NEPA REVIEW SCREENING FORM (NRSF) 3
Categorically Excluded Actions

Document ID #: DOE/CX-00228

I. Project Title:
National Nuclear Security Administration Aerial Measuring System Radiological Survey of the Hanford Site during Fiscal Year 2023

II. Describe the proposed action, including location, time period over which proposed action will occur, project dimension *(e.g., acres displaced/disturbed, excavation length/depth)*, and area/location/number of buildings. Attach narratives, maps and drawings of proposed action. Describe existing environmental conditions and potential for environmental impacts from the proposed action. If the proposed action is not a project, describe the action or plan.

PROPOSED ACTION

The U.S. Department of Energy (DOE), Richland Operations Office (RL), Assistant Manager for River and Plateau (AMRP), Soil and Groundwater Division (SGD) proposes to use the DOE National Nuclear Security Administration (NNSA) Aerial Measuring System (AMS) to perform an aerial radiological survey of portions of the Hanford Site during FY 2023 (referred to hereafter as the survey). The AMS would be operated by the NNSA Nevada Field Office Remote Sensing Laboratory (RSL), Las Vegas, Nevada. The survey area would be bounded on the north by Hanford Site Route 11A, on the south by Washington State Highway 240, and includes the Hanford Site 200 East and West Areas, the Environmental Restoration Disposal Facility (ERDF), and a portion of the 600 Area (see Figure 1). Aerial radiological surveys of the Hanford Site using the AMS have been performed in the past as early as June 24 - July 23, 1959, with the latest survey conducted during September 18 - 26, 2015. The results of the 2015 survey are documented in DOE/NV/03624-0869, "An Aerial Survey of the 200 East and 200 West Areas of the Hanford Nuclear Reservation," and provides a basis for comparison of changes in radiation levels over the past eight years.

The purpose of the survey has been, and continues to be, establishment of background radiation levels; identification of spatial and temporal changes in radiation levels; and to support the design, implementation, and evaluation of site remediation activities. The project proponent would perform an evaluation comparing the new survey results to results from past surveys.

SURVEY METHOD

The survey would be performed using a RSL Bell 412 helicopter, or equivalent, equipped with twelve 2 inch by 4 inch by 16 inch rectangular thallium activated sodium iodide (NaI-Tl) "logs" with their spectra summed to form a single detector and a mechanically cooled high-purity germanium (HPGe) detector with associated photomultiplier tubes and data acquisition modules (see Figures 2, 3, and 4). Both detectors would collect gamma-ray spectra from naturally occurring radioactive materials (i.e., background radiation in rocks and soils) and anthropogenic radioactive materials (i.e., deposited by man) that are present as a result of Hanford Site operations. Data would be collected over the Hanford Site during approximately 80 hours of survey flight time and 680 flight lines, which result in approximately 270,000 one-second spectra collected by both the NaI-Tl array and the HPGe detector. These data would be analyzed to map the distribution of anthropogenic radioactive materials, associated radioisotopes, and radiation levels.

The survey would be flown in a series of parallel lines (i.e., flight lines) spaced to give 100 percent coverage of the survey area with the assumption that the detector footprint diameter is approximately twice the flight altitude above ground level (AGL). Spatial resolution is governed by flight altitude. The flight altitude and speed are chosen as low as possible to improve detector sensitivity and resolution. The flight altitude would be a minimum of approximately 50 feet and a maximum of approximately 500 feet AGL, with a corresponding flight line spacing of approximately 75 to 100 feet to maximize detector sensitivity to anthropogenic radiation and to reduce the effective footprint of the radiation acquisition system. Flight speed would be approximately 80 miles per hour. Navigation along the flight lines would be maintained using a Trimble steering computer programmed with the desired flight lines, and an integral global positioning system (GPS) receiver would monitor helicopter position relative to the programmed flight lines. The helicopter height AGL would be measured with a radar altimeter (see Figure 5).

The Bell 412 is a twin engine utility helicopter that has been manufactured by Bell Helicopter since 1981. With a standard fuel capacity of 330 gallons, the helicopter is capable of flying for up to 3.7 hours with a maximum range of 356 miles and a cruising speed of approximately 140 miles per hour. However, with the AMS radiation survey configuration of 12 detectors and four crew members (two pilots, a mission scientist, and an equipment operator), the Bell 412 is capable of

only 2.5 hours of flight time with a survey speed of approximately 80 miles per hour at a survey altitude of 50 feet AGL. The speed of 80 miles per hour is the minimum speed the Bell 412 helicopter can fly while maintaining good flight characteristics (i.e., low vibration and good fuel economy).

The NaI-Tl detectors are calibrated to convert "count rates" (i.e., counts per second, cps) measured during the flight to "exposure rates" (i.e., microroentgen per hour, uR/hr) at three feet AGL. The differences in elevation above sea level and weather can make it necessary to also collect data on the ground within the survey area to verify detector calibration and sensitivity (referred to as ground truthing). However, detector calibration and sensitivity would be determine offsite and no ground disturbing activities are proposed on the Hanford Site. Instrumentation used for ground truthing typically includes, but may not be limited to, mechanically cooled HPGe detectors and pressurized ion chambers (see Figure 6). Although not proposed, if the use of ground-based radiological survey instruments becomes necessary, then additional review would be required prior to implementation to evaluate potential impacts to cultural and ecological resources, wildfire hazards associated with off-road driving, and appropriate mitigation measures to avoid adverse impacts.

The survey focuses primarily on four isotopes, which include Americium-241, Cesium-137, Cobalt-60, and Plutonium-239. Concentrations of specific isotopes are derived by applying appropriate coefficients (i.e., isotopic sensitivities) that convert counts per second (cps) to picocuries per gram (pCi/gm).

Before the helicopter flight each day and periodically thereafter as needed, a radiological survey equipment calibration would be performed using a Cesium-137 check source and measurements of background radiation. Normally occurring background at most locations is almost entirely due to naturally-occurring radioactive materials (NORM) and cosmic rays. NORM includes the radioactive isotopes of potassium, uranium, and thorium (KUT) present essentially everywhere on the Earth, and the daughter products of these isotopes including radon in the atmosphere.

AIR SPACE USE AND SAFETY

Helicopter flights conducted in airspace controlled by or under the jurisdiction of the U.S. Department of Transportation, Federal Aviation Administration (FAA) would follow applicable FAA procedures for air traffic control, planning, coordination, and services provided during the survey. These procedures deal with matters including, but not limited to, coordination and scheduling, communications, flight paths, flight altitudes, flight speeds, and separation of aircraft. The FAA procedures include mitigation measures to avoid potential air collisions and other accidents.

Since helicopter staging and refueling operations would be performed at the Bergstrom Aircraft, Inc. facilities located at the Pasco, Washington airport and periodic maintenance and preflight equipment inspections would be conducted to ensure proper helicopter operability and safety, the potential for fuel, oil, or hydraulic fluid spills on the Hanford Site would be insignificant. However, the NNSA would be responsible for cleaning up all fuel, oil, or hydraulic fluid spills that occur on the Hanford Site as a result of the survey and complying with applicable regulatory requirements for spill reporting, containment, cleanup, and disposal.

Collisions between aircraft and birds represent a potential airspace safety hazard. The most serious strikes for helicopters are windshield strikes, which have resulted in pilots experiencing confusion, disorientation, loss of communications, and aircraft control problems. Bird strike risks tend to be highest near areas where birds congregate and during certain times of the year when bird migration is prevalent. The Hanford Site is adjacent to the Columbia River, which is part of the "Pacific Flyway" used by a variety of migratory bird species. The Ecological Resources Review section provides best management practices to avoid potential impacts of helicopter flights on migratory birds and other wildlife species on the Hanford Site.

A wide range of avionics are incorporated in the Bell 412 helicopter. These may include, but are not limited to, conventional flight instruments such as the Garmin GTN-750 touchscreen navigation system and glass cockpit display, which are designed to improve pilot situational awareness, reduce pilot workload, and increase safety. Primary flight and other key information is displayed on large multi-function liquid crystal displays (LCD) in the cockpit. Other avionics may include, but are not limited to, a helicopter terrain avoidance warning system, radar altimeter, power

situation indicator, automatic dependent surveillance broadcast system, light emitting diode (LED) cockpit lighting and panels, weather radar, and wire strike avoidance technology.

NOISE AND VIBRATION

General day-night ambient noise level (DNL) estimates for various types of land use vary widely, from approximately 35 decibels in wilderness areas to a maximum of 90 decibels in the noisiest urban areas. The Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978 (42 U.S. Code 4901-4918), requires federal agencies to conduct their programs in a manner that promotes an environment free of any noise that could jeopardize public health or welfare.

The Bell 412 helicopter employs a four-bladed fully articulated main rotor. The composite rotor blades are designed to produce maximum lift with minimum noise, and feature tip caps to reduce noise. Aluminum honeycomb structural panels are used throughout the airframe, which absorb both noise and vibration, thus requiring no additional vibration absorption systems to be employed.

According to the Helicopter Association International, a global leader in all aspects of the vertical takeoff and landing industry, the sound level of a helicopter flying at 500 feet AGL is approximately 87 decibels. At 1,000 feet AGL the sound level drops to approximately 79 decibels. The difference in sound level may not seem large, but it is significant and reduces the resultant noise by half its impact. This is because sound levels are measured according to a logarithmic scale. For comparison, these helicopter noise levels are similar to that produced by a farm tractor, motorcycle, or power lawnmower.

The Bell 412 helicopter would fly approximately 50 feet AGL while performing the survey. At this low altitude, the noise levels would be similar to those created at helicopter takeoff, which is approximately 90 decibels. This noise level is similar to that created in the noisiest urban areas. The U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) has established permissible exposure limits for the workplace (including the cockpit of an aircraft) as a function of noise level or intensity and duration of exposure. The exposure limit for a noise intensity of 90 decibels is 8 hours per day. Helicopter flights over or near populated portions of 200 East and 200 West Areas would be temporary and of short duration each day. No adverse noise and vibration effects would be anticipated. Large portions of the survey would be over unoccupied land parcels where the primary noise and vibration effects would be on wildlife. Best management practices to mitigate noise and vibration impacts on wildlife are addressed in the ecological resources section. The helicopter pilots and crew are accustomed to noise and vibration exposure during flights and would use appropriate hearing and other applicable protection.

The Laser Interferometer Gravitational Wave Observatory (LIGO), which is supported by the National Science Foundation and operated by Caltech and MIT on Hanford Site land leased from DOE-RL, is located near the southeast corner of the survey area. The LIGO is a large-scale physics experiment and observatory designed to detect gravitational waves of cosmic origin which are indicators of deep space phenomena such as neutron stars and black holes. This research is extremely sensitive to noise and vibration. Flight routes would maximize the distance between the helicopter and LIGO with a minimum distance of 0.5 miles from the LIGO Facility. DOE-RL/SGD would be responsible for contacting LIGO regarding any survey activities planned near the facility to avoid potential impacts to ongoing experiments from helicopter noise and vibration.

The Pacific Northwest National Laboratory (PNNL), which is managed by Battelle for the DOE Office of Science, is located adjacent to and east of the Hanford Site, and is approximately 10 miles to the southeast of the survey area. A portion of PNNL's research at the Environmental Molecular Sciences Laboratory (EMSL) is conducted at the molecular level and is sensitive to noise and vibration. Although no adverse noise and vibration impacts are anticipated due to the distance between the survey area and the EMSL, helicopter flight routes would avoid airspace near the PNNL Campus and EMSL.

AIR QUALITY

The potential contribution of greenhouse gases to the atmosphere from the survey would be temporary and insignificant when compared to emissions from Hanford Site vehicles and equipment due to use of a single helicopter and relatively short duration of the flights. The helicopter would not land on the Hanford Site. All takeoff, landing, and refueling activities would be performed at the Bergstrom Aircraft, Inc. facilities located at the Pasco, Washington airport.

When flying over exposed soils a phenomenon known as rotor wash, in which the wind produced by helicopter rotors dislodges and moves soil from the ground creating fugitive dust, has the potential to occur. The greatest risk for this type of wind erosion would be during extended hovering in areas with fine soils and under dry conditions. The helicopter pilot would minimize unnecessary hovering and creation of fugitive dust to the extent possible. The majority of the survey area is vegetated and comprised of sandy soils. Therefore, helicopter effects on soil erosion, fugitive dust, and air quality would be temporary, restricted to localized areas, and insignificant.

ECOLOGICAL RESOURCES REVIEW (ECR-2023-630)

The DOE-RL, Assistant Manager for Mission Support (AMMS), Site Stewardship Division (SSD), Ecological Compliance Program evaluated the proposed project. Because of the low altitude of the helicopter overflight, the following controls were developed to avoid potential impacts to mammals, special status wildlife species, and migratory birds and their nests.

Mammals - Previous helicopter flights over the Hanford Site have been observed to induce a panic response in terrestrial mammals, especially elk and deer. If elk or deer herds are observed during the helicopter overflight at any location on the Hanford Site, then efforts to increase the slant distance to approximately 1,300 feet or greater would be taken.

Slant distance is a common measure of exposure that is the distance from the aircraft to the endpoint. This measure has two advantages: (1) distance is sometimes a better predictor of wildlife response than sound pressure and (2) distance incorporates both the acoustic and visual stressors associated with overflights. Slant distance is the hypotenuse of the right triangle that includes the altitude and lateral distance to the endpoint. If the overflight is almost overhead, then slant distance may be assumed to be equivalent to altitude. If the altitude is low (approximately 985 feet or below), then the lateral distance is a close approximation of the slant distance.

Special Status Wildlife Species - The Hanford Site Natural Resource Protective Buffer Zones Map identifies the current protective wildlife buffer zones, including ferruginous hawk nest sites, bald eagle nest and roost sites, and rookeries located across the site (see Figure 7). Although no protective buffers are located within the survey area, the flight paths taken to and from the survey area would maintain an approximately 3,280 feet “no fly” slant distance around these protective buffer zones during the active nesting and/or roosting periods indicated on the map to limit disturbance and avoid nest abandonment by these birds, which are protected under the Migratory Bird Treaty Act.

Migratory Birds and their Nests - There is always the potential for birds to nest within the survey area on the ground, on buildings, or on equipment. The bird nesting season in the Hanford Site area is typically from mid-March to mid-July. The active nests (containing eggs or young) of migratory birds are protected under the Migratory Bird Treaty Act (MBTA). The MBTA makes it illegal for people to "take" migratory birds, their eggs, feathers, or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. Project management would instruct personnel conducting the survey to watch for nesting birds, specifically raptor and raven nests within the survey area, which are assumed to be the most vulnerable to impacts from low altitude helicopter flights. Raptor and raven nest surveys are required if helicopter flights occur during the nesting season and would be performed by the DOE-RL/SSD Ecological Compliance Program prior to initiating any low altitude helicopter flights over the Hanford Site.

Based on the U.S. Air Force Bird Avoidance Model, the risk of daytime bird strikes over the Hanford Site during the month of August is low to moderate. The Hanford Site is located along the Pacific Flyway and the Columbia River serves as a major resting area for migrating waterfowl. During spring and fall several bird species, among them sand-hill cranes and Canadian geese, fly over the Hanford Site. To reduce the risk of bird strikes, especially during the March to May and the late August through November time periods, it is recommended that radar be consulted prior to flight initiation and that one member of the flight crew be focused outside the helicopter for obstacle detection and avoidance.

No adverse impacts to ecological resources are anticipated as a result of the survey on the Hanford Site provided identified mitigation measures are followed. The ecological resources review is valid for one year from the date the clearance letter was issued (until August 17, 2024) and must be renewed if the project is not completed by this date.

CULTURAL RESOURCES REVIEW

The DOE-RL Cultural and Historic Resources Program (CHRP) performed a cultural resources review on May 23, 2023. The helicopter would fly over the survey area at an altitude of roughly 50 feet AGL. The helicopter would not land on the Hanford Site for staging or refueling. These activities would occur offsite at the Bergstrom Aircraft, Inc. facilities located at the Pasco, Washington airport. There would be no excavation of previously undisturbed sediments, no off-road driving, and no other ground disturbing activities on the Hanford Site. Based on this information, the survey does not require a cultural resources review in accordance with Hanford Site Form A-6006-139, "Cultural and Ecological Resources Review Screening Form." If there are changes in the scope of survey activities that would result in ground disturbing activities, then project management would contact DOE-RL CHRP to determine if additional cultural and historic resources review is required prior to initiating the work.

Although no impacts to cultural resources are anticipated, project management would direct workers to watch for cultural or historical materials (e.g., bones, stone tools, rock alignments or cairns, mussel shell, cans, and bottles) during all work activities. If any cultural materials are encountered, work in the vicinity of the discovery would stop until project management contacts DOE-RL CHRP, the significance of the find is assessed, appropriate Tribes are notified, and if necessary, arrangements are made for mitigation of the find. The DOE-RL CHRP Manager provided his concurrence that no cultural resources review is required on May 23, 2023.

CONCLUSION

The survey is a class of actions with coverage under DOE's NEPA Implementing Procedures at 10 Code of Federal Regulations (CFR) 1021, Subpart D, Appendix B, Categorical Exclusions (CX) B3.1, "Site Characterization and Environmental Monitoring" and B3.2, "Aviation Activities." CX B3.1 provides for site characterization and environmental monitoring including, but not limited to, activities performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Resource Conservation and Recovery Act (RCRA); Atomic Energy Act (AEA); or other applicable statutory authority. Among other things, subpart (f) addresses characterization of water, soil, rock, or contaminants. In addition, CX B3.2 provides for aviation activities which involve survey, monitoring, or security purposes that comply with Federal Aviation Administration (FAA) regulations.

The requirements and conditions that are integral elements for applying CXs would be met without extraordinary circumstances where a normally excluded action may have significant effects. If an extraordinary circumstance is present, the DOE nevertheless may categorically exclude the Proposed Action if the agency determines that there are circumstances (i.e., mitigation measures) that lessen the impacts or other conditions sufficient to avoid significant effects [40 CFR 1501.4(b)(1)]. Any changes to the Proposed Action described herein must be reviewed and approved by the DOE Hanford NEPA Compliance Officer and may result in the need to perform additional cultural and ecological resource reviews and revision of this NEPA Review Screening Form and determination.

III. Existing Evaluations *(Provide with NRSF to DOE NCO)*:

Maps:

Figure 1. Boundary Map for NNSA Aerial Radiological Survey Area on the Hanford Site
Figure 2. RLS Bell 412 Helicopter with Externally Mounted AMS Detector Pods
Figure 3. Three 2 inch X 4 inch X 16 inch NaI-Tl Scintillators, Photomultiplier Tubes, and Data Acquisition Modules
Figure 4. Data Acquisition System
Figure 5. Radiation Survey Method
Figure 6. Ground Truth Measurements with HPGe Detector and Pressurized Ion Chamber
Figure 7. Hanford Natural Resource Buffers Overview

Other Attachments:

N/A

NEPA REVIEW SCREENING FORM 3 **Categorically Excluded Actions** (Continued)	**Document ID #:** DOE/CX-00228

IV. List Applicable CX(s) from Appendix B to Subpart D of 10 CFR 1021:

B3.1, "Site Characterization and Environmental Monitoring" and B3.2, "Aviation Activities."

V. Integral Elements and Extraordinary Circumstances ***(See 10 CFR 1021, Subpart D, B. Conditions that are Integral Elements of the Class of Actions in Appendix B; and 10 CFR 1021.410(b)(2) under Application of Categorical Exclusions)***	**Yes**	**No**
Are there extraordinary circumstances that may affect the significance of the environmental effects of the proposed action? If yes, describe them.	○	◉
Is the proposed action connected to other actions with potentially significant impacts, or that could result in cumulatively significant impacts? If yes, describe them.	○	◉
Would the proposed action threaten a violation of applicable statutory, regulatory, or permit requirements related to the environment, safety, health, or similar requirements of DOE or Executive Orders?	○	◉
Would the proposed action require siting, construction, or major expansion of waste storage, disposal, recovery, or treatment facilities?	○	◉
Would the proposed action disturb hazardous substances, pollutants, contaminants, or natural gas products already in the environment such that there might be uncontrolled or unpermitted releases?	○	◉
Would the proposed action have the potential to cause significant impacts on environmentally sensitive resources? See examples in Appendix B(4) to Subpart D of 10 CFR 1021.	○	◉
Would the proposed action involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, such that the action is not contained or confined in a manner designed, operated, and conducted in accordance with applicable requirements to prevent unauthorized release into the environment?	○	◉

If "No" to all questions above, complete Section VI, and provide NRSF and any attachments to DOE NCO for review.
If "Yes" to any of the questions above, contact DOE NCO for additional NEPA review.

VI. Responsible Organization's Signatures:

Initiator:

Jerry W. Cammann, HMIS/NEPA SME	JERRY CAMMANN (Affiliate) Digitally signed by JERRY CAMMANN (Affiliate) Date: 2023.08.23 11:06:20 -07'00'
Print First and Last Name	*Signature / Date*

Cognizant Program/Project Representative:

Kaycee J. Bailey, DOE-RL/SGD	KAYCEE BAILEY Digitally signed by KAYCEE BAILEY Date: 2023.08.23 11:20:28 -07'00'
Print First and Last Name	*Signature / Date*

VII. DOE NEPA Compliance Officer Approval/Determination:

Based on my review of information conveyed to me concerning the proposed action, the proposed action fits within the specified CX(s): ☒ Yes ☐ No

Douglas H. Chapin, DOE Hanford NCO	Douglas H. Chapin Digitally signed by Douglas H. Chapin Date: 2023.08.23 11:30:13 -07'00'
Print First and Last Name	*Signature / Date*

NCO Comments:

Figures for DOE/CX-00228

National Nuclear Security Administration Aerial Measuring System Radiological Survey of the Hanford Site during Fiscal Year 2023

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Figure 1. Boundary Map for NNSA Aerial Radiological Survey Area on the Hanford Site

Figure 2. RLS Bell 412 Helicopter with Externally Mounted AMS Detector Pods

Figure 3. Three 2 inch X 4 inch X 16 inch NaI-Tl Scintillators, Photomultiplier Tubes, and Data Acquisition Modules

Figure 4. Data Acquisition System

Figure 5. Radiation Survey Method

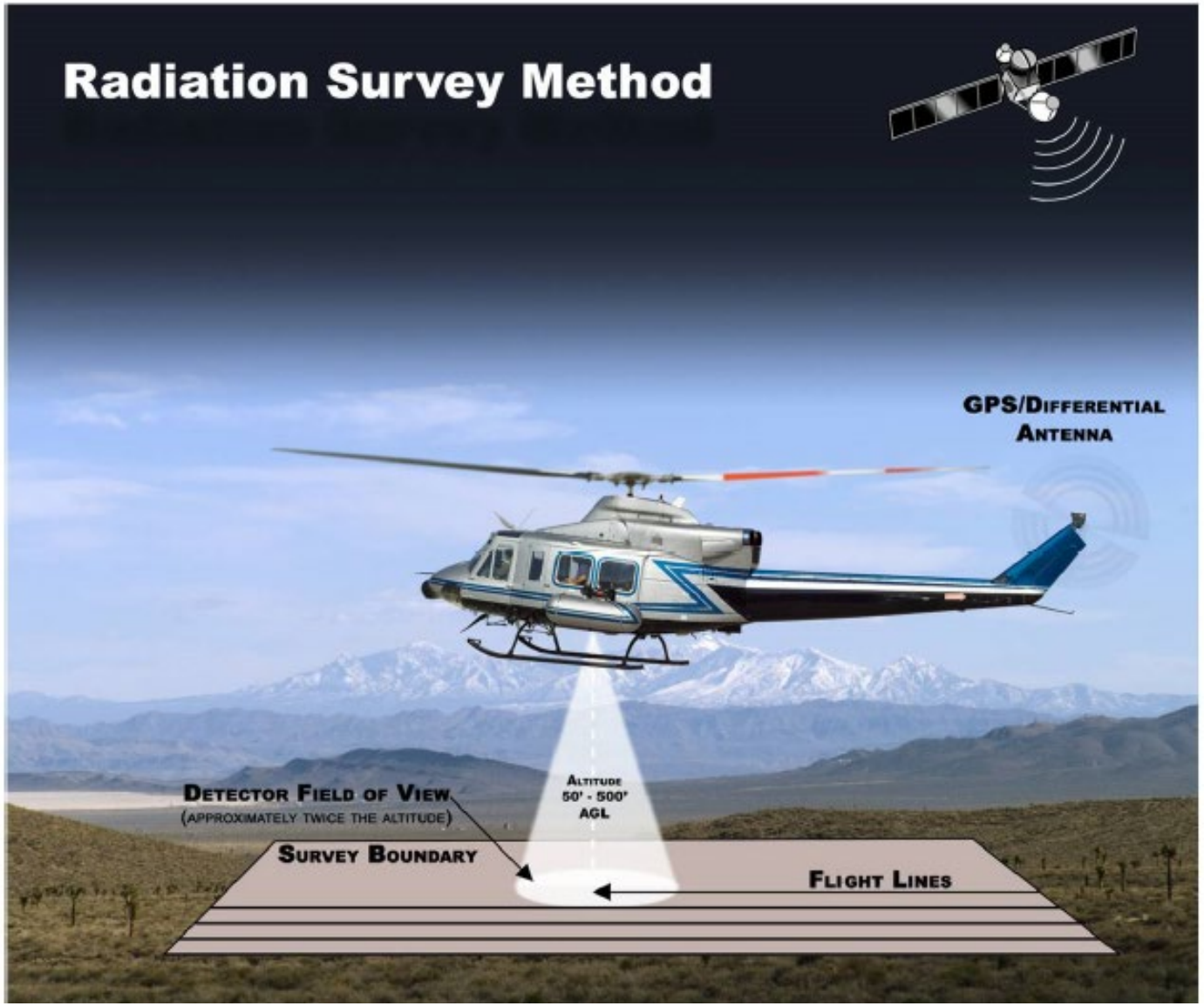
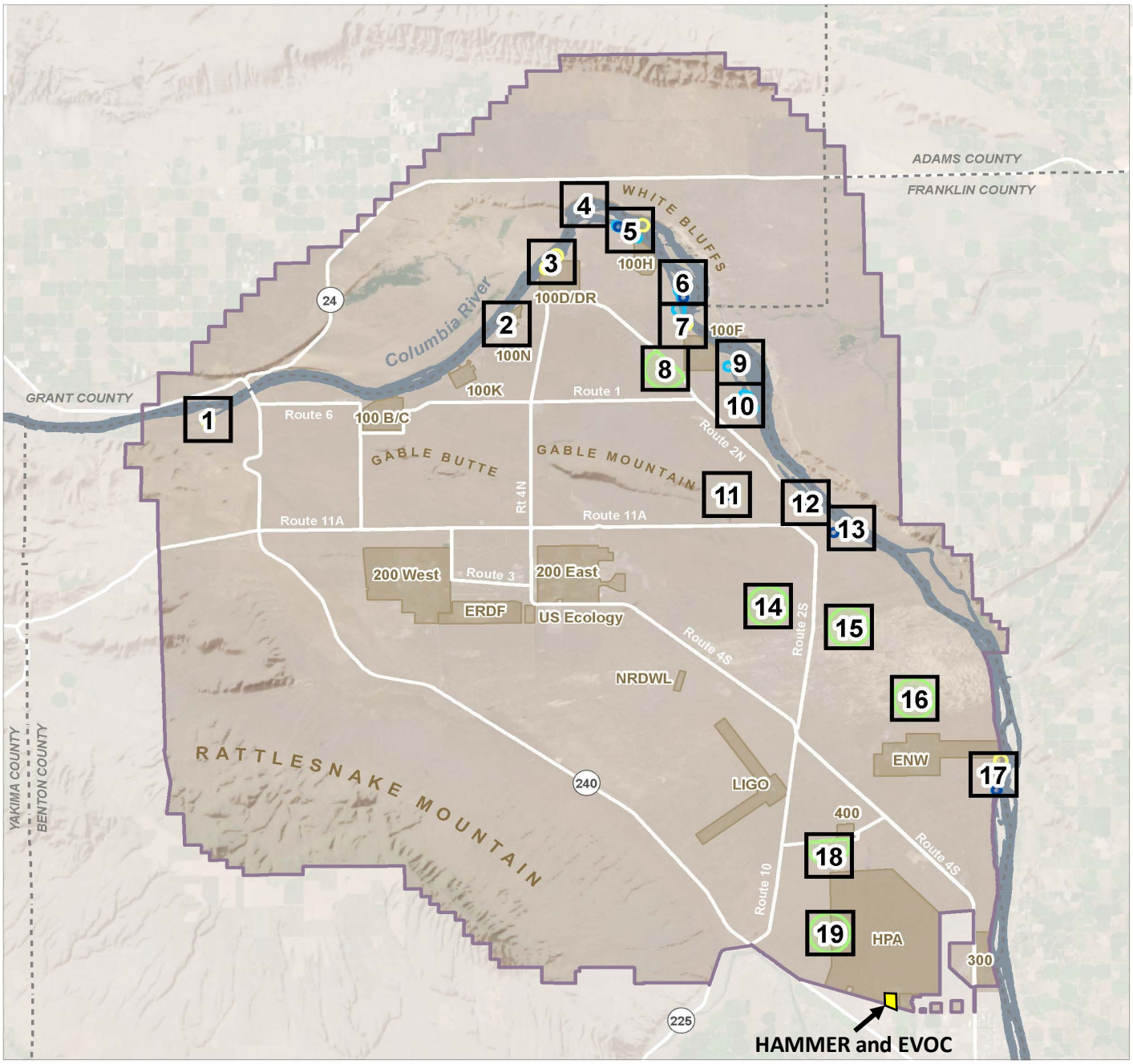


Figure 6. Ground Truth Measurements with HPGe Detector and Pressurized Ion Chamber

Figure 7. Hanford Natural Resource Buffers Overview



Hanford Natural Resource Buffers OVERVIEW

Hanford Site, Benton County, Washington

Dates Areas are Protected

- February 15 to July 31
- March 1 to July 31
- November 15 to July 31
- November 15 to March 15

- Hanford Site Boundary
- Hanford Site Areas

N

0 5 10 Miles

0 5 10 Kilometers