



Colorado Department
of Public Health
and Environment



September 21, 2011

David Lucas, Chief
Division of Refuge Planning
U.S. Fish and Wildlife Service
Mountain-Prairie Region
P.O. Box 25486, DFC
Denver, CO 80225-0486

RE: Service's requests for additional information regarding residual risk at Rocky Flats National Wildlife Refuge

Dear Mr. Lucas,

The Colorado Department of Public Health and Environment (CDPHE) and Region 8 of the U.S. Environmental Protection Agency (EPA) are responding to your letter of September 1, 2011 requesting assistance in better understanding site conditions as they affect the safety of refuge workers and visitors. Our responses to your specific questions are on pages attached to this correspondence.

Please let us know if you have additional questions or need further information.

Sincerely,


Carl Spreng
CDPHE


Vera Moritz
EPA

cc: Steve Berendzen, USFWS
Dan Miller, AGO
Lorraine Ross, EPA
Simon Lipstein, DOE

Responses to U.S. Fish and Wildlife Service's letter of September 1, 2011

Response to item #1 - Provide a qualitative summary of risk to Wildlife Refuge Worker (WRW) and Wildlife Refuge Visitor (WRV) within the lands transferred to the Refuge.

- Major Rocky Flats Site documents demonstrate and declare that the risks to the WRW and WRV are within or below the acceptable CERCLA risk range (10^{-4} – 10^{-6} risk of excess cancer incidence) and that radiation doses are below State standards. These documents include:
 - - 1) *RCRA Facility Investigation – Remedial Investigation/Corrective Measures Study – Feasibility Study Report for the Rocky Flats Environmental Technology Site*, June 2006 (RI/FS Report) [document available on-line at: http://www.lm.doe.gov/Rocky_Flats/Regulations.aspx#RIFS]
 - 2) *Corrective Action Decision/Record of Decision for Rocky Flats Plant Peripheral Operable Unit and the Central Operable Unit (CAD/ROD)* [document available on-line at: http://www.lm.doe.gov/Rocky_Flats/Regulations.aspx].
 - 3) Notice of partial deletion of the Rocky Flats Plant from the National Priorities List (72 ed. Reg. 29276, May 25, 2007)

At Rocky Flats, potentially contaminated sites were originally divided into 16 “operable units” (OUs) to facilitate the orderly investigation and cleanup of the Site. Based on the final comprehensive environmental investigation (RI/FS Report), The US Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE) and the US Department of Energy (DOE) decided to re-configure the Site OU boundaries to consolidate all areas that might require controls or further remedial action into a single OU named the Central OU. Areas that would not any require controls or further remedial action were merged into the Peripheral OU. The final boundaries are shown in Figure 1, Site map (DOE, Figure 1, CAD/ROD Amendment, September 2011). The majority of the land in the Peripheral OU was subsequently transferred to the Service and became the Rocky Flats Wildlife Refuge.

For purposes of assessing risk to human health, the Rocky Flats Site was partitioned into 12 Exposure Units (EUs). At least a portion of all of these EUs constitutes what is now the Refuge and a slice along the eastern edge of four of these EUs comprises land that is now proposed for use as a transportation corridor.

The evaluation of the nature and extent of contamination in the RI/FS Report identified 14 contaminants of interest in surface soil and sediments. Of these contaminants, only one – plutonium – was identified by the Human Health Risk Assessment as requiring further evaluation. The EU with concentrations of plutonium compelling evaluation was the Wind Blown EU where the risk to a WRW was calculated to be 2×10^{-6} , which is at the very low end of the CERCLA risk range for excess cancer. The risk estimates provided for the Wind Blown EU in the RI/FS Report are for the entire exposure unit

and, as noted above, are well within the acceptable risk range. However, the most contaminated parts of the Windblown EU were retained in the Central Operable Unit and not transferred to the Refuge. This partitioning of the Windblown EU results in a much lower average concentration in those lands now comprising the Refuge, which would result in even lower risks, estimated to be less than 1×10^{-6} for the WRW. The average concentration of the 135 samples from 66 locations within the Refuge portion of the Wind Blown EU (see attached Figure 2) is about 3.2 pCi/g, well below the 9.8 pCi/g that corresponds to a 1×10^{-6} risk for a WRW. In comparison, the average plutonium concentration of the 586 samples collected throughout the entire Peripheral OU is 1.09 pCi/g.

The following table shows a comparison of risk levels to plutonium soil concentrations that are assumed to be uniformly distributed over the entire exposure area.

Approximate plutonium concentrations in surface soil and sediments at Rocky Flats*

CERCLA risk range for Refuge Worker/Refuge Visitor **		Average plutonium concentration - Refuge	Average plutonium concentration - DOE lands
1×10^{-4} ***	980 pCi/g	1.09 pCi/g	2.3 pCi/g
1×10^{-6} ***	9.8 pCi/g		

* Source: Derived from Task 3, Soil Action Levels Technical Memorandum

**Exposure Assumptions:

Refuge Worker – 4 hours indoors and 4 hours outside for 250 days a year for 18.7 years

Refuge Visitor – 2.5 hours outside for 100 days a year for 6 years (child) or 24 years (adult)

*** 1×10^{-4} – 1×10^{-6} means a 1 in 10,000 – 1 in 1,000,000 lifetime excess cancer risk (risk of cancer added to the human lifetime risk of cancer that would normally be expected from all causes)

Response to item #2 - Provide an updated statement regarding restrictions.

- The lands comprising the Refuge are suitable for unlimited use and unrestricted exposure.

As noted in your letter, the Service’s CCP/EIS was required to be completed prior to cleanup and final decision making. Subsequent to the 2004 CCP, additional sampling of the area that was to become the Refuge was performed, numerous environmental analyses, including the Comprehensive Risk Assessment (CRA), were completed and the boundaries of the Refuge were configured. The additional data and the results of the CRA demonstrated that no use restrictions on the Refuge were necessary, and the final remedial decisions for the site did not impose any restrictions. These investigations and the remedy decision supersede prior responses from CDPHE and EPA written back in 2003.

In the Final CAD/ROD, dated September 2006, the agencies selected the “no action” alternative for the Peripheral OU and no use restrictions were imposed. On March 13, 2007, EPA published a notice of intent to delete the Peripheral OU from the Superfund

National Priorities List. With regard to the Peripheral OU, the Notice of Intent states, in part, that “no hazardous substances, pollutants, or contaminants occur in the Peripheral OU above levels that allow for unlimited use and unrestricted exposure.” On May 25, EPA deleted the Peripheral OU from the National Priorities List (72 ed. Reg. 29276, May 25, 2007).

On June 11, 2007, EPA sent a letter to the Secretaries of Energy and the Interior certifying that the cleanup and closure of Rocky Flats had been completed. That letter incorporated the Federal Register notice announcing the deletion of the Peripheral Operable Unit from the Superfund National Priorities List. The only portion of the Rocky Flats site that has land use restrictions is the Central OU. In accordance with the Rocky Flats Refuge Act, this area will remain under DOE management.

Please refer to the following sections of the CAD/ROD:

The selected remedy/corrective action for the Peripheral OU is no action. The RI/FS report concludes that the Peripheral OU is already in a state protective of human health and the environment. The NCP provides for the selection of a no action remedy when an OU is in such a protective state and therefore, no remedial action for the Peripheral OU is warranted. (p.3)

Considering the results of the RI/FS Report, DOE, EPA and CDPHE concluded that the Peripheral OU was unaffected by hazardous wastes. They also concluded that the risk and dose from low levels of residual radionuclides in the Peripheral OU were well within the EPA’s CERCLA range of acceptable risk and below the State of Colorado’s 25-mrem dose criterion for rural residents. Conditions in the Peripheral OU are acceptable for unrestricted use and unlimited exposure. (p.65)

Considering the results of the RI, DOE, EPA and CDPHE concluded that the Peripheral OU was unaffected by site activities from a hazardous waste perspective; that is, no hazardous wastes or constituents have been placed in or migrated to the Peripheral OU. This determination is based on process knowledge including past waste management practices, research into evidence of disturbed areas, and results of extensive sampling in the former Buffer Zone OU. A small portion of the Peripheral OU was impacted by site activities from a radiological perspective; for example, plutonium-239/240 exists above background in surface soil in the Wind Blown EU. (p. 49)

The decommissioning criteria in Section 4.61 of the Colorado Standards for Protection Against Radiation (6 CCR 1007-1) set dose limits for members of the public. These limits were considered relevant and appropriate requirements for determining if the Refuge lands were acceptable for unrestricted use. Surface soil sample results in the Refuge indicate that doses to members of the public would be less than 1 mrem/year, far below the residual radiological criteria for unrestricted use (25mrem/year). Section 4.60 provides a level of activity from plutonium that triggers a requirement to use “special techniques of construction” in “uncontrolled areas.” This level, 2 dpm (approximately 1

pCi/g), was set back in 1973 and was designed to keep radiation exposure as low as reasonably achievable. These requirements have been determined to not apply to refuge lands because the land is under federal jurisdiction and therefore is not “uncontrolled.” The requirements would, however, apply to land that is transferred out of federal jurisdiction.

In cases where §§ 4.60 and 4.61 apply, the Colorado Department of Public Health and Environment would evaluate appropriate construction controls, which would likely consist of dust suppression. Since dust suppression is not considered a restriction, applying this control would not limit use of the property proposed for transfer. The declaration that the refuge is available for unrestricted use would not be violated by the application of Part 4 of the Colorado Radiation Control Regulations.

There are a number of state and federal environmental requirements that may apply to the proposed construction, such as a stormwater permit, dredge and fill permit, air permit, etc. None of these are considered "restrictions" on land use, though a regulatory agency may impose conditions that must be met to perform the work, but are applied to mitigate environmental (including human health) impacts.

Response to item #3 - Provide information on 1) how disposal of lands associated with transportation was handled in Site documents, and 2) how exposures to construction workers and trail users would differ from those calculated for the WRW and WRV.

- 1) The CAD/ROD contemplated a future land transfer at the eastern edge of the site, as per provisions of the Refuge Act:

The Refuge Act prohibits the United States from transferring any rights, title, or interest in land within the boundaries of Rocky Flats, except for the purpose of transportation improvements on the eastern edge of the site that is bordered by Indiana Street. (p. 37)

- 2) The CRA developed a site conceptual model which identified multiple exposure pathways, which were analyzed as part of the human health risk assessment. Pathways for the WRV include inhalation and ingestion of surface soil and sediment, direct contact with surface soil and sediment, and external irradiation from surface soil and sediment. Hiking was one of the WRV activities that was evaluated, so exposure to “trail users” is included in that receptor scenario.

Risk to a construction worker was not directly calculated in the RI/FS Report. Because the exposure pathways and assumptions are similar to those used for a WRW, the risks should be somewhat similar to the risks calculated for a WRW. Differences include the potential for greater rates of inhalation and ingestion of soil by the construction worker. Those differences are likely offset by the much greater exposure duration for the WRW (18.7 years versus a few months for a construction worker). Due to the very short exposure duration, the very low levels of residual plutonium in the strip of land proposed

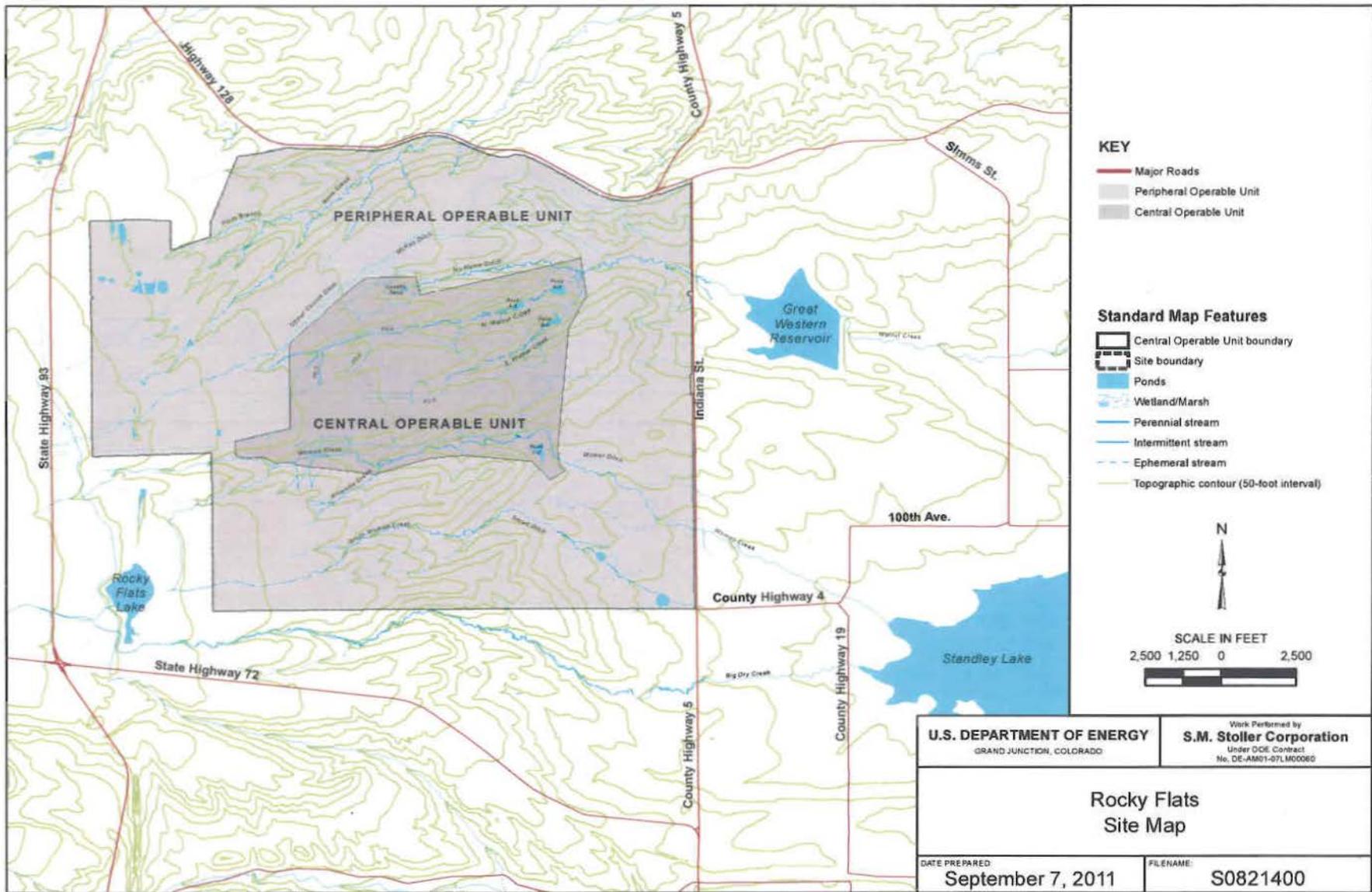
for transfer and the calculated low radiation dose (see response to item #1), the risk to a construction worker would be at or below the low end of the CERCLA risk range.

Air emissions from the Rocky Flats Site do not present health or environmental concerns in ambient air. This key factor in one of the potential exposure pathways is addressed in the "Air Contamination" section of the CAD/ROD, quoted below (p. 29):

Air Contamination - - Monitoring programs and other studies were conducted during both the production era and cleanup phase at Rocky Flats. These data show that contaminant emissions and resulting ambient airborne concentrations during both the weapons production era and cleanup phase were always compliant with all regulatory requirements. In fact, compliance monitoring at the facility fence line showed maximum airborne radionuclide concentrations of no more than three per cent of the limiting standard during the entire cleanup phase. With completion of all accelerated actions and the attendant removal of all historical air emissions sources except for wind erosion of the minor, remnant contamination in surface soils, future air emissions from the site will be less than those in the past.

The CAD/ROD acknowledges that resuspension of residual radioactive contaminants attached to surface soil particles remains a potential source of ongoing air emissions. However, sources of radionuclide contamination were removed during cleanup - former processing and waste storage buildings were decommissioned, decontaminated, and demolished and contaminated soils were removed) and the Site is now much less susceptible to air emissions. The CAD/ROD states (p. 30):

Air modeling conducted for radionuclide parameters predict that, even for scenarios involving a fire in the historic 903 Pad area, emissions will be much lower than the EPA's ten millirem benchmark level for an airborne exposure pathway."



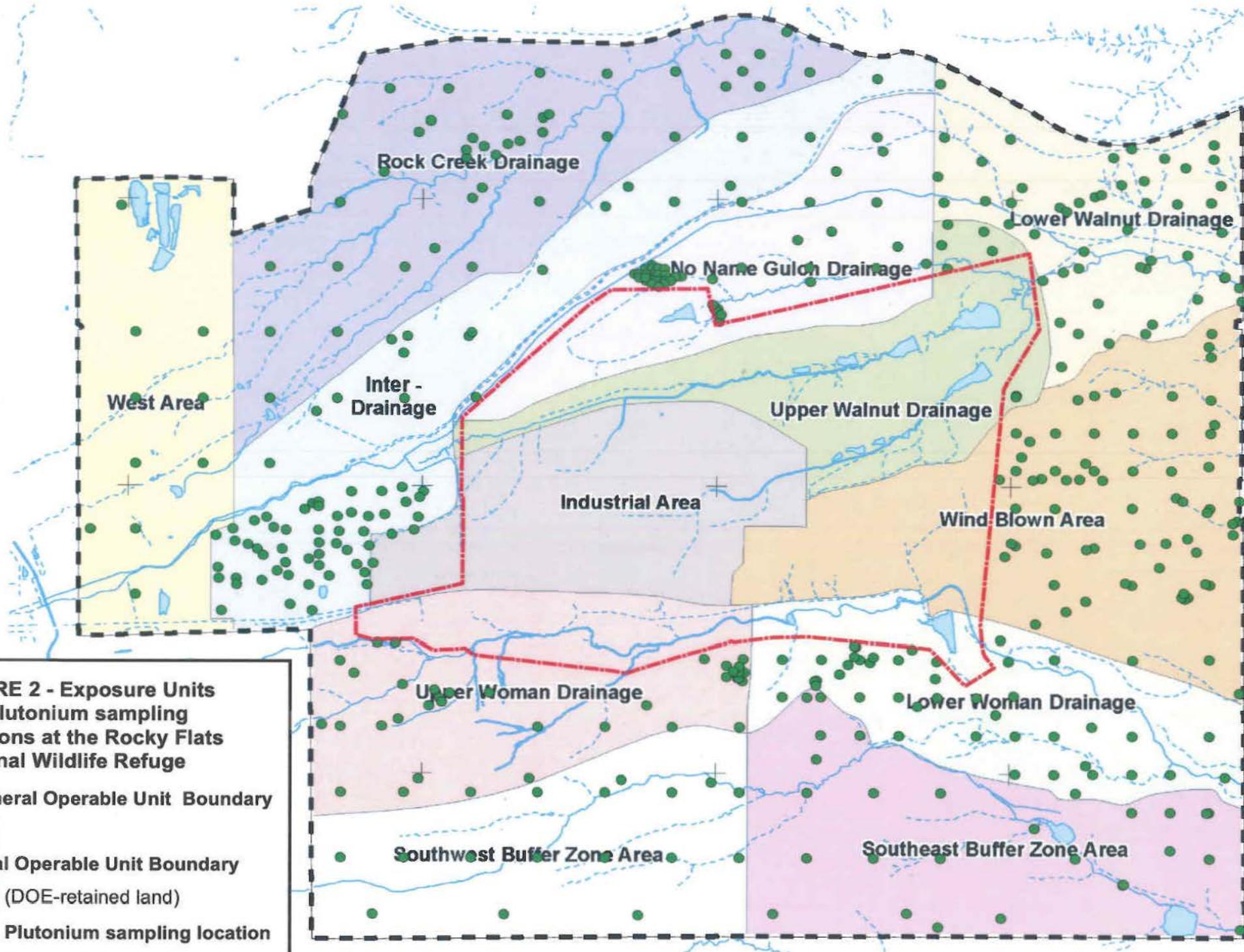


FIGURE 2 - Exposure Units and plutonium sampling locations at the Rocky Flats National Wildlife Refuge

- Peripheral Operable Unit Boundary
- Central Operable Unit Boundary
- (DOE-retained land)
- Plutonium sampling location