DOE-ID NEPA CX DETERMINATION
Idaho National Laboratory

CX Posting No.: DOE-ID-INL-20-083

SECTION A. Project Title: Hansel and Gretel

SECTION B. Project Description and Purpose:

The scope of the Hansel & Gretel project is to test the LEGO system (plastic blocks that resemble LEGO® blocks), Gas Atmospheric Sample Processor (GASP) and Automated Cryogenic Rectifier (ACR) capabilities to provide the end user with a tag, track and locate system targeted for specific threat vehicles. The LEGO system serves as an encapsulation technology for the chemical taggant that will be used to tag, track and locate target vehicles. The LEGO devices measure 2-3 inches in length and are fabricated using additive manufacturing (3-D printing) using aluminum and/or ABS plastic. The LEGO systems are designed to release a payload of 6.0 mL (0.2 oz) of the taggant chemical when run over by a specific target vehicle.

The payload consists of two chemical types; 1) inert liquid perfluorocarbon, which quickly evaporates and is carried downwind leaving no residual material, 2) isotopically-labeled (C-14) methane or perfluoro methane. These materials are gases at room temperature and are rapidly dipsered for collection and identification downwind. The radiolabled methane and tetrafluoromethane taggants will contain activities up to 300 mCi. Typical releases will be between 20-90 mCi with two releases at 300 mCi. A total of 900 mCi of radiolabeled taggants will be dispersed throughout CY 2021.

Proposed chemicals in support of Hansel & Gretel:

1) Perfluoro-1,2-dimethylcyclobutane: CAS# 2994-71-0

2) Perfluoromethylcyclopentane: CAS# 1805-22-7

3) Perfluoromethylcyclohexane: CAS# 355-02-2

4) Perfluoroethylcyclohexane: CAS# 335-21-7

5) Perfluoro-1,2-dimethylcyclohexane: CAS# 306-98-9

6) Perfluoroisopropylcyclohexane: CAS# 423-02-9

7) Perfluoro-2-methylpentane: CAS# 355-04-4

8) Perfluoro-1,3-diethylcyclohexane: CAS# 355-23-9

9) Perfluoro-2,4-dimethyl-3-ethylpentane: CAS# 50285-18-2

10) C14 Methane: CAS# 74-82-8

11) C14 tetrafluoromethane: CAS# 75-73-0

Downwind identification will be achieved by the GASP and the ACR. The GASP serves as a taggant collection and detection system. The GASP unit is a fiedable atmospheric sampler containing 100 sorbent tubes allowing for 100 discrete samples. The GASP is a battery powered autonomous sampler. Post deployment, the GASP units will be analyzed off-site. Multiple GASP systems will be placed locally around the LEGO release location up to a distance of 25 miles.

Long range detection (up to 100 miles) will be achieved by using the ACR long-range whole-air collection system. The air is condensed using cryo-cooling techniques eliminated most the inert components of the air. Samples are collected into 1-liter bottles over a 24 hour period. Sample bottles will then be sent off-site for analysis.

Testing is proposed to begin in the April - May, 2021 timeframe and extending through late summer. Testing includes the use of several bifurcating intersections for verification of the taggant. As such, the proposed test locations are CITRC and CFA. The locations will include dirt/gravel roads as well as 2-track roads. Travel will be limited to previously disturbed areas. No excavation is required for placement of the LEGO-type blocks. No off-road travel is planned. The vehicle(s) will be provided by the customer. Off-site collection locations have yet to be determined, but will likely be a combination of private and public lands.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

This work would generate non-regulated air emissions from vehicle use. A maximum of 0.9 Ci of radioactive C-14 would be released to the atmosphere as part of chemical releases. The chemical components are not regulated under IDAPA 58.01.01 The release of C-14 will be reported as part of the annual Radioactive National Emission Standards for Hazardous Air Pollutants (NESHAPS) Report. The estimated dose to the maximally exposed member of the public from the C-14 will be less than 0.1 mr/yr; no PTC will be required.

Project activities have the potential to generate fugitive dust.

Discharging to Surface-, Storm-, or Ground Water

N/A

Disturbing Cultural or Biological Resources

Vehicles at the release points and detection monitors will be travel on 2-tracks or other designated roadways, avoiding damage to vegetation such as sagebrush.

Breeding bird surveys may be required.

Release of up to 0.9 Ci of C-14 is not expected to have any measurable affect on flora or fauna.

Cultural resources could be impacted if detectors are placed in undisturbed areas.

Generating and Managing Waste

This work is expected to generate small amounts of common trash and radioactive Low-Level Waste. All Solid Waste associated with material release and detection will be managed at the INL through Waste Generator Services (WGS). Analytical waste will be managed by the off-site laboratory performing the analysis.

Releasing Contaminants

The release of C-14 has potential to release contaminants. However, these atmospheric releases of methane labeled with 14C would quickly be diluted to atmospheric background levels before being deposited to soil or water.

Using, Reusing, and Conserving Natural Resources

Waste will be diverted from the landfill to the extent possible. Project activities will release known greenhouse gases (GHGs) to the atmosphere.

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 to subpart D, items B3.6, "Small-scale research and development, laboratory operations, and pilot projects"

Justification:
Project activities are consistent with 10 CFR 1021, Appendix B, 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); and 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 or developed 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 Sturm, DOE-ID NEPA Compliance Officer on: 11/30/2020