



Environmental Review Form for Argonne National Laboratory

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Creator

Badge:	51790	Name:	Woodford, John B.
Cost Center:	254	Division:	WSH
Job Title:	Safety Specialist 5	Employee Type:	Regular Full-Time Exempt
Building:	208	Lab Extension:	2-0910

General Information

Project/Activity Title: Sodium and Lithium Work
ASO NEPA Tracking No.: Type of Funding:
B & R Code: Identifying Number: 21-17
SPP Proposal Number: CRADA Proposal Number:
Work Project Number: ANL Accounting Number: (Item 3a in Field Work Proposal)
Other (explain):
List appropriate NEPA Owners:
Division: NSE NEPA Owner:

Financial Plans

To select a Financial Plan, click the magnifying glass icon to open a search window.
Cost Center: Project: Phase: Task:

Description of Proposed Action

Researchers in Argonne's Nuclear Science & Engineering Division and its predecessors have long performed work with molten alkali metals in support of research on advanced reactors and accelerators, and this work is expected to continue into the future. While much work can take place in the existing large-scale sodium loop (the Mechanisms Engineering Test Loop, covered under ASO-CX-335) or in much smaller loops (<20 L), there is still a need for medium-scale (20 L-200 L) alkali metal systems. This is an environmental review applicable to alkali metal systems that meet certain criteria: the working fluid would be either molten sodium or molten lithium, and the systems would be set up in either the Building 206 high bay or the Building 308 high bay (cf. the Description of Affected Environment, below). Test systems may be used to study the compatibility between advanced materials and a molten alkali metal environment, to characterize flow behavior through prototypical reactor components, to assess sensors such as microwave cavity resonator flowmeters, etc. All test systems would be constructed of stainless steel, would be designed according to the ASME piping code and would (when applicable) use ASME code-stamped pressure vessels rated for the service temperature and pressure, and would use argon as a cover gas to minimize the effects of air ingress in the event of a leak. All test systems would in addition go through a design review process.

Description of Affected Environment

All work is planned to take place in either the Building 206 high bay or the Building 308 high bay. Both of these areas have been designed for alkali metal research: they lack sprinkler service (to avoid adverse reaction with alkali metals), they have fireproof construction, they are isolated by fire barrier doors and walls from office occupancies, and they have scrubber systems to handle the caustic oxide smoke that is the primary hazard from an alkali metal fire. Both high bays already have one or more alkali metal experiments taking place in them. The Building 308 scrubber has a 30,000 cfm blower and is designed to be able to capture smoke from significant quantities of burning alkali metal in the open high bay. The Building 206 scrubber has a much smaller blower (3,000 cfm), so all of the active alkali metal systems are in enclosures that are directly vented to the scrubber. The active alkali metal systems have smoke detectors in their enclosures, set to activate the scrubber if any smoke is detected. The Argonne Fire Department has pre-incident plans in place to deal with the alkali metal hazards present in both buildings, as well as guidelines for emergency response for extinguishing sodium fires and directions to activate the scrubber in Building 308.

Potential Environmental Effects

- Attach explanation for each "yes" response near bottom of form.
- **See Instructions for Completing Environmental Review Form.**

Section A (Complete For All Projects)		Yes	No	Explanation
1.	Project evaluated for Pollution Prevention and Waste Minimization opportunities and details provided under items 2, 4, 6, 7, 8, 16, and 20 below, as applicable	<input checked="" type="radio"/>	<input type="radio"/>	See details below. In addition, the use of scrubbers in the high bays will reduce or eliminate any air emissions of alkali metal oxide smoke, ensuring that air emissions due to off-normal events are minimal.
2.	Air Pollutant Emissions	<input checked="" type="radio"/>	<input type="radio"/>	No air emissions are expected during normal facility operations. In the event of a sodium leak and fire, caustic sodium or lithium oxide/hydroxide smoke would be produced. This smoke will be managed by the installed scrubber system. The scrubber system is designed to remove at least 99% of this material before it is exhausted from the scrubber. The Argonne Fire Department's pre-incident plan and guidelines for emergency response for Building 308 call for them to activate the scrubber in the event of a sodium leak, and all building occupants are trained to do likewise if they are in or near the high bay and a sodium leak occurs. Any alkali metal systems constructed in Building 206 would be in containments vented to the Building 206 scrubber, and would have smoke detectors set to activate the scrubber in the event of a leak and fire inside the containment.
3.	Noise	<input checked="" type="radio"/>	<input type="radio"/>	Normal operation of the test systems will not present a noise hazard. When the scrubber is in operation (only during an alkali metal fire from the facility or when it is being used for waste treatment), it produces quite a lot of noise. Personnel will be provided with appropriate protective equipment when needed. It is not noisy enough to pose a hazard to the environment outside the building.
4.	Chemical/Oil Storage/Use	<input checked="" type="radio"/>	<input type="radio"/>	Test loops may contain up to 200 L sodium or lithium. All systems constructed would use stainless steel secondary containment/drip pans sized to hold the maximum volume of alkali metal present in the event of a spill. Other chemicals may include cleaning solvents for component cleanup; these would not be used in the test loops, but would be used to remove grease from loop components or test samples that would eventually be exposed to molten alkali metals. No halogenated solvents would be used.
5.	Pesticide Use	<input type="radio"/>	<input checked="" type="radio"/>	
6.	Toxic Substances Control Act (TSCA) Substances			
6a.	Polychlorinated Biphenyls (PCBs)	<input type="radio"/>	<input checked="" type="radio"/>	
6b.	Asbestos or Asbestos Containing Materials	<input type="radio"/>	<input checked="" type="radio"/>	
6c.	Other TSCA Regulated Substances	<input type="radio"/>	<input checked="" type="radio"/>	
6d.	Import or Export of Chemical Substances	<input type="radio"/>	<input checked="" type="radio"/>	
7.	Biohazards	<input type="radio"/>	<input checked="" type="radio"/>	
				When the Building 308 scrubber is in use, it produces large volumes (potentially hundreds of liters) of dilute aqueous lithium or sodium hydroxide solutions, which are drained to Argonne's laboratory wastewater sewer system after further dilution with canal water. No wastewater is anticipated to be produced during normal facility operations, except when the scrubber is being

8.	Effluent/Wastewater (If yes, see question #12 and contact Peter Lynch (HSE) at 2-4582 or lynch@anl.gov)	<input checked="" type="radio"/>	<input type="radio"/>	used during a spill or leak of alkali metals or when it is being used as a waste treatment facility as described in ASO-CX-225. The Building 206 scrubber does not drain directly to the laboratory wastewater sewer system, as that scrubber is allowed to treat radioactively-contaminated alkali metal waste. The scrubber effluent is neutralized with sulfuric acid and checked for radioactive contamination; if no contaminate is found, the effluent is disposed of in the laboratory wastewater sewer. If contamination is detected, the effluent is disposed of as radioactive waste. No work involving radioactive materials is covered by this evaluation; the information on contaminated effluent is included because the Building 206 scrubber can (as described in ASO-CX-225) be used to treat radioactively-contaminated alkali metals.
9.	Waste Management			
9a.	Construction or Demolition Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9b.	Hazardous Waste	<input checked="" type="radio"/>	<input type="radio"/>	As noted above, the existing scrubbers produce large volumes of dilute aqueous sodium or lithium hydroxide solutions. In Building 308, these are drained to Argonne's laboratory wastewater sewer system. Waste sodium or lithium will be treated and disposed of using the scrubber. In Building 206, the dilute alkali metal hydroxide solutions are neutralized with sulfuric acid and disposed of as low-level waste if radionuclides are present. If no radionuclides are present, the waste solutions would be disposed of in the laboratory wastewater sewer system. No work involving radioactive materials is covered by this evaluation; the information on contaminated effluent is included because the Building 206 scrubber can (as described in ASO-CX-225) be used to treat radioactively-contaminated alkali metals. Any other RCRA hazardous wastes, such as small quantities of solvents used for cleaning, would be retained in Satellite Accumulation Areas by trained personnel in accordance with Argonne procedures. All on-site treatment, storage, and disposal would be performed in accordance with the site's RCRA Part B permit issued by the IEPA.
9c.	Radioactive Mixed Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9d.	Radioactive Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9e.	Asbestos Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9f.	Biological Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9g.	No Path to Disposal Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9h.	Nano-material Waste	<input type="radio"/>	<input checked="" type="radio"/>	
10.	Radiation	<input type="radio"/>	<input checked="" type="radio"/>	
11.	Threatened Violation of ES&H Regulations or Permit Requirement	<input type="radio"/>	<input checked="" type="radio"/>	
12.	New or Modified Federal or State Permits	<input type="radio"/>	<input checked="" type="radio"/>	
13.	Siting, Construction, or Major Modification of Facility to Recover, Treat, Store, or Dispose of Waste	<input type="radio"/>	<input checked="" type="radio"/>	
14.	Public Controversy	<input type="radio"/>	<input checked="" type="radio"/>	
15.	Historic Structures and Objects	<input type="radio"/>	<input checked="" type="radio"/>	
16.	Disturbance of Pre-existing Contamination	<input type="radio"/>	<input checked="" type="radio"/>	

17.	Energy Efficiency, Resource Conserving, and Sustainable Design Features	<input checked="" type="radio"/>	<input type="radio"/>	All sodium or lithium systems covered under this analysis would be prepared with insulation, to ensure even heating and minimize the power required to maintain the alkali metal at the desired service temperature. Some loops may have cold trap purification systems to remove oxygen contamination, increasing the usable lifetime of the alkali metal and thus reducing waste.
Section B (For Projects that Occur Outdoors)		Yes	No	
18.	Threatened or Endangered Species, Critical Habitats, and/or other Protected Species	<input type="radio"/>	<input type="radio"/>	
19.	Wetlands	<input type="radio"/>	<input type="radio"/>	
20.	Floodplain	<input type="radio"/>	<input type="radio"/>	
21.	Landscaping	<input type="radio"/>	<input type="radio"/>	
22.	Navigable Air Space	<input type="radio"/>	<input type="radio"/>	
23.	Clearing or Excavation	<input type="radio"/>	<input type="radio"/>	
24.	Archaeological Resources	<input type="radio"/>	<input type="radio"/>	
25.	Underground Injection	<input type="radio"/>	<input type="radio"/>	
26.	Underground Storage Tanks	<input type="radio"/>	<input type="radio"/>	
27.	Public Utilities or Services	<input type="radio"/>	<input type="radio"/>	
28.	Depletion of a Non-Renewable Resource	<input type="radio"/>	<input type="radio"/>	
Section C (For Projects Outside of ANL)		Yes	No	
29.	Prime, Unique, or Locally Important Farmland	<input type="radio"/>	<input type="radio"/>	
30.	Special Sources of Groundwater (such as sole source aquifer)	<input type="radio"/>	<input type="radio"/>	
31.	Coastal Zones	<input type="radio"/>	<input type="radio"/>	
32.	Areas with Special National Designations (such as National Forests, Parks, or Trails)	<input type="radio"/>	<input type="radio"/>	
33.	Action of a State Agency in a State with NEPA-type Law	<input type="radio"/>	<input type="radio"/>	
34.	Class I Air Quality Control Region	<input type="radio"/>	<input type="radio"/>	

Categorical Exclusion

Other (Use field below to enter other categorical exclusion)

ANL NEPA Reviewer Use Only

- My approval is the final approval necessary
- This form requires additional approval from DOE

To be Completed by DOE/ASO

Section D	Yes	No
Are there any extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal?	<input type="radio"/>	<input checked="" type="radio"/>
Is the project connected to other actions with potentially significant impacts or related to other proposed action with cumulatively significant impacts?	<input type="radio"/>	<input checked="" type="radio"/>
If yes, is a categorical exclusion determination precluded by 40 CFR 1506.1 or 10 CFR 1021.211?	<input type="radio"/>	<input type="radio"/>
Can the project or activity be categorically excluded from preparation of an Environment Assessment or Environmental Impact Statement under Subpart D of the DOE NEPA Regulations?	<input checked="" type="radio"/>	<input type="radio"/>
If yes, indicate the class or classes of action from Appendix A or B of Subpart D under which the project may be excluded: This project may be excluded from the following 10 CFR Part 1021, Subpart D, Appendix B, Category: B 3.6 Small-scale research and development, laboratory operations, and pilot projects		
If no, indicate the NEPA recommendation and class(es) of action from Appendix C or D to Subpart D to Part 1021 of 10 CFR.		

Attachments

File Description:

Comments**Add Approver**

Approver Name	Approver Badge	Reason	Delete
Lynch, Peter L.	46304	Site wastewater SME	

Notifications

The approval notification email will be copied to the people listed below.

Badge	Name	Division	Delete
87740	Li, Meimei	NSE	

ASO-CX Number**ASO-CX- 389**

Comments:

Approval

<u>Approver</u>	<u>Action</u>	<u>Date Routed</u>	<u>Action Date</u>	<u>Approval Reason / Comments</u>	<u>Approval Type</u>
Woodford, John B.	APPROVED	2021-08-18	2021-08-18 14:17:58.0	Creator :	PRIMARY
Woodford, John B.	APPROVED	2021-08-18	2021-08-18 14:17:58.0	Allows access to the form :	PRIMARY
Woodford, John B.	APPROVED	2021-08-18	2021-08-18 14:17:58.0	Project Manager :	PRIMARY
Lynch, Peter L.	APPROVED	2021-08-18	2021-08-18 15:03:12.0	Site wastewater SME :	PRIMARY
Harris, Amy M.	APPROVED	2021-08-18	2021-08-19	NEPA Owner Approval for Argonne	PRIMARY

Ptak, Jill S.	APPROVED	2021-08-19	11:20:01.0 2021-08-23 12:04:11.0	Environmental Review : ANL NEPA Reviewer : Draft ERF was reviewed by DOE in advance and questions were resolved regarding fire protection	PRIMARY
Hellman, Karen B.	APPROVED	2021-08-23	2021-08-23 15:27:20.0	ANL-985 Review and Approval :	PRIMARY
Dunn, Michael W.	APPROVED	2021-08-23	2021-08-24 08:02:28.0	ANL-985 ANL Deputy COO Review and Approval :	PRIMARY
Joshi, Kaushik N.	APPROVED	2021-08-24	2021-08-24 15:43:37.0	ANL-985 DOE-ASO Review and Approval : This DOE NEPA CX approval is tracked as ASO-CX-389.	PRIMARY
Siebach, Peter Rudolf	APPROVED	2021-08-24	2021-08-24 17:06:55.0	ANL-985 DOE NEPA Compliance Officer Review and Approval :	PRIMARY
