SECTION A. Project Title: Green Day/Snow Eagle II (Rev 1)

SECTION B. Project Description and Purpose:

Revision 1:

This revision of the project will evaluate two primary threats from Unmanned Aircraft Systems (UAS). UAS have been identified as a legitimate delivery system for multiple Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) threats including radiological materials. The revision includes:

- Two test events at the Radiological Response Training Range (RRTR) will use an agricultural drone to:
  - Explosively dispersed radiological payload at elevation, and
  - Spray radiological solutions as designed.
- Installation of a triple stack conex structure with windows and doors (Figure 1) for explosive dispersion of 0.5 Ci of KBr (less than 1 lb of explosive) at elevation (RRTR Site 1); and
- Installation of a single layer conex structure (Figure 2) for spraying radiological solutions of 0.16 Ci of KBr (RRTR Site 4 or 5).
- For this revision, only E133 brilliant blue will be used, not propylene glycol or fluorescein sodium salt.

The conexs will be located on previously disturbed areas inside of the pits at Sites 1 and 4/5. Details of the triple stack conex structures are including in Figures 3-4.

Two drone tests will incorporate explosive charges which will be positioned directly next to the battery allowing for complete destruction resulting from the fireball. If an explosive charge fails to destroy the battery, waste from the drone (plastic, metal, battery, etc.) will be managed per WGS guidance.

Figure 1: Triple stack conex configuration

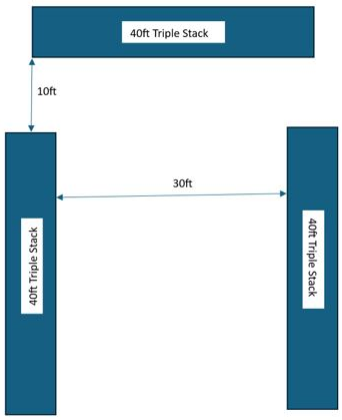


Figure 2: Single layer conex configuration

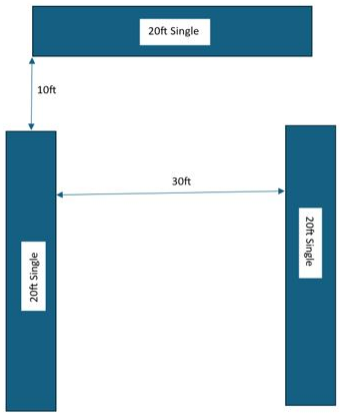


Figure 3: Triple stack: 1st, 2nd, and 3rd Level Elevations

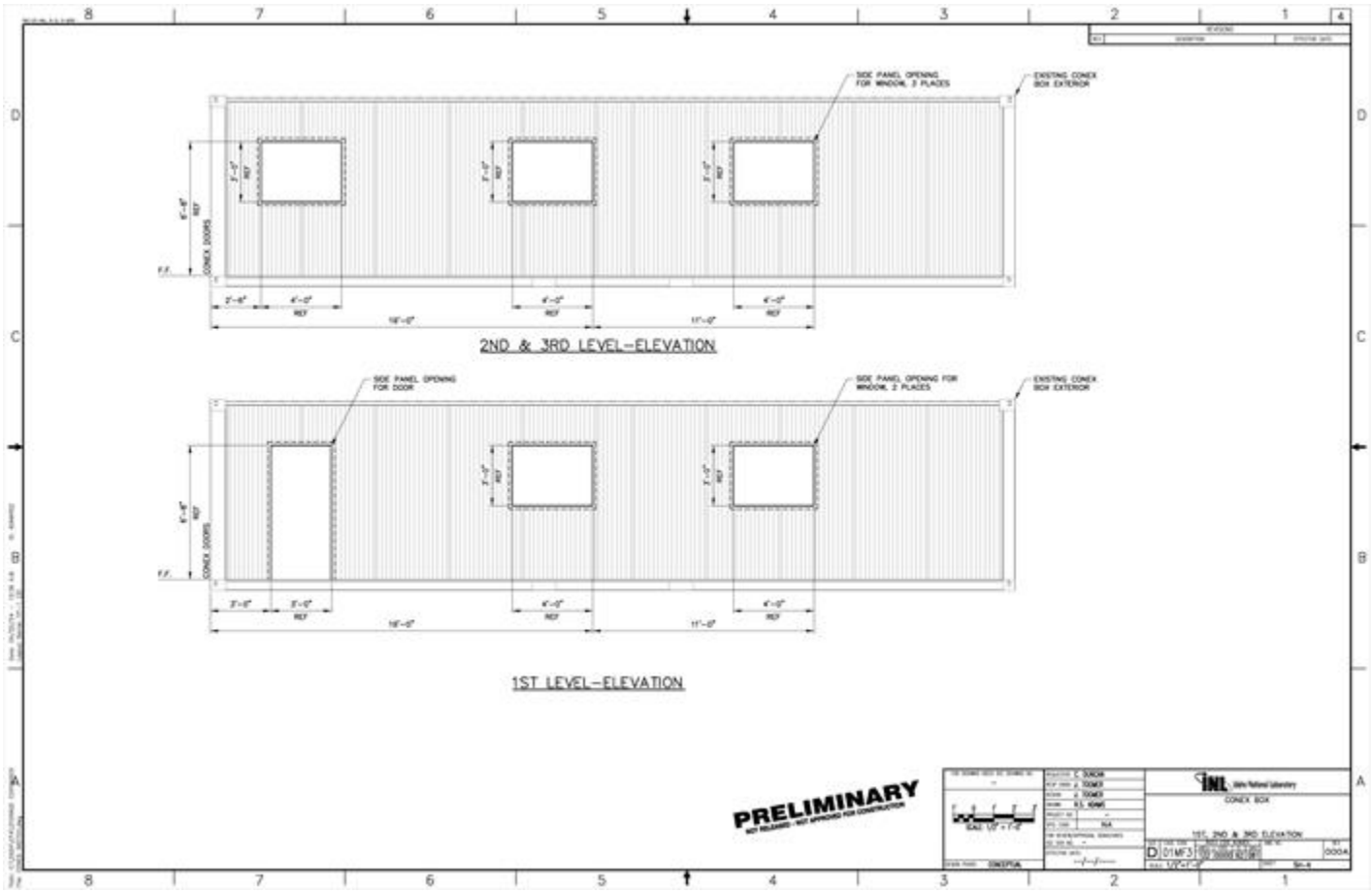
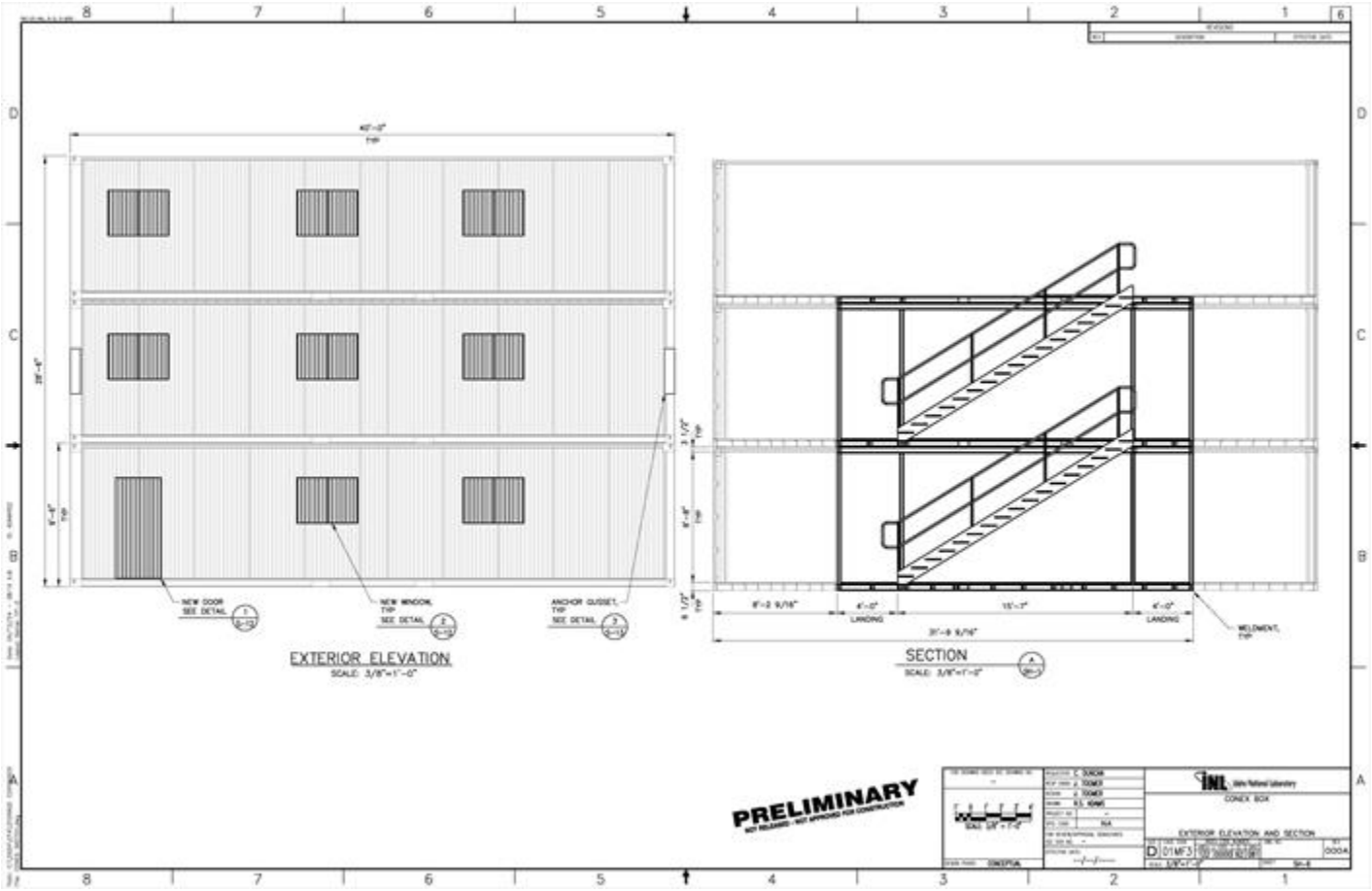


Figure 4: Triple Stack Exterior Section



Original ECP:

The Department of Energy has recognized the potential adversaries to use drones as a weapon to disperse radioactive material (a dirty bomb drone) to perform nuclear terrorism attacks on human populations and natural ecosystems. In an effort to better understand the consequences of such an action the Emergency Response and Readiness organization within Idaho National Laboratory's (INL) National & Homeland Security directorate is proposing to evaluate the dispersal of liquid radioactive material from an agricultural drone. The proposed project is an extension of the Green-Day test series at the Radiological Response Training Range (RRTR) at the INL Site. The Green-Day test series is an international program that is evaluating the transfer of radioactive material from a radiological dispersion device (RDD) to the environment.

Under the proposed project, an agricultural drone capable of dispersing liquid will be modified to carry and remotely disperse liquid radioactive material. The proposed project has identified three specific tests that will be performed at the RRTR:

- An agricultural drone loaded with liquid radioactive material intentionally crashed dispersing the radioactive liquid.
- An agricultural drone loaded with liquid radioactive material explosively detonated mid-air dispersing large droplet to aerosolized particulates of radioactive material to the ground and down-wind.
- An agricultural drone loaded with liquid radioactive material dispersing/spraying the radioactive material as designed.
- An agricultural drone loaded with liquid radioactive material explosively detonated at ground level dispersing large droplet to aerosolized particulate of radioactive material to the ground and down-wind.

Each of three tests will be performed using the following parameters:

- Radioactive material - Potassium Bromide (KBr)

a. Activity - 0.1Ci - 1Ci

b. Liquid volume - 1-10 L

2. Explosive mass - 0.1 - 1.0 lb.

3. Drone type - unavailable

a. Drone flight height - 5-200ft

b. Drone battery - unknown, but likely lithium ion.

Following each test, a full characterization of the test area will be completed using mobile detection (back packs, drones, carts, and handheld equipment). Data will be used to validate radioactive material dispersion models developed under the Green-Day test series.

The proposed testing will occur during the week of August 7 – 11.

A second test will be performed with an agricultural drone with a 10-Liter liquid capacity. Testing will consist of a dispersal via the as-designed drone agricultural spray system. This test will evaluate the dispersal pattern and droplet sizes using a chemical simulant. The primary simulant consists of propylene glycol and two taggants. Taggants will consists of E133 brilliant blue dye and fluorescein sodium salt at a loading of 1% by weight.

General parameters of the drone platform are as follows:

- 10-L capacity
- 4-nozzles (0.525L/min).
- 10 kg standard operating payload
- 23.8 kg standard takeoff weight
- 10-minute hovering time @ 23.8 kg.
- Dimensions – 1471 mm x 1471 mm x 482 mm

The drone platform consists of four nozzles with a max flowrate of 0.525L/min. A particle size of 130-250 μm are anticipated based on the working environment and spraying speed. Particle sizes in this range will immediately be deposited on the ground. It is anticipated that a small, aerosolized fraction will be released down-wind.

Per DOE/EA-2063 Final Environmental Assessment for Expanding Capabilities at the National Security Test Range and the Radiological Response Training Range at Idaho National Laboratory, this type of activity has been analyzed for potential impacts. DOE/EA-2063 included calculated dispersion factors; impacts to public receptors and co-located workers; approved isotopes, including KBr; and explosive mass limits. Based on the parameters outlined for each of the tests, the proposed project is expected to be performed within bounding conditions identified in DOE/EA-2063. In DOE/EA-2063, Section 2.1.2 notes including using UAVs to detect radiation and chemicals but not for dispersing radionuclides. Furthermore, the proposed test involving the mid-air detonation would use the maximum KBr activity of 0.5 Ci, which is below the modeled values described in DOE/EA-2063. In an effort to limit the size of the dispersal, the mid-air detonation would be performed close to the ground.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

Air emissions from engines are expected to be the primary air contaminant. Air emissions are expected to include exhaust from portable/mobile electrical generators, ATVs, and potential radioactive emissions to the air from buildings.
Generators will be in place for periods much less than one year so no permitting is required. Air emissions may also occur from ATVs and other mobile sources. Exhaust emissions are not regulated. Potential radioactive emissions will be considered in the annual Rad NESHAPS report. ECAR 3533 RRTR is attached for reference, the inventories are within the ranges specified in the attached ECAR and emissions are below permitting thresholds.

Discharging to Surface-, Storm-, or Ground Water

NA

Disturbing Cultural or Biological Resources

Cultural: A Section 106 review was completed under CRMO project number (BEA-24-056) and resulted in No Historic Properties Affected.

Generating and Managing Waste

Low-Level Radioactive waste will include personal protective equipment (PPE) and sample materials. Indoor materials such as furniture, carpet, and similar materials may also be contaminated and disposed as radioactive waste if not left in place for decay. Radioactive PPE and decontamination solution may be disposed as radioactive waste or stored for decay until cleared by RadCon personnel for disposal as non-radioactive. Non RCRA Liquid radioactive waste may be solidified before disposal in an off-site disposal site.

Releasing Contaminants

When chemicals are used during the project there is the potential for spills that could impact the environment (air, water, soil).

Using, Reusing, and Conserving Natural Resources

NA

Environmental Justice

NA

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: B3.2 "Aviation activities", B3.11 "Outdoor tests and experiments on materials and equipment components"

Justification: B3.11 Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components) under controlled conditions. Covered actions include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water-immersion, or thermal tests. Covered actions would not involve source, special nuclear, or byproduct materials, except encapsulated sources manufactured to applicable standards that contain source, special nuclear, or byproduct materials may be used for nondestructive actions such as detector/sensor development and testing and first responder field training.

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 Robert Douglas Herzog, DOE-ID NEPA Compliance Officer on: 7/2/2024