

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: VTR Site Geotechnical Investigation Work

SECTION B. Project Description and Purpose:

Interim Action for VTR Site Geotechnical Investigation Work

The U.S. Department of Energy (DOE established the Versatile Test Reactor (VTR) project the Department of Energy-Nuclear Energy (DOE-NE) Nuclear Energy Advisory Committee (NEAC) recommendation to "...proceed immediately with pre-conceptual design planning activities to support a new test reactor (including cost and schedule estimates)." In December 2020, DOE published a Draft Environmental Impact Statement (DEIS) evaluating the potential environmental impacts of proposed alternatives for the construction and operation of the VTR and associated facilities that are needed for performing post-irradiation evaluation of test articles and managing spent nuclear fuel (SNF). DOE is currently reviewing and addressing public comments related to the DEIS.

The DEIS does not contain specific geotechnical data for the candidate site at the Materials and Fuels Complex (MFC) at Idaho National Laboratory (INL). The proposed action conducts geotechnical investigations needed to support preliminary design. All information contained herein is for geotechnical site investigation only. The purpose of this investigation is to obtain information and basic data on the nature and suitability of subsurface materials at the MFC location.

Under DOE's NEPA Implementing Procedures at 10 CFR Part 1021.211, no action may be taken concerning a proposal that is the subject of an EIS before issuing a ROD except as provided in the Council on Environmental Quality (CEQ) Regulations. The CEQ Regulations (40 CFR Part 1506.l(a)) state that "until an agency issues a record of decision as provided in Sec. 1505.2 (except as provided in paragraph (c) of this section), no action concerning the proposal shall be taken which would: (1) have an adverse environmental impact; or (2) limit the choice of reasonable alternatives." Actions within the scope of the NEPA process that are taken before a Record of Decision or Finding of No Significant Impact is issued are commonly referred to as "interim actions." Such actions should proceed in accordance with applicable CEQ and DOE published guidance. DOE Policy 451 through the Safety Management Functions, Responsibilities, and Authorities (FRA) Document Revision 9, assigns the Manager for the Idaho Site the responsibility for NEPA compliance, which includes authority to determine that an interim action is clearly allowable under the Regulations. DOE has determined that this action is allowable through an interim action determination completed separately from this ECP.

Background

The proposed VTR project would construct a new facility to the east and south of MFC. This area is currently undeveloped land, and INL has performed extensive cultural and ecological reviews of the area. The Cultural Resource Management Office (CRMO) conducted A Cultural Resources Field Survey in spring of 2020 and determined that proposed activities in the area would not affect cultural resources. DOE's Environmental Surveillance, Education, and Research (ESER) contractor completed ecological surveys in 2019 and again in 2020 on about 100 acres (Figure 1). Neither report identified substantial impacts to either vegetation or wildlife in the area.

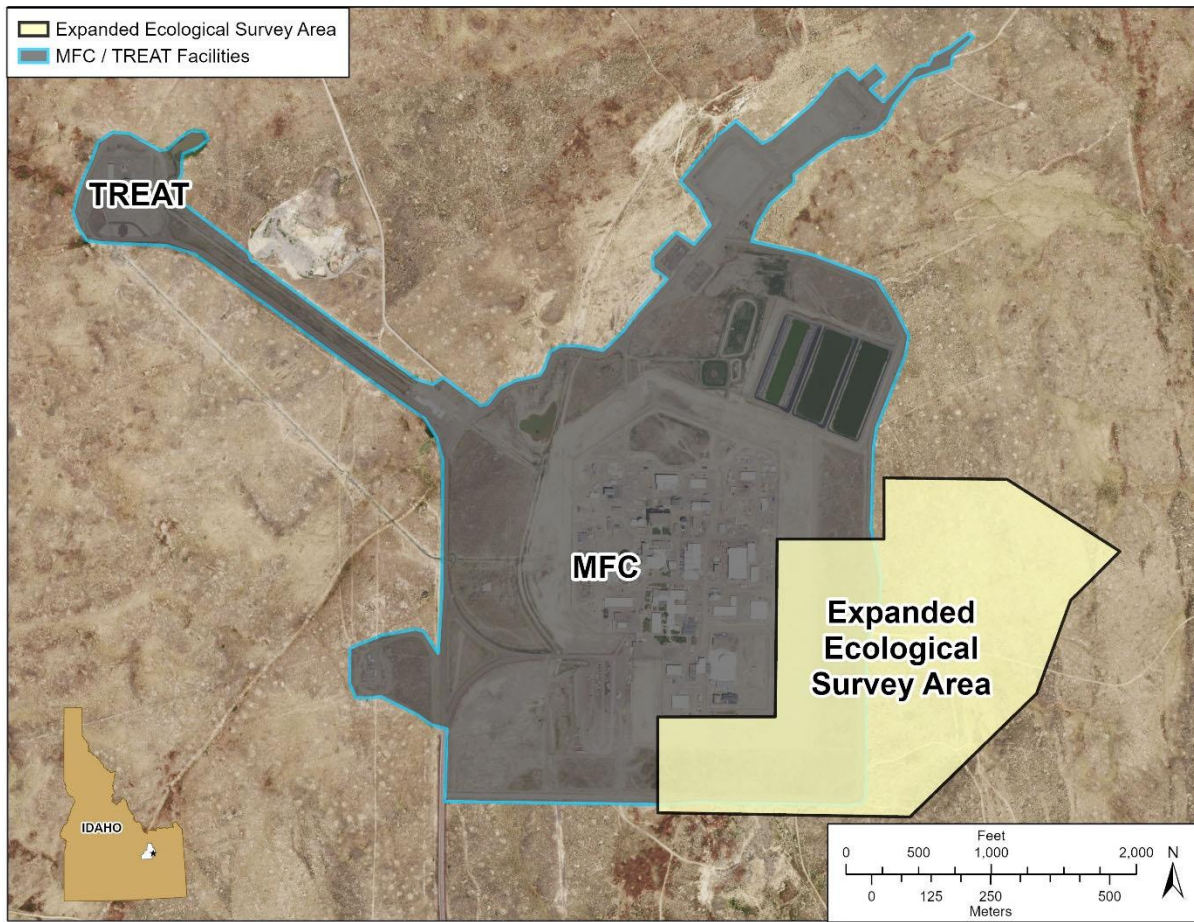


Figure 1. Image of the Expanded Ecological Survey Area where the proposed VTR site will exist.

Subsurface Investigations

Proposed drilling activities will affect a surface area about the size of the proposed VTR footprint. The proposed action surveys a larger area (up to 650 feet x 650 feet) and minimizes ground disturbance to the maximum extent possible. Figure 2 shows an image of the VTR subsurface investigations near MFC, and Figure 3 gives a close-up image of individual bore holes. The proposed drilling plan may change depending on field conditions but will remain within the surveyed area.

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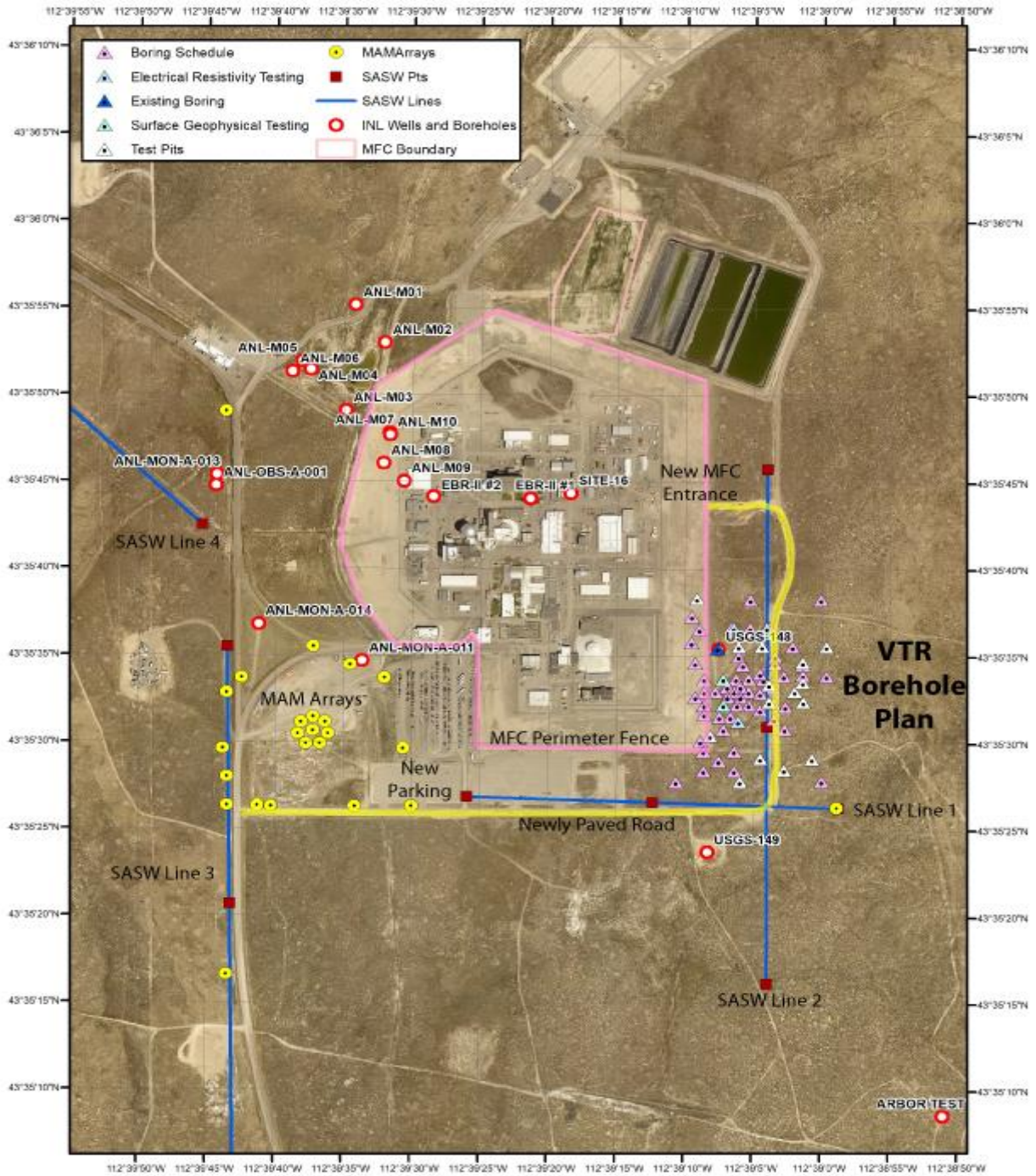


Figure 2. Image of MFC with proposed locations for the VTR site subsurface investigations.

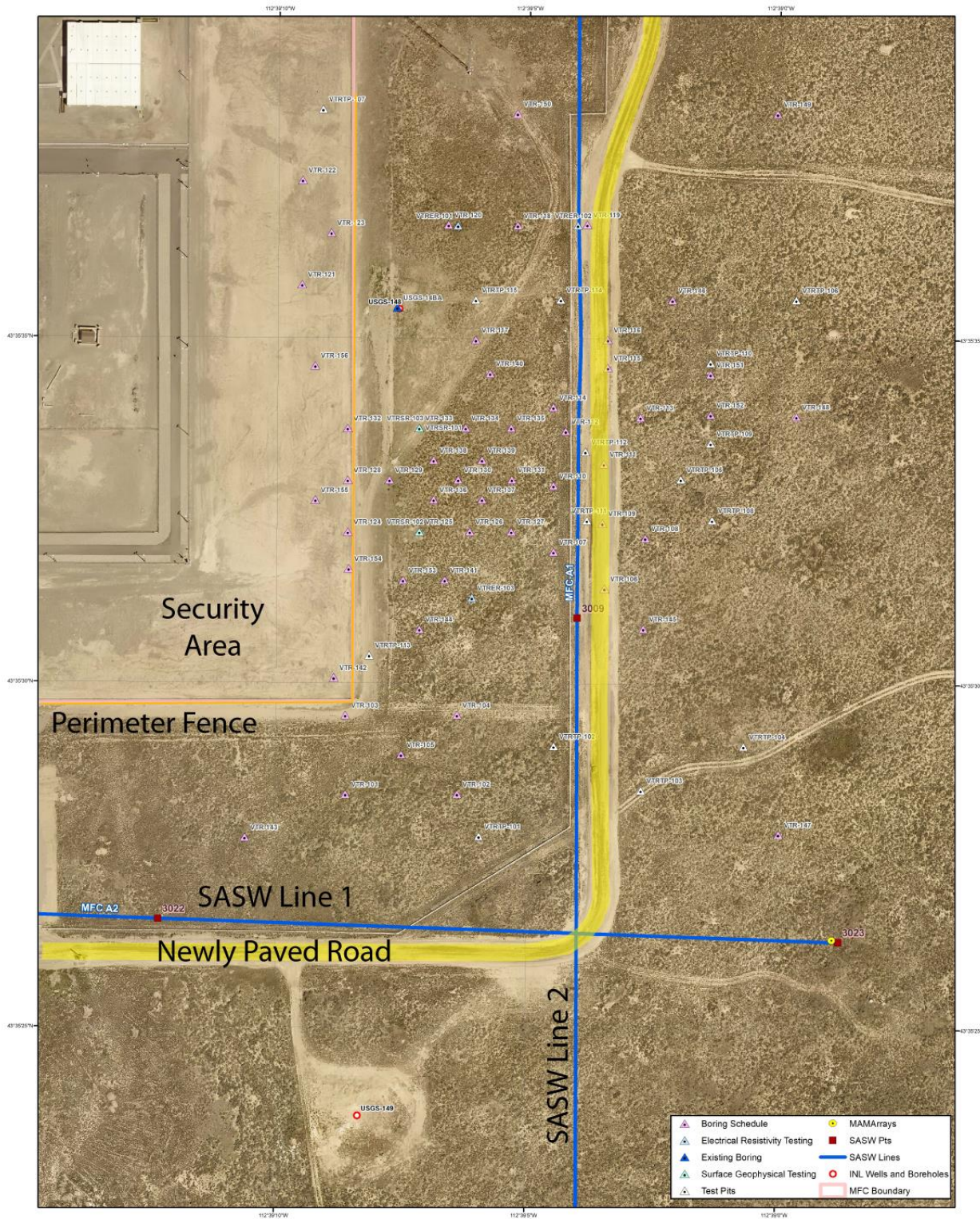


Figure 3. Image showcasing a close-up of the VTR site and proposed boring locations.

The proposed geotechnical investigations include 56 borings with depths ranging from 10 feet to 650 feet. The proposed action uses rotary drilling machines a hydraulic feed to obtain soil samples and rock cores. If skid-type drill rigs are used, ballast or tiedowns may be required to reduce vibration and movement transmitted through the drill rods to the rock core barrel. The project will use rotary equipment and/or air and drilling fluid to remove cuttings for boreholes that do not require sampling. The project drills and cores each borehole to fit a downhole seismic probe of 4-6 inches in diameter. The proposed activity cases the holes in steel or PVC using a cement and bentonite grouting mixture.

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For some of the borehole sites, the investigations use suspension (S-P) logging and downhole seismic velocity measurement techniques. For S-P logging, the project will cap the casing at the bottom-hole depth then fill it with water or drilling mud to ensure effective transmission of seismic signals. Activities include moving the probe containing the seismic source and receivers to differing depths then activating the source and receiving signals. The proposed investigations also obtain S-P logging measurements after completing downhole measurements. Downhole measurements use a surface seismic source (sledgehammer and vibroseis truck) while the receivers are lowered to varying depths.

In addition to the boreholes, The proposed action uses a backhoe to excavate 15 test pits, eight of which are about 4 feet deep for thermal resistivity/conductivity testing. The remaining seven pits are for bulk sampling and will be about 14 feet deep. The project will place excavated material close to the excavation sites for later use to backfill the pits following completion of testing.

The project proposes to perform three electrical resistivity tests at depths ranging from 3-150 feet along with thermal resistivity testing in conjunction with the test pits at depths of 2-4 feet.

The proposed action also performs Spectral Analysis of Surface Waves (SASW). This analysis involves laying up to 1,312 feet of cable on top of the ground to allow for a maximum profile depth of 650 feet. The process places up to six standard 1-Hz vertical seismometers along the cable to acquire SASW data by placing the seismometers in shallow holes (<1' deep and <1' diameter) excavated with a shovel or hand auger.

Each line uses a sledgehammer source with receivers spaced along a length of 26 feet. The first vibroseis truck (64,000 lbs. weight; vibrates the ground at frequencies 12-180 Hz) has receivers spaced along a length of 330 feet. The second truck (70,000 lbs. weight; vibrates the ground to lower frequencies of 1.3-100 Hz) has receivers spaced along a length of 984 feet. Receiver lines for each source will overlap. Proposed activities use existing roads where possible. The project uses a pickup truck or ATV to lay down and retrieve cable along each designated line. Each line with all receiver configurations and source locations will be surveyed one at a time.

The azimuths of the SASW lines will be oriented parallel and perpendicular to the basalt lava flow directions to the degree possible where existing roads permit such orientations. The project will not use vibroseis on paved roads. Some of the proposed locations may require new two-track roads and a turn-around point for the trucks.

Cleanup, Sampling, and Finalization

Water discharged during sampling will be disposed in accordance with all appropriate state and local regulations and will be controlled to prevent erosion. The project will remove work material from the site and casings from the boreholes prior to backfilling. Before closing wells, the project will offer ownership of the wells to other entities such as the United States Geological Survey (USGS) for future monitoring.

All boreholes will be subject to a variety of geotechnical testing, including but not limited to geophysical testing, thermal conductivity testing, and surface geophysics. Multiple downhole logs are also anticipated in all borings such as natural gamma and three-arm caliper. Existing groundwater wells will be sampled as part of the geotechnical assessment. In addition, drill core and sediment will be subject to a variety of sampling and additional testing, including but not limited to rock mechanics for shear modulus or Young's modulus, Atterberg limits, and organic content. The proposed action also conducts various compaction and strength tests, compressibility and degradation tests, and distribution coefficient tests.

Temporary Structures

The proposed action requires several temporary structures, including a trailer with generator and portable restrooms and a water tank as shown in Figure 4, in addition to a seismic station. The trailer will support core logging and temporary core storage and will be located between the existing concrete barrier and existing road. The trailer, generator, and restrooms take-up about 15 feet x 65 feet of space.

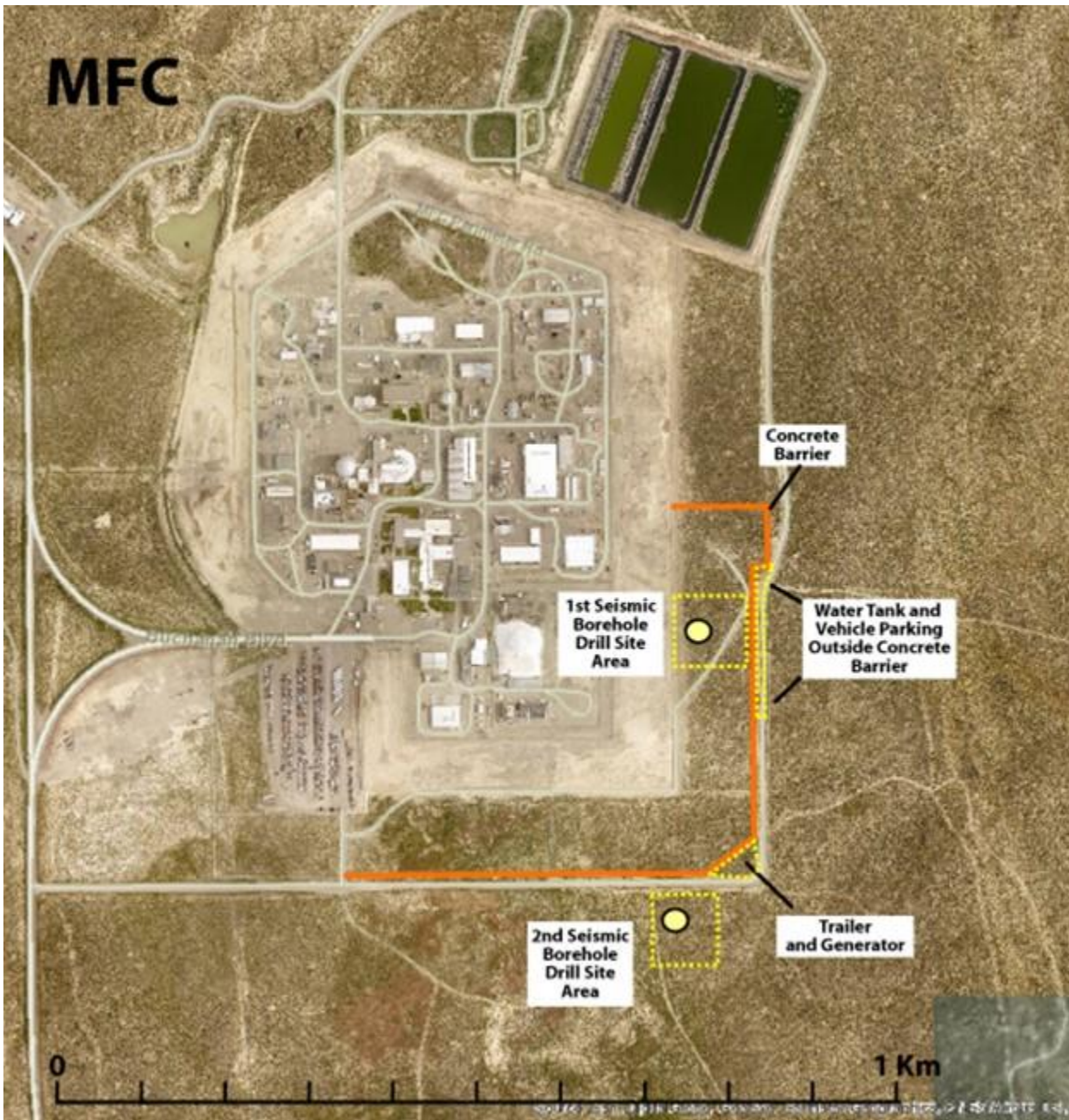


Figure 4. Image showing the temporary structures required for VTR site boring including a trailer with a generator, and a water tank.

The refillable water tank will be located outside the concrete barrier and will have a hose connected to it that extends over the concrete barrier.

The seismic station will be located adjacent to MFC to the south east outside the existing road as shown in Figure 5. The station includes a 3 feet x 3 feet x 3 feet concrete pad to support a 10 feet high antenna tower, a 3 feet x 3 feet x 3 feet metal box near the tower to house batteries, and less than three feet deep subsurface covered enclosure measuring 4 feet in diameter by 2 feet high to house a seismometer and accelerometer.

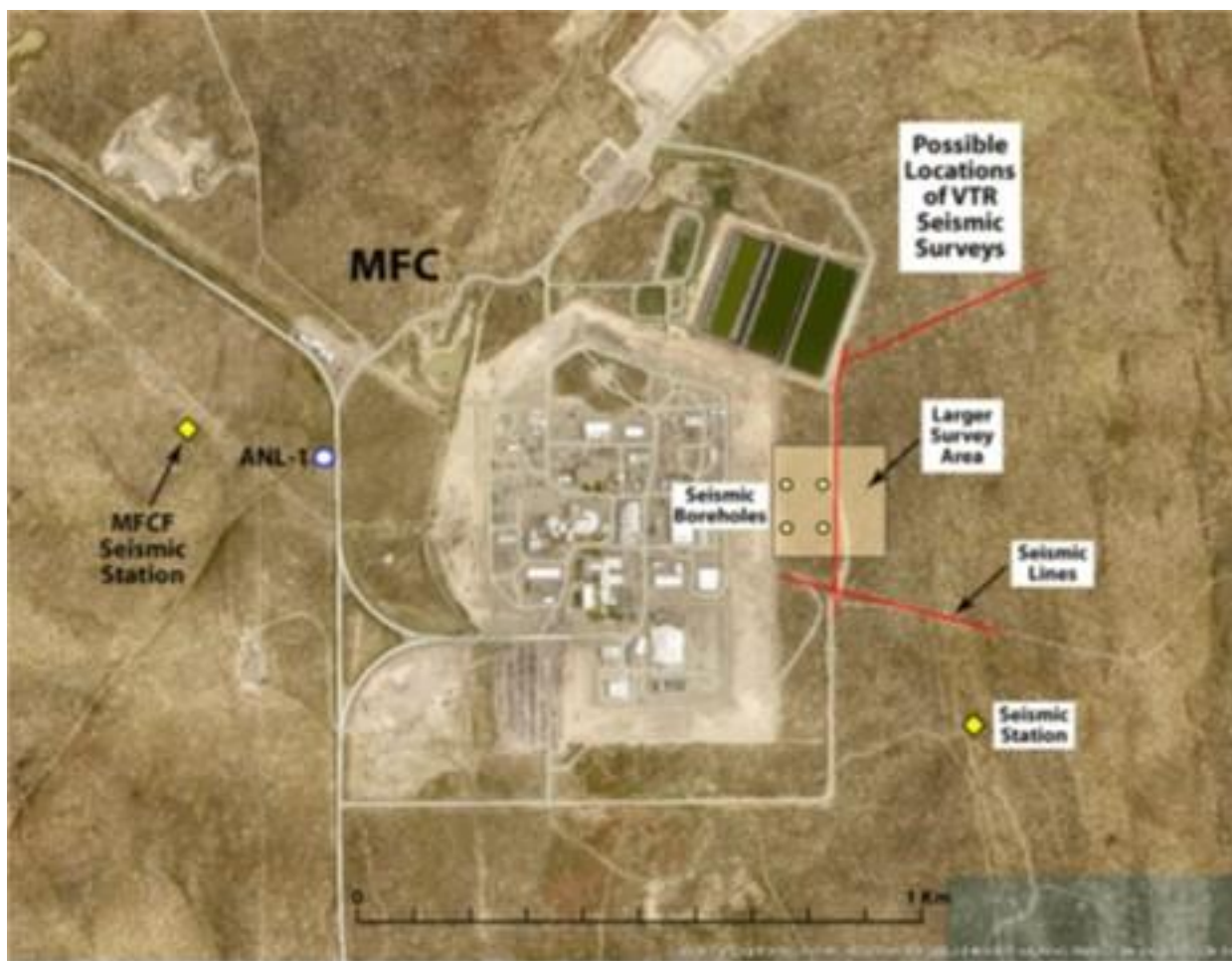


Figure 5. Image showing the proposed location of the Seismic Station for VTR.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

The proposed action has the potential to generate fugitive dust and emissions from mobile equipment.

Discharging to Surface-, Storm-, or Ground Water

Drilling boreholes has the potential to impact groundwater.

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 project may generate small amounts of industrial waste such as concrete, scrap metal and 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. Waste Generator Services (WGS) will characterize and dispose of waste. Program personnel will incorporate waste minimization measures and recycling where practical.

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Releasing Contaminants

The proposed action will use typical construction chemicals such as fuels, lubricants, adhesives, etc. 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 Environmental Staff. If the Environmental Staff 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, item 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 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;
- (f) 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);
- (g) Sampling and characterization of water effluents, air emissions, or solid waste streams;
- (h) Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources);
- (i) Sampling of flora or fauna; and
- (j) 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 Anderson, DOE-ID NEPA Compliance Officer on: 05/26/2021