

Environmental Defense Institute

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RE: Preliminary Comments on U.S. Department of Energy Class 3 Modified Permit to the Volume 14 for the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Laboratory, Permit Number EPA ID No. ID4890008952I INTEC Liquid Waste Management System and the Integrated Waste Treatment Unit. IDEQ Public Notice of Intent 6/28/13 to approve Class 3 Permit Modifications of Volume 14, Docket Number 10HW-1320.

These comments for the public record are submitted by the Environmental Defense Institute (EDI) Inc. We reserve the right to submit supplemental comments due to release resistance of our Freedom of Information Act (FOIA) requests to DOE, EPA and Public Records Requests (PRR) for Idaho National Laboratory RCRA permit information to Idaho Department of Environmental Quality.¹

EDI's 5/1/12 "Comments on Department of Energy (DOE) Idaho National Laboratory (INL) Highly Radioactive Sodium Bearing Waste Tank Closure Program and Integrated Waste Treatment Unit (IWTU) and Replacement Capacity for Disposal of Remote Handled Low-level Waste," are included as an attachment and by reference because the issues articulated were never resolved.

¹ Environmental Protection Agency Region 10 denied fee waiver to Environmental Defense Institute's Freedom of Information Act request for INL permit documentation "EPA has determined that the requested records do not meet the threshold test of contributing significantly to the public understanding of the operations or activities of the Federal government." Stephanie Kercheval, FOIA Officer, 2/7/07. EPA requires payment of \$750 for processing fees. Idaho Department of Environmental Quality also denied EDI fee waiver for INL permit documentation.

Section I: Summary

The Department of Energy (DOE) Idaho National Laboratory (INL) contractor CH2M- WG- Idaho issued a public notice mailing (June 28, 2013) on a Permit Modification Request that offered inadequate discussion on this project and no "on-line" access to the documentation.

Way back in 2006, DOE quickly posted a "Permit Modification Request" (PMR) in August 2006 that has no official public comment provisions. Idaho Department of Environmental Quality (IDEQ) subsequently issued Public Notice: Intent to Approve a Permit Modification Request 1/26/07.

The 45-day comment period (ending 8/12/13) provided by IDEQ is inadequate given the importance of this major new operation, the failed applied treatment technology and the potential for significant environmental impact. Therefore, EDI requests that the comment period be extended to 90 days to IDEQ "Intent to Approve the Permit Modification" of the more than 640+ pages of the Permit.

The DOE Permit Request submitted to IDEQ includes a new previously classified 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)". This is the deadliest material on the planet short of nerve- gas. This new operation is called the Integrated Waste Treatment Unit (IWTU).

Integrated Waste Treatment Unit (IWTU)

The INL Integrated Waste Treatment Unit (IWTU) is designed to convert ~900,000 gallons of previously classified high-level liquid waste generated over decades of nuclear fuel reprocessing to a solid form suitable for final disposal in a geologic repository. It is crucial to remember that this is the most deadly material on the planet. A dixy cup of it on the table in front of you would give you a fatal dose of radiation before you could get up and leave the room.

DOE has been trying for decades to convert this liquid waste into a stable form that can be put into a permanent waste repository. This more recent DOE treatment – IWTU - from construction to startup has taken over 7 years.

EDI conducted an assessment of relevant DOE reports related to the IWTU, and offer them below. The documented evidence below will give a reasonable person pause before endorsing DOE's choice of radioactive waste treatment technology and the State of Idaho's ability to oversee the operation.

DOE's Occurrence Reports document serious malfunctions of the IWTU that state:

“On Saturday, June 16, 2012, the Integrated Waste Treatment Unit (IWTU) was performing startup and testing activities when an unexpected pressure transient caused a loss of vacuum in the Carbon Reduction Reformer (CRR) vessel activating the Rapid Shutdown System (RSS). IWTU Operations were in the process of performing the system lineup to transfer Off-Gas Filter (OGF) material to the Product Receiver Filter/Product Receiver Cooler-1 (PRF/PRC-1) when the CRR began losing vacuum needed to maintain established operating parameters and to continue heat-up of the steam reforming process. Control room operators backed out of the product transfer lineup, exited the transfer procedure and continued to operate the plant under the IWTU startup procedure. IWTU Operations personnel, with engineering support, continued to monitor the system and make adjustments throughout the evening attempting to restore CRR heat up and to maintain vacuum. During the adjustments, the pressure in the CRR rose to approximately 14 inches of water column. The RSS trip point is 14.0 inches of water column. Downstream temperature and differential pressure problems became evident in the HEPA

filters, 260 and 240 blower systems. A pressure increase in the Off-Gas Cooler (OGC) caused a rupture of the rupture disk on the OGC and an increase in the OGC outlet temperature which tripped Safety Instrumented Function (SIF)-2. The failure of the rupture disk and the tripping of SIF-2 are the initiating events for this ORPS occurrence. Timeline: 11:57 - A Hi CRR pressure alarm was received. Operators responded per procedure by raising the Off-Gas Blower speed. CRR pressure responded as expected and pressure returned to normal. 12:08 CRR pressure began to rise. Operators responded per procedure and pressure became erratic. 12:20 - CRR pressure began to rapidly rise passing through the Hi and Hi-Hi alarm set-points. 12:24 - A Hi-Hi-Hi CRR pressure alarm was received along with the corresponding Distributed Control System (DCS) - RSS activation. 13:05 - The shift supervisor commenced plant shutdown per procedure. During shutdown a dark plume was noted coming from the stack. 13:35 - The OGC rupture disc pressure alarm was received indicating Rupture Disc PSE-SRC-160-003, a design feature SSC, had ruptured. 13:59 - Following rising temperatures at the outlet of the OGC, SIF-2 High-Temperature Protection System (a Safety Significant System) activated.

“Immediate Action(s): All applicable Emergency Action Response procedure steps were verified completed and a plant shutdown/cool-down was initiated. Notifications were made to DOE-ID and CWI Corporate.”¹

An on-site employee at INTEC during the IWTU startup “incident;” states the “he was not sure whether or not that there had actually been an explosion (of coal dust) but its pretty darn certain that ALL of the IWTU’s off-gas filters had failed resulting in ‘stuff’ being blown up the stack. These filters include the sintered ceramic blow back filters at the tops of the cyclones situated downstream of both the fluidized bed reactors (DMR & CRR) and the main bank of HEPA filters situated immediately upstream of the main stack.”²

“On March 13, 2012, a Hot Work Permit was authorized and a Fire Safety Watch was present for workers to weld and grind brackets in Room 109 South Corridor at IWTU. At 1430 hours MST, the Fire Safety Watch observed smoke coming out of the fume extractor unit, disconnected the unit and took it outside of the facility. After taking the smoking unit outside the Fire Safety Watch removed the spark trap cover and observed a small flame in the pre-filter which self-extinguished.

“The workers were performing hot work (welding and grinding) installing supports on an electrical cable tray. The workers were in compliance with the hot work permit. Due to the restricted work area the intake funnel on the fume extractor hose was located below the hot work area, pointed up and positioned close to the welding location, but not directly under. The cable tray is approximately 10 feet above the ground with the fume extractor, ACE Industrial Products, Model No 73-200 M, located on a cart below. It appears that a hot spark was sucked into the funnel and down the hose into the spark trap portion of the fume extractor. The spark was drawn onto the surface of the pre-filter where it caused the pre-filter media to smolder generating the smoke observed by the fire watch.”³

“Waste Treatment: Startup testing was suspended on June 16, 2012, at the Integrated Waste Treatment Unit (IWTU), which is designed to treat about 900,000 gallons of liquid radioactive waste stored at the Idaho Nuclear Technology and Engineering Center. Testing was suspended

¹ DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0008

² Darryl Siemer 6/22/12 email to Chuck Broschious

³ DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0004

and plant heat-up was terminated to allow detailed evaluation of the process temperature, pressure and flow excursion observed on June 16. Facility startup testing has been ongoing for the past month, evaluating system and component operation and response during operating conditions. Radioactive waste has not been introduced into the facility, pending successful completion of startup testing.”⁴

“July 17, 2012: A potential inadequate safety analysis was declared as part of the investigation into the pressure event that occurred during start-up of the Integrated Waste Treatment Facility. It was determined that the potential for “blinding” filter systems in the facility with unburned charcoal had not been adequately analyzed in the current safety documents. The facility was shut down after the June 16 pressure event, and an investigative team was commissioned to determine the root causes of the event and how to correct them. (EM-ID—CWI-IWTU-2012-0009).”

“Waste Treatment Progress: Progress continues in the effort to resume start-up activities for the Integrated Waste Treatment Unit, after the “pressure event” halted start-up activities last summer. **The IWTU** is designed to treat the remaining 900,000 gallons of liquid waste stored at the Idaho Nuclear Technology and Engineering Center tank farm. With the completion of the IWTU main process piping flush, the project can now start reassembling the process gas filter, off gas filter and the carbon reduction reformer. Restart activities are anticipated to resume this summer.”⁵

“Dec. 17, 2013: An investigation was initiated into the adequacy of controls for relief valves and a rupture disk at the Integrated Waste Treatment Unit (IWTU). If the valves are not properly controlled, pressure could increase downstream of the rupture disks during process heat-up. This increase could cause a condition where the rupture disks would not rupture at the required pressure to protect the process off-gas system. IWTU operations have been shut down and will not resume until the necessary changes have been made to the facility or procedures. (EM-ID—CWI-IWTU-2012-0013).”⁶

“June 19, 2012: Operators at the Integrated Waste Treatment Unit were performing start-up testing when an unexpected pressure transient caused a loss of vacuum in the Carbon Reduction Reformer vessel, activating the Rapid Shutdown System. All applicable emergency action procedures were followed, and a plant shutdown was initiated. A team has been formed to evaluate the cause of the incident and recommend corrective actions. (EM-ID—CWI-IWTU-2012-0008).”⁷

“July 17, 2012: A potential inadequate safety analysis was declared as part of the investigation into the pressure event that occurred during start-up of the Integrated Waste Treatment Facility. It was determined that the potential for “blinding” filter systems in the facility with unburned charcoal had not been adequately analyzed in the current safety documents. The facility was shut down after the June 16 pressure event, and an investigative team was commissioned to determine the root causes of the event and how to correct them. (EM-ID—CWI-IWTU-2012-0009).”⁸

⁴ DOE-ID Operations Summary; For the Period June 5 to June 18, 2012

⁵ DOE-ID Operations Summary -13 4-1; For the Period Feb. 12 to Feb. 25, 2013

⁶ DOE-ID Operations Summary 13.01; For the Period Dec. 11, 2012-Jan. 2, 2013

⁷ DOE-ID Operations Summary; For the Period June 19 to July 12, 2012

⁸ DOE-ID Operations Summary; For the Period July 13 to Aug. 2, 2012

Defense Nuclear Facility Safety Board report to Congress Idaho National Laboratory

“Integrated Waste Treatment Unit. During 2012, the Board’s staff evaluated preparations to commence operations of the Integrated Waste Treatment Unit project at Idaho National Laboratory. This facility is designed to convert approximately 900,000 gallons of radioactive liquid waste stored in tanks at the Idaho Nuclear Technology and Engineering Center to a solid form in preparation for permanent disposal. On June 16, 2012, the process system over-pressurized during pre-operational testing using nonradioactive materials. The system’s off-gas filters were breached, creating an unimpeded path from the process vessels to the environment. The staff reviewed the operating contractor’s corrective action plan and found several weaknesses. Among the staff’s concerns was the potential for improper operation of bypass valves in the pressure relief system to impact the function of safety-significant rupture disks that protect other portions of the process system from over-pressurizing. The staff’s communication of this concern prompted the contractor to declare a Potential Inadequacy of the Safety Analysis to ensure the issue was formally tracked and resolved. The Board continues to monitor the project’s progress as DOE prepares to resume startup activities.”⁹

U.S. Nuclear Waste Technical Review Board

“The NWTRB is an independent agency of the U.S. Federal Government. Its sole purpose is to provide independent scientific and technical oversight of the Department of Energy’s program for managing and disposing of high-level radioactive waste and spent nuclear fuel.”¹⁰

According to Dr. Darryl Siemer, former INL scientist, “the people on the NWTRB Board are supposed to serve as totally independent advisors/counselors to DOE on its "technical" issues - kinda like what the folks at the National Academy of Sciences & Defense Nuclear Facility Safety Board are also supposed to be doing for it (us?). Frankly, I think that DOE has made captives of all of its "advisors" because 1) it's both fun & lucrative (about \$165K/yr for part time work) to be one of DOE's pet independent experts, and 2) they don't really have to do all much for it (their support staff does all the scut work). The main problem is that DOE usually dictates what its independent experts are supposed to "think" about & provides them with carefully rehearsed dog & pony shows/selected documents to "bring them up to speed" on each such issue. Most of these experts don't seem to question what they're being told & therefore usually end up not spotting/fixing the real problem(s).”

⁹ http://www.dnfsb.gov/sites/default/files/Board%20Activities/Reports/Reports%20to%20Congress/2013/ar_2013228_21831_0.pdf

¹⁰ <http://NWTRB.gov>

Additional Occurrence Reports on IWTU Problems

7/30/12; ITWU – Failure to Follow Confined Space Entry Process; ¹¹

5/2/12; ITWU Potential Inadequacy of Safety Analysis (PISA) – Inadequacy of Technical Safety Requirements TSR-level Controls for Fire Detection in Granular Activated Carbon Beds; ¹²

4/25/12; ITWU Hazardous Energy Control Process Violation; ¹³

2/27/12; IWTU – Safety Significant Pressure Safety Disk PSE- SRH-141-001A Discovered Ruptured; ¹⁴

IDEQ has allowed DOE for many years to "boot-strap" 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.

DOE's IWTU is required as a matter of law to obtain an RCRA and MACT permit as a new major source facility and not be grafted as a modification onto the current application that is decades old. ⁷ This is a jurisdictional issue that requires resolution before the IWTU can receive any legitimacy as a RCRA facility.

The IDEQ illegally relies on the decades old RCRA permit (on record) for the Process Equipment Waste Evaporator (PEWE) and attempts to "boot-strap" **new separate operations in separate buildings** into this new permit modification. Current EPA regulations restrict permit modification to **existing** permitted operations. 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. Moreover, the deadline for DOE compliance with the Clean Air Act/NESHAP/MACT standards for these operations was 6/29/98.

Section II. IDEQ Fails to Require DOE to Implement Permanent Waste Treatment Solutions Stipulated in the Settlement Agreement

This section is included by reference to Environmental Defense Institute Comments to Department of Energy Highly Radioactive Sodium-Bearing Waste Tank Closure Program; and Integrated Waste Treatment Unit; and Replacement Capacity for Disposal Remote-Handled Low-Level Waste, May 1, 2012 submitted as official comment for the record.

¹¹ DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0011

¹² DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0007

¹³ DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0006

¹⁴ DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0002