

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: Passive Gravity and Magnetic Surveys Across Unnamed Butte at INL

SECTION B. Project Description and Purpose:

Revision 1

As part of the INL PVHA, new data collection and analyses (NDCA) are being conducted to support development of volcanic hazard models. Airborne geophysical surveys will be conducted to passively monitor the Earth's gravitational and magnetic fields in the Eastern Snake River Plain. These data will be processed to provide gravity and magnetic maps of INL and adjacent areas that can be used to interpret and assess characteristics of the basaltic and silicic volcanic surface and subsurface features. Gravity and magnetic maps will be used by the INL PVHA Technical Integration (TI) team to assist with developing spatial models that forecast future volcanic vent locations. Flights will be performed by Sander Geophysics Limited.

Air surveys will be a combined gravity and magnetic survey using a fixed-wing aircraft. For this type of project, SGL's standard field crew consists of a field crew chief/data analyst and two pilots, as well as an aircraft maintenance engineer available as necessary. For this project, a Cessna 208B Grand Caravans (C-CSGZ or similar). The Cessna Grand Caravan is an extremely safe aircraft, due to their modern, rugged construction, and extremely reliable turbine engine.

Gravity and magnetic surveys will be conducted at 60-200 meters above the ground. A flying height of 160 m (525') is reasonable for this area and would deliver good quality gravity and magnetic data. The final flying height can be discussed with the client and DOE Aviation. The total survey size will be about 24,500 lkm with a line spacing of 400 m x 2,000 m. This is just an estimate, and the final survey size will be based on completing a flight plan for the area.

Original Scope

Passive Gravity and Magnetic Survey Across Unnamed Butte at INL

Battelle Energy Alliance (BEA) is performing the "INL PVHA Project" to conduct a Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 study on behalf of the U.S. Department of Energy (DOE). The Idaho National Laboratory (INL) SSHAC Level 3 study will conduct a Probabilistic Volcanic Hazards Assessment (PVHA) for six INL sites. The INL sitewide SSHAC Level 3 PVHA, herein termed "INL PVHA", includes providing criteria and guidance for siting and volcanic eruption design. These products will be applied to existing and planned new nuclear facilities at INL with a volcanic design category (VDC) VDC-1 and higher as per DOE-STD-1020-16, Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities. They will also be used to support proposed new nuclear facilities at INL to be licensed under the U.S. Nuclear Regulatory Commission (NRC).

As part of the INL PVHA, new data collection and analyses (NDCA) are being conducted to reduce uncertainties for characterizing future eruptions of rhyolitic domes and cryptodomes. In some places in the Eastern Snake River Plain (ESRP), silicic magma intruded the shallow crust, erupted, and was subsequently buried by younger basalt flows (e.g., Unnamed butte). Geophysical properties are needed to identify and characterize the subsurface extent and locations of buried and partially buried domes and cryptodomes in the ESRP. Unnamed butte, located at INL between East and Middles buttes, is a partially buried dome that is easily accessible for conducting ground-based geophysical surveys to obtain its geophysical properties. Results of this investigation will be used by the INL PVHA Technical Integration (TI) team to identify and interpret geophysical anomalies associated with rhyolitic domes and cryptodomes which may be present at other locations in the ESRP.

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Geophysical surveys will be conducted in October or November of 2022 passively using a trimble Global Positioning System (GPS), two magnetometers, and one gravimeter. The GPS, magnetometer, and gravimeter will be carried in backpacks by a three-person team (University of South Florida) walking along each of four survey lines (see Image 1). In addition to the three-person team, INL seismic personnel will assist in data collection. At positions along the survey lines, the gravimeter will be set on the ground for five minutes to read the earth's gravitation field. The magnetometer will be carried along the profile as it takes readings of the earth's magnetic field. The GPS is on a rod that is set on the ground to measure the geographical location of the magnetometer and gravimeter readings. A magnetometer base station will be set up using a tripod that sits on the ground, no excavation. The base station will be set at the end of one survey line. It will passively record the Earth's magnetic field while the second magnetometer is collecting readings along each survey line. The surveys will be conducted over 1 to 3 weeks depending on the diurnal variations of the Earth's magnetic field. Existing two-track roads will be used to access the survey lines and will be from highway 26. Line lengths will be 6.5 km traversing Unnamed butte. Line geographical locations (zone 12):

- Line 1: 363000 E, 4819500 N to 363000 E, 4813000 N
- Line 2: 362600 E, 4819500 N to 362600, 4813000 N
- Line 3: 363400 E, 4819500 N to 363400, 4813000 N
- Line 4: 363800 E, 4819500 N to 368400, 4813000 N

Image 1: Survey Lines



Note: "Borehole 1" in Image 1 is an existing borehole. This project will not be drilling any new boreholes.

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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

Cultural and biological resources may be encountered during surveys.

Generating and Managing Waste

Industrial waste may be produced.

Releasing Contaminants

N/A

Using, Reusing, and Conserving Natural Resources

N/A

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, and B3.2 Aviation activities.

Justification:

Project activities are consistent with 10 CFR 1021, Appendix B to Subpart D, 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: Geological, geophysical (such as gravity, magnetic, electrical, seismic, radar, and temperature gradient), geochemical, and engineering surveys and mapping, and the establishment of survey marks. Seismic techniques would not include large-scale reflection or refraction testing; Installation and operation of field instruments (such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools); 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; Aquifer and underground reservoir response testing; Installation and operation of ambient air monitoring equipment; 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); Sampling and characterization of water effluents, air emissions, or solid waste streams; Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources); Sampling of flora or fauna; and Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7.1 and, B3.2 Aviation activities for survey, monitoring, or security purposes that comply with Federal Aviation Administration regulations.

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: 11/07/2022