DOE-ID NEPA CX DETERMINATION
Idaho National Laboratory

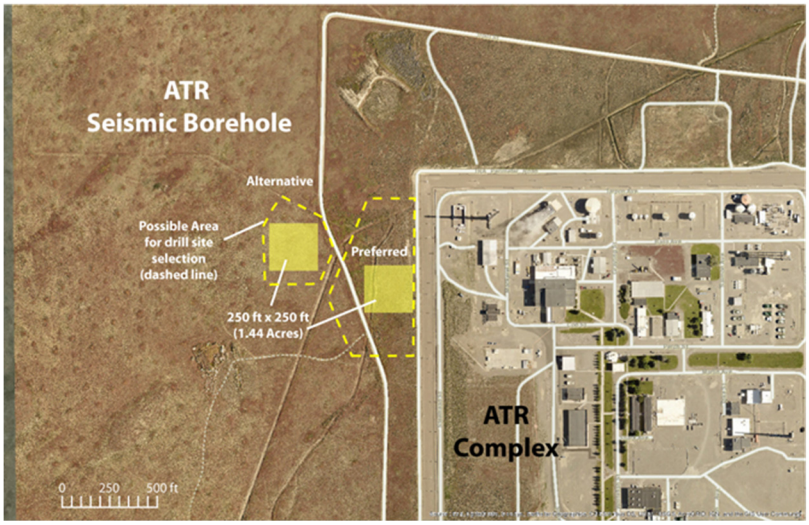
CX Posting No.: DOE-ID-INL-19-012 R1

SECTION A. Project Title: INL Site-wide Seismic Velocity Boreholes

SECTION B. Project Description and Purpose:

The purpose of this revision is to document a change to the seismic borehole location near the Advanced Test Reactor (ATR) Complex. Two alternative sites on the northwest side of ATR are proposed for the borehole (Figure R-1). The preferred site covers about 250 ft x 250 ft and is adjacent to the west fence of the ATR. If this location is not suitable, an alternative site west of the ATR perimeter road is proposed. The depth to the aquifer is ~450 ft. At this time, the ATR borehole is planned for abandonment following data collection.

Figure R-1. ATR seismic borehole location with possible area (dashed yellow line) for selecting the 250 ft x 250 ft drill site (yellow box) at the preferred location or at an alternative location



The remaining scope in the original EC remains valid and is included below:

Original EC

Under the proposed action, the U.S. Geological Survey (USGS) drills up to eight boreholes, each with ≤10 inch diameter and extending to depths between 800 and 1,600 ft, at four locations on the INL Site. After seismic measurement collection, USGS may take ownership of the boreholes for future monitoring activities. Borehole depth varies depending on location (discussed below for each location). The following discussion summarizes project scope at each location:

- Borehole drilling and logging disturbs an area about 250 ft x 250 ft to accommodate the drill rig, lay-down area, water tank, water truck turnaround, and vehicles. Access to and from the drill sites uses existing roads. The proposed action includes grubbing vegetation prior to drilling, and, where possible, choosing locations to minimize sagebrush disturbance. Drilling takes between 40 and 80 days, depending on borehole depth. Seismic velocity logging is performed over a period of 3 to 10 days.

- The USGS core-drills a ≤5 inch diameter borehole to the top of the aquifer and performs geophysical logging in open-hole conditions. A geotechnical firm logs cores on site, places cores in boxes, and transports cores to the USGS core library. The USGS grouts (mixture of water, cement, and bentonite) the borehole from the bottom to the top, reams the grout to a ≤5 inch diameter borehole, then places a FLUTe Flexible Liner containing a 50 ft slug of water and a seismic sensor in the borehole. Seismic velocities are measured by moving the 50 ft slug of water and seismic sensor from the bottom of the hole to the surface. The seismic sensor generates and records vibrations transmitted into and out of nearby rock. For deeper boreholes extending into the aquifer, the USGS reams the borehole out to 9.8-inches diameter and sets and grouts 6-inch steel casing to stabilize the borehole for further core-drilling. The USGS core drills below the bottom of the steel casing to the bottom-hole depth. If the borehole is stable, geophysical and seismic velocity logging occurs in open-hole conditions. If not stable, then the FLUTe Flexible Liner and seismic sensor log seismic velocities. Following seismic velocity logging, the USGS completes the borehole as a monitoring well, or borehole is abandoned in compliance with regulatory requirements.

The following four sections describe each project location, the number of boreholes, and proposed disposition of the boreholes:

1. Naval Reactors Facility (NRF)

The proposed action drills and measures seismic velocities in two deep boreholes near NRF to support seismic design of current and planned nuclear facilities at NRF. The two boreholes will be core-drilled to 1,500 ft depths at a location on the east side of the NRF, and another location on the west side of NRF. The depth to the aquifer is ~425 ft. Once seismic velocities have been logged, the USGS will install monitoring instrumentation in each borehole and take ownership of the boreholes.

The NRF East borehole drill site is located off of Lincoln Blvd on the NRF emergency road (Figure 1), and has been reviewed and cleared for use as part of the Naval Spent Fuel Handling (NSFH) Facility. The NRF West borehole location is located west of an historic canal and has not been assessed (Figure 2). Drilling at the NRF West borehole includes placing a hose that connects to a refillable water tank along the road on the east side of the historic canal to avoid disturbance to the historic canal from water trucks crossing the canal to the drill site. Also, alternate roads around the historic canal will be used to transport the drill rig to and from the borehole location. The area for the temporary water tank and truck turnaround covers about 50 ft by 50 ft.

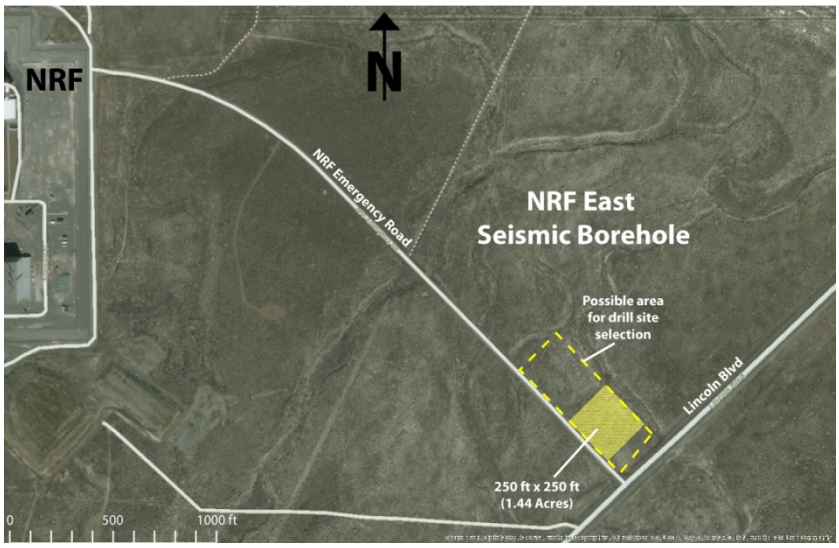


Figure 1. Map showing NRF East seismic borehole location with possible area (dashed yellow line) for selecting the 250 ft x 250 ft drill site (yellow box).

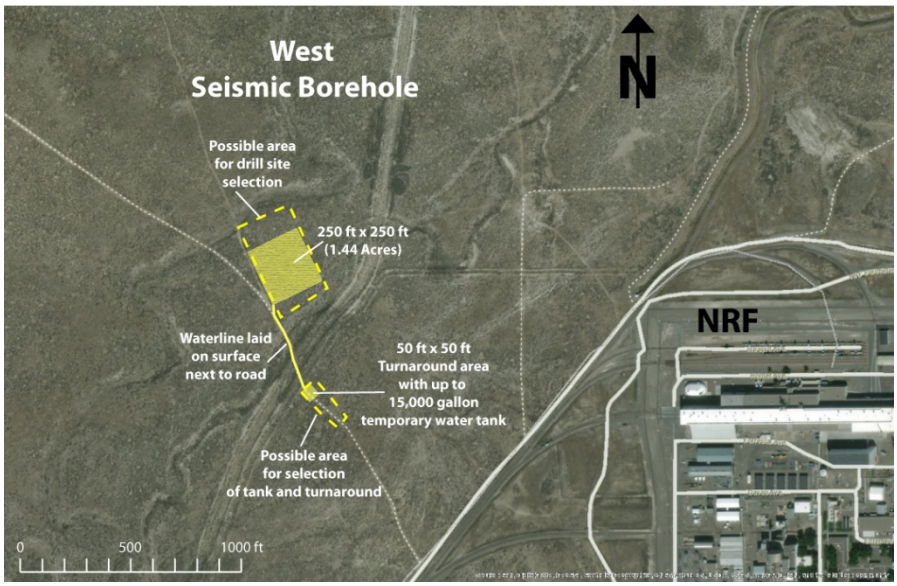


Figure 2. Map showing NRF West seismic borehole location with possible areas (dashed yellow line) for selecting the 250 ft x 250 ft drill site (yellow box), and truck turnaround and water tank, and the water line location across the historic canal.

2. Advanced Test Reactor (ATR)

The proposed action core-drills one 1,600 ft deep borehole at ATR to obtain seismic data for an updated ATR seismic safety basis. Two alternative sites are proposed for the borehole at ATR (Figure 3). The preferred site covers about 250 ft x 250 ft north of the ATR fence. If this location is not suitable, an alternative site further north of the ATR northern perimeter road is proposed. The depth to the aquifer is ~500 ft. At this time, the ATR borehole is planned for abandonment following data collection.

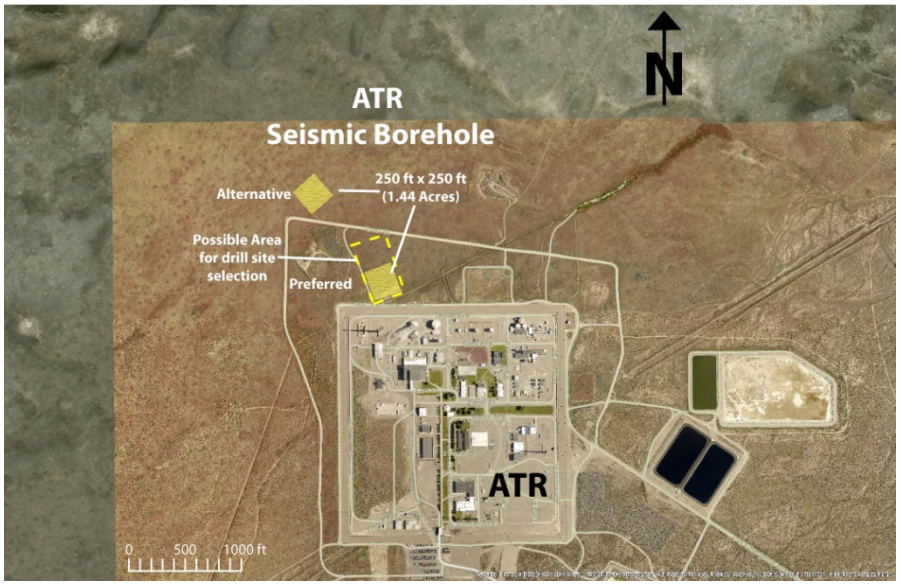


Figure 3. Map showing ATR seismic borehole location with possible area (dashed yellow line) for selecting the 250 ft x 250 ft drill site (yellow box) at the preferred location or at an alternative location further north.

3. Idaho Nuclear Technology and Engineering Complex (INTEC)
The proposed action drills and measures seismic velocities in one 1,500 ft borehole east of INTEC to obtain data for an updated seismic safety basis for potential future projects/activities. The proposed site covers about 250 ft x 250 ft near the INL seismic station, ITCF (Figure 4). The borehole location and seismic station are located east of INTEC and outside of the restricted zone for drilling. At this time, the INTEC borehole is planned for abandonment following data collection.

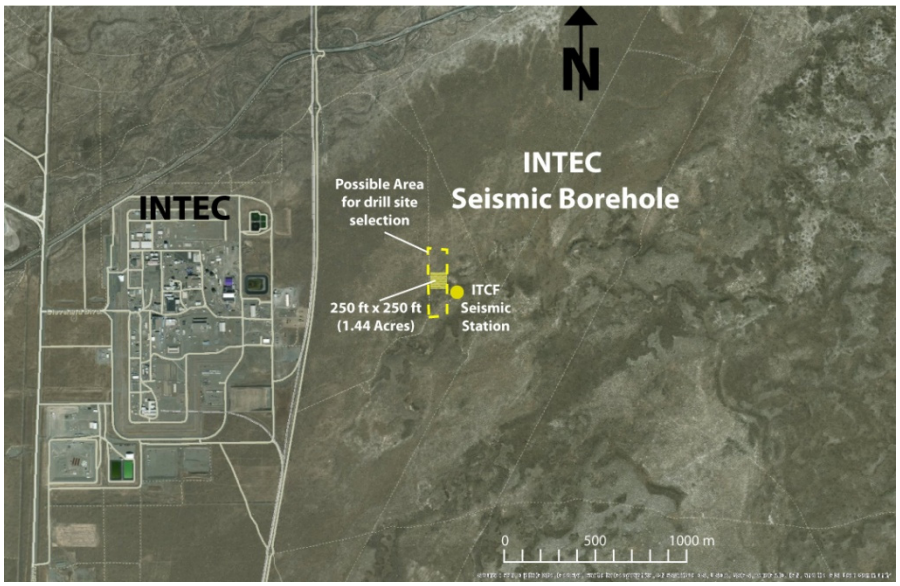


Figure 4. Map showing INTEC seismic borehole location with possible area (dashed yellow line) for selecting the 250 ft x 250 ft drill site (yellow box).

4. Small Modular Reactor (SMR) Site
The Utah Association of Municipal Power Systems (UAMPS) is evaluating siting a Small Modular Reactor (SMR) on the INL Site. Environmental checklist INL-18-095 evaluated the environmental impacts of installing a seismic station for the proposed SMR at location south of Central Facilities Area (CFA). UAMPs is reconsidering the location and has not identified a new location at present. In advance of UAMPS site characterization studies at a new INL location, it is proposed that the USGS drill and measure seismic velocities in four boreholes to obtain data for the INL SSHAC Level 3 Study. A new seismic station may also be installed to collect regional earthquake data. Earthquake recordings and seismic velocities are vital for developing site-specific ground motion models for the INL SSHAC Level 3 PSHA at the SMR site.

The four seismic velocity boreholes will be drilled for the SMR. They will be located on the site selected for the SMR. Each of the boreholes will be drilled to depths from 800 to 1,600 ft depending on the site location on INL. If the SMR site selected is south of CFA, then each borehole will be 800 ft deep. If the

SMR site is located in the western or northern parts of INL, then each borehole will be 1,600 ft deep. When the SMR site is selected, this EC will be revised to include the map, depth, location, and disposition of each borehole and seismic station.

The project anticipates locating a new seismic station near one of the seismic velocity boreholes. Installing the seismic station requires soil disturbance within a 50 ft radius around the seismic station. The soil disturbance includes:

- Placing a 4 ft-diameter concrete circular pad housing a circular culvert enclosure (4 ft high) and steel lid with handle
- Hand-augering a 12-inch diameter hole to a depth of 3 or 4 ft to place a steel rod in concrete
- Hand-excavating a 3 x 3 ft base for a 10' tower in 1 to 2 ft of concrete.

The seismic station consists of the following instrumentation:

- A datalogger, three-component broadband seismometer, and three-component accelerometer housed in the culvert enclosure
- Two solar panels and one antenna attached to the tower
- Global Positioning System (GPS) antenna attached to the top of the steel rod
- Digital 2.4G radio and GPS receiver in a small enclosure on the tower
- A 2 x 3 ft steel box set on the soil surface adjacent to the tower to house two or more sealed 12 volt, 100 amp/hr Gel Cell batteries.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

Fugitive dust and emissions from mobile equipment may be generated during excavation activities.

Discharging to Surface-, Storm-, or Ground Water

Drilling boreholes has the potential to impact groundwater.

The project will have little, if any, effect on the floodplain, nor will the floodplain adversely affect the project. However, project personnel should use practices to prevent and minimize spills (e.g., good housekeeping) during storage and use of chemicals and fuels. Projects should also minimize soil disturbance to the extent practical.

Disturbing Cultural or Biological Resources

The proposed locations for the seismic stations, boreholes, and seismic lines are outside the previously disturbed facility fenced areas/improved grounds and have the potential to disturb Cultural or Biological resources.

Generating and Managing Waste

The seismic investigation portion of the project may generate small amounts of industrial waste such as concrete, scrap metal/wire, packaging material, etc. Hazardous waste is not expected to be generated. Batteries will be used while operating the seismic stations and will need to be replaced on occasion. Drill cuttings from the boreholes and wells will also be generated. All waste will be appropriately characterized and disposed at the direction of the facility Waste Generator Services representative. Program personnel will incorporate waste minimization measures and recycling where practical.

Releasing Contaminants

Typical construction chemicals such as fuels, lubricants, adhesives, etc. will be used while constructing the seismic stations. Pesticides and fertilizers may also be used if revegetation becomes necessary. Although not anticipated, there is a potential for spills when using chemicals or fueling equipment. In the event of a spill, notify facility PEL. If the PEL cannot be contacted, report the release to the Spill Notification Team (208-241-6400). Clean up the spill and turn over spill cleanup materials to WGS.

Using, Reusing, and Conserving Natural Resources

All applicable waste would be diverted from disposal in the landfill when possible. Program personnel would use every opportunity to recycle, reuse, and recover materials and divert waste from the landfill when possible. The program would practice sustainable acquisition, as appropriate and practicable, by procuring construction materials that are energy efficient, water efficient, are bio-based in content, environmentally preferable, non-ozone depleting, have recycled content, and are non-toxic or less-toxic alternatives.

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, B3.1 "Site characterization and environmental monitoring"

Justification: Project activities are consistent with 10 CFR 1021, Appendix B, B3.1 "Site characterization and environmental monitoring (including, but not limited to, siting, construction, modification, operation, and dismantlement and removal or otherwise proper closure (such as of a well) of characterization and monitoring devices, and siting, construction, and associated operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis). Such activities would be designed in conformance with applicable requirements and use best management practices to limit the potential effects of any resultant ground disturbance. Covered activities include, but are not limited to, site characterization and environmental monitoring under CERCLA and Resource Conservation and Recovery Act (RCRA). (This class of actions excludes activities in aquatic environments. See B3.16 of this appendix for such activities.) Specific activities include, but are not limited to:

a) Geological, geophysical (such as gravity, magnetic, electrical, seismic, radar, and engineering surveys and mapping, and the establishment of survey marks. Seismic techniques would not include large-scale reflection or refraction testing;
b) Installation and operation of field instruments (such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools);
c) Drilling of wells for sampling or monitoring of groundwater or the vadose (unsaturated) zone, well logging, and installation of water-level recording devices in wells;
d) Aquifer and underground reservoir response testing; (e) Installation and operation of ambient air monitoring equipment;
e) Sampling and characterization of water, soil, rock, or contaminants (such as drilling using truck- or mobile-scale equipment, and modification, use, and plugging of boreholes);
f) Sampling and characterization of water effluents, air emissions, or solid waste streams;
g) Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources);
h) Sampling of flora or fauna; and
i) Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7.

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: 3/14/2019