

FACT SHEET

**DRAFT CLASS 3 PERMIT MODIFICATION TO MODIFY EQUIPMENT AND OPERATIONAL PARAMETERS FOR THE INTEGRATED WASTE TREATMENT UNIT PORTION OF THE EXISTING HMWA/RCRA LIQUID WASTE MANAGEMENT SYSTEM STORAGE AND TREATMENT PERMIT FOR THE IDAHO NUCLEAR TECHNOLOGY AND ENGINEERING CENTER (INTEC) LOCATED AT THE IDAHO NATIONAL LABORATORY
EPA ID NO. ID4890008952**

This fact sheet sets forth the principal facts pertaining to a draft Class 3 Permit Modification Request the Idaho Department of Environmental Quality (DEQ) is proposing to approve. The request sets forth the applicable permit conditions the DEQ intends to require of the United States Department of Energy (DOE).

A. PURPOSE OF THE PERMITTING PROCESS

The purpose of the permitting process is to design specific administrative and operational requirements under which the Permittee will operate to comply with the Idaho Hazardous Waste Management Act (HWMA) of 1983, as amended, and regulations promulgated thereunder by the DEQ.

The Integrated Waste Treatment Unit (IWTU) was added to the Volume 14 (INTEC Liquid Waste Management System - ILWMS) Partial Permit on March 27, 2007. Construction of the IWTU was completed in the Fall of 2011. A significant process upset occurred during the initial efforts to start the steam reforming process. At the time of the upset neither hazardous nor radioactive waste had been placed in the unit. This Class 3 Permit Modification Request represents the physical and operational changes deemed necessary for the IWTU to recover from the process upset. The requested modifications do not alter the ability of the Permittee to provide continued protection of human health and the environment under HWMA.

The facility public noticed the Class 3 Permit Modification Request on November 30, 2012. DEQ received the modification request, with requests for Temporary Authorizations, on December 4, 2012. NOTE: The application contains both trade secret (confidential business information) and federal "Official Use Only" documents. DEQ has determined that the trade secret claim (see IDAPA 58.01.05.997) is justified for this first in the nation application of the steam reforming process. The applicant has requested the "Official Use Only" documents be restricted because the information could be of use to terrorist groups. A list of the withheld documents is included below. DEQ granted a Temporary Authorization to make construction changes to the IWTU in December 2012 and extended this Temporary Authorization for another 180 days on June 13, 2013.

B. PROCEDURES FOR REACHING A FINAL DECISION

DEQ has prepared a revised draft Volume 14 Permit incorporating the proposed modifications to the permit and related attachments. IDAPA 58.01.05.013 [40 CFR § 124.10(b)(1)] requires that the public be given at least forty five (45) calendar days to comment on the draft Permit presented for approval under the HWMA. The comment period will begin on June 28, 2013, and will end at 5:00 p.m. on August 12, 2013. Any person interested in commenting must do so within this 45-calendar day comment period. This public participation process for a Class 3 Permit Modification is consistent with the process for a new permit application except **that only the draft modifications to the permit are open for public comment**. Comments on previously issued portions of the partial permit, by regulation, will not be considered. Changed text is indicated in the draft. All persons wishing to comment on the modified portions of the Partial Permit should submit comments in writing to:

*Mr. Robert Bullock
c/o Jennifer Shafer
Waste and Remediation Division
Idaho Department of Environmental Quality
1410 North Hilton
Boise, ID 83706-1255
(208) 373-0502*

Comments should include all reasonable available references, factual grounds, and supporting material. As a Class 3 Permit Modification, only those conditions to be modified are reopened for comment in this Draft Permit in accordance with IDAPA 58.01.05.013 [40 CFR § 124.5].

Opportunity for a public hearing may be provided if signed, written requests for a hearing, in accordance with IDAPA 58.01.05.013 [40 CFR § 124.11], are submitted personally to DEQ and received on or before August 12, 2013. If sufficient public interest is expressed in holding a public hearing, then a formal public hearing will be held. The decision on whether there is sufficient public interest in holding the hearing will be based on the receipt of written comments and requests for a public hearing

When making the final decision regarding the Permit Modification; DEQ will consider all written comments received during any public comment period; comments received during the public hearing; the requirements of the hazardous waste regulations of IDAPA 58.01.05.000 et seq.; and all other applicable federal, state, or local laws.

C. FACILITY/UNIT DESCRIPTION

The INL is a large (approximately 890 square miles) DOE-owned facility, co-operated by DOE and various contractors and located in Bingham, Butte, and Jefferson Counties, Idaho. The ILWMS is located within the INTEC fence on the INL and is used to treat aqueous mixed waste (hazardous and radioactive) that is generated at INTEC and other INL facilities. The ILWMS consists of four steam-heated separation treatment systems and associated tanks used for storage and pre-treatment of the waste. The first treatment system, Process Equipment Waste Evaporator (PEWE), is operating in accordance with the existing ILWMS HWMA Permit. The PEWE consists of two thermo-siphon distillation units that reduce the volume of mixed waste sent to the INTEC Tank Farm Facility. The PEWE creates two streams from its operation, a high volume, low hazard condensed vapor (overheads) and a low volume concentrated waste (bottoms). The bottoms are transferred to the Tank Farm Facility, processed through the Evaporator Treatment System (ETS), or reprocessed through the PEWE. The overheads are characterized and returned to the PEWE or are further processed in the Liquid Effluent Treatment and Disposal (LET&D) system, which is the second treatment system. The LET&D, also operating under the current ILWMS HWMA Permit, eliminated the surface disposal of the PEWE condensate stream. The LET&D also recovers nitric acid that is then reused in other INTEC processes. The Evaporator Tank System, ETS, is the third steam-heated treatment unit. The IWTU is the fourth treatment unit in the ILWMS Permit. The IWTU consists of two in-line steam reformers. The first, the Dinitration and Mineralization Reformer (DMR) is operated under reducing conditions. Prior to flowing into the second reformer, the Carbon Reduction Reformer (CRR), the process stream passes through a high temperature filter. As the process stream moves upward in the CRR, air is added shifting the operating condition to oxidizing. The oxidizing conditions destroy the organic materials present and convert any hydrogen present to water. The process stream is again filtered before passing into the unit's pollution control devices. The pollution control devices consist of High Efficiency Particulate Air filters and a Mercury Adsorber (Granulated Activated Carbon bed also known as GAC).

Pretreatment in the tanks associated with these units include: pH adjustment; blending; settling; and chemical complexing to make the waste more amenable for treatment in the ILWMS. The combined PEWE, LET&D, ETS and proposed IWTU operations have been determined to be protective of human health and the environment based on risk analysis screening. Upon completion of the IWTU System Performance Test the risk analysis will be revisited to ensure protectiveness.

D. SUMMARY OF PROPOSED MODIFICATIONS

This modification request addresses IWTU system design and operational changes determined to be necessary to recover from the process upset that occurred during the initial phases of IWTU start-up. The modification includes changes deemed necessary that were identified during the post-event system reviews. The majority of the modifications proposed for approval here were described in the public notice issued by the facility at the time the modification request was submitted. An additional seven items were identified during DEQ's review of the modification

request and are the first seven items listed below in the description of the proposed modification.

The Class 3 Permit Modification Request includes several changes to the system design and operation. These are:

1. Add an oxygen supply line to the existing Carbon Reduction Reformer process gas distributor near the fluidizing rail level. Testing has shown that during heat-up/start-up and during controlled system shutdown oxygen needs to be injected lower in the CRR for better temperature control. Injection of oxygen at a lower point in the CRR will expand the oxidizing region of the CRR and increase the oxygen residence time. During shut down the addition of oxygen will result in slower cooling with better temperature control. The oxygen shall be disabled prior to waste feed operations. The need for the oxygen during cool down was not part of the initial modification request.
2. The Permit Modification Request at Permit Condition VI.C.4.g., now Permit Condition VI.C.4.h., cited Appendix D-7 for a process to modify operating conditions during system shake down and System Performance Testing. Appendix D-7 was not a part of the original Permit Modification Request.
3. The Product Receiver Cooler was added to the list of equipment in Permit Condition VI.A.6.a. that must be functioning or that may contain waste upon shut down.
4. Automatic waste feed cut-off (AWFCO) changes. The IWTU has developed an improved control strategy. Based on the control strategy, regulatory agency feedback, and ongoing process reviews significant changes have been made to the AWFCOs. In addition to the changes in numerical values, this component of the permit has been reformatted so that the AWFCOs are presented in a table format rather than as multiple permit conditions. Two AWFCO changes may be deemed less stringent. The Rapid System Shutdown/AWFCO trip on low-low OGC surge water was replaced with an emergency alarm response to switch water sources. There are two sources of water (primary potable water and backup treated water) so low-low pressure in one system does not trigger a shut down. The less stringent AWFCO change involves redundant shut down triggers. Previously, an AWFCO would be triggered by either a low-low fluidizing gas pressure or by a low-low DMR fluidizing gas flow. The only way to trigger a low-low pressure condition is due to a low-low flow so the low-low gas pressure AWFCO has been proposed for deletion.

Other changes to existing AWFCO conditions include:

- Clarification that there are two feed pumps, one in use and one on standby. AWFCO set point unchanged.
- Reducing the AWFCO Actuation Pressure for the Granulated Activated Carbon

- beds to ≥ 0.5 PSIG.
 - Clarification of the CRR high O₂ in the off-gas is not a ten minute rolling average but instantaneous.
 - Clarification of the CRR low O₂ in the off-gas is not a ten minute rolling average but instantaneous.
 - Clarification that if either thermocouple registers a low temperature an AWFCO is triggered.
 - Clarification that the HEPA/inlet to GAC beds is an average temperature for both high and low temperature AWFCO triggers.
 - Clarification that an AWFCO is triggered if any HEPA pre-filter differential pressure exceeds 8 inches water column.
5. Added Permit Condition VI.C.4.f. setting the maximum temperature for transfer of the dry waste product to the waste canisters $t_o < 150$ °C.
 6. Corrected Attachment 1 Section D, Process Information, Page 34, Solids Sampling to reflect the INL Remote Analytical Laboratory has been closed. Limited analysis such as bulk density and particle size may be conducted in the IWTU Solids Sample Cell.
 7. After the Modification Request, INL requested to remove the valve internals for four pressure bypass lines. For these lines the system protection device is a rupture disk. If the valve were to fail/close during operations the rupture disk might not function as designed due to back pressure between the valve and rupture disk. Removing the valve internals eliminates the possibility of valve being misaligned or failing in the closed position.
 8. Redesign of the pressure relief system for the Product Receiver Filter (PRF) and Product Handling Vacuum Filter (PHVF). This change is associated with changes 2 and 3 below. Modification 2 (below) makes it possible for the PRF and PHVF components to overpressure during a pressure excursion. This modification reduces possibility of releases to the environment in the event of a pressure event.
 9. Tying down the filter bundles in the Off Gas Filter (OGF), Process Gas Filter (PGF), PRF and PHVF. The original design allowed the bundles to lift to relieve pressure. A design change will provide a mechanical connection between the venturi plates and tube sheets. The design of the OGF and PGF do not necessitate pressure relief. Pressure relief for the PRF and PHVF are addressed by modification 1 (above). This change prevents downstream release of particulates that could blind the HEPA filters.
 10. Redesign of the gasket between the venturi plates and tube sheets. An improved gasket will eliminate a pathway for particulates to bypass the filter bundles.

11. Filter fuse removal in the PGF, OGF, PRF, and PHVF tube bundle filters. The filter fuses were a part of the original design of the filter elements. The fuse was designed to plug and stop air flow to an individual filter, should the filter media fail. This tube design is from another pollution control application where the filter is the last particulate control device. This is not the case for the IWTU where banks of high efficiency particulate air filters are downstream.
12. Add differential pressure transmitters on the four process HEPA pre-filters. This design change will allow the pre-filters differential pressure to be monitored. The data control system will include three levels of alarm, High – will alert the operator to the increase in differential pressure and allow time for a response, High-High – alarm is the point where the prefilter needs to be isolated and changed, and High-High-High – alarm will activate the Rapid System Shutdown.
13. Modification of the Denitration and Mineralization Reformer feed nozzles by adding a ceramic cover to the tip of the nozzles. Despite limited run times, an inspection of the existing nozzles showed signs of erosion. The ceramic tipped replacement nozzles are like those successfully used in the New Waste Calcine Facility.
14. Re-routing of the Continuous Emission Monitoring System Drain Line. The pumps on the existing system were insufficient to move the condensate to the drain tank. The modified system corrects this deficiency.
15. Install isolation valves on each of the process HEPA firewater supply lines and provide over pressurization protection for the filter housing. Addition of these valves allows complete isolation of each filter bank to allow filter changes.
16. Add air supply source to off-gas blowers for minimum flow. This change will add a bleed-in line/connection to provide air to the blowers during start-up and shutdown. The bleed-in air will provide additional air, allowing the blowers to operate at their design flows. The bleed-in air helps protect the blowers and blower gaskets. At operating conditions there is sufficient process flows to the blowers so the bleed-in valve will be shut.
17. Modification of the Compliance Schedule to include the submittal of revised, Professional Engineer certified, construction documents and to finalize the IWTU System Performance Test Plan in advance of testing.
18. Changes to the solids management in the PGF, OGF, PRF, And PHVF. To ensure only a limited amount of solids accumulate in these filters a control strategy has been implemented. Permit Condition VI.C.4.i. establishes a minimum schedule for solids removal from each of the filters.

19. Addition of a DMR feed water globe valve. As constructed, the DMR feed water flush system is controlled by a ball valve that does not provide the desired level of flow control. The retention of the ball valve while adding a globe valve will permit better control of the feed nozzle water flush system.
20. Addition of new CRR and DMR differential pressure transmitters. The new pressure transmitters will help the operator control/adjust the density of the fluidized beds.
21. Modified the CRR auto-thermal (ATG) gas injection nozzles. The modified nozzles will help prevent nozzle plugging during shut-down or in an inactive condition.
22. Clarified Permit Conditions VI.C.4.b. and VI.C.4.c. addressing process HEPA filter replacement.
23. Deleted from Permit Condition IV.A.6.1: requirement associated with SPL-SRC-440 as the equipment was not installed and added F-SRH-140-A/B/C/D due to addition of an AWFCO associated with differential pressure being added to the DCS.
24. Modified Permit Condition VI.C.4.e. to state bleed in air will not be used when waste feed is being processed.
25. Added post System Performance Test operating parameters to Permit Condition VI.V.4.g.
26. Added reporting requirement to Permit Condition VI.E.5. to include reporting initiation of any AWFCO.
27. Revised Attachment 1 Section D of the Permit. In addition to numerous clarifying word changes the following changes were made to Section D:
 - Page 23, lines 12-15 described the three ways coal can be added to the DMR.
 - Page 25 lines 27-33 described the three ways carbon can be added to the CRR.
 - Page 26, line 27 added treated water use in the OGC (See Item 4 above).
 - Page 68, line 16: Added low-low temperature at outlet of the process HEPA filters to the list of process trips that will bypass the Mercury Adsorber after 300 seconds. This was added to prevent condensation in the GAC.
 - Page 68, line 17: Added high-high temperature after the GAC beds to the list of process trips that will bypass the Mercury Adsorber after 300 seconds. At temperatures greater than the high-high temperature the adsorption efficiency of the GAC begins to decline.
 - Page 68, Line 18: Added pressure relief activation of GAC bed rupture disk to the list of process trips that will bypass the Mercury Adsorber after 300 seconds. The

GAC will continue to adsorb mercury since the pressure relief is down stream of the adsorber.

- Page 68, line 19: Added low-low CRR average temperature to the list of process trips that will bypass the Mercury Adsorber after 300 seconds. Below the low-low the efficiency of the organic destruction in the CRR declines.
- Page 68, line 20: Deleted loss of pressure in Off-Gas Cooler Surge Tank from list of process trips that will bypass the Mercury Adsorber after 300 seconds. The GAC does not need to be bypassed unless the temperature at the outlet of the OGC goes high-high.
- Page 68, line 22: Deleted high-high off-gas temperature after the Off-Gas Cooler (after a three minute delay) from the list of process trips that will bypass the Mercury Adsorber after 300 seconds. This trip without the 300 second delay has been added to the list of process trips that will bypass the Mercury Adsorber immediately. This was done to protect the Mercury Adsorbers from excess temperature.
- Page 68, line 26: Added clarification that the low-low temperature in the CRR leading to an immediate bypass of the Mercury Adsorber is the SIF-1 Trip. This is different from the environmental trip that bypasses the Mercury Adsorber after 300 seconds.
- Page 68, line 34: Added high-high-high process HEPA pre-filter differential to the list of process trips that will bypass the Mercury Adsorber immediately.
- Page 68, line 35: Added high-high fluidizing gas pressure to DMR to the list of process trips that will bypass the Mercury Adsorber immediately. This shut down stops waste feed and fluidizing gas to the DMR.
- Page 68, line 38: Added high-high temperature Off-Gas Cooler outlet to the trips that will bypass the Mercury Adsorber immediately. This protects the GAC from seeing high temperatures and possible ignition.
- Page 68, line 39: Deleted pressure relief valve activated for fluidizing gas superheater from the list of process trips that will bypass the Mercury Adsorber immediately. The high-high pressure of the fluidizing gas will actuate before the relief valve.
- Page 72, Table D-6: Deleted relief valve PSV-SRC-140-006 because it was removed from the system. Added Process HEPA Filters pressure rupture disk PSE-SRH-140-006 and PSE-SRH-140-008 that replaced the relief valve.
- Appendix D-7 added (see 2 above).

28. Some inspection forms found in Section F-2, Appendix F-1 of Attachment 4 of the Permit have been revised.

29. The definition of the Permit Application is being revised to include documents supporting this Permit Modification.

30. Administrative changes including removal of outdated permit conditions and deletion of closed units no longer subject to this partial permit.

The proposed permit, the December 2012 Permit Modification request, and other supporting documents are available online through www.deq.idaho.gov. The proposed modifications are identified throughout the draft modified permit.

Trade Secret and "Official Use Only" Documents

This document contains both Confidential Business Information (CBI) and Official Use Only (OUO) information. Both classes of information are printed on light blue paper within the Permit Modification Request (PMR). Prior to release of this document for public viewing please remove the light blue pages from the PMR. There is a notice in the front of the CBI and OUO information that needs to be left in the PMR and states the following:

Under appropriate circumstances, Idaho law allows a permittee to maintain confidentiality of information in the Hazardous Waste Management Act/Resource Conservation and Recovery Act permitting process. Pursuant to this law, the following drawings have been removed from this Permit Modification Request to protect Company Confidential information.

632762	632782	632790	F-SRC-191 FE Data Sheet
632763	632783	632791	F-SRC-192 FE Data Sheet
632764	632787	F-SRC-153 FE Data Sheet	
632765	632788	F-SRC-160 FE Data Sheet	
632766	632789	F-SRC-190 FE Data Sheet	

Under appropriate circumstances, Idaho law allows a permittee to maintain confidentiality of information in the Hazardous Waste Management Act/Resource Conservation and Recovery Act permitting process. Pursuant to this law, the following drawings have been removed from this Permit Modification Request to protect Official Use Only information.

PMR-01	632512	632831	
632503	632513	Exhibit B-12. Isometric Drawing of the IWTU, Building CPP-1696	
632504	632830	Appendix D-1, Figure 3. Process building and product storage building sections in the IWTU facility	