Environmental Review Form for Argonne National Laboratory

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Created By:	Woodford, John B.

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		◉	○	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		◉	○	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		◉	○	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		◉	○	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		○	◉	
6.	**Toxic Substances Control Act (TSCA) Substances**				
	6a.	Polychlorinated Biphenyls (PCBs)	○	◉	
	6b.	Asbestos or Asbestos Containing Materials	○	◉	
	6c.	Other TSCA Regulated Substances	○	◉	
	6d.	Import or Export of Chemical Substances	○	◉	
7.	Biohazards		○	◉	
					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)		◉	○	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	○	◉	
	9b.	Hazardous Waste	◉	○	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	○	◉	
	9d.	Radioactive Waste	○	◉	
	9e.	Asbestos Waste	○	◉	
	9f.	Biological Waste	○	◉	
	9g.	No Path to Disposal Waste	○	◉	
	9h.	Nano-material Waste	○	◉	
10.	Radiation		○	◉	
11.	Threatened Violation of ES&H Regulations or Permit Requirement		○	◉	
12.	New or Modified Federal or State Permits		○	◉	
13.	Siting, Construction, or Major Modification of Facility to Recover, Treat, Store, or Dispose of Waste		○	◉	
14.	Public Controversy		○	◉	
15.	Historic Structures and Objects		○	◉	
16.	Disturbance of Pre-existing Contamination		○	◉	

17.	Energy Efficiency, Resource Conserving, and Sustainable Design Features	◉	○	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	○	○	
19.	Wetlands	○	○	
20.	Floodplain	○	○	
21.	Landscaping	○	○	
22.	Navigable Air Space	○	○	
23.	Clearing or Excavation	○	○	
24.	Archaeological Resources	○	○	
25.	Underground Injection	○	○	
26.	Underground Storage Tanks	○	○	
27.	Public Utilities or Services	○	○	
28.	Depletion of a Non-Renewable Resource	○	○	
Section C (For Projects Outside of ANL)		**Yes**	**No**	
29.	Prime, Unique, or Locally Important Farmland	○	○	
30.	Special Sources of Groundwater (such as sole source aquifer)	○	○	
31.	Coastal Zones	○	○	
32.	Areas with Special National Designations (such as National Forests, Parks, or Trails)	○	○	
33.	Action of a State Agency in a State with NEPA-type Law	○	○	
34.	Class I Air Quality Control Region	○	○	

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?	○	◉
Is the project connected to other actions with potentially significant impacts or related to other proposed action with cumulatively significant impacts?	○	◉
If yes, is a categorical exclusion determination precluded by 40 CFR 1506.1 or 10 CFR 1021.211?	○	○
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?	◉	○

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

Approver	Action	Date Routed	Action Date	Approval Reason / Comments	Approval Type
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

			11:20:01.0	Environmental Review :	
Ptak, Jill S.	APPROVED	2021-08-19	2021-08-23 12:04:11.0	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