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Comment Submittal on the Department of Environmental Quality Notice of Intent to Approve a Draft Hazardous Waste Treatment, Storage, and Disposal Permit Modification for INTEC Liquid Waste Management System Partial Permit at the Idaho National Laboratory (EPA ID No. ID4890008952) (Docket No. 10HW-2102) Issued September 28, 2021 (Which addresses changes to the Integrated Waste Treatment Unit (IWTU))

The Idaho Department of Environmental Quality (DEQ) is proposing to issue a modified Hazardous Waste Storage and Treatment Facility Partial Permit for the Idaho Nuclear Technology and Engineering Center (INTEC) Liquid Waste Management System (ILWMS). The modified Permit is based on the Class 3 modification request submitted on June 2, 2021.

The Class 3 permit modification request addresses the replacement of the sintered metal filter elements in the Process Gas Filter (PGF) with ceramic filter elements, modifications to the wet and dry radiological decontamination systems, addition of 36 new thermocouples to the shell of the Carbon Reduction Reformer (CRR) and several other changes. The ILWMS Partial Permit is being modified to include design, operation and inspection changes to the IWTU

”The Defense Nuclear Facilities Safety Board completed a review of the safety basis for Idaho National Laboratory’s Integrated Waste Treatment Unit (IWTU) in October 2017. The Board’s review team identified the following weaknesses in IWTU’s safety basis:

“• Several hazards are designated as standard industrial hazards and are screened from further analysis in IWTU’s safety basis. As a result, IWTU’s safety basis does not adequately analyze some events, such as a carbon dust explosion in the fuel storage silos, and oxygen displacement in the process areas. These types of events may require identification of safety-significant controls for protection of workers.

“IWTU’s fire hazard analysis relies on the implementation of site-wide safety management programs to screen out hazards during the unmitigated analysis. This is inconsistent with the Department of Energy’s documented requirements. Consequently, IWTU’s safety basis does not analyze several possible accident events, such as a carbon dust fire in the additive storage room. A carbon dust fire

could spread to the adjacent mechanical equipment area, potentially damaging the safety-significant components in that space.

“IWTU has implemented safety management programs and non-credited safety controls that are intended to address these potential hazards within the short expected operational life of the facility but has not sufficiently documented the hazards and the controls in the safety basis. Such documentation should be completed regardless of the expected operational life of a facility.”¹

“**Integrated Waste Treatment Unit (IWTU) Process Gas Filter (PGF).** Fluor Idaho continues to test and gather data to determine causes and solutions for PGF issues. The final set of coupons and the sintered powdered metal filter elements were removed in mid-January from the PGF at an independent research laboratory’s IWTU model pilot plant for analysis. The research laboratory is supporting startup of the facility for the PGF filter element high temperature testing. Fluor Idaho is evaluating potential plant modifications (e.g., off-gas cooling) and use of alternate filter media if the sintered powdered metal filter elements do not prove to function as designed.”²

[At this point the public is left in the dark about the outcome of these design revisions]

“**MSA Filter Failure.** An MSA combination HEPA/charcoal filter came apart at the seam during doffing in ARP VII. Radiological surveys found no personnel contamination. Fluor Idaho experienced a similar issue in 2017. At that time, all filters from the identified lot number were returned to MSA. Following the recent event, Fluor Idaho discovered that a single box of the previously identified lot number was received at INL in January 2019. Although MSA instituted a formal recall in September 2018, the INL supplier apparently was not responsive.”³

“**Staff Conclusion.** The staff review team believes that the scope and depth of the engineering actions required to address the TSR violation, PISA, design changes, and transitions to steam and non-radioactive simulant feeds indicate a lack of assurance that the facility can safely proceed with nuclear operations. These changes may result in a safety basis, facility design, and operational procedures very different from those assessed during the DOE RA. DOE Order 425.1D requires a readiness review after substantial process, system, or facility modifications. Additional and independent technical assessments, such as an additional readiness review, may be necessary to ensure that all potential safety and operational issues have been identified and appropriately resolved prior to introducing radioactive feed.”

“While conducting the off-gas system heatup, a Technical Safety Requirement (TSR) violation occurred due to a safety-significant system in the off-gas system not being properly configured for operation.”

¹ The Honorable James Richard Perry, Secretary of Energy U.S. Department of Energy, March 27, 2018.

² DEFENSE NUCLEAR FACILITIES SAFETY BOARD; February 1, 2019, Christopher J. Roscetti, Technical Director Timothy L. Hunt, Acting Cognizant Engineer, Idaho National Laboratory (INL) Report for January 2019

³ DEFENSE NUCLEAR FACILITIES SAFETY BOARD April 5, 2019 TO: Christopher J. Roscetti, Technical Director INL

When the staff members discussed this inconsistency with the DOE RA team leader, he indicated that the DOE RA team did not have the resources to perform a review of every facility modification. The staff review team believes that a review of all facility modifications is needed to comply with the intent of DOE Order 425.1D, particularly for such a first-of-a-kind facility startup.”

*“Granular Activated Carbon (GAC) Bed Potential Inadequacy of the Safety Analysis (PISA)—*On April 3, 2014, during a subsequent attempt at off-gas system heat-up, CWI declared a PISA at IWTU with respect to the estimated time to GAC vessel failure when subjected to the maximum credible fire temperature of 1000 °C. The GAC vessels are a significant portion of the off-gas system and have several safety-significant controls to ensure their proper operation.

“Engineers discovered that the GAC vessel wall thickness used in the original engineering analysis of a fire in the vessel did not take into account the corrosion rate of the vessel wall.

“Following the declaration of this PISA, a test hold was put in place with the process off-gas bypassing the GAC vessels. CWI is performing an analysis of the GAC vessels with the anticipated wall corrosion rate. Following the conclusion of the analysis, CWI engineers will determine if changes are required to IWTU’s safety basis and/or operating procedures.

*“High Off-Gas Temperature Causes Actuation of Safety Instrumented Function (SIF)-2 Panel—*On April 11, 2014, while heating up the GAC beds, IWTU experienced a SIF-2 trip due to high temperature in the process off-gas system. The SIF-2 safety instrumented system performs a safety-significant function to prevent a release of hazardous concentrations of nitrous oxide and mercury resulting from a breach in the off-gas system due to high off-gas temperatures. To assist in the heat-up of the GAC beds, the Shift Supervisor directed the Control Room Operator (CRO) to increase the outlet temperature of the Off-Gas Cooler (OGC). The CRO made the associated adjustment to the OGC’s automatic temperature controller. After approximately 30 minutes, the CRO shifted the OGC’s temperature control from automatic to manual to aid in maintaining the desired outlet temperature. Soon after, the test engineer noted that the OGC and GAC bed outlet temperatures were rising more rapidly than previously observed. Consequently, the Assistant CRO (ACRO), who had responsibility for maintaining the OGC outlet temperature, attempted to lower the OGC temperature. In doing so, the ACRO adjusted the temperature controller in the wrong direction, reducing the amount of cooling provided by the OGC. The OGC outlet temperature subsequently rose to 204 °C, causing the SIF-2 trip, which prevented further heat-up of the GAC beds.

*“Inadequate Operation of Hydrogen Analyzer System—*On April 18, 2014, while reviewing the hydrogen analyzer in preparation for adding steam to IWTU’s processing systems, CWI engineers noted that a gas sampling line was unexpectedly cold. Gas samples are drawn from the Process Gas Filter (PGF), routed through the hydrogen analyzer, and returned to the Denitration Mineralization Reformer. An eductor provides the motive force to move the sampled gas. The engineers directed a series of troubleshooting actions to determine if obstructions existed in the sample lines or the eductor, but found none. The engineers believe that the design of the eductor is inadequate to draw the required sample from the PGF. They are re-evaluating the eductor’s design and intend to procure a replacement. Management personnel made the

decision to shut down and cool down the facility until corrective actions can be implemented. This situation highlights the consequences of the numerous unknowns associated with how the as-built IWTU facility operates.”

“**Staff Conclusion.** The staff review team believes that the scope and depth of the engineering actions required to address the TSR violation, PISA, design changes, and transitions to steam and non-radioactive simulant feeds indicate a lack of assurance that the facility can safely proceed with nuclear operations. These changes may result in a safety basis, facility design, and operational procedures very different from those assessed during the DOE RA. DOE Order 425.1D requires a readiness review after substantial process, system, or facility modifications. Additional and independent technical assessments, such as an additional readiness review, may be necessary to ensure that all potential safety and operational issues have been identified and appropriately resolved prior to introducing radioactive feed.”⁴

The DOE Permit Request submitted to IDEQ includes a new high-level radioactive and hazardous waste processing plant. IDEQ's permit approval is back dated to September 16, 2004 for a "partial-permit (for less than entire facility)".³

This is the deadliest material on the planet short of nerve-gas. **This new operation is the Integrated Waste Treatment Unit (IWTU).**⁴ IDEQ has allowed DOE for many years to "bootstrap" new deadly waste operations like the IWTU onto old Process Equipment Waste Evaporator (PEWE) permits and thereby avoid the otherwise full legal Resource Conservation Recovery Act (RCRA) and Clean Air Act (MACT) permitting process.⁵ DOE's IWTU is required as a matter of law to obtain a RCRA and MACT permit as a new major source facility and not be engrafted as a modification onto the current application that is decades old.⁶ This is a jurisdictional issue that requires resolution before the IWTU can receive any legitimacy as a RCRA facility.⁷

The IDEQ, with EPA Region-10's concurrence, illegally relies on the decades old RCRA permit (on record) for the Process Equipment Waste Evaporator (PEWE) and attempts to "bootstrap" **new separate operations in separate buildings** into this new permit modification.

Current EPA regulations restrict permit modification to **existing** permitted operations.⁸ Therefore, IDEQ approval of this new permit modification is bogus because there are no original permits for the IWTU, High-level Liquid Waste Evaporator and Liquid Effluent Treatment & Disposal. These operations needed to obtain individual RCRA permits as new facilities because they were not in existence before 1986.⁹ Moreover, the deadline for DOE compliance with the Clean Air Act/NESHAP/MACT standards for these operations was 6/29/98.¹⁰ Why? Because even Idaho knows that Interim Status only applies to RCRA operations operating prior to 1986.

⁴ This report documents an on-site visit by members of the Defense Nuclear Facilities Safety Board's (Board) staff to Idaho National Laboratory's Integrated Waste Treatment Unit (IWTU) during March 10–13, 2014, and subsequent review of IWTU startup testing.]

EPA/OIG states; "Interim status is a temporary designation, but some units have existed for as many as 25 years without formal issuance or denial of a permit, or other regulatory controls." ¹¹

Additionally, Petitioners believe the 2/5/04 EPA/OIG Evaluation Report "Review of EPA's Response to Petition Seeking Withdrawal of Authorization for Idaho's Hazardous Waste Program" recommendations have not been adequately or fully implemented by either Region 10 or IDEQ. ¹²

Due to the fact that a significant number of requested FOIA documents have yet to be released by DOE/ID, EPA Region-10 and IDEQ, Petitioners reserve the right to submit additional information to EPA/OIG if and when these reports are released. ¹³

³ IDEQ Toni Hardesty, Director Department of Environmental Quality, September 16, 2004.

⁴ Permit Modification, Attachment 1, Section B, Facility Description, (Dec. 06). IDEQ reference (1b_facility description).

⁵ Code of Federal Regulations (CFR), National Emission Standards for Hazardous Air Pollutants, Maximum Achievable Control Technology (MACT) Standards for Major Sources 40 CFR 63.40 through 63.44

⁶ IDEQ Updated Listing of INL RCRA documents 1/17/07, INTEC Permitting, page 29-30, shows the last full RCRA permit for the Process Equipment Waste Evaporator.

⁷ 40 CFR 270.42

⁸ 40 CFR 270.42(a)(i) Subpart D Changes to Permit. 6/7/05

⁹ Construction for the High-Level Liquid Waste Evaporator (HLLWE) at the Idaho National Laboratory was initiated in 1993 and operation of the HLLWE as a new facility began in 1996. The HLLWE has processed over 4 million gallons of high level radioactive liquid and mixed hazardous wastes without a RCRA permit. DOE is required but has failed to submit an application for a RCRA permit for the HLLWE. The HLLWE has operated at all times without a RCRA permit and without interim status. See Environmental Defense Institute, et al., Notice of Intent to Sue DOE, 7/9/02, available at; <http://environmental-defense-institute.org>

¹⁰ 40 CFR 63.42. Also see EPA Office of Inspector General 3/9/05 Evaluation Report "Substantial Changes Needed in Implementation and Oversight of Title V Permits If Program Goals Are to Be Fully Realized"

¹¹ USEPA Office of Inspector General, 12/4/06, EPA's Management of Interim Status Permitting Needs | | Improvement to Ensure Continued Progress, Report No. 2007-P-00005.

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