance.</p> <p>Container decontamination and recovery of a contaminated container may be problematic... [page 8] Container decontamination will be demonstrated by integrated testing during startup and</p>

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		<p>commissioning... Closure of the vulnerability base on BNI response is adequate. The LAW FPD has reviewed this report, is aware of the risk, and concurs with the closure of this vulnerability on design.</p> <p>Operation of the Carbon Dioxide (CO₂) pelletizer and C5V vacuum pickup system may be problematic...[page 10] The Vendor is recommending that no spare parts be provided for the pelletizer to support startup and commissioning... Trend 06-03055 was previously generated to identify the scope and cost for performing additional integrated testing of the LAW decon system equipment to address concerns from the [March 2007] DOE Technical Readiness Assessment. The trend was cancelled based on recommendation of the WTP Technical Steering Group <i>to perform additional testing as part of facility startup</i>. Activities listed above indicate that the baseline schedule Commissioning start in Nov 2020... LFH capabilities will be demonstrated by integrated testing during startup and commissioning... The LAW FPD has reviewed this report, is aware of the risk, and concurs with the closure of this vulnerability on design.</p> <p>"Maintenance on Bogies in Swabbing and Export Rooms may be problematic due to contamination potentially pulled from Container Lidding Areas."...[page 17] "The commissioning (and operational procedure development activities) were subsequently re-sequenced; thus de-coupling the subject schedule activity. Schedule ID 3EL4880062 no longer aligned with Engineering support to Commissioning for the subject system and was therefore not an indication of closure of these vulnerabilities. It is reasonable to conclude that operations procedures <i>will be</i> developed for maintenance and/or recovery of bogies within the finish line...The ORP reviewer has considered the response provided by BNI in conjunction with the original D&O statements and agrees that BNI will have to develop appropriate procedures <i>in the future</i> to ensure safe and reliable operations and maintenance. However, these details have not yet been developed.</p> <p>"Absence of Finishing Line Bogie maintenance hoist may result in problematic bogie maintenance."...[page 19] "The commissioning (and operational procedure development activities) were subsequently re-sequenced; thus de-coupling the subject schedule activity... BNI will have to develop appropriate procedures in the future to ensure safe and reliable operations and maintenance.</p> <p>"Lidding and Decontamination Bogies need to be disconnected from Power Cables and Carrier prior to maintenance which makes their transfer back to their respective process area problematic."...[page 20]</p>

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		<p>BNI responded as follows, "The commissioning (and operational procedure development activities) were subsequently re-sequenced; thus de-coupling the subject schedule activity...BNI will have to develop appropriate procedures in the future to ensure safe and reliable operations and maintenance. However, these details have not yet been developed.</p> <p>'Contamination on the surface of the Container Lower Overpacks may be physically pressed and imbedded in the lower surface of the container at 8 locations. [page 30-31] The indentations will increase complexity of the decontamination process since 'indentations' are being decontaminated rather than a smooth cylinder. Thermal distortion of the Lower Overpack may cause binding of the container and Overpack."... according to the vendors evaluation, interference between the overpack and the canister <i>should not</i> occur. However, observations during commissioning will need to validate that conclusion. Although the <i>SDD no longer contains the requirement to measure the overpack temperature</i>, the reviewer agrees that any interference issues will be revealed during commissioning and modifications to the overpack <i>could happen</i> with relative ease at that time. It is noted that although the tolerance evaluation performed by the vendor does show that interference <i>should not</i> be a problem, in some cases clearances are minimal and thus risk of interference is not negligible.</p> <p>"The factory acceptance testing of the LRH conveyor system does not seem to meet all the requirements of the conveyor specifications...[page 33] it appears BNI could not verify FAT test meets spec requirements...FAT testing to be reverified during start up and commissioning." BNI has concluded to initiate a CR to further investigate and document this vulnerability. CR 17-01592. This LAW D&O vulnerability is considered closed and the issues identified will be addressed under the contractor's corrective action management program (CR 17-01592).</p> <p>Empty LAW container handling by the LSH-CRN-00001 crane will have to be done by either moving the containers around each other or by moving the containers in controlled, sequential order...[page 35] "The LSH-CRN-00001 crane does not have enough lift clearance to lift a LAW container over another container on an over-the-road truck. Due to the length of the procured pendant cable, use of the pendant to control the crane and move canisters from a truck will be difficult." ... "Procedures have not yet been developed that are approved for operational use. These are being developed in accordance with the level 5 schedule." The reviewer determined the vulnerability does not constitute a condition adverse to quality at this time... Furthermore, to address the training concern, the WTP Contract No. DE-AC27-</p>

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		<p>01 RV14136, section C states: Standard 5: Commissioning - The purpose of this standard is to describe the requirements and deliverables for the startup testing and commissioning of the WTP. Startup testing begins following turnover of systems from construction, including component and system level tests that will be performed in a planned sequence at each facility, and precedes cold commissioning of the facility. The Startup and Commissioning process begins with Startup testing followed by Commissioning testing, which includes testing during Cold Commissioning making production runs using agreed upon simulant waste, then Hot Commissioning using actual tank waste, and continues through to turnover to the future Operations Contractor. Commissioning is supported by testing, operations, maintenance, procedure development, and training required to support the scope contained in this standard. ... This LAW D&O vulnerability is considered closed. [No ALARA review?]</p> <p>"From a load lifting perspective, the LSH-CRN-00001 appears to be over-specified as a Class D (Heavy Service) crane for empty container handling. [page 36] However, from a motor jog/start stop perspective, the crane may require a Class D rating. Excessive numbers of starts, stops, and motion reversals is hard duty for motors, motor starter contacts, and motor brakes and may lead to early failure of the motors, starters, and brakes. Maintenance on the motors and motor brakes will require a scissor lift to be rented and delivered to the site. If the repairs cannot be completed in two or three days, the LAW Facility will have to be shut down due to a lack of empty LAW containers... Man-lifts are provided throughout the WTP facility ensuring available access for maintenance." ... The reviewer determined the vulnerability does not constitute a condition adverse to quality <i>at this time</i> and the BNI response above properly addresses the D&O comment on crane maintenance and duty/rating. Furthermore to address the training concern, the WTP Contract No. DE-AC27-01 RVI4I 36, section C states: Standard 5: Commissioning - The purpose of this standard is to describe the requirements and deliverables for the startup testing and commissioning of the WTP. Startup testing begins following turnover of systems from construction, including component and system level tests that will be performed in a planned sequence at each facility, and precedes cold commissioning of the facility. The Startup and Commissioning process begins with Startup testing followed by Commissioning testing, which includes testing during Cold Commissioning making production runs using agreed upon simulant waste, then Hot Commissioning using actual tank waste, and continues through to turnover to the future Operations Contractor. Commissioning is supported by testing, operations, maintenance, procedure development, and training required to support the scope contained in this standard</p>

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		This LAW D&O vulnerability is considered closed. [No verification that the man lifts are equivalent in capability to the scissor lifts identified by the review team?]
17-WTP-0235	15	<p>Rollup doors are used in several places in the facility. Rollup doors are larger than personnel doors and are not solid doors. They have the potential to allow greater infiltration into the airspace than a standard personnel door. [page 7] This amount of infiltration has not been quantified. The BNI response says that rollup door infiltration has been accounted for in the infiltration calculation. While it is true that infiltration into C5 areas has been accounted for in the calculation, <i>none of it is attributed to the rollup door</i>. ... The magnitude of this issue will not be known and will not be known until commissioning;... In the event that the infiltration is greater than anticipated, it is believed that a more secure seal for the door edges could be devised and installed in order to bring the infiltration back in line with expected system performance.... DOE <i>accepts the risk</i> that infiltration through these rollup doors will present challenges with the C5V ventilation system.</p> <p>"The 40 year design life of the LFP Vessels is in question due to the lack of credible data to accurately predict the erosion wear for SA-240, 316L material." [page 12] ... The D&O basis explains that "The basis for the assumption that for the LFP Vessels, that the velocity inside the vessels with glass formers will be less than 1/2 the agitator tip speed is derived from the results of a Non-NQA-1 Computational Fluid Dynamic (CFO) software performed by the agitator vendor. With this unverified assumption accepted, all that is currently required for verification is to confirm the agitator shaft RPM and blade dimensions during startup testing and commissioning.... The method for verifying the assumption that the velocity at the vessel wall is 1/2 the agitator speed has not been adequately captured. ... BNI decided to initiate a Condition Report (24590-WTP-GCA-MGT-17-01834) to address the matter. At the time of this closure document, the CR was still in screening status... The ORP Reviewer confirmed that 24590-WTP-GCA-MGT-17-01302 is active in the BNI CAMP system. Based on BNI action to address this via the CR process, this D&O vulnerability can be closed. ... The LAW FPD has reviewed this report, recognizes the risk in closing the item based on <i>future resolution</i> [contrary to QA] of a CR and concurs with the closure of this vulnerability on design.</p> <p>"The operating envelope has not been defined to ensure the requirement for mixing homogeneity can be met during normal plant operations." ... [pages 14-15] ... It is not apparent where BNI vetted these recommendations based on the LAW D&O responses. However there is flexibility to address such</p>

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		<p>issues should they arise in commissioning.... The ORP reviewer has reviewed the response provided by BNI in conjunction with the original D&O statements and agrees that BNI <i>will have to</i> evaluate the function of the single speed agitator as well as the use of radar detection for level indication during start up and cold commissioning.... The LAW FPO has reviewed this report, understands the risk in closing this item based on <i>future work to be performed</i> [a violation of QA], and concurs with the closure of this vulnerability on design.</p> <p>Operation of the Carbon Dioxide (CO₂) pelletizer and C5V vacuum pickup system may be problematic. The shrouds and operation of the upper and lower decontamination power manipulators may be problematic. ...[pages 19-20] The Vendor is recommending that no spare parts be provided for the pelletizer to support startup and commissioning. ... While the duct is Q quality and is not likely to fail, there is a flex coupling on the fan that is still suspect. BNI is looking into the life expectancy of the flex coupling. <i>As long as</i> the flex coupling is adequately maintained, the hazard should be minimal. BNI has generated CR 24590-WTP-GCA-MGT-17-01874 to track this hazard to resolution. This CR will adequately disposition his D&O issue. ... The LAW FPO has reviewed this report, <i>is aware of the risk</i>, and concurs with the closure of this vulnerability on design.</p> <p>The <u>Lidding Jib Crane</u> (LFH-CRN-00003 / 00006) [pages 21-22] should be interlocked with the Sealing Jib Crane (LFH- CRN-00004 / 00007) to allow movement of the Lidding Crane only if it will not collide with the Sealing Crane. ... Start-up and commissioning should include exhaustive testing of both success and failure paths and off-normal operations to "wring out" errors and identify improvements in operations and operator/control interfaces before operations begin. ... BNI's response: This is <i>future work</i> to be completed during support to startup 3EL4880062. <i>Credit is given to skilled operators</i> trained and adhering to operating instructions where they are told of the hazards associated with bogie location and doors acting as guillotine. ... Conclusion: From the review of the J3, SDD, PISW, and MSD document, it shows this LFH-IC-1-V003 is well documented, and interlock functions are sufficient, and has no need to be over engineering to provide all possible interlocks, that does not justify for any additional interlocks to prevent any potential lidding and sealing jib movement interferences. In addition, the operator will be trained to operate the crane. The local and remote controls and displays are sufficient for safe operations. The comment is acknowledged and no further interlocks is considered necessary. [NOTE: this disposition sheet is not signed by the engineer or by the DOE]</p>

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		<p>FPD. A second version, without a report number (pages 23-25) addresses the same topic. Omitted signatures and report numbers are quality assurance issues.</p> <p>The <u>Sealing Jib Crane</u> (LFH-CRN-00004 / 00007)-should be interlocked with the Lidding Jib Crane (LFH-CRN- 00003 / 00006) to allow movement of the Sealing Crane only if it will not collide with the Lidding Crane. [pages 26-27] Device specific interlocks should be complete enough to keep the equipment from damaging itself or other systems, structure or components regardless of whether they are operated locally or remotely; manually or automatically. ...</p> <p>If the requirements are incorrect, the requirements documents should be updated. If the implementation is incorrect, it should be corrected. Add a reference in the MSDs to the J3 Logic Diagrams where the interlock is implemented. Start-up and commissioning should include exhaustive testing of both success and failure paths and off-normal operations to "wring out errors and identify improvements in operations and operator/control interfaces before operations begin. ...</p> <p>Conclusion: ...From the review of the J3, SDD, PISW, and MSD document, it shows this LFH-IC-1-V004 concern is well documented, and interlock functions are sufficient, and has no need to be over engineering to provide all possible interlocks, that does not justify for any additional interlocks to prevent any potential lidding and sealing jib movement interferences. In addition, the operator will be trained to operate the crane. The local and remote controls and displays are sufficient for safe operations. The comment is acknowledged and no further interlocks is considered necessary. [NOTE: this disposition sheet is not signed by the engineer or by the DOE FPD. A second version, without a report number (pages 28-30) addresses the same topic. Omitted signatures and report numbers are quality assurance issues.</p> <p>Interlocks on the Decon Shield Door listed in the Mechanical Sequence Diagram 24590-LAW-M1-LFH-00001 are not sufficient to protect against HVAC flow disruptions or the spread contamination. [Pages 31-32] Conclusion: From the review of the J3, SDD, PISW, and MSD document, it shows this LFH-IC-1-V005 <i>concern is well documented</i>, and interlock functions are sufficient, and has no need to be over engineering to provide all possible interlocks, that <i>does not justify for searching</i> any additional interlocks to prevent any potential contamination it may cause. In addition, the operator will be trained to operate the crane. The local and remote controls and displays are sufficient for safe operations. The comment is acknowledged and no further interlocks is considered necessary...[Wonder if the D&O review team was asked if they concurred?] [NOTE: this disposition sheet is not signed by the</p>

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		<p>engineer or by the DOE FPD. A second version, without a report number (pages 33-35) addresses the same topic. Omitted signatures and report numbers are quality assurance issues. Signed attachments are not the same as a signed report.</p> <p>Interlocks on the Decontamination Power Manipulators and the Decontamination Turntable listed in the Mechanical Sequence Diagram 24590-LAW-M1-LFH-00001, are not sufficient to prevent the equipment from damage. [Pages 37-38] ... Start-up and commissioning should include exhaustive testing of both success and failure paths and off-normal operations to "wring out" errors and identify improvements in operations and operator/control interfaces before operations begin. The K965-002 will become Revision 0, once the Factory acceptance Test (FAT) is completed, although the only document copy can be found in the BNI iDoc system is Revision G. ...From the review of the 24590-CM-POA-HDYR-00002-03-00001 document, it shows this LFH-IC-1-V006 concern has been well designed, tested and documented, and interlock functions are sufficient, and has no need to be over engineering to provide all possible interlocks, that does not justify for searching any additional interlocks to prevent any potential damage which the D&O did not even identify. The comment is acknowledged and no further interlock is considered necessary. [NOTE: this disposition sheet is not signed by the engineer or by the DOE FPD. A second version, without a report number (pages 39-41) addresses the same topic. Omitted signatures and report numbers are quality assurance issues. Signed attachments are not the same as a signed report.</p> <p>Interlocks on the Swabbing Bogie (LFH-TRLY-00015 / 00005) listed in the Mechanical Sequence Diagram 24590- LAW-M1-LFH-00001, are not sufficient to prevent the equipment from damage....[pages 42-43] Start-up and commissioning should include exhaustive testing of both success and failure paths and off-normal operations to "wring out" errors and identify improvements in operations and operator/control interfaces before operations begin. ... Conclusion: From the reviews discussed above, it shows this LFH-IC-1-V007 concern has been well designed, tested and documented, and interlock functions are sufficient, and has no need to be over engineering to provide all possible interlocks, that does not justify for searching any additional interlocks to prevent any potential damage which the D&O did not even identify. The comment is acknowledged and no further interlock is considered necessary. [NOTE: this disposition sheet is not signed by the engineer or by the DOE FPD. A second version, without a report number (pages 44-46) addresses the same</p>

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		<p>topic. Omitted signatures and report numbers are quality assurance issues. Signed attachments are not the same as a signed report.</p> <p>There is no clear flow down of requirements from higher level documents to the Logic Diagrams. The J3 logic Diagrams attempt to correct this, but that puts them in violation of an upper-level requirement...[pages 447-48]. Start-up and commissioning should include exhaustive testing of both success and failure paths and off-normal operations to "wring out" errors and identify improvements in operations and operator/control interfaces before operations begin. ... Conclusion: It has no need to be over engineering to provide all possible solution for the requirements traceability, and documentation until the management decision is concluded. The comment is acknowledged and no further interlock is considered necessary. NOTE: this disposition sheet is not signed by the engineer or by the DOE FPD. A second version, without a report number (pages 49-51) addresses the same topic. Omitted signatures and report numbers are quality assurance issues. Signed attachments are not the same as a signed report.</p> <p>"The analysis indicates air moving over the robot arm to the gripper to create convective cooling is required to maintain temperature sensitive instruments below critical temperatures. The velocity of the air at the surface of the container was not analyzed to determine the potential for spreading contamination and adversely affecting the quality of the swabs. Temperature of the compressed air lines has not been adequately analyzed to determine if the aluminum wrap is effective at maintaining the compressed air lines below critical temperatures. [pages 55-56]... At this time, the reviewer concludes that the updated CFD analysis has shown that canister temperatures will be significantly less than previously predicted and the resultant effect to swabbing sensors will more than likely be minimal. However, the new analysis did not focus on that area of the finishing line so this is purely a judgment based on limited temperature data that is available. If the temperature effect on the swabbing equipment is determined to be detrimental, 24590-CM-POA-HDYR-00002-21-00002 identified methods to mitigate the temperature affects if necessary. Given the stage of project completion, DOE accepts the risk and recognizes that mitigation activities (if needed) would be implemented during startup and commissioning.</p> <p>"Intrusive maintenance performed on the LOP system (including the condensate receipt vessel) will require both melters to be in idle with the cold cap burned off. [Page 58] Other non-intrusive</p>

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		<p>maintenance requiring a process cell entry could also result in idling both melters." ... BNI is still in the process of developing operating and maintenance procedures. Procedures will be developed prior to operating the melters and offgas system. These procedures will be further refined during startup and commissioning to maximize glass production. ... DOE recognizes the potential impact to glass production if both melters are idled and the cross-over line between the melters is opened. However, it is <i>believed</i> there are ways to work around this issue and minimize the impact to glass production. DOE accepts the risk. The LAW FPD has reviewed this report, <i>understands</i> the remaining risk, and concurs with the closure of this vulnerability on design.</p> <p>"Heat-up and cool-down temperature profiles for TCO skid not considered in OR model." [The OR model is used to determine contractual compliance with the requirement for 70% operating availability.] [page 61] ... The TCO skid will be started up and shut down several times during startup and commissioning. These heat-up and cool-down cycles will affect production during startup and shutdown. However, once the facility is operational, startup and shutdown cycles will be minimal since continuous operation is <i>anticipated [assumed]</i>. The impact of these startup and shutdown cycles is anticipated to be minimal as well. The TCO skid is in place. <u>Replacing it at this point would be cost prohibitive.</u> DOE <i>anticipates</i> the impact to glass production due to heat-up and cool-down cycles of the TCO skid to be limited. DOE accepts the risk to glass production due to heat-up and cool-down of the TCO skid.... The LAW FPO has reviewed this report, understands the remaining risk, and concurs with the closure of this vulnerability on design.</p> <p>There are many inconsistencies between the requirements documents such as the Mechanical Sequence Diagram and the implementation of these requirements on the Logic Diagrams. Since there is no narrative or cross-walk between the requirements and the logic diagrams it is difficult to review, and will be difficult to verify and validate that the requirements are met. ... "Start-up and commissioning should include exhaustive testing of both success and failure paths and Off-Normal operations to "wring out" errors and identify improvements in operations and operator/control interfaces before operations begin. ... Conclusion: From the review of the document, it shows this LPH-IC-1-V001 will not add additional benefits with a major benefits. The control software are tracked and documented to J3 and PISW document and are field V&V'd and tested to verify the requirements are fulfilled and accurate. The comment is <i>acknowledged and no further documentation is considered necessary.</i> NOTE: this disposition sheet is not signed by the engineer or by the DOE FPD. A second version, without a</p>

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		<p>report number (pages 72-74) addresses the same topic. Omitted signatures and report numbers are quality assurance issues. Signed attachments are not the same as a signed report.</p> <p>Insufficient priority, resources and funding have been given to the LSH maintenance program to ensure successful plant commissioning and startup. [pages 90-93] ... Currently, the mechanical flow diagram drawings are cancelled; however, they are <i>in the process of</i> being reissued, 24590-LAW-MS-LSH-XXXXXxxx. The mechanical flow diagrams provide a description, in flow diagram format, of the sequential operational steps within system LSH. Note that this information, albeit in a different format, already exists in the System Design Description. <i>Currently, the OR model does not contain detailed activities for all LSH equipment. Frequencies and durations of activities would be a WTP input to the OR model if the project determined it necessary for incorporation.</i> ORP Comments: ORP has reviewed and concurs with BNI's responses. ... The LAW FPD has reviewed this report, <i>is aware of the risk</i>, and concurs with the closure of this vulnerability on design.</p> <p><i>[Note – the DOE reviewer associated with the unsigned forms in this letter was found in May 2018 (via unsatisfactory examination) to have weaknesses in understanding the hazards in the BOF Facility, the Building 89 function and purpose, the credited safety functions for LOP, backup versus emergency power, uninterruptible power supply loads, DOE standards of classification for the public, co-located worker, and facility worker, facility walkthrough, understanding of misroutes, and safety basis class. These weaknesses were not documented until after the completion of the LAW D&O “verification” of closure actions were completed. Have these items been revisited?]</i></p>
18-WTP-0007 January 17, 2018	1	Bechtel’s <i>plan</i> is to conduct <i>demonstration testing</i> early in the startup and commissioning phase. ...