

DOE-ID NEPA CX DETERMINATION Idaho National Laboratory

SECTION A. Project Title: Materials and Fuels Complex Enhanced Research, Development, and Demonstration Support Activities 2018-2019

SECTION B. Project Description and Purpose:

The Materials and Fuels Complex (MFC) at Idaho National Laboratory (INL) is a world leader in innovative nuclear energy technology and is the hub of the INL Nuclear Energy (NE) test bed. Activities at MFC support core research in nuclear fuels and cladding, radiation damage in core structural materials, chemical separations and fuel recycling, nuclear nonproliferation and nuclear forensics, space nuclear power and isotope technologies, and transient testing of reactor fuels. INL needs to maintain effective nuclear research, development, and deployment (RD&D) capabilities at MFC. INL has developed a multi-year strategy to address these needs by reducing deferred maintenance and repair needs, increasing the availability of RD&D facilities, and procuring and installing state-of-the-art scientific instrumentation and equipment.

Based on INL priorities, some activities in this environmental checklist (EC) will not be completed or funded and other activities could be added. Activities proposed beyond FY 2019 are included because priorities and estimated dates for completion have the potential to change. Individual projects will be reviewed by the Program Environmental Lead (PEL) and/or the National Environmental Policy Act (NEPA) Technical Lead to verify scope is covered by this NEPA analysis. In addition, the 5-year strategy is typically updated on an annual basis. This EC will be reviewed and revised consistent with the annual update to the 5-year strategy.

The discussion below describes the scope of the proposed action:

MFC Plant Health

MFC plant health investments are a key aspect of a robust nuclear energy RD&D test bed. The MFC strategy identifies the highest priority risks to facility reliability and RD&D throughput and proposes a multi-year strategy to address these risks. The strategy also addresses deferred maintenance (DM) across MFC nuclear and radiological facilities. Priorities are established by analysis of overall risk to facility availability and system reliability.

Table 1 provides a list of activities necessary to implement the strategy and prioritizes DM items. As noted, some activities in this EC may not be completed or funded and other activities could be added based on changing priorities. Activities proposed beyond FY 2019 are included because priorities and estimated dates for completion have the potential to change. Additional analysis to comply with the National Environmental Policy Act (NEPA) will be performed in conjunction with annual updates to the 5-year strategy.

Table 1. Prioritized MFC Plant Health Investment.

Facility	Name	DM	FY-18	FY-19	FY-20	FY-21	FY-22
AL	Replace or Upgrade HVAC	No	\$10,000				
HFEF/FCF/ AL	Replace Manipulators	No	\$3,000	\$3,000	\$2,500	\$4,000	\$4,000
HFEF/FCF/ AL	Replace Window Campaign	Yes	\$2,500	\$2,000	\$2,000	\$2,000	\$2,000
HFEF	Argon Cell Temperature and Pressure Controls	No	\$1,500				
FCF	Replace Programmable Logic Control	Yes		\$3,000			
FMF/ZPPR	Replace the Criticality Alarm System (CAS)	No	\$2,000				\$2,300
HFEF/ IMCL	Compressed Argon Supply System	Yes	\$700				
FCF	Multi-Function Furnace	New	\$6,000				
HFEF/FCF/ AL	Replace RLWTF Process/Storage Tanks	Yes	\$3,000				
MFC	Refurbish MFC-Wide Drainage System	No		\$2,100			
TREAT	Replace ARCS	No			\$3,000		
MFC	Replace HVAC Systems Facility-wide	No		\$400	\$400	\$400	\$400
FMF/ZPPR	Replace Roof	No		\$3,000	\$3,000		
AL	Renovate Lab Space	No		\$440	\$400	\$400	\$400
IMCL	Noise Reduction Modifications	No		\$350			
HFEF/FCF	Refurbish Electro-mechanical Manipulator	No	\$2,000				
MFC	Repair/Replace Pavement	Yes		\$2,100			
MFC	Update Radiation Monitoring (CAMs/RAMs)	No		\$3,070			
HFEF	Small Transfer Lock Doors	Yes	\$600				

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Facility	Name	DM	FY-18	FY-19	FY-20	FY-21	FY-22
HFEF	Small and Large Transfer Lock Drive Control System Upgrade	Yes	\$500				
HFEF	Containment Box	No		\$500			
HFEF	Decontamination Spray System	Yes					
HFEF	Radioactive Drain System Piping/Valves/Tanks	No				\$350	
FCF	New SCRAPE Cathode Module for Electrorefiner	No	\$2,500				
FCF/ ZPPR/ SSPSF	Compressed Air Supply System	No					\$1,000
HFEF	Facility Building Chiller Units	No				\$400	
HFEF	Facility Electrical Distribution System	No					\$2,000
HFEF	Facility Standby Diesel Generators	No				\$3,000	
FMF	Replace Casting Lab Glovebox	No				\$2,500	
AL	Replace Cell 1 Glovebox	No					\$1,500
AL	Redesign Hot Cell #2	No				\$1,000	
HFEF	Upgrade Pneumatic Sample Transfer Control System	No				\$275	
EFF	Fixed Air Sampling System	No			\$350		
HFEF/FCF /EBR-II	Replace 480V Critical Switchgear	No			\$1,000	\$1,000	\$1,000
FCF	In-cell Periscope and Camera System	No					
FASB/RCL	Stack Monitoring System	No			\$500		

Research Instrumentation

MFC instrumentation use is increasing, and operating Focused Ion Beam (FIB), Scanning Electron Microscope (SEM), and Electron Probe Micro-Analyzer (EPMA) instruments have a backlog of 3-9 months. The availability of high resolution Transmission Electron Microscope (TEM) and shielded FIB, SEM, and EPMA capability has also resulted in additional increases in use. Furthermore, replacement or upgrade of instrumentation is needed on a 3-5 year cycle to provide state of the art research opportunities.

Table 2 lists instrumentation needs. This list will be reviewed annually and may be updated based on programmatic needs and development of new technology. Additional analysis to comply with the National Environmental Policy Act (NEPA) will be performed in conjunction with annual updates.

Table 2. Summary of instrument development strategy and cost estimates

Facility Name	Capability	Sustainment/ Development	FY-18	FY-19	FY-20	FY-21	FY-22
IMCL	Install Thermal Properties Cell and Glovebox (laser flash, DSC, thermogravimetric, and dilatometry)	Development	\$3,500				
AL	Mass Spectrometers (Quad/ToF-MS/LA-LIBS)	Sustainment	\$3,800				
HFEF	Complete GASR and Polisher/Grinder Refurbishment	Sustainment	\$1,500				
HFEF	TREAT Experiment Handling Support	Sustainment	\$1,000				
FASB	Install new 'workhorse' SEM	Sustainment	\$500				
HFEF	ERS Elevator Repair	Sustainment	\$1,000				

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Facility Name	Capability	Sustainment/ Development	FY-18	FY-19	FY-20	FY-21	FY-22
HFEF	NRS Neutron Science Readiness	Sustainment	\$1,000				
IMCL	Titan TEM upgrades	Development		\$1,300			
HFEF	Replace Leitz Metallograph in MetBox	Sustainment		\$500			
IMCL	Titan TEM probe upgrade	Development		\$750			
NRAD	Neutron diffraction capability	Sustainment		\$385	\$565	\$485	\$500
IMCL	In-situ thermal, mechanical, and micro isotopic measurement using FIB	Development		\$700	\$250	\$250	
IMCL	Atom probe tomography instrument	Development					
HFEF	ECP/EBLM refurbishment	Sustainment					
AL	B-wing ICP-OES (non-rad)	Sustainment		\$300			
HFEF	Install and test visual examination system	Sustainment		\$500			
All	Research data management and visualization system	Development			\$250	\$1,000	\$1,000
NRAD	NRAD digital neutron radiography/tomography	Development		\$500	\$1,000	\$1,000	
HFEF	Shielded multi-instrument non-destructive PIE capability	Development		\$955	\$1,000	\$3,000	\$5,000
FASB	IASCC shielded cell #2	Development					
AL	Replace TIMS	Sustainment			\$1,000	\$1,000	
AL	Gas flow proportional counters, series 5 LB5500 (Canberra) or WPC-1150 model (Protean)	Development					
AL	Agilent or Thermo triple quad ICP-MS	Sustainment					
AL	High performance liquid chromatograph	Sustainment					
AL	Gas mass spectrometer	Sustainment					
AL	High Resolution ICP-MS (B-154)	Sustainment					
AL	Quad ICP-MS	Sustainment					
NRAD	Automated Computed Tomography system	Development		\$500	\$850	\$850	\$200

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Facility Name	Capability	Sustainment/ Development	FY-18	FY-19	FY-20	FY-21	FY-22
NRAD	Beamline Upgrades	Development		\$550	\$600	\$400	
NRAD	Power upgrade to 1 MW	Sustainment					
BEAMS	High Energy X-ray Diffraction System	Development					
BEAMS	Transmission Mode XRD Development	Development			\$700		
BEAMS	X-ray Micro-CT System	Development		\$800			
FIB	Replace EML Quanta FIB	Sustainment		\$1,000			
HFEF	Separate Effects Furnace	Development			\$200	\$250	
HFEF	Laser-based pulsed neutron source	Development					
IMCL	Ion Mill (PIPS-II) for Sample Preparation	Development					
EML	Replace TEM	Sustainment					
IMCL	ASTAR system	Development		\$360			
EML	Replace SEM	Sustainment		\$750			
TBD	Upgrade Energy Dispersive Spectrometers (JEOL 700, JEOL 7600)	Sustainment		\$165			
IMCL	Upgrade Electron Microprobe (EPMA) to Field Emission Gun	Development					
TBD	Adiabatic calorimeter	Development					
HFEF	Shielded Multi-Instrument non-destructive PIE Capability MEITNER	Development					
IMCL	Physical Property Measurement System	Development					
Multiple	Acquire new BRR cask	Sustainment					
AL	Capillary Electrophoresis	Development			\$200		
AL	Ion Chromatography	Sustainment			\$200		
AL	Liquid Scintillator	Sustainment					
AL	3 Mobius gamma detectors	Sustainment					
AL	Multi-Collector ICP-MS	Sustainment					

Nine asphalt areas have been identified as needing immediate attention. That combined area totals ~139,000 ft².

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The strategy for MFC builds and improves core competencies and introduces new and revitalized RD&D capabilities. Many of the proposed actions improve efficiency, reliability, and safety of MFC operations to support the RD&D mission. The scope of work maintains and improves infrastructure and equipment needed for safe operations and supplies state-of-the-art research instrumentation and capabilities.

This EC covers the deferred maintenance, mission enabling infrastructure improvements, and procurement, installation, and operation of the items listed above. Activities not listed require program/project specific ECs or revision of this EC. The scope of work does not include activities that generate TRU waste. Activities that generate TRU waste must have project specific NEPA review.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

Project activities have the potential to contribute to air emissions through the following:

- Generating air pollutants, including but not limited to radionuclides, chemical and combustion emissions. Some activities may involve stationary air emission sources, including stationary internal combustion engines.
- Generating hazardous and radiological emissions, such as by operation of fuel burning equipment, decontamination work, use of maintenance products that contain hazardous constituents, and disturbance of contaminated soils.
- Distributing, excessing or disposing of appliances containing refrigerants.
- Maintaining, servicing or repairing stationary heating, ventilation, air conditioning and refrigeration equipment.
- Maintaining, testing, or disposing of halon-containing equipment and halon.
- Purchasing equipment containing refrigerants or halon.
- Acquiring and dispositioning chemicals.
- Disturbing asbestos.
- Generating fugitive dust or other fugitive emissions.
- Purchasing, relocating, operating, modifying or maintaining portable air emission sources, including non-road internal combustion engines.

Discharging to Surface-, Storm-, or Ground Water

Activities addressed by this EC have the potential to impact waters of the United States (U.S.) or groundwater through conduct of the following:

- Maintaining, repairing, or altering drinking water systems and cross connection at the INL
- Using drinking water systems and cross connections at the INL
- Maintaining or repairing septic tanks or septic systems
- Discharging Wastewaters
- Managing storm water discharges.

Disturbing Cultural or Biological Resources

Activities included in this EC have the potential to disturb cultural or biological resources as follows:

- Maintaining or repairing facilities, structures, equipment or processes
- Management of migratory birds and bird nests on the INL
- Modifying historical buildings or structures

Generating and Managing Waste

Proposed activities have the potential to generate waste from conducting the following activities:

- Decontaminating equipment containing or contaminated with polychlorinated biphenyls (PCBs) (From equipment manufactured before 1982)
- Maintaining equipment containing or contaminated with PCBs (From equipment manufactured before 1982)
- Disposing asbestos-containing material
- Disturbing asbestos or removing asbestos-containing material
- Other activities that generate waste.

Releasing Contaminants

Activities addressed by this EC have the potential to release contaminants through the following:

- Acquiring, using, storing and dispositioning chemicals
- Managing and dispositioning excess property and materials
- Reporting and cleaning up spills and releases
- Managing elemental lead
- Removing lead from service or from a structure.

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Using, Reusing, and Conserving Natural Resources

Activities addressed by this EC have the potential for use, reuse and conservation of natural resources related to the following:

- Generating greenhouse gasses
- Building energy use
- Consuming potable, industrial or irrigation water
- Generating storm water
- Generating landfill waste or construction and demolition wastes
- Generating recyclable materials
- Engaging in sustainable acquisition practices.

SECTION D. Determine Recommended Level of Environmental Review, Identify Reference(s), and State Justification: Identify the applicable categorical exclusion from 10 Code of Federal Regulation (CFR) 1021, Appendix B, give the appropriate justification, and the approval date.

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, or similar requirements of Department of Energy (DOE) or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; (3) disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no extraordinary circumstances related to the proposal exist that would affect the significance of the action. In addition, the action is not "connected" to other action actions (40 CFR 1508.25(a)(1) and is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1608.27(b)(7)).

References: 10 CFR 1021, Appendix B to subpart D, items B1.3 "Routine maintenance," B1.31 "Installation or relocation of machinery and equipment," and B2.5 "Facility safety and environmental improvements."

Justification: Project activities are consistent with 10 CFR 1021, Appendix B, B1.3, "Routine maintenance activities and custodial services for buildings, structures, rights-of-way, infrastructures (including, but not limited to, pathways, roads, and railroads), vehicles and equipment, and localized vegetation and pest control, during which operations may be suspended and resumed, provided that the activities would be conducted in a manner in accordance with applicable requirements. Custodial services are activities to preserve facility appearance, working conditions, and sanitation (such as cleaning, window washing, lawn mowing, trash collection, painting, and snow removal). Routine maintenance activities, corrective (that is, repair), preventive, and predictive, are required to maintain and preserve buildings, structures, infrastructures, and equipment in a condition suitable for a facility to be used for its designated purpose. Such maintenance may occur as a result of severe weather (such as hurricanes, floods, and tornados), wildfires, and other such events. Routine maintenance may result in replacement to the extent that replacement is in-kind and is not a substantial upgrade or improvement. In-kind replacement includes installation of new components to replace outmoded components, provided that the replacement does not result in a significant change in the expected useful life, design capacity, or function of the facility. Routine maintenance does not include replacement of a major component that significantly extends the originally intended useful life of a facility (for example, it does not include the replacement of a reactor vessel near the end of its useful life). Routine maintenance activities include, but are not limited to:

- a) Repair or replacement of facility equipment, such as lathes, mills, pumps, and presses;
- b) Door and window repair or replacement;
- c) Wall, ceiling, or floor repair or replacement;
- d) Reroofing;
- e) Plumbing, electrical utility, lighting, and telephone service repair or replacement;
- f) Routine replacement of high-efficiency particulate air filters;
- g) Inspection and/or treatment of currently installed utility poles;
- h) Repair of road embankments;
- i) Repair or replacement of fire protection sprinkler systems;
- j) Road and parking area resurfacing, including construction of temporary access to facilitate resurfacing, and scraping and grading of unpaved surfaces;
- k) Erosion control and soil stabilization measures (such as reseeding, gabions, grading, and revegetation);
- l) Surveillance and maintenance of surplus facilities in accordance with DOE Order 435.1, "Radioactive Waste Management," or its successor;
- m) Repair and maintenance of transmission facilities, such as replacement of conductors of the same nominal voltage, poles, circuit breakers, transformers, capacitors, crossarms, insulators, and downed powerlines, in accordance, where appropriate, with 40 CFR part 761 (Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions) or its successor;
- n) Routine testing and calibration of facility components, subsystems, or portable equipment (such as control valves, in-core monitoring devices, transformers, capacitors, monitoring wells, lysimeters, weather stations, and flumes);
- o) Routine decontamination of the surfaces of equipment, rooms, hot cells, or other interior surfaces of buildings (by such activities as wiping with rags, using strippable latex, and minor vacuuming), and removal of contaminated intact equipment and other material (not including spent nuclear fuel or special nuclear material in nuclear reactors); and
- p) Removal of debris;"

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B 1.31 "Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts;" and

B2.5 "Safety and environmental improvements of a facility (including, but not limited to, replacement and upgrade of facility components) that do not result in a significant change in the expected useful life, design capacity, or function of the facility and during which operations may be suspended and then resumed. Improvements include, but are not limited to, replacement/upgrade of control valves, in-core monitoring devices, facility air filtration systems, or substation transformers or capacitors; addition of structural bracing to meet earthquake standards and/or sustain high wind loading; and replacement of aboveground or belowground tanks and related piping, provided that there is no evidence of leakage, based on testing in accordance with applicable requirements (such as 40 CFR part 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities" and 40 CFR part 280, "Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks"). These actions do not include rebuilding or modifying substantial portions of a facility (such as replacing a reactor vessel)."

Adherence to appropriate environmental documents, test plans, safety plans, Safety Data Sheets (SDS), Department of Energy regulations, and State and Federal law during project activities does not 1) threaten a violation of applicable statutory, regulatory, or permit requirements; 2) require expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment that would result in an uncontrolled or unpermitted release; 4) have the potential to cause significant impacts on environmentally sensitive resources, e.g., historic properties; state or federally listed sensitive, threatened, endangered, or candidate species; floodplains and wetlands; areas having special designation, e.g., designated wilderness, national parks, national monuments, etc.; and 5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds or invasive species. Additionally, there are no extraordinary circumstances related to the proposed action that would affect the significance of the environmental effects of the proposal.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on: 8/06/2018