EA-437; Environmental Assessment Process Equipment Waste and Process Waste Liquid Collection Systems Idaho Chemical Processing Plant Idaho National Engineering Laboratory

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Final Draft

ENVIRONMENTAL ASSESSMENT

Process Equipment Waste

and

Process Waste Liquid

Collection Systems

IDAHO CHEMICAL PROCESSING PLANT

IDAHO NATIONAL ENGINEERING LABORATORY

Idaho Operations Office
U.S. Department of Energy

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1. INTRODUCTION

This Environmental Assessment (EA) describes and evaluates the environmental impacts of the proposed action (and alternatives to the proposed action.) The proposed action, which would be the installation of new waste lines and associated equipment in the Process Equipment Waste (PEW) and Process Waste Liquid (PWL) systems, seeks to bring those existing parts of a waste management facility into compliance with applicable state and federal environmental regulatory requirements (49 CFR 265 Subpart J and Idaho Administrative Procedures Act Title I, Chapter 5, Rules, Regulations and Standards for Hazardous Waste, Section 01.5000 et seq). These facilities are located at the Idaho Chemical Processing Plant (ICPP), which is part of the Department of Energy (DOE), Idaho National Engineering Laboratory (INEL) (see figures 1 and 2).

The proposed action would include changes to transfer piping, limited floor cutting and removal, core boring of some cells, and emplacement of some sumps and small tanks and the operation of the resulting system. The principal sending and receiving vessels and tanks would remain unchanged. Therefore, the safety envelope would be the same as is addressed in the existing Plant Safety Document(footnote 1) since the proposed changes addressed in this document cause no adverse safety problems. In accomplishing the proposed action, above-ground waste lines and associated equipment would be installed, secondary containment would be provided, as appropriate, and old waste lines would cease being used and then capped in a manner that would ensure environmental protection. The proposed action will be coordinated with the State of Idaho and/or the Environmental Protection Agency (EPA).

Alternatives to the proposed action, including (1) rerouting piping and using visual inspection instead of secondary containment, (2) construction of new facilities, and (3) taking no action (obtain a variance) were considered and are addressed in this EA.

This EA was prepared in accordance with the Council on Environmental Quality regulations implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500-1508) and the DOE Guidelines for Compliance with the National Environmental Policy Act (52 CFR 47662, December 15, 1987). This EA evaluates alternatives and the impacts of the proposed action as an aid in determining whether to prepare an environmental impact statement or a finding that there will be no significant impact.

Figure (Page 2 Figure 1. Location of the Idaho National Engineering Laboratory)

Figure (Page 3 Figure 2. Location of Fuel and Waste Processing Facilities...)

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Purpose and Need of the Proposed Action

The purpose of the proposed action would be to ensure that the PEW and PWL collection systems, a series of enclosed process hazardous waste, and radioactive waste lines and associated equipment, would be brought into compliance with applicable State and Federal hazardous waste regulations. This would be accomplished primarily by rerouting the lines to stay within the buildings where the lined floors of the cells and corridors would provide secondary containment. Leak detection would be provided via instrumented collection sumps located in the cells and corridors. Hazardous waste transfer lines that are routed outside buildings will be constructed using pipe-in-pipe techniques with leak detection instrumentation in the interstitial area.

The need for the proposed action was identified when a DOE-sponsored Resource Conservation and Recovery Act (RCRA) compliance assessment of the ICPP facilities found that singly-contained waste lines ran buried in the soil under some of the original facilities. These lines carried wastes with a pH of less than 2.0, which were hazardous wastes according to the RCRA standards (40 CFR 261.22). Other hazardous materials covered by RCRA regulations may have been routed through the lines over the thirty-eight year life of the facilities, but insufficient information exists to verify the possibility or to quantify the amounts. Likewise, the integrity of the existing lines, though thought to be good, cannot be accurately determined. The proposed action would provide new transfer lines that have primary and secondary containment and leak detection systems which satisfy applicable regulatory requirements.

2.2 Description of the Affected Facilities

One of the primary missions of the ICPP is processing irradiated nuclear fuel assemblies to recover uranium. These facilities were built in the early 1950s. The processing facilities are buildings which contain numerous concrete-shielded vaults or cells containing process vessels and equipment. The equipment is interconnected by piping through the cell walls. Solution generated in these facilities is routed into enclosed drain systems and transferred to collection tanks. The proposed action would involve changes to the drain systems.

The principal reprocessing facilities affected by the proposed action are the CPP 601 process building, the CPP 627 multicurie cell facility and the CPP 602 analytical support building. Solutions produced in these buildings are handled through a PEW collection system inside CPP 601. The collected solution is transferred to the PWL system located within CPP-604/605. The PWL system also includes building CPP-649, the atmospheric protection system. The existing PEW collection system consists of stainless steel tanks, piping, valves, and other stainless steel equipment. The PEW collection system drains handle process liquids as well as spent decontamination solutions (water, nitric acid, various caustics, etc.) in the cells. The solutions may be radioactive, hazardous, or mixed waste, but are considered process streams until sampled for recoverable uranium product. The radioactive constituent is derived from fission products remaining after reprocessing the fuels. The hazardous nature of the solution is usually due to the fact that the pH of the solution is less than 2.0 (40CFR 261.22) Occasionally other materials such as cadmium may make the solutions hazardous. These solutions typically might consist of aqueous nitric acid solutions containing fission products (Cs, Sr, etc.) and other process additives such as aluminum nitrate, etc.

Many of the existing collection system drains, constructed of type 347 or 304 stainless steel, are currently routed outside the cells and underneath the building, passing singly-contained through the soil, then back into the building to various collection headers which carry the drain fluids to four PEW holding tanks. Certain singly-contained stainless-steel, solution lines from adjacent analytical and custom processing facilities, for which the integrity cannot be assured, are also routed underground to the same tanks. These drain lines do not have secondary containment meeting the requirements of 40 CFR 265.193.

The PWL waste processing facilities in CPP 604/605/649 contain most of the gaseous and liquid waste treatment processes at the ICPP. The primary purpose of liquid waste treatment in the affected waste processing facilities is to perform a waste volume reduction. Small amounts of process and decontamination solutions result from operation and maintenance of these facilities. These solutions may be hazardous, radioactive, or mixed waste. The system drain lines, constructed of type 347 or 304 stainless steel, transfer these solutions to existing collection tanks pending further treatment. Many of the facilities' drain lines are routed under the buildings. The drain lines running underneath the buildings do not have secondary containment.

In accordance with the RCRA, all hazardous waste tank system ancillary piping must be capable of being either visually inspected or have secondary containment (40 CFR 265.193(f)). To a great extent, the tank systems ancillary piping described above cannot be visually inspected. Therefore, it is necessary to provide acceptable secondary containment for the tank systems in order to be in full compliance with 40 CFR 265.193(b) and (c).

2.3 Description of the Proposed Action

The proposed action would alter existing collection systems to ensure acceptable secondary containment for the waste lines, tanks, sumps, and pumping devices. This action would install approximately 6000 feet of new type 304L stainless steel waste lines (varying in diameter from 1/2 inch to 3 inches), seven small type 304L stainless steel tanks, numerous type 304L stainless-steel-lined sumps, new jet pumps, and associated monitoring instrumentation. All new waste lines would be installed above floor or ground level (see figures 3, 4, 5, and 6). Expected pressures in the lines would not exceed 60 psi.

that would be generated during maintenance operations would be sent directly to holding tanks. There the solutions would be sampled and if within tolerances for uranium, would be sent to the waste treatment system. The function of the modified systems, therefore, would remain unchanged: to transfer liquid process solutions from the fuel and waste processing facilities to existing tanks.

The existing, buried lines would not be reused and would be capped. Since these lines are all gravity-drained, no residual liquids would remain in the pipes and no future releases to the environment would occur. Characterization and closure, as required, would be accomplished as part of the overall facility closure, following requirements agreed to in the RCRA Part B permitting process and through superseding compliance agreements (40 CFR 265.197). All available records concerning past use of the affected lines would be retained to aid in any required closure.

Construction equipment expected to be involved in the proposed action includes coring machines, jack hammers, welders, and similar machines.

Large earth moving equipment would not be required.

The new system would comply with the applicable environmental requirements for management of hazardous waste materials. Repair and upgrade actions would be reviewed and certified by an independent, qualified, and registered Professional Engineer in accordance with 40 CFR 265.192 and 40 CFR 265.196, as appropriate.

2.4 Alternatives to the Proposed Action

Three alternatives have been identified: (1) rerouting piping and using visual inspection instead of secondary containment, (2) constructing new facilities, or (3) continuing to operate the current facilities without any changes (no action). These options are described below and evaluated in section 5.

2.4.1 Visual Inspection

The piping could be rerouted within the building and daily visual inspection of the piping substituted for secondary containment and leak detection. The current hazardous waste regulations provide for performing visual inspection of hazardous waste tank ancillary equipment on a daily basis as an alternative to providing secondary containment and leak detection (40 CFR 265.193(f)). This alternative was evaluated for all affected facilities.

2.4.2 New Facilities

The second alternative to the proposed action would be to construct new facilities and cease using and close the existing facilities. The new facilities would perform the function of the existing processes. However, the existing facilities would have to operate while new facilities were constructed or construction of extensive new fuel

storage would be required in order to store incoming receipts of recoverable, irradiated fuels from defense reactors. The existing facilities would be decontaminated and decommissioned following shutdown.

2.4.3 No Action

This alternative would entail continued operation of the facilities without providing additional secondary containment for hazardous waste tanks or piping systems. To do so, a variance, pursuant to RCRA, 40 CFR 265.193(d) would have to be obtained from the regulators. Annual leak testing to ensure integrity of the system would then be required. Pursuant to 40 CFR 265.193(g), annual leak testing on multi-branched piping systems such as these would be difficult since many given lines cannot be effectively isolated for testing.

2.4.4 Alternatives Considered but Rejected

2.4.4.1 Use of Other Pipes. Use of other pipe was evaluated to determine if other existing lines with secondary containment could be used. This alternative was evaluated for all affected facilities. Because no other existing piping was identified which could be substituted for the current lines, this alternative was not considered further.

2.5 Separate but Related Actions

A number of future tasks have been proposed to replace other buried, singly-contained transfer lines with secondarily contained lines. These singly-contained lines are not currently in use and are not directly required for nuclear fuels processing. They are located primarily in research or analytical facilities. A schedule for replacement of these lines has been discussed with the EPA and State of Idaho but no final agreement has been reached. When these schedules are confirmed and before DOE proposes to proceed with these tasks, appropriate NEPA review will be undertaken. Funding to perform the work has been requested in fiscal years 1991 and 1992. In the interim, these lines will not be used.

Figure (Page 9 Figure 3. Proposed Action for Fuel Processing Facilities...)

3. AFFECTED ENVIRONMENT

3.1 Introduction

The purpose of the proposed action is to seek compliance with applicable regulations concerning appropriate leak detection and containment of process and waste solutions. In achieving this, the ability to protect the environment surrounding the Idaho Chemical Processing Plant is greatly enhanced.

The proposed action would take place in a controlled, already disturbed, regulated environment within existing ICPP facilities. Design of facilities and intrinsic safeguards would prevent release of any materials resulting during the construction efforts or subsequent operations. Therefore, any environmental impact related to construction or operation would be effectively mitigated.

A brief discussion of the natural environment at the INEL is included below for completeness of this Environmental Assessment.

The physical, biological, and cultural environments at the INEL have been extensively studied.(footnotes 2,3) Environmental characteristics specific to the ICPP are described in DOE/EA-0306 (Environmental Assessment for Fuel Processing Restoration at the Idaho National Engineering Laboratory),(footnote 4) and DOE/EIS-0136 (Final Environmental Impact Statement for Special Isotope Separation Project), dated November 1988.(footnote 5)

The INEL occupies 890 square miles in southeastern Idaho and is on the Snake River Plain. In addition to activities related to nuclear energy, the area has been designated as a National Environmental

Research Park. The INEL provides an area for research on the environmental impacts of human activities on relatively undisturbed ecosystems because developed facilities at the INEL cover only a small portion of the total land area. The ICPP is an enclosed area of approximately 245 acres in the south-central portion of the INEL.

3.2 Physical Environment

The INEL is on the Snake River Plain and is bordered on the north and northeast by the Lost River, Lemhi, and Bitterroot mountain ranges. The surface of the INEL is relatively flat and composed of basaltic lava flows interbedded with sedimentary strata. The basalt-sediment sequence is underlain by an unknown thickness of rhyolitic and pyroclastic flow materials.

The INEL is in a seismic zone 2B, defined by the Uniform Building Code (UBC) as an area where destructive earthquakes may occur.(footnote 6) Extensive seismic evaluations have been performed for the INEL.(footnotes 5,7) Numerous small earthquakes have been recorded in the region. Epicenters of most earthquakes have been in the surrounding mountains. In October 1983, a

large earthquake (Richter magnitude 7.3) occurred 15 miles northwest of Mackay, Idaho. The ICPP is approximately 70 miles from the epicenter of that earthquake. No damage occurred at any ICPP facilities.(footnote 7)

The surface of the INEL is relatively flat, with the predominant relief manifested as volcanic buttes or uneven basalt flows. Elevations on the INEL range from 5200 feet in the northeast, to 4750 feet in the southwest. Soils at the INEL include loam, clay, loess, and lacustrine sediments. Soil depth and water-holding capacity vary considerably around the INEL.

The climate of the INEL has been extensively studied for many years. The National Oceanic and Atmospheric Administration (NOAA) operates 26 monitor stations on or near the INEL. Detailed climatological information has been published by NOAA.(footnote 2)

Severe weather on the INEL consists of thunderstorms and funnel clouds. On the average, two to three thunderstorms occur during each of the summer months. Small hail may accompany the thunderstorms, but hail damage has not occurred at the INEL. NOAA records indicate a total of five funnel clouds and no tornadoes on the INEL since 1950.

Naturally-occurring surface waters at the INEL consist of three intermittent streams, the Big Lost River, Little Lost River, and Birch Creek. These streams drain adjacent mountain valleys and flow onto the INEL. All of the streams infiltrate, disappearing in the underlying aquifer.

The ICPP is located approximately 0.5 miles east of the Big Lost River channel. The area is approximately 11 feet above the riverbed. The elevation of facilities affected by the proposed action is 4917 feet above sea level which coincides with the water level in the Maximum Probable Flood (35,000 CFS). A flood control system was constructed on the Big Lost River in 1958. The system consists of a dam which diverts water into a series of spreading areas. In 1984, the dikes were raised so that the flood control system could contain a flood with an average return period of 300 years or more. In recent years, all of the water in the Big Lost River has been stored or diverted for irrigation upstream of the INEL.

The aquifer at the ICPP is approximately 450 feet below the surface. Perched water has been found in shallow alluvium and in the deeper basalt at the ICPP.(footnote 8) The perched water has been found at various depths ranging from 40 to 377 feet.

3.3 Biological Resources

Flora and fauna of the INEL have been surveyed and studied since the late 1950s. No significant impacts caused by operation of INEL facilities have been identified. Biological resources at the INEL in general and ICPP in particular are extensively described in DOE/EA-0306.(footnote 3,4)

No species on the federal list of threatened or endangered species are known to permanently reside on the INEL. No unique habitats are located on the INEL. Endangered animals occasionally observed at the INEL are the bald eagle and the peregrine falcon. Several additional species are on the State of Idaho watch list, including the bobcat, ferruginous hawk, long-billed curlew, and merlin.(footnote 9)

3.4 Cultural Resources

Several archeological and cultural resource surveys have been conducted in association with development at the ICPP (Reed, 1986 and Ross, 1988). The only significant site identified by these surveys was an historic homestead (Smithsonian Site # 10-BT-269). The site consists of a dugout shelter and associated historic debris characteristic of an occupation period between 1900 and 1930. The site is a considerable distance from any activity related to the proposed action and would not be affected by these efforts.

3.5 Environmental Quality and Monitoring Programs

A monitoring program to measure radioactive and nonradioactive materials released from INEL facilities has been in operation for many years. This program is carried out by the DOE Radiological and Environmental Sciences Laboratory, the U. S. Geological Survey, NOAA, and individual facility managers. The onsite and offsite monitoring program is summarized in DOE/EA-0306.(footnote 4) ICPP has and uses an extensive environmental surveillance program approved by DOE which continuously monitors atmospheric, terrestrial, and subsurface environments for measurable changes and release of hazardous and radioactive materials.

4. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

The assessment shows that the primary impact from the proposed action would result from occupational radiation exposure received during the construction activities. The radiation exposures received by construction workers would be controlled below DOE limits as defined in DOE Orders 5480.11 and 5484.1.(footnote 4) These limits control individual radiation exposure to below an Annual Effective Dose Equivalent (AEDE) of 3 rem/quarter and a maximum of 5 rem/year. Exposure limits during this proposed action would be more restrictive and would control individual whole-body radiation exposures to less than 3 rem/year and 1.8 rem/quarter. See section 4.1.3 for a more detailed discussion on radiation exposure.

Risks to workers from other hazards such as chemical exposures or burns, falls or trips, and heat exhaustion were considered. These hazards would be minimized by the industrial safety programs in place at the ICPP and by the training each worker would receive prior to working in the plant. Chemicals have been flushed from the systems to the extent practicable and provisions to control heat exhaustion and other similar hazards are outlined in the subcontractor's Special Conditions attached to the bid documents.

The environmental impacts of the proposed action may be divided into two distinct areas: those that would result from construction and those that would result from operations. In each case, both normal and abnormal conditions are addressed in the discussion that follows.

4.1 Impacts Attributable to Construction

4.1.1 Description of Construction Activities

Construction would consist of capping or removing existing pipes and installing new pipes, tanks, sumps, instrumentation, and valves. Portions of existing flooring in some cells would be cut and removed for installation of new sumps. Some cell walls would be core-drilled for piping installation.

Much of the work would be performed in cells containing residual radiological and acidic contamination. General body fields range from 5 mR/hr to 600 mR/hr depending on the cell. Workers would utilize protective clothing and equipment to minimize radiation exposures or contamination, in accordance with established practices and procedures.(footnote 13) Detailed written procedures, prepared specifically for these tasks, would be followed for all in-cell construction work. These procedures, attached to the contract Special Conditions, would be provided to and discussed with the subcontractor prior to initiating work. Daily briefings would also serve to pass current information to subcontractors and to enforce issues related to safety. A Construction Safe Work Permit would be issued prior to each work shift. The construction work would be scheduled to be performed over a period of approximately six months.

Dust and noise normally associated with construction would be minimized because the work is being performed primarily within the affected facilities. No significant radioactive or hazardous emissions to the atmosphere would occur since these materials would be contained within cells. Prior to release to the atmosphere through the ICPP main stack, all air from these cells would pass through high efficiency particulate air (HEPA) filters that are part of the ICPP atmosphere protection system. The small amount of piping that will be installed outside the facility will be entirely new construction and therefore will not require demolition or similar action.

Asbestos waste would be generated from the removal of insulation on existing piping and tanks. The asbestos would be removed, packaged, and shipped in accordance with Occupational Safety and Health Administration (OSHA) and National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements.(footnotes 10,11) Special clothing, ventilation and containment would be used to control exposure of workers to the asbestos dust. The asbestos that would be removed as part of this activity would be managed in one of two ways: 1) nonradioactive contaminated asbestos would be properly packaged, labeled, and shipped to the INEL Central Facility Areas (CFA) landfill asbestos disposal area, or 2) radiologically contaminated asbestos would be properly packaged, labeled and shipped to the Radioactive Waste Management Complex (RWMC) for disposal. It is estimated that less than one (1) cubic yard of asbestos would be generated during this construction activity. The disposal of this quantity of radiologically contaminated asbestos, when added to those wastes already in place at the RWMC, would not be a significant added burden.

Liquid wastes generated as a result of construction activities would consist of oil from pipe-cutting machines, solvents used in paint cleanup, decontamination solutions, and other typical construction wastes. The small volume (<5 gallons) of organic solvents would be treated at the Waste Experimental Reduction Facility, if contaminated, or, if non-contaminated, at an offsite permitted treatment facility to yield them nonhazardous. This type of solvent is not sent to the tank farm since wastes there are aqueous based.

All aqueous, high-level radiologically contaminated liquids (mixed hazardous waste) generated by decontamination activities associated with the proposed action are expected to meet process equipment waste (PEW) treatment acceptance criteria and would be processed at the ICPP through the PEW system. The PEW system is designed to treat 12,000 gallons per day. Approximately 13,000 gallons of decontamination solutions would be generated by the proposed action usually in increments of 100 gallons to 1000 gallons. These solutions will be generated within enclosed cells which preclude the possibility of releasing these solutions directly to the environment. Due to the small volumes (approximately one day of processing) that would be generated, the liquid waste would not add significantly to the volumes of liquid waste at ICPP.

Solid, nonradioactive, nonhazardous waste which would be generated by the proposed construction activities would be disposed of in the existing INEL CFA landfill. Approximately 12 cubic yards of nonradioactive, nonhazardous solid waste would be generated during this construction. This waste quantity would not add significantly to the stored volume at the landfill.

Concrete, equipment, or other non-hazardous materials that are contaminated with low levels of radioactivity, and could not be decontaminated, would be shipped in accordance with established DOE policies to the RWMC located at the INEL. At the RWMC, low-level radioactive waste that could be compacted would be reduced to about one sixth of the original volume. Compactible low-level waste including protective clothing and other noncombustible material would contribute approximately 4 cubic yards of waste. Approximately 25 cubic yards of noncompactible low-level waste (metal piping, concrete, wet mop heads and nonhazardous liquids that have been immobilized in absorbent materials) would be generated and sent to the RWMC.

For purposes of this activity, the Waste Experimental Reduction Facility (WERF) would be used to reduce the volumes of various types of low-level solid wastes. Combustible waste would be incinerated resulting in a volume reduction of approximately 350:1. The combustion gases would be released to the atmosphere after HEPA filtration to remove radioactive particulates. These releases would be in accordance with existing WERF air permits. The ash would be subsequently immobilized by mixing with cement grout. Combustible waste (anti-contamination clothing, paper, wood, tape, etc.) generated during the proposed action would result in generating less than 1 cubic yard of materials following combustion and mixing with grout.

In summary, the total anticipated low-level radioactive waste that might be sent to the RWMC during execution of the proposed action is approximately 30 cubic yards over six months. By comparison, approximately 58 cubic yards of low-level radioactive waste is packaged and shipped to the RWMC from the ICPP each month. The quantity of low-low-level waste generated by the proposed action, when added to that already received at the RWMC, would not be a significant addition.

Solid mixed waste (hazardous and low-level radioactive) generated by the proposed action would be packaged and shipped in accordance with established DOE-ID guidelines. All solid mixed waste would be shipped to the Special Power Excursion Reactor Test (SPERT) facility for temporary storage at the INEL. The SPERT facility currently maintains interim status under RCRA as a temporary storage facility. Waste minimization techniques would be utilized during the proposed action resulting in generation of less than 1 cubic yard of mixed waste. For example, all hazardous piping would be triple rinsed using a solvent capable of removing the hazardous contaminant, thereby, making the pipe a non-mixed waste (based on discussions with the EPA Region 10 compliance officer).

All solid mixed waste sent to SPERT would be analyzed to qualify and quantify radionuclide and hazardous contaminants. The proposed action is expected to generate less than 1 cubic yard of contaminated lead, which would be rendered non-mixed waste at SPERT by decontamination.

The following table summarizes the amount of waste that would be generated by the proposed action. The wastes are listed in accordance with the categories discussed above.

Table 1
Estimate of Wastes Generated by the Proposed Action (footnote 12)

	Quantity	Routing Destination	
		Radioactive	Nonradioactive
Asbestos Waste	Less than 1 cu yd.	RWMC	CFA Sanitary Landfill
Solvents from Paint Cleanup	Less than 5 gallons	WERF	Offsite
Radioactive Liquid Mixed Waste	13,000 gal	ICPP Tank Farm	N/A
Solid, non-radio-active Waste	12 cu yd.	N/A	CFA Sanitary Landfill
Radioactive Solid	30 cu yd.	RWMC	N/A

Waste			
Solid Mixed Waste	Less than 1 cu yd.	SPERT	N/A

The radioactivity present in material generated as a result of the proposed activity would amount to less than 10 curies total. Seven (7) curies of the total would be present in the liquid waste as a result of decontamination of stainless steel components. This liquid waste would remain at the ICPP. The total activity would consist of Cs-137, Sr-90 and Y-90 in approximately equal quantities. At most, 5 percent of the total would be other intermediate-lived fission products with less than 1 percent from transuranics (principally Pu 238). Less than 2 curies would be present as fixed contamination on the surfaces of stainless steel. Approximately 1 curie would be present in the concrete scrap generated by coring and preparing surfaces. The 3 curies that would therefore be sent to the RWMC over a six-month period by the proposed action compares to approximately 10 curies in the waste sent to the RWMC from the ICPP each month. Thus, the total radioactivity present in waste that would be generated by this construction activity, is considered to be small compared to the radioactivity in waste sent to the RWMC each month.

4.1.2 Worker Protection and Training

Personnel involved with the construction activities would be required to wear protective clothing and respiratory protection appropriate to the area in which the work would be conducted.(footnotes 13,14) All construction areas would be decontaminated to as low as reasonably achievable (ALARA) levels before initiation of the construction activities. Special work permits would be required to ensure that all personnel hazards have been identified and that all necessary precautions have been taken to protect personnel. Radiation Safety personnel would closely monitor construction activities and specify the particular personnel protection to be used.

After decontamination, the areas would be assessed by Radiation Safety personnel to identify the contamination levels and the appropriate restrictions in each area.

In areas where cutting of lines would be required as part of the construction activities, personnel would be required to use respiratory protection appropriate for the maximum contamination zone classification, even if actual contamination levels are lower. Detailed written procedures would require that operating personnel who are familiar with the facility identify and mark all pipes to be cut prior to construction. This would minimize the potential for cutting of incorrect pipes. Pipes would be cut by personnel in full acid suit protection. In most cases a pilot hole would be drilled in the pipe at the cut point to make sure that no free liquids are present.

Personnel would be trained specifically in the importance and use of protective clothing and respiratory protection. Air line respiratory protection would be required, as conditions warrant. Radiation Safety surveillance would be provided to assure that required protective devices are being used correctly and that personnel would be appropriately protected.

4.1.3 Occupational Exposure to Radiation During Construction

During construction, workers who have been trained in radiological and industrial safety requirements,(footnotes 3,14) using appropriate protective clothing and equipment, would enter various cells in the facilities to perform the construction activities. Under normal conditions, this would result in worker exposure to radiation from residual levels of radioactive materials remaining in the cells after decontamination to be ALARA levels.

Actions would be taken to reduce the radiation exposures received during this construction to ALARA levels. Some of the specific actions would be as follows: (1) a Kelly decontamination system, which uses high-pressure water sprays to remove contamination from various surfaces within the cells, would be used to decontaminate the affected areas to the greatest extent possible, (2) the design of the proposed action would minimize the amount of in-cell welding and fabrication,

(3) epoxy coatings would be used to enhance the secondary containment provided by the floors instead of stainless steel in order to reduce the total in-cell construction time by about 30 - 40 percent, (4) video cameras would be used, to allow Health Physics technicians to monitor in-cell work without making an entry, and (5) remote-readout dosimeters would be used, where appropriate, to allow Health Physics technicians to monitor the radiation exposures being received by workers without entering the cell.

As noted in the introduction of this section, construction personnel radiation exposure would be the primary impact resulting from the proposed action. The personnel radiation exposure estimate for the total proposed construction effort is 373 person-rem(footnote 15), spread among an estimated workforce of about 250 persons. This exposure was arrived at by multiplying in-cell construction times by the general body radiation fields in each cell and then adding the exposure from all cells. Of this 373 person-rem, 270 person-rem would be attributed to the construction effort in the fuel processing facilities, while 77 person-rem would be attributed to construction in the waste processing facilities. Twenty-six person-rem, as part of the 373 person-rem exposure, is estimated to be received by operational personnel for decontamination efforts that would be associated with construction. By comparison, total plant exposures during the last ten years have been as high as 594 person-rem and have averaged 244 person-rem per year (see section 4.2.2).

Person-rem collective dose equivalent may be converted to estimates of health effects expressed in latent cancer fatalities (LCF) by using a conversion factor of 1 person rem = 4.0 X 10E-4 LCF. The EPA has used this figure in a recent rulemaking based on a review of the best available information at the time.(footnote 16) Based on this risk conversion factor, the collective dose equivalent of 373 person-rem would result in an estimated LCF of 0.15 (no latent cancer fatalities expected) over the workers' lifetime. It is estimated that 50 fatal cancers would normally occur in any 250 person sample of the United States population over the same time frame (footnote 17).

The Biological Effects of Ionizing Radiation (BEIR) V report(footnote 18) was published shortly after the EPA's rulemaking but has not been adopted yet by DOE. DOE is thoroughly evaluating the findings of BEIR V to determine if there are warranted changes in risk estimation methods. It currently appears that changes by more than a factor of two are unlikely.

Cumulative radiation exposure for each individual worker would be tracked daily. Individual radiation exposures would not exceed DOE requirements (DOE Orders 5484.1 and 5480.11). Approximately 5,600 person-hours would be required to complete in-cell construction.

4.1.4 Non-Occupational Exposure to Radiation During Construction

No nonoccupational radiation exposure would result from construction.

4.1.5 Criticality Due to Construction

During construction, appropriate controls would be placed on those areas of the facility that would normally contain fissile material to assure criticality prevention. Fissile materials have been flushed from most of the areas where they would normally exist that are affected by the proposed action. This precludes concerns related to cutting the wrong pipe. Nevertheless, controls on cutting of pipes would be strictly enforced as an added precaution. Affected areas that do not contain significant quantities of fissile material during operations, such as the waste processing facilities, would not present a criticality hazard. No transfers of fissile material within any affected area would be allowed while activities associated with the proposed action would be taking place in the area. Consequently, criticality would not be a hazard during the proposed construction.

4.1.6 Postulated Abnormal Occurrences

The maximum credible postulated abnormal occurrence during the construction phase of the proposed action assumes that five workers (a maximum construction crew) would be exposed to the suspended radioactivity resulting from a spill of decontamination solution in the cell in which they are working. The workers would be wearing filter-type respirators which would be removed or fail causing direct respiration of the suspended radioactivity. This represents an enveloping credible situation that would be unlikely to occur for the reasons discussed in section 4.1.2. Calculations(footnote 19) indicate that, as a result of the postulated exposure, each worker is estimated to receive an Annual Effective Dose Equivalent (AEDE) of 2.3 millirem. No exposure to any individuals outside the area would occur, and no radioactive contamination would be released outside the facility.

Other hazards of a non-radioactive nature would be possible (e.g. falling, fire or heat exhaustion) which could lead to injury or death. As previously discussed in the introduction to this section, these risks would be mitigated to the greatest extent possible by established DOE and contractor programs.

4.2 Impacts Attributable to Facility Operation

Due to the nature of the proposed action, which would provide for improved leak containment and detection under abnormal conditions, the completed action would have no negative environmental impact during normal operations. Relative to abnormal conditions, leak detection and containment would be markedly improved after completion of the proposed action, thus reducing the risk of environmental impact from undetected leaks.

Currently some solutions drain to the cell floor for collection in the floor drains, which channel the solutions to collection tanks. In these situations there is no secondary containment. The proposed action would pipe these solutions directly to the collection tanks. This would establish the floor, which is lined with stainless steel or with another waste-compatible coating, as the secondary containment.

4.2.1 Description of Operations

The PEW and PWL collection systems would continue to collect solutions from various routine process sources, mostly dilute nitric acid streams of intermittent flows, in the fuel and waste processing facilities. After accumulation in the collection tanks, the solutions would be sampled and then either transferred to the waste treatment facilities or returned to the process facilities for further processing. In portions of these facilities, solutions would be concentrated by evaporation to minimize the volume. The condensed water vapor would be discharged to the service waste system. The concentrated wastes would be sent to storage tanks pending solidification.

4.2.2 Occupational Exposure to Radiation

Routine operations at the ICPP result in radiation exposures to personnel. The exposures are limited by physical and administrative controls to meet DOE regulations (DOE Orders 5484.1 and 5480.11). Efforts are continually made to reduce exposures to ALARA levels. Historical data are available to project the exposures due specifically to operation of the fuel and waste processing facilities. However, data are not available to project the radiation exposure which would be directly attributable to the day-to-day operation of the systems affected by the proposed action. It is anticipated that no greater exposure potential would exist after the proposed action is completed than existed before since the function would be unchanged and the cell walls would provide essentially the same protection as the soil and wall combinations. Under any postulated abnormal conditions, occupational exposure would not be expected to increase compared to the current postulated abnormal conditions.

The design agency, Stearns-Roger Division of United Engineers and Constructors, has evaluated the need for radiation shielding on all newly constructed piping systems which would result from the proposed action. Shielding was to be installed wherever significant reduction in radiation exposures to personnel could be achieved. The results of this evaluation has concluded that additional shielding would be required only on lines in the controlled access corridor of the fuel processing facility (CPP-601) since personnel would enter this area to perform operational tasks.

The personnel radiation exposure attributed to normal plant operation, maintenance, and other construction activities not associated with the proposed action for CY 1990 is estimated to be 184 person-rem. By comparison, the average annual personnel radiation exposure for plant

operations, maintenance, and construction has historically been as follows:

10 year average (1979 - 1989) was 244 person-rem per year. (A maximum of 594 person-rem was incurred in 1979 due to activities associated with plant maintenance. This is comparable to the construction planned in the proposed action.)

Five year average (1984 - 1989) was 198 person-rem per year. (A maximum of 374 person-rem was incurred in 1986 due to scheduled plant maintenance in the fuel and waste processing facilities.)

One year total (1989) was 228 person-rem.

4.2.3 Nonoccupational Exposure to Radiation

Under both normal conditions and postulated abnormal conditions, the proposed action would result in no nonoccupational radiation exposure increases beyond the current operating mode. Nonoccupational radiation exposures under the current operating mode are insignificant.

4.2.4 Criticality

Currently, stringent controls are in place to prevent criticalities in the process systems. After completion of the proposed action, the same controls would continue. The changes to be made by the proposed action have been extensively reviewed by Operational Safety Analysis personnel and have been determined to be within the boundaries of the existing safety analyses for the facilities.(footnote 20)

4.3 Impacts from Natural Phenomena

Systems at the INEL are designed to withstand postulated natural phenomena such as seismic, tornadoes, and floods. The proposed action would not significantly affect the resistance of the existing facilities to these phenomena.

4.4 Impacts from Other Sources

No other sources of impacts were identified as a result of the proposed action.

4.5 Cumulative Environmental Impacts

The environmental impacts that have been identified that would result from the proposed action, when added to or compared to other existing impacts, would present minimal incremental increases.

5. EVALUATION OF ALTERNATIVES

5.1 Visual Inspection

An alternative would be to reroute the pipes and to perform visual inspection as an alternative to double containment and leak detection on the hazardous waste tank ancillary piping. The majority of transfer piping which would be replaced with this construction effort is beneath the floors of buildings where it is not possible to visually inspect. The remaining piping is located in the process cells.

This alternative was evaluated for all affected facilities. Strong consideration of this option was given for those cells or vaults where viewing windows exist or where the radiation fields are low enough to allow routine entry. In the older facilities built in the early 1950s, cell windows are not available to permit visual inspection from outside the cell. Because the cells are often inaccessible due to radiation fields, inspection is difficult or impossible. An important considera-tion in plant operations has been to minimize the radiation exposure received by operations personnel. Daily cell entries to perform visual inspections would not be consistent with ALARA goals and, in fact, would be an unsafe practice.

For the reasons stated above, this alternative is not considered technically feasible or reasonable for use in the operating cells of the affected buildings.

5.2 New Facilities

Construction of new facilities would have the following impacts in excess of the proposed action. The design and construction of new facilities would be lengthy processes. The existing facilities would be required to operate during this period in order to fulfill the important mission of reprocessing recoverable irradiated fuels. Operation of these facilities in the present condition does not assure compliance with current regulations related to the management and disposal of hazardous material. The proposed action would still be required to allow operation prior to completion of construction of new facilities. Abandonment of existing facilities would produce significant environmental and exposure impact due to decontamination, demolition, and waste disposal activities.

A portion of the original fuel processing facilities will be replaced in 1996 by the Fuel Processing Restoration Project. The existing facilities will then be used for custom processing and other special fuel processing activities. The existing facilities must meet environmental regulations to continue operations.

Since the proposed action would still be required, this alternative is not considered feasible or reasonable.

5.3 No Action

Continuing operations with buried, singly-contained pipe carrying hazardous waste would not meet the State and Federal regulatory requirements and, therefore, would require a variance from the regulators. Approval of a variance per 40 CFR 265.193(g), would require that annual leak testing be performed on the system. Since verification of integrity per leak testing would not be possible due to the inability to isolate the systems, and because the proposed action presents a method for achieving compliance with applicable regulatory requirements, a variance from the regulators would not be likely. Therefore, this alternative is not considered feasible.

6. PERMITS AND REGULATORY REQUIREMENTS

State and federal permits would not be required prior to this proposed construction effort. The proposed action would be implemented through discussions with the State of Idaho and/or the EPA. A partial closure plan would be submitted to the State to fulfill the requirements of 40 CFR 265, Subpart G, for the capped lines that will no longer be in service.

As described earlier, no significant solid, liquid, or gaseous emissions would result from construction and no new operational or accumulated effluents or cumulative effects would be anticipated under the proposed action. All work would be performed in accordance with industrial safety requirements and ALARA to minimize worker radiation exposure.

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FINDING OF NO SIGNIFICANT IMPACT FOR THE PROCESS EQUIPMENT WASTE AND PROCESS WASTE LIQUID COLLECTION SYSTEM TASKS AT THE IDAHO NATIONAL ENGINEERING LABORATORY

Summary

The U.S. Department of Energy (DOE) has prepared an environmental assessment (EA) for construction related to the Process Equipment Waste and Process Waste Liquid Collection System Tasks at the Idaho National Engineering Laboratory near Idaho Falls, Idaho (DOE EA No. 0437). Based on the analyses in the EA, the DOE has determined that the proposed action is not a major Federal action that significantly affects the quality of the human environment, within the intent of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement is not required and the DOE is issuing this Finding of No Significant Impact (FONSI).

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Background

The Resource Conservation and Recovery Act (RCRA) and the State of Idaho Hazardous Waste Management Act (HWMA) regulations require operators of facilities handling hazardous wastes to evaluate and, if necessary, modify existing hazardous waste tank and piping systems to assure containment for these hazardous waste streams. The interim status requirements under these laws require owners and operators to assure proper secondary containment that is compatible with the hazardous waste streams that they contain. The proposed action results from evaluations pursuant to these requirements.

The proposed action would take place at the Idaho Chemical Processing Plant and would modify the process systems used to handle acidic waste streams generated during the dissolution of DOE-consigned nuclear fuels and the subsequent purification and recovery of uranium.

Proposed Action

The proposed action would alter existing collection systems to provide secondary containment of waste lines, tanks, sumps, and pumping devices. This proposed action would consist of installation of approximately 6000 feet of new stainless steel waste lines (varying in diameter from 1/2 inch to 3 inches) and seven small (5-10 gallon) stainless steel tanks, numerous stainless-steel-lined sumps, new jet pumps, and associated monitoring instrumentation. All new waste lines would be installed above floor or ground level. The floors of the facilities would be lined with stainless steel or coated with a waste-compatible coating to ensure secondary containment. New sumps, lined with stainless steel, would be installed to replace waste drains. The new sumps would have leak detection capabilities.

Typically, any solution collected in the sump during processing would be jet pumped back to the process vessels. During external process cell decontamination actions that precede the performance of maintenance activities, solutions collected in the sumps would be jet pumped to the waste system. The function of the systems, therefore, would remain unchanged: to transfer liquid wastes from the fuel and waste processing facilities to existing waste tanks.

The existing buried lines would not be used and would be capped to ensure that no hazardous material could enter the lines. Closure is expected to be accomplished in accordance with a Partial Closure Plan to be coordinated with the State of Idaho Hazardous Materials Bureau.

The goal of the proposed action is to construct a new system which will assist DOE with satisfying the applicable environmental requirements for managing hazardous waste materials. An Independent Professional Engineer Certification assessment of these actions shall be prepared and reviewed by an independent, qualified, and registered Professional Engineer in accordance with 40 CFR 265.192 and/or 40 CFR 265.196 (as appropriate) and IDAPA Title 1, Chapter 5, Section 01.5000 et seq.

Environmental Impacts

Potential environmental impacts (direct, indirect and cumulative) of this proposed action were evaluated in DOE EA No. 0437, including: atmospheric releases of hazardous and radioactive materials and other pollutants; radioactive and nonradioactive liquid effluents; hazardous materials, wastes, and mixed wastes; and impacts that would be associated with hypothetical accidents during construction or operation of the updated systems. In all cases these evaluations indicated that there would be no significant environmental impacts.

Construction and Operational Impacts

Impacts due to releases of hazardous materials to the environment during construction and normal operations were assessed and determined to be negligible. All construction activities would be performed inside buildings or containment enclosures to mitigate any environmental impact due to dust, fumes or noise. There will be no impacts from the construction activities or facility operation on environmentally sensitive areas (e.g., wetlands, floodplains, habitat of endangered or threatened species, cultural resources, natural areas, prime agricultural lands, or special sources of water). During normal operation, the updated hazardous waste handling systems would perform the same function as existing systems, but the new provisions for containment of any leakage are expected to satisfy current environmental regulations.

Exposure Impacts

Impacts due to radiation exposures received by construction personnel were assessed. Rigid controls exist to ensure that all construction personnel are protected and that exposures will not exceed limits in DOE Orders 5484.1 and 5480.11. These control individual radiation exposure to below an Annual Effective Dose Equivalent (AEDE) of 3 rem/quarter and a maximum of 5 rem/year. Exposure limits during this proposed action would be more restrictive and would control individual whole-body radiation exposures to less than 3 rem/year and 1.8 rem/quarter.

A cumulative radiation exposure of 373 person-rem is expected to be received by the combined decontamination/construction workforce of approximately 250 workers over a six-month period. No adverse health effects would be expected to result from these exposures.

Solid and Hazardous Waste Generation Impacts

Environmental impacts due to waste generation during construction were assessed. Some hazardous mixed waste (e.g., piping with acid residues) and radioactively contaminated waste would be generated. The quantity of the waste that would be generated is small relative to that generated by normal operations. The radioactivity present in material generated as a result of the proposed activity would amount to less than 10 curies total. Seven (7) curies of the total would be present in the liquid waste as a result of decontamination of stainless steel components. This liquid waste would remain at the ICPP. The remaining 3 curies would be present as fixed contamination in concrete stainless steel scrap materials. All of these materials would be handled in accordance with established DOE, EPA and State of Idaho procedures. The impact, therefore, is not considered to be significant.

Alternatives to the proposed Action

Three alternatives were identified: (1) reroute pipes and use visual inspection instead of secondary containment, (2) construct new facilities, and (3) no action (continue to operate the current facilities without any changes).

Visual Inspection

The current environmental regulations provide for performing visual inspection of hazardous waste tank ancillary equipment on

a daily basis as an alternative to providing secondary containment and leak detection (40 CFR 265.193(f)). This alternative was evaluated for all affected facilities. The majority of hazardous waste transfer piping being replaced with this construction effort is beneath the floors of buildings where it is not possible to visually inspect. The remaining piping is located in the process cells. Because the cells are often inaccessible due to radiation fields, visual inspection is difficult or impossible.

For the reasons stated above, this alternative was not considered reasonable or feasible.

New Facilities

An alternative to the proposed action is to construct new facilities and abandon existing facilities. The new facilities would duplicate the existing processes. The existing facilities would have to operate while new facilities were constructed or extensive new fuel storage would be required to avoid impact on the receipt of recoverable irradiated fuels from defense reactors. Operation of these facilities in the present condition does not assure compliance with current regulations related to the management of hazardous material. The proposed action would still be required to allow operation prior to completion of construction of new facilities. The existing facilities would be required to be decontaminated and decommissioned following shutdown.

Since the proposed action would still be required in addition to undertaking the construction of new facilities, this alternative was not considered reasonable.

No Action

Continuing operations with buried, singly-contained pipe carrying hazardous waste would not meet the regulatory requirements since verification of integrity, as required by these regulations, is not possible.

Therefore, this alternative was not considered reasonable.

Determination

The proposed action does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act. Therefore, DOE has determined that an environmental impact statement is not required for the proposed action. This finding is based upon analyses presented in the EA.

Issued at Washington, D.C., this 27 day of June 1990.

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health

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