

# DOE-ID NEPA CX DETERMINATION

## Idaho National Laboratory

**SECTION A. Project Title:** Advanced Laser Ultrasonic Sensor for Fuel Rod Characterization

**SECTION B. Project Description and Purpose:**

Intelligent Optical Systems, Inc. (IOS), located in Torrance, California, is a highly innovative Research and Development (R&D) organization. IOS is the supplier of sensor, test, and measurement technology to industry, government, and research markets, with a principal position in physical, chemical, biological, radiological, and remote sensing.

IOS and Idaho National Laboratory (INL) were recently awarded funding by the Small Business Innovation Research (SBIR) program for a proposal (DE-FOA-0002146) entitled "Advanced Laser Ultrasonic Sensor for Fuel Rod Characterization". Under the award, INL and IOS will further develop the IOS laser ultrasound fuel rod inspection system.

INL has extensive experience with application of acoustic/ultrasonic technologies to radiation environments, irradiation testing, and demonstration of technologies associated with nuclear energy. As such, INL offers unique expertise relevant to this effort. INL will utilize this experience to guide technical development of a laser ultrasound fuel rod examination system and will provide test samples simulating pressurized fuel rodlets for demonstration of the system using capabilities unique to the High-Temperature Test Laboratory (HTTL), which are not available in the private sector.

Currently, monitoring of fuel rod condition in operating nuclear power reactors is not possible. Monitoring of fuel rods in test reactors is possible, but the available technologies are very limited. This project seeks to develop an in-situ laser ultrasound-based system for monitoring fuel rod pressure and stress state. As a first step, testing will be performed on surrogate fuel rods, containing no fuel, but fabricated from relevant cladding materials and pressurized to mimic a range of operating conditions. Towards this end, INL personnel will engage IOS to provide technical guidance as well as the surrogate fuel rods. The surrogate fuel rods will be sent to IOS at no cost, then returned to INL after testing and measurement demonstration have been completed.

All INL tasks will be performed in INL's HTTL located in the Energy Innovation Laboratory (EIL).

### Tasks

This work is split into three basic tasks, which will run concurrently.

Task 1: INL will provide technical and strategic guidance, primarily by phone and through email correspondence. Specifically, two one-hour calls per month will be held.

Task 2: INL will host a one-day meeting. This may be a virtual meeting depending on travel restrictions.

Task 3: INL will provide 5 to 10 surrogate fuel pin samples for testing the IOS developed measurement technique. These samples will not contain fuel but will be made with relevant cladding materials and will be pressurized to simulate realistic conditions. These surrogate fuel pins were fabricated under another project "Halden" covered by environmental checklist INL-20-043 (OA 13 & 31). Material certifications and fabrication records will be provided with the samples.

**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

N/A

### Generating and Managing Waste

N/A

### Releasing Contaminants

N/A

### Using, Reusing, and Conserving Natural Resources

Surrogate fuel pins fabricated by another project will be provided to the customer for testing.

**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, items B1.24, "Property transfers" and A11, "Technical advice and assistance to organizations".

**Justification:**

The proposed transfer of the surrogate fuel pins is consistent with CX B1.24 "Transfer, lease, disposition, or acquisition of interests in personal property (including, but not limited to, equipment and materials) or real property (including, but not limited to, permanent structures and land), provided that under reasonably foreseeable uses (1) there would be no potential for release of substances at a level, or in a form, that could pose a threat to public health or the environment and (2) the covered actions would not have the potential to cause a significant change in impacts from before the transfer, lease, disposition, or acquisition of interests."

The consulting portion of the project is consistent with CX A11 "Technical advice and planning assistance to international, national, state, and local organizations."

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: 09/03/2020