

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: Fresh Fuel Glovebox and Laboratory Hood Installation and Operation

SECTION B. Project Description and Purpose:

The revision to this environmental checklist (EC) covers installation and operation of a Netzsch Laser Flash Analyzer 427 and Carbolite MTF tube furnace in the Fresh Fuels Glovebox (FFG) to enhance post-irradiation examination (PIE) capabilities of nuclear fuel test specimens. This EC covers general installation and operation of equipment described below. Project-specific ECs are required for programs using the FFG and associated equipment.

The Fuel Cycle Research and Development (FCRD) program requires a glovebox for the characterization of unirradiated nuclear fuel test specimens. To meet this need, the FFG has been installed in Room B-127 of the Analytical Laboratory (AL), Building 752 at the Idaho National Laboratory (INL) Materials and Fuels Complex (MFC). The new FFG is a negative pressure glovebox with a dry argon atmosphere housing analytical instruments necessary to perform fuel analyses.

The glovebox serves the following two purposes:

1. provide confinement of radioactive materials to protect the worker and the environment from the spread of contamination
2. permit handling of reactive materials under controlled conditions.

The glovebox has a dedicated atmospheric pressure control, purification, and monitoring systems. The pressure control systems maintain the glovebox at negative pressure under normal operating conditions. The design configuration of the glovebox, pressure control system, and laboratory suspect exhaust system operate in a complimentary fashion to maintain confinement of radiological materials resulting from abnormal system conditions. A nuclear air hood is installed on the north end of the glovebox, and an 18-inch diameter transfer chamber (air lock) is located between the glovebox and the hood. The transfer chamber allows for the transfer of materials and equipment into or out of the glovebox while maintaining the atmospheric integrity of the glovebox. In addition, bag in/bag out transfers can be used, as necessary through any of the 8-inch glove ports to support glovebox transfers.

The analytical instruments listed below are installed in the FFG. These instruments will be used to determine material properties (e.g. conductivity, heat capacity, etc.) of fresh reactor fuels manufactured and analyzed for the Fuel Cycle Research and Development program.

Glovebox Fuel Characterization Equipment:

- Differential Scanning Calorimeter, DSC 404,
- Dilatometer, Netzsch DIL 402E analyzer,
- Metallograph, Leica DM5000 inverted,
- Simultaneous Thermal Analyzer (STA), STA449F3,
- Balance Weigh Scale, Mettler/PB303 S or equal

This revision of the EC includes installation of the following equipment:

- Netzsch Laser Flash Analyzer 427
- Carbolite MTF Tube Furnace

The glovebox has an inert argon atmosphere. The pressure of the glovebox is controlled automatically by three separate systems, designated primary pressure control, secondary pressure control, and glovebox pressure relief systems. The purity of the argon atmosphere is monitored for oxygen and moisture impurities by gas analyzers that sample the atmosphere of the glovebox. Atmospheric impurities (oxygen, moisture and nitrogen) may be reduced by purging gas (argon) through the glovebox. Oxygen and moisture may also be removed from the glovebox atmosphere by the glovebox purification system. Sealed blowers recirculate the glovebox atmosphere through beds containing purification media. When the purification beds become saturated, a mixture of argon and hydrogen gas will be used to regenerate the beds. The purification system contains two beds, which allows one bed to be regenerated (or on standby) while the other is on line. The purification blowers move gas progressively from north to south.

The glovebox atmosphere control system discharges filtered exhaust gases into the AL suspect exhaust system. Radiological and general particulate contamination is controlled through High Efficiency Particulate Air (HEPA) grade filters located in the atmosphere recirculation loop. Other miscellaneous gas penetrations have small replaceable in-line filters. An aerosol testable filter is located downstream of the glovebox filters before the exhaust gases enter the building suspect exhaust system.

Abnormal glovebox conditions will alarm on the local glovebox alarm panel. A single 'Fresh Fuels Glovebox Abnormal' alarm will be sent to the Analytical Laboratory alarm panel located in the AL supervisor's office. All alarms register both audibly and visually.

The existing Alpha Glovebox in Room B-127 of the MFC AL was removed to allow installation of this FFG in support of the PIE Upgrade Project [ref. environmental checklist INL-11-023 (OA 12)].

The new laboratory hood is installed and utilized in conjunction with the FFG to provide a controlled area for material entry and removal into/from the dry air chamber. The laboratory hood also serves as an environment that will accommodate smearing and counting operations for radiation control surveys. The radiological hood is installed on the north end of the glovebox. The transfer chamber is accessed from the inside of the hood.

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The Fresh Fuel Thermo-physical properties characterization line enhancement installed a new inert fresh fuels glovebox in the MFC Analytical Laboratory in FY-11. Installation of the glovebox fuel characterization equipment at the MFC enhances PIE capabilities that support the INL in the establishment of a state-of-the art capability for the development and qualification of transmutation fuels.

The FCRD program uses TRU feedstock materials recovered from defense decommissioning programs to build irradiation experiments and characterization samples. Therefore, waste associated with the FFG is defense related and eligible for disposal at the Waste Isolation Pilot Plant (WIPP). National Environmental Policy Act (NEPA) coverage for the transportation and disposal of waste to WIPP are found in Final Waste Management Programmatic Environmental Impact Statement [WM PEIS] (DOE/EIS-0200-F, May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, Sept. 1997), respectively. The 1990 ROD also stated that a more detailed analysis of the impacts of processing and handling transuranic (TRU) waste at the generator-storage facilities would be conducted. The Department has analyzed TRU waste management activities in the Final Waste Management Programmatic Environmental Impact Statement (WM PEIS) (DOE/EIS-200-F, May 1997). The WM PEIS analyzes environmental impacts at the potential locations of treatment and storage sites for TRU waste; SEIS-II addresses impacts associated with alternative treatment methods, the disposal of TRU waste at WIPP and alternatives to that disposal, and the transportation to WIPP. Project-specific ECs analyze specific waste streams.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

The FFG is one of three gloveboxes installed in room B-127. A radiological fume hood is attached to each of the glove boxes. Exhaust from the FFG is discharged through a HEPA filter prior to being combined with the AL B-wing suspect exhaust system. The B-wing exhaust is then drawn through an additional set of HEPA filters before being combined with the A-wing (Hot Cell) exhaust and discharged from the facility via the AL Main Stack. Any potential emissions are double HEPA-filtered and stack emissions are sampled and analyzed for particulate as well as gaseous radionuclides.

The FFG houses analytical instruments necessary to perform analyses of fresh nuclear fuel test specimens (i.e., have not been irradiated). Use of standard lab chemicals is not expected to increase from past operations. Based on interviews with laboratory staff, FFG operations are not expected to result in an increase in radioactive or toxic air emissions and should actually decrease over historical levels.

Generating and Managing Waste

Installation of FFG:

- Hazardous/Mixed Waste Generation and Management: Project activities are not expected to generate any hazardous/mixed waste.
- Hazardous/Radioactive Material or Waste Handling and Transportation: Project personnel will work with Waste Generator Services (WGS) to properly package and transport regulated radioactive material or waste according to laboratory procedures.
- Industrial Waste Generation and Management: Project activities are likely to result in the generation of small amounts of industrial waste. Project personnel would work with WGS to characterize and properly dispose of industrial wastes.

Operation of FFG:

- Radioactive Materials Use and Storage: Operations personnel will properly store radioactive materials and will work with WGS to properly characterize, and dispose of generated waste in a timely manner.
- Transuranic (TRU) Waste Generation: Operation of the FFG is expected to generate TRU radioactive waste (estimated <25 ft³). The FCRD program uses TRU feedstock materials recovered from defense decommissioning programs to build irradiation experiments and characterization samples. Therefore, any TRU waste is defense related and eligible for disposal at WIPP. Operation personnel will work with WGS to properly characterize, store, and dispose according to established waste streams and laboratory procedures. Installation of new equipment is not anticipated to increase the volume of waste generated as analyzed in the original EC.
- Hazardous/Radioactive Material or Waste Handling and Transportation: Operations personnel will work with WGS to properly package and transport regulated radioactive material or waste according to laboratory procedures.

SECTION D. Determine Recommended Level of Environmental Review, Identify Reference(s), and State Justification: Identify the applicable categorical exclusion from 10 Code of Federal Regulation (CFR) 1021, Appendix B, give the appropriate justification, and the approval date..

For Categorical Exclusions (CXs), the proposed action must not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, or similar requirements of Department of Energy (DOE) or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; (3) disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no

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extraordinary circumstances related to the proposal exist that would affect the significance of the action. In addition, the action is not "connected" to other action actions (40 CFR 1508.25(a)(1)) and is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1608.27(b)(7)).

References: National Environmental Policy Act (NEPA) Implementing Procedures, Final Rule, 10 CFR 1021, Appendix B to Subpart D, Categorical Exclusion B1.31 "Installation or relocation of machinery and equipment."

Final Environmental Impact Statement for the Waste Isolation Pilot Plant (DOE/EIS-0026, October 1980) and Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant (SEIS-I) (DOE/EIS-0026-FS, January 1990)

Final Waste Management Programmatic Environmental Impact Statement [WM PEIS] (DOE/EIS-0200-F, May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, Sept. 1997)

Justification: The proposed activities are consistent with CX B1.31 "Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts."

The impacts of transporting and disposing of waste resulting from defense activities that was placed in retrievable storage pursuant to a 1970 Atomic Energy Commission policy (see Section 1.2) and TRU waste that was reasonably expected to be generated by ongoing activities and programs was analyzed in DOE/EIS-0026 (October 1980) and the Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant (SEIS-I) (DOE/EIS-0026-FS, January 1990).

NEPA coverage for the transportation and disposal of waste to WIPP are found in DOE/EIS-0200-F (May 1997) and Waste Isolation Plant Disposal Phase Supplemental EIS (SEIS-II) (DOE/EIS-0026-S-2, Sept. 1997), respectively. The 1990 ROD also stated that a more detailed analysis of the impacts of processing and handling TRU waste at the generator-storage facilities would be conducted. DOE has analyzed TRU waste management activities in DOE /EIS-200-F (May 1997). The WM PEIS analyzes environmental impacts at the potential locations of treatment and storage sites for TRU waste; SEIS-II addresses impacts associated with alternative treatment methods, the disposal of TRU waste at WIPP and alternatives to that disposal, and the transportation to WIPP. (SEIS-II also includes potential transportation between generator sites.)

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on: 12/3/2015