Environmental Review Form for Argonne National Laboratory

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Your Form ID:	ANL-985-1617
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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: Development of Sensor Performance Model of Microwave Cavity Flow Meter for Advanced Reactor High Temperature Fluids

ASO NEPA Tracking No.:		Type of Funding:		
B & R Code:	NT0107000	Identifying Number:	B&R Code NT0107000	
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

This project is intended to develop and demonstrate performance of waveguide-coupled microwave cavities for advanced reactor in-core flow sensing in high temperature fluid. These flowmeters are conceptually and physically simple: a cylindrical cavity is fabricated with known microwave resonance properties, and with one end covered by a flexible membrane. Fluid flow past the membrane transfers some momentum to it, deforming it and thus changing the resonance properties of the cavity. Analysis of that change can be used to determine the fluid flow rate. These sensors have two major advantages for deployment in-core: first, they can be made from materials that are resistant to the aggressive environment; and second, they can be placed anywhere in the core, not just on coolant lines. If the project is successful, these sensors would be available for use in liquid sodium-cooled or molten salt reactors. However, the initial project work would be limited to testing in a room-temperature water system. The first phase of work is planned to consist of fabrication of cavity flowmeters, along with dry benchtop testing. Once a candidate flowmeter prototype has been verified to work, the second phase of work would be testing of the prototypic sensor in a flowing water loop. The loop would be fabricated from PVC pipe, and would hold up to 50 gallons of water in the loop and attached reservoir. The loop is to be no more than six feet long and four feet tall. Demineralized water would be used as a working fluid, with the addition of sufficient commercial bleach (sodium hypochlorite) to obtain a chlorine level of ~10 ppm. This is intended to minimize biofouling. Flow rates would be less than 40 gpm, and working pressure would be less than 10 psig. The behavior of the prototypic cavity flowmeter would be evaluated in the loop, to demonstrate its accuracy and precision. The first phase of the work falls entirely under the current bench-scale categorical exclusion (ASO-CX-325). It is only the second phase that would exceed the bench-scale parameters, and then only by the volume of water used in the test loop. If the flowmeter behaves adequately in the room-temperature water system, the final phase of testing would take place in liquid sodium and/or molten salt environments. This would be in the third year of the program, and because of uncertainty regarding the scale of the final tests the environmental impact of that work would have to be evaluated at that time.

Description of Affected Environment

Work with room-temperature water systems is proposed to take place in one of three dedicated laboratory spaces in Building 205: either Room E124, Room E110, or Room E102.

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		●	○	The loop will be sized as small as feasible to obtain the desired results.
2.	Air Pollutant Emissions		○	●	
3.	Noise		○	●	
4.	Chemical/Oil Storage/Use		●	○	The loop will be fabricated from PVC pipe, cemented together using commercial PVC cement. Commercial bleach (sodium hypochlorite) will be added to the water to minimize biofouling. Once a candidate sensor has been confirmed to operate in the flowing water loop, it is possible that further testing will take place in liquid sodium or molten salt; as noted above, the environmental impact of that work will be evaluated once there is sufficient information to perform the evaluation. None of that work will take place before the evaluation has been approved.
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		○	●	
8.	Effluent/Wastewater (If yes, see question #12 and contact Peter Lynch (HSE) at 2-4582 or lynch@anl.gov)		●	○	Tens of gallons of demineralized water with low concentrations of sodium hypochlorite is proposed to be used in the loop, and would be disposed of in the Laboratory sewer system once the work has been completed. The loop is planned to be placed in a secondary tray to contain any spills.
9.	**Waste Management**				
	9a.	Construction or Demolition Waste	○	●	
	9b.	Hazardous Waste	○	●	
	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		○	●	
	Threatened Violation of				

11.	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	●	○	The loop will be sized as small as feasible to obtain the desired results.
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 under 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	Wastewater reviewer	
Bakhtiari, Sasan	45801	Project lead	

Notifications

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

Badge	Name	Division	Delete

ASO-CX Number

ASO-CX- 385

Comments:

Approval

Approver	Action	Date Routed	Action Date	Approval Reason / Comments	Approval Type
Woodford, John B.	APPROVED	2021-03-31	2021-03-31 15:44:05.0	Creator :	PRIMARY
Woodford, John B.	APPROVED	2021-03-31	2021-03-31 15:44:05.0	Project Manager :	PRIMARY
Bakhtiari, Sasan	APPROVED	2021-03-31	2021-03-31 16:28:02.0	Project lead :	PRIMARY
Lynch, Peter L.	APPROVED	2021-03-31	2021-04-05 08:22:52.0	Wastewater reviewer : **Discharge loop water during peak flow hours (9 AM - 3 PM)**	PRIMARY

Harris, Amy M.	APPROVED	2021-04-05	2021-04-05 13:03:03.0	NEPA Owner Approval for Argonne Environmental Review :	PRIMARY
Ptak, Jill S.	APPROVED	2021-04-05	2021-04-13 10:41:47.0	ANL NEPA Reviewer : **potential low chloride concentration sent to lab wastewater treatment plant should be negligible impact; draft review comments from DOE addressed**	PRIMARY
Hellman, Karen B.	APPROVED	2021-04-13	2021-04-13 14:45:16.0	ANL-985 Review and Approval :	PRIMARY
Dunn, Michael W.	APPROVED	2021-04-13	2021-04-15 07:46:36.0	ANL-985 ANL Deputy COO Review and Approval :	PRIMARY
Joshi, Kaushik N.	APPROVED	2021-04-15	2021-04-30 11:16:11.0	ANL-985 DOE-ASO Review and Approval : **This DOE's NEPA CX approval is tracked as ASO-CX-385.**	PRIMARY
Siebach, Peter Rudolf	APPROVED	2021-04-30	2021-04-30 13:34:05.0	ANL-985 DOE NEPA Compliance Officer Review and Approval :	PRIMARY