



**Environmental Review Form for Argonne
National Laboratory**

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Created By:	McGhee, Ian Riley

Creator

Badge:	232518	Name:	Willig, Ryne T.
Cost Center:	254	Division:	WSH
Job Title:	ESH Multi-Functional 3	Employee Type:	Regular Full-Time Exempt
Building:	362	Lab Extension:	2-1212

General Information

Project/Activity Title: Modification, and Continued Operation of the Materials Engineering Research Facility

ASO NEPA Tracking No.: _____ Type of Funding: DOE

B & R Code: _____ Identifying Number: ASO-CX-270

SPP Proposal Number: _____ CRADA Proposal Number: _____

Work Project Number: 0108A ANL Accounting Number: FWP-49519 (Item 3a in Field Work Proposal)

Other (explain): DOE Operating Funds-49727-00-155

List appropriate NEPA Owners:

Division: AMD 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 is a complete update of the existing ERF for MERF (previously approved as ASO-CX-270). Certain scopes have been either restricted (asbestos, ammonia), while other scopes (NOx emissions and nanomaterial handling guidance) have been updated in the description of the applicable environmental effects section below. New procedures, regulations, and other changes have also been suggested by SMEs and subsequently incorporated. Any future construction would be conducted by an outside agency, or NWM/IS for smaller changes, as was previously approved. The Materials Engineering Research Facility (MERF) is a part of the Applied Materials Division at Argonne National Laboratory. Established in 2009, and expansion started in 2019, the MERF is a ~11,000 sq ft. research facility, operated by the Process R&D and Scale-up Group, with an expansion which would total ~16,000 sq ft. The Process R&D and Scale-up Group applies advanced synthesis and processing protocols to develop scalable manufacturing procedures for newly invented experimental materials. The facility produces kilogram quantities of materials and makes samples available for industrial evaluation, prototyping, and to support further research. The MERF staff develops economically viable processes for materials manufacturing and produces detailed process description for accurate cost modeling. The key material manufacturing technologies available in the MERF are advanced cascaded Continuous Stirred Tank Reactors (CSTRs), Taylor Vortex Reactors, Flame Spray/Spray Pyrolysis, Supercritical Hydro/Solvothermal Synthesis, Atomic Layer Deposition, Electrospinning Processing, Continuous Flow Chemistry, Binder Jet, Electrodeposition, Roll-to-Roll techniques and other emerging technologies. These are a variety of equipment/processes to generate new chemicals, new materials, scale up of existing materials, or pursuits in the field of materials science. The impact, chemicals, and research field largely depends on which process is being followed and which chemicals are being used. We utilize science-based, data-driven approach to evaluate emerging manufacturing technologies and tailor them to advance manufacturing intensification processes for each particular material. The MERF and construction activities for the MERF expansion would use currently existing utilities with minor modifications. Modifications included re-routing available power to new panels and transformers and re-routing existing chilled water and cold and hot water. Demolition activities would include removal of existing aged motor control centers, conduit, floor repair/resurfacing and grinding and other miscellaneous small demolition activities (e.g. removing piping, etc).

Description of Affected Environment

All work will take place on Argonne National Laboratory's property, located in DuPage County, Illinois. Experimental and scale-up activities take place and future activities will take place in building 370 (MERF), and are and will be performed in an existing building and areas that have been previously disturbed. The MERF expansion within building 370 and scale up activities would have no significant environmental impact. Existing utilities are planned to be used; however, connections of the lab sinks, condensate, eyewashes, would be connected to the laboratory sewer. In building 370, new exhaust stacks were installed 10 ft. above the roof line. The MERF was built and the MERF expansion will be built within the existing Building 370 high bay. The facility includes high-hazard, Group H, (H-3), pilot and high-bay laboratory spaces due to the presence of significant quantities of hazardous material needed to conduct the applied research. The existing ~11,000 sq. ft. facility includes seven total lab spaces, whereas the expanded facility ~16,000 sq.ft. will include one high bay, three pilot labs, and one prototyping lab. The facility has been designed and constructed in compliance with code requirements (i.e., NFPA, IBC, and other applicable codes and standards).

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 responses below.
2.	Air Pollutant Emissions	<input checked="" type="radio"/>	<input type="radio"/>	Flame Spray Pyrolysis and Spray Synthesis would produce Nitrogen Oxides. Unbound Nano-particles (UNPs) generated are removed from airstream exhaust via HEPA filtration. NOx emissions are, at maximum, <100kg/year @ <50g/hour, or less NOx emissions than ~12.5 gasoline cars during a year of operation. (https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100EVXP.TXT).
3.	Noise	<input checked="" type="radio"/>	<input type="radio"/>	The MERF does not generate noise and the construction of the MERF expansion may generate noise from the use of construction equipment including but not limited to jack hammers, cutting equipment and front end loaders. Argonne has an established hearing protection program in which the OSHA standard for noise would be followed.
4.	Chemical/Oil Storage/Use	<input checked="" type="radio"/>	<input type="radio"/>	Construction of the Materials Engineering Facility may use typical construction chemicals including but not limited to cements, PVC primer & cement, epoxy and paints. The inventory of chemicals is not excessive relative to the amount required to conduct the research, thus minimizing disposal of unneeded materials. Incompatible chemicals would be segregated. All storage of chemicals conform to the requirements in the applicable LMS and ESH procedures. The inventory of chemicals is entered into Argonne's centralized electronic inventory system. Containers used to store chemicals will be evaluated by the researchers and occupants/lab area leads for compatibility with contents. Chemicals will be stored in containers provided by manufacturer or a compatible container. The MERF facility uses flammable, toxic, , corrosive, and water reactive chemicals (multiple 55 gallon drums of flammables/combustibles and 300 gallon DOT approved shipping totes (of corrosives). The chemicals may change depending on future materials that are tested. The chemicals to be used would fall into the general chemical categories listed below. Below are some examples of chemicals used but other chemicals would not be limited as long as any new chemicals fall into the general chemical categories below. 1. Corrosives- (e.g. sulfuric acid, triethylamine, sodium hydroxide, ammonium hydroxide, etc.) 2. Carcinogens- (e.g. Nickel containing compounds , cobalt containing compounds, etc.) 3. Flammables-Class 1B flammables and Class IIIA combustibles such as liquids and solids. 4. Gases Used a. He, Ar, N2, O2, hydrogen, methane) b. Carbon monoxide 5. Gases Generated d. CO2-carbon dioxide maximum expected is 0.55 tons/yr 6. Nanomaterials- (e.g. Acetylene black powder suspended in binder, lithium lanthanum zirconium oxide (LLZO), Lithium Nickel Manganese Cobalt Oxide (NCM) oxide, platinum alloys) 7. Pyrophoric/water reactive- (e.g. n-butyl lithium, tetramethyl aluminum, tetra fluoride , etc.) 8. Peroxide Formers- (e.g. tetrahydrofuran, etc.) 9. Toxic-(e.g. Nickel and cobalt containing compounds (e.g. nickel sulfate, nickel hydroxide, nickel acetate, lithium nickel oxide, lithium trifluorosulfonimide salt,

				triethylamine, allyl bromide, manganese sulfate, and manganese acetate, etc.). The MERF has engineering controls to account for high volumes and hazards associated with the advanced materials chemistries (e.g. chemicals hoods, non-sparking motors, bag houses, air monitoring, safety switches for moving parts, etc) Spill Control- Small spills are contained in the hoods and spill kit used to clean up spills. Trenches provide additional spill control.. The MERF facility-Any 55 gallon drums would be on secondary containment. The equipment will be jacketed double walled units; in addition, adsorbents will be available for use. These adsorbents would be disposed following the Argonne Waste Procedures Manual.
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 checked="" type="radio"/>	<input type="radio"/>	A number of TSCA-regulated substances are used in the MERF on a number of projects. All materials are reviewed by ESH coordinators and the applicable SMEs before being used, and their storage/labeling is assessed on a regular basis. Due to the nature of the programs at MERF, the TSCA substances used may change rapidly. Chemical inventories are documented in Argonne's chemical tracking system - CORAL. Inventories for building 370 capture which materials are in use and where they are stored.
6d.	Import or Export of Chemical Substances	<input checked="" type="radio"/>	<input type="radio"/>	Battery material is imported and exported for research needs in gram quantities. Shipments and import/export requirements will be coordinated through the Shipping Dept. An ANL-1002 form should be completed for chemical substances (including samples) to be imported into the United States.
7.	Biohazards	<input type="radio"/>	<input checked="" type="radio"/>	
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"/>	Discharges from sinks and condensate would be piped by pumping or gravity to the laboratory or sanitary sewer system, whichever is required. Argonne policies and procedures prohibit disposal of hazardous material, RCRA-regulated waste, or any other materials prohibited from drain disposal by Argonne procedures in any drains. The proposed laboratory and high bay sinks would drain to the laboratory sewer. No wastewater emissions containing UNPs are allowed.
9.	Waste Management			
9a.	Construction or Demolition Waste	<input checked="" type="radio"/>	<input type="radio"/>	Construction of the Materials Engineering Facility would generate typical construction wastes including but not limited to concrete, cinder blocks, metal scraps, excess wiring and roofing materials. Construction debris would be recycled where possible.
9b.	Hazardous Waste	<input checked="" type="radio"/>	<input type="radio"/>	All RCRA hazardous waste generated during facility operations would be accumulated (in a Satellite Accumulation Area(s)) by qualified personnel who underwent Argonne-specific training. Requisitions for transfer of accumulated hazardous waste to a central on-site facility are completed by Argonne-certified personnel. The research personnel conform to the requirements in Argonne's Hazardous Waste Handling Procedures Manual. All on-site treatment, storage, and disposal would be performed in accordance with the RCRA Part B permit issued by the IEPA. The accumulated hazardous waste is disposed in accordance with Argonne's Part B permit, and in accordance with the requirement in Argonne's Waste Handling Procedures Manual. Any unused feed chemicals would be initially placed on the excess chemical inventory and if no new uses are found they will be disposed of by Argonne's waste management. The majority of the product generated would be sent back to the user, analytical labs, and battery manufacturers for testing. Any unwanted product would be logged into the SAA and disposed of by Waste Management.
9c.	Radioactive Mixed Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9d.	Radioactive Waste	<input type="radio"/>	<input checked="" type="radio"/>	
	Asbestos			Any asbestos abatement would be minor in scale, and limited to the demolition phase of construction or renovation activities. The Illinois EPA would be notified as required, and the

9e.	Waste	<input checked="" type="radio"/>	<input type="radio"/>	asbestos removed and disposed following the Argonne Waste Handling Procedures Manual and IEPA regulations.
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 checked="" type="radio"/>	<input type="radio"/>	Nanomaterials would eventually be incorporated into battery-related materials to enhance performance, including materials produced by advanced technology nanopowder atomic layer deposition reactors. Nanomaterial waste would be disposed of following the Waste Handling Procedures Manual. Handling and disposal will also be performed in compliance with LMS-PROC-83.
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"/>	No construction permit is required. However, the determination of insignificant activity potentially affecting facility operations would be evaluated with the IEPA.
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"/>	The MERF was designed and built to incorporate the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings per DOE Order 430.2b .
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 checked="" type="radio"/>	
19.	Wetlands	<input type="radio"/>	<input checked="" type="radio"/>	
20.	Floodplain	<input type="radio"/>	<input checked="" type="radio"/>	
21.	Landscaping	<input type="radio"/>	<input checked="" type="radio"/>	
22.	Navigable Air Space	<input type="radio"/>	<input checked="" type="radio"/>	
23.	Clearing or Excavation	<input type="radio"/>	<input checked="" type="radio"/>	
24.	Archaeological Resources	<input type="radio"/>	<input checked="" type="radio"/>	
25.	Underground Injection	<input type="radio"/>	<input checked="" type="radio"/>	
26.	Underground Storage Tanks	<input type="radio"/>	<input checked="" type="radio"/>	

27.	Public Utilities or Services	<input type="radio"/>	<input checked="" type="radio"/>	
28.	Depletion of a Non-Renewable Resource	<input type="radio"/>	<input checked="" type="radio"/>	
Section C (For Projects Outside of ANL)		Yes	No	
29.	Prime, Unique, or Locally Important Farmland	<input type="radio"/>	<input checked="" type="radio"/>	
30.	Special Sources of Groundwater (such as sole source aquifer)	<input type="radio"/>	<input checked="" type="radio"/>	
31.	Coastal Zones	<input type="radio"/>	<input checked="" type="radio"/>	
32.	Areas with Special National Designations (such as National Forests, Parks, or Trails)	<input type="radio"/>	<input checked="" type="radio"/>	
33.	Action of a State Agency in a State with NEPA-type Law	<input type="radio"/>	<input checked="" type="radio"/>	
34.	Class I Air Quality Control Region	<input type="radio"/>	<input checked="" type="radio"/>	

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 under 10 CFR 1021.211, Subpart D, Appendix B: B 3.6 Siting/Construction/Operation of facilities for bench scale/ small scale R&D's 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
Pfeiffer, Mark Albert	232188	Question 2	
Perez, Christina T.	225594	Question 3	
Lynch, Peter L.	46304	Questions 4, 6c, 8	
Mesarch, Matthew B	291600	Environmental Reviewer	
Hansen, Kelly	47227	Question 6d	
Grzymajlo, Jeffrey T.	97489	Questions 9a-9h	
Schmoltdt, Michael John	287923	Question 9h	
Hurley, Catherine Nicole	289201	Question 17	
Willig, Ryne T.	232518	ECR for AMD	
Harris, Amy M.	49490	NEPA Owner for EGS	
Brunner, Donna L.	222381	Reviewer	
Pupek, Krzysztof Z.	97542	MERF Section Leader	
Krumdick, Gregory K.	41078	AMD Division Director	

Notifications

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

Badge	Name	Division	Delete
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ASO-CX Number

ASO-CX- 373

Comments:

This NEPA ERF CX is tracked as ASO-CX-373 "Modification, and Continued Operation of the Materials Engineering Research Facility.

Approval

<u>Approver</u>	<u>Action</u>	<u>Date Routed</u>	<u>Action Date</u>	<u>Approval Reason / Comments</u>	<u>Approval Type</u>
McGhee, Ian Riley	APPROVED	2020-04-16	2020-04-16 09:23:53.0	Creator :	PRIMARY
Willig, Ryne T.	APPROVED	2020-04-16	2020-04-16 13:28:06.0	Project Manager :	PRIMARY
Krumdick, Gregory K.	APPROVED	2020-04-16	2020-04-16 14:33:39.0	AMD Division Director :	PRIMARY
Lynch, Peter L.	APPROVED	2020-04-16	2020-04-16 13:33:26.0	Questions 4, 6c, 8 :	PRIMARY
Hansen, Kelly	APPROVED	2020-04-16	2020-04-17 13:14:35.0	Question 6d :	PRIMARY
Harris, Amy M.	APPROVED	2020-04-16	2020-04-20 08:00:05.0	NEPA Owner for EGS :	PRIMARY
Grzymajlo, Jeffrey T.	APPROVED	2020-04-16	2020-04-17 08:34:53.0	Questions 9a-9h :	PRIMARY
Pupek, Krzysztof Z.	APPROVED	2020-04-16	2020-04-17 06:46:51.0	MERF Section Leader :	PRIMARY
Hurley, Catherine Nicole	APPROVED	2020-04-16	2020-04-22	Question 17 :	PRIMARY

Brunner, Donna L.	APPROVED	2020-04-16	2020-04-16 14:41:06.0	10:39:29.0 Reviewer :	PRIMARY
Perez, Christina T.	APPROVED	2020-04-16	2020-04-21 08:11:42.0	Question 3 :	PRIMARY
Willig, Ryne T.	APPROVED	2020-04-16	2020-04-16 13:28:06.0	ECR for AMD :	PRIMARY
Schmoldt, Michael John	APPROVED	2020-04-16	2020-04-22 10:20:51.0	Question 9h :	PRIMARY
Mesarch, Matthew B	APPROVED	2020-04-16	2020-04-16 13:42:08.0	Environmental Reviewer :	PRIMARY
Pfeiffer, Mark Albert	APPROVED	2020-04-16	2020-04-16 14:58:54.0	Question 2 :	PRIMARY
Harris, Amy M.	APPROVED	2020-04-20	2020-04-20 08:00:05.0	NEPA Owner Approval for Argonne Environmental Review :	PRIMARY
Ptak, Jill S.	APPROVED	2020-04-22	2020-04-24 11:05:59.0	ANL NEPA Reviewer :	PRIMARY
Hellman, Karen B.	APPROVED	2020-04-24	2020-04-28 13:22:10.0	ANL-985 Review and Approval :	PRIMARY
Kearns, Paul K.	APPROVED	2020-04-28	2020-04-30 16:55:50.0	ANL-985 ANL COO Review and Approval :	PRIMARY
Joshi, Kaushik N.	APPROVED	2020-04-30	2020-05-12 15:00:55.0	ANL-985 DOE-ASO Review and Approval : This NEPA ERF CX approval is tracked as ASO-CX-373	PRIMARY
Siebach, Peter Rudolf	APPROVED	2020-05-12	2020-05-13 09:26:48.0	ANL-985 DOE NEPA Compliance Officer Review and Approval :	PRIMARY
