

SECTION A. Project Title: MFC – EBR-II Sodium Removal/RCRA Closure Activities

SECTION B. Project Description

The proposed action will remove the sodium from the Experimental Breeder Reactor (EBR-II) piping system and tanks to achieve clean-closure for eventual decommissioning, deactivation and demolition (DD&D). The clean-closure will be completed in compliance with the EBR-II Hazardous Waste Management Act/Resource Conservation and Recovery Act (HWMA/RCRA) Storage and Treatment Permit PER-120. EBR-II is located at the Materials and Fuels Complex at the Idaho National Laboratory. The EBR-II DD&D actions will be addressed under the Comprehensive Environmental Response Compensation, and Liability Act, specifically, the Engineering Evaluation/Cost Analysis for the EBR-II End State (DOE/ID-11398) and Action Memorandum.

The sodium-cooled reactor (EBR-II) was in service from 1964 through 1994, after which it was shut down and drained. Hundreds of gallons of sodium residue remains in the primary and secondary systems, most of which has been reacted (“passivated”) with moist carbon dioxide into sodium bicarbonate. However, non-passivated sodium still exists; it resides mostly in the secondary sodium drain tank and associated piping in the west basement of MFC-766.

The RCRA Permit currently addresses the treatment or removal of residual sodium, passivated sodium residuals, and sodium potassium alloy residuals. Treatment may be completed within the tanks and piping system or the specific piping/components may be removed and treated. The proposed treatment system for the steam/water treatment of the remaining sodium and sodium residuals is based on standard industrial practices. Additional instrumentation will be installed for monitoring the treatment process and equipment for handling/neutralizing the offgas from the system during treatment.

To achieve clean closure within the project time frame, the following actions will be implemented:

- Increase the sodium treatment capacity from 1.5 gallons/day to 785 gallons/day each for the Secondary Sodium Drain Tank System, the Primary Sodium Tank, and the Intermediate Heat Exchanger.
- Use water/steam (instead of moist carbon dioxide) with additives for the treatment of sodium.
- Change the use of the cover gas from carbon dioxide to argon or nitrogen.

The clean piping and tanks will be dispositioned with the EBR-II Reactor based on the decision documented in the EE/CA and Action Memorandum.

In addition, bench-scale mock-up testing to optimize treatment design will be performed at Premier Technology, located at 1579 W. Bridge Street in Blackfoot, Idaho. The mock-up testing will react water/steam and additives with approximately 2.5 lbs total of uncontaminated elemental sodium and approximately 260 lbs of sodium bicarbonate.

The proposed action is scheduled to begin in February 2010 and continue through September 2011. The approximate cost is \$3M.

SECTION C. Environmental Aspects / Potential Sources of Impact

Air Pollutants –The proposed action will generate radiological emissions from the piping, tanks and other equipment (the sodium in the primary system and Secondary Sodium Drain Tank System contains Na^{23} and H^3). Also, hydrogen gas as well as sodium hydroxide aerosols and acetic acid emissions will be generated. The emissions will be emitted through a scrubber and HEPA filtration. In support of the proposed action, a 100,000 BTU process boiler will be used. Radiological emissions to the environment, including those from point and diffuse sources, must be determined for demonstrating compliance with the NESHAP Standard [see 40 CFR 61.93(a)] and submitted for reporting in the INL NESHAP Annual Report per 40 CFR 61.94.

Asbestos Emissions – Regulated Asbestos-Containing Material (RACM) (friable) will be generated during removal of pipe sections. Friable asbestos-containing material is subject to specific asbestos regulations and is acceptable for disposal at Idaho CERCLA Disposal Facility (ICDF) and/or, if not radiologically contaminated, at the CFA asbestos waste disposal facility. Regulated asbestos will be removed and disposed of as required by 40 CFR 61.150, “Standard for Waste Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations.”

Chemical Use and Storage – Water/steam with additives will be used to treat any of the remaining sodium for pH adjustment and dissolution of the sodium carbonate passivation layer. Examples of additives include: citric acid and/or sodium citrate-neutralizing and buffering solution.

**DOE-ID NEPA CX DETERMINATION
IDAHO NATIONAL LABORATORY**

Cultural/Historical Resource Disturbance – The EBR-II Reactor is a historic property, eligible for nomination to the National Register of Historic Places and an INL Category 1, as defined in the “INL Cultural Resource Management Plan” (DOE/ID-10997, Rev. 3). Prior to any activities that will adversely impact the EBR-II structure, a Historic American Engineering Record report will be written and approved. The sodium removal and treatment actions described in Section B., do not qualify for activities that will adversely impact the EBR-II structure.

Hazardous/Mixed Waste Generation – There is a potential that both hazardous and mixed waste could be generated from performing the proposed action. If so, these waste streams will be managed in accordance with the substantive and administrative requirements of the HWMA/RCRA, and will be disposed of at an off-Site disposal facility in accordance with the disposal facility’s waste acceptance criteria (WAC).

Hazardous/Radioactive Material and Waste Handling and Transportation – A hazardous waste determination will be performed for all waste streams to identify the appropriate management practices. Waste streams will be evaluated to determine if any of these materials can be recycled or reused and will be evaluated to implement actions for minimizing waste entering the landfill.

Industrial Waste Generation and Management – Small amounts of industrial waste will be generated in the form of packaging materials and wiring from equipment installation. This waste stream will be disposed of at the CERCLA Landfill at MFC through waste generator services. Waste generated from the mock-up activities performed at Premier in Blackfoot, Idaho will be managed by Premier. Based on conversations with the Blackfoot Sewage Treatment Plant, the liquids will be disposed of through that system. Wipes, etc., will be disposed of at the Blackfoot Landfill.

Radioactive Waste Generation and Management – Radiologically-contaminated waste will be generated in the form of personal protective equipment, tools, etc. Waste stream planning and management will be performed under the direction of Waste Generator Services in accordance with MCP-1390. The piping and the tank will be addressed as part of the EBR-II end state in the Engineering Evaluation/Cost Analysis for the EBR-II End State (DOE/ID-11398) and Action Memorandum.

Storage of Hazardous/Rad. Materials or Waste in Tanks – The proposed action includes three tanks; the Secondary Sodium Drain Tank System, the Primary Sodium Tank, and the Intermediate Heat Exchanger. The tanks and associated piping are RCRA permitted (HWMA/RCRA Storage and Treatment Permit for the Experimental Breeder Reactor-II and Buildings MFC-793E AND MFC-793F located at the Materials and Fuels Complex at the Idaho National Laboratory). The Permit has been modified to address the treatment process described in Section B. The Secondary Sodium Drain Tank will be used to collect the flush solution. Once the process is complete, the flush solution will be sampled to determine a disposition path. If the solution is non-hazardous, it will be disposed of at the ICDF in the evaporation pond.

SECTION D. Determine the Level of Environmental Review (or Documentation) and Reference(s): Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.

Note: 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, including requirements of DOE orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) adversely affect environmentally sensitive resources. In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not “connected” nor “related” (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

References: 10 CFR 1021, Appendix B, B6.1, Small-scale, short-term cleanup actions under RCRA, Atomic Energy Act, or other authorities.

Justification: Removing sodium from the EBR-II piping system and tanks by steam passivation (treatment) to achieve clean-closure in compliance with a HWMA/RCRA closure plan will be addressed as described in this document.

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 1/20/09