

# DOE-ID NEPA CX DETERMINATION

## Idaho National Laboratory

### SECTION A. Project Title: X-Wave Self-Powered Wireless Sensor System Irradiations

### SECTION B. Project Description and Purpose:

INL will provide access to X-Wave Innovations for neutron and gamma irradiation testing of sensor components consisting of sensing unit, wireless power system, ultrasonic communication devices. The sensor unit will be assembled in easy to handle aluminum container and will be provided for irradiation. The total weight of the assembly will be around 4 kg.

Neutron irradiation is to be performed at the NRAD reactor located in the Hot Fuel Examination Facility (MFC-785) at the Materials and Fuels Complex (MFC). Neutron irradiation is expected to take one 24-hour cycle in NRAD to reach desired fluence and is anticipated to start in April, 2022. Waste materials will include sensor components exposed to neutron radiation and may include Al 6061, 316 or 304 stainless steel, LiNbO<sub>3</sub>, Cr(20nm)/Au(500nm) thin film (adhered to the LiNbO<sub>3</sub>), alumina, machinable oxide ceramics, aluminum, fused quartz, and tungsten. All components irradiated in NRAD will be considered low level radioactive waste to be disposed of using in-place procedures.

Gamma irradiation is to be performed using a Co-60 gamma irradiator located at either the Energy Innovation Laboratory (IF-688) building in REC or Fuels and Applied Science Building (MFC-787) at MFC, depending on availability. Gamma irradiation is expected to take two to four weeks and is anticipated to start in April, 2022. Gamma irradiation is not expected to produce any waste materials or emissions and the test samples may be returned to X-Wave for further study. The project has the potential to generate mixed waste.

### SECTION C. Environmental Aspects or Potential Sources of Impact:

#### Air Emissions

N/A

#### Discharging to Surface-, Storm-, or Ground Water

N/A

#### Disturbing Cultural or Biological Resources

FASB (MFC-787) is over 50 years old. However, no structural or aesthetic changes will be made to the building.

#### Generating and Managing Waste

Waste materials will include sensor components exposed to neutron radiation and may include Al 6061, 316 or 304 stainless steel, LiNbO<sub>3</sub>, Cr(20nm)/Au(500nm) thin film (adhered to the LiNbO<sub>3</sub>), alumina, machinable oxide ceramics, aluminum, fused quartz, and tungsten. All components irradiated in NRAD will be considered low level radioactive waste to be disposed of using in-place procedures. The project also has the potential to generate mixed waste.

Gamma irradiation is not expected to produce any waste materials or emissions and the test samples may be returned to X-Wave for further study.

#### Releasing Contaminants

N/A

#### Using, Reusing, and Conserving Natural Resources

All applicable material will be diverted from disposal in the landfill when possible. Project personnel will use every opportunity to recycle, reuse, and recover materials and divert waste from the landfill when possible. Equipment will be returned to X-Wave.

### 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)-

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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, Item B3.6, "Small-scale research and development, laboratory operations, and pilot projects"

**Justification:** The proposed R&D activities are consistent with CX B3.6 "Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment."

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

Approved by Jason L. Anderson, DOE-ID NEPA Compliance Officer on: 03/23/2022