

# **NOTICE**

**All drawings located at the end of the document.**

# **SAMPLING AND ANALYSIS PLAN**

## **Characterization of Airborne Soil, Cover, and Actinide Exposure During Prescribed Burn and Post-Burn Vegetative Recovery in Rocky Flats Buffer Zone**

*Revision 3  
09 March 2000*

**Working Final Draft**

*Subject to pen-and ink revision to address field contingencies and logistical constraints*



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KAISER HILL  
COMPANY

March 13, 2000

00-RF-00905

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ATTN: JON DION

**SAMPLING AND ANALYSIS PLAN FOR THE FY00 ROCKY FLATS BUFFER ZONE  
PRESCRIBED BURN MONITORING PLAN - RCN-005-00**

Please find enclosed two copies of the working final draft of the Sampling and Analysis Plan (SAP) for environmental monitoring of the upcoming buffer zone prescribed burn, titled "Characterization of Airborne Soil, Cover, and Actinide Exposure During Prescribed Burn and Post-Burn Vegetative Recovery in Rocky Flats Buffer Zone." Though this is a working document, and subject to change, it accurately presents the purpose, scope, and path forward of prescribed burn monitoring.

The SAP is targeted at two goals: (1) characterizing worker and public exposure, if any, to radionuclides as a result of the prescribed burn; and, (2) developing site-specific data on brushfire particulate emissions and surface recovery rates for inclusion in actinide migration models. To this end, an extensive suite of air, vegetation, and soil sampling and analysis has been planned.

Historical data, process knowledge, and soil radionuclide isopleth maps all support the belief that the areas to be burned and monitored are devoid of actinide contamination above background levels. Despite this confidence, the SAP includes sampling and analysis of soils and air for radionuclides as a confirmatory measure.

If you have any questions concerning this correspondence, please contact me at 966-4663 or Patrick Haines, Air Quality Management/Radian International, at 966-7240.

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Enclosures: As Stated (2)

**-SAFE AND COMPLIANT CLOSURE-**

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**SAMPLING AND ANALYSIS PLAN**

**Characterization of Airborne Soil, Cover, and Actinide  
Exposure During Prescribed Burn and Post-Burn Vegetative  
Recovery in Rocky Flats Buffer Zone**

*Revision 3  
09 March 2000*

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## 1.0 INTRODUCTION

### 1.1 Overview

Kaiser-Hill (KH) has received a permit from Colorado Department of Public Health and Environment to conduct a prescribed burn of up to 500 acres, split among five areas in the Site's west buffer zone (see Map 1). The prescribed burn will fulfill Site natural resource management and fire risk-reduction goals. It also offers a unique opportunity to characterize and quantify air pollutants associated with buffer zone range fires; the resulting data could be of benefit to the Actinide Migration Evaluation study (AME) and the Site air quality program. Hard questions about the potential impacts of an unplanned fire on the Site after Closure could then be answered using source-specific data.

This study proposes to satisfy concerns regarding the immediate air quality impacts of the prescribed burn, and to obtain site-specific resuspension data from range fires for inclusion into the AME. The study would involve five aspects: (1) upwind and downwind sampling for radionuclides during the burn to characterize potential worker exposure as a result of the fire, if any, and long-term ambient sampling to characterize changes in mass resuspension above a burned plot; (2) direct sampling of the burn plume to characterize and quantify soil particles possibly suspended by the fire; (3) wind tunnel testing and other sampling of the burn area over time to determine changes in soil erosion potential as a result of the burn and vegetative recovery; (4) vegetative sampling to update biomass fuel loading calculations for buffer zone areas; and (5) pre- and post-burn soil samples to provide a soil composition baseline against which burn plume particulates may be compared.

### 1.2 Problem Identification Statement

This five-aspect study proposes to assess the potential air quality impacts, onsite and at the Site perimeter, of a buffer zone range fire.

- Aspect 1: Quantify radionuclide concentrations in ambient air during the fire to determine short-term worker and public exposure resulting from the prescribed burn, if any.
- Aspect 2: Characterize and quantify the relative amounts of soil and vegetative material in the burn plume.
- Aspect 3: Characterize and quantify buffer zone erosion potential as a function of wind speed during post-fire vegetative recovery, including both short-term (immediately following) and long-term (up to one year later) evaluations.
- Aspect 4: Obtain vegetative clippings along two representative transects for biomass determination in the areas to be burned, in order to update biomass fuel loading calculations.
- Aspect 5: Obtain pre- and post-burn soil samples along the same transects as used for Aspect 4 and analyze the composition of the resuspendable portion of those samples to serve as a baseline for Aspect 2. (Soil samples will also be provided to the soil erosion group within AMES for soil matrix analyses.)

### 1.3 Schedule

Aspects one and two of this plan will be executed beginning no sooner than 3 March 2000, in accordance with the open-burning permit. Aspect three will follow a flexible schedule as explained in Section 3.3. Aspect 4 was executed on 6-7 March 2000. The pre-burn sampling of Aspect 5 will be executed on 10 or 13 March 2000; the post-burn sampling will follow the burn. All burn events will have concluded by 15

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April 2000. Laboratory analyses are expected to have a 45-day turnaround. A written report that presents and interprets the resulting data will be drafted within 30 days of receiving all analytical results

### 1.4 List of Acronyms

a/b	alpha particle / beta particle
AME	Actinide Migration Evaluation
Al	aluminum
AQM	Air Quality Management
ASTM	American Society for Testing and Materials
Ca	calcium
CASI	Commodore Analytical Services Inc.
Ci	Curies
cfm	cubic feet per minute
cm	centimeters
cm <sup>2</sup>	square centimeters
CSM	Colorado School of Mines
DOE	Department of Energy
EPA	Environmental Protection Agency
Fe	iron
ft <sup>3</sup>	cubic feet
g	grams
GPS	Global Positioning System
HVOL	high volume ambient air sampler
in.	inch
K	potassium
KH	Kaiser-Hill Company
lpm	liters per minute
m	meter
m <sup>2</sup>	square meters
m <sup>3</sup>	cubic meters
mg	micrograms
Mg	magnesium
mg	milligram
ml	milliliter
mm	millimeter
Mn	manganese
Na	sodium
ng	nanogram
RAAMP	Radioactive Ambient Air Monitoring Program
RBA/CA	Radiological Buffer Area / Contamination Area
PM-10	particulate matter, <10 microns aerodynamic equivalent diameter
QA/QC	Quality Assurance / Quality Control
RMRS	Rocky Mountain Remediation Services
SAP	Sampling and Analysis Plan
Site	Rocky Flats Environmental Technology Site
TOR	thermal/optical reflectance analysis for organic and inorganic carbon
TSP	total suspended particulate matter
XRF	X-ray fluorescence analysis for element identification

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### DATA QUALITY OBJECTIVES

#### 2.1 Aspect 1

**Problem:** Characterize and quantify radionuclide concentrations in ambient air during the fire to determine worker and public exposure resulting from the prescribed burn, if any. Characterize the long-term changes in mass resuspension above a burned plot.

**Decision 1:** Did radiation exposure to burn technicians exceed an amount equivalent to a 1 mrem dose in an eight-hour period?

Decision Inputs	Study Boundaries	Decision Rule	Absolute Detection Limit
$\alpha/\beta$ screenings of a 47mm punch from the HVOL sampler filters*	One 2-hour or longer measurement per burn event from the upwind and downwind HVOL samplers	1 mrem dose has been exceeded if the difference between the upwind and downwind HVOL samplers is more than $5.1\text{e-}12$ Ci measured on the 47mm filter punch	$5.13\text{E-}13$ Ci

\* Note:  $\alpha/\beta$  screenings of a 47mm punch are performed 96 hours following exposure of the filter, to allow time for radon accumulation to dissipate. Radon interferes with accurate  $\alpha/\beta$  counting.

**Decision 2:** Did potential radiation dose to the public exceed 1 mrem over the duration of the burn?

Decision Inputs	Study Boundaries	Decision Rule	Absolute Detection Limit
$\alpha/\beta$ screening of a 47mm punch from the perimeter RAAMP samplers*	One measurement from each of the perimeter RAAMP samplers following the completion of the burn plan	1 mrem dose has been exceeded if the difference between the burn period measurement and the time-weighted, sampler-specific, three year March average is more than $5.1\text{e-}12$ Ci as measured on the 47mm filter punch	$5.13\text{E-}13$ Ci
Isotopic analyses of perimeter RAAMP filters	One measurement from each of the perimeter RAAMP samplers following the completion of the burn plan	1 mrem dose has been exceeded if the difference between the burn period measurement and the time-weighted, sampler-specific, three year March average is more than $1.19\text{e-}10$ Ci is measured on the entire filter	$1.35\text{E-}13$ Ci

\* Note:  $\alpha/\beta$  screenings of a 47mm punch are performed 96 hours following exposure of the filter, to allow time for radon accumulation to dissipate. Radon interferes with accurate  $\alpha/\beta$  counting.

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**Decision 3:** Did mass resuspension above the burned area increase compared to an unburned control?

Decision Inputs	Study Boundaries	Decision Rule	Absolute Detection Limit
Gravimetric analysis of long-term, post-burn HVOL filters (Sampling will cease when vegetative recovery is complete, as determined in Aspect 3)	One 8-hour sample per day, two days a week, from paired HVOL samplers deployed within the burn plot and away from the burned areas as a control, respectively.	Mass resuspension from burned areas has increased if the average burn-plot HVOL filter mass is significantly different (95% confidence interval) than the average control HVOL filter mass for the same period(s).	2 mg

### 2.2 Aspect 2

**Problem:** Characterize and quantify the suspension of soil material and vegetative matter in the burn plume.

**Decision 1:** What soil and vegetative materials are emitted by a buffer zone range fire?

Decision Inputs	Study Boundaries	Decision Rule	Absolute Detection Limit
XRF analyses of upwind and in-plume Teflon filters	One 2-hour or longer measurement per burn event from up-wind and in-plume filters	Identify species present in the burn plume that are not present in the upwind sample and their relative concentration; compare these values to the Aspect 5 data	<5.0 ng/m <sup>3</sup>
Thermal/optical reflectance carbon analyses of upwind and in-plume quartz filters	One 2-hour or longer measurement per burn event from up-wind and in-plume filters	Identify species present in the burn plume that are not present in the upwind sample and their relative concentration; compare these values to the Aspect 5 data	0.2 µg/cm <sup>2</sup>
Gravimetric analyses of upwind and in-plume Teflon filters	One 2-hour or longer measurement per burn event from up-wind and in-plume filters	Quantify mass difference between in-plume and upwind samples	2 mg

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### 2.3 Aspect 3

**Problem:** Characterize and quantify buffer zone erosion potential as a function of wind speed during post-fire vegetative recovery, including both short-term (immediately following) and long-term (up to six months later) evaluations.

**Decision 1:** Did the prescribed burn cause quantifiable changes in buffer zone erosion potential compared to unburned areas?

Decision Inputs	Study Boundaries	Decision Rule	Detection Limits
Undisturbed erosion potential	Three trials (locations) comprising one test (data point) to measure unburned emissions potential	None	3.3 $\pm$ 1.1 mg/m <sup>2</sup>
Short term (immediately following burn) erosion potential	Three trials (locations) comprising one test (data point) immediately following the burn	None	3.3 $\pm$ 1.1 mg/m <sup>2</sup>
Long term (up to one year post burn) erosion potential	Three trials (locations) comprising one test (data point) at intervals following the burn	Three tests, up to six months following the burn, until test result is indistinguishable from the undisturbed test	3.3 $\pm$ 1.1 mg/m <sup>2</sup>

### 2.4 Aspect 4

**Problem:** Update AMES fuel loading model biomass estimates for buffer zone areas.

**Decision 1:** Is the vegetative biomass in the areas to be burned consistent with AMES model inputs?

Decision Inputs	Study Boundaries	Decision Rule	Detection Limits
Vegetative biomass sampling	Two 50 meter transects, one in the northern burn area and one in the southern burn area, will be sampled by Ecology staff to measure biomass	Biomass is significantly different than the 1993-1994 Site mean biomass data if the percent difference exceeds 15%	1.0 g

### 2.5 Aspect 5

**Problem:** Characterize and quantify the resuspendable portion of pre-burn and post-burn surface soils along the Aspect 4 transects to provide a baseline for comparison to Aspect 2 in-plume samples.

**Decision 1:** What is the composition of erodible surface soil?

Decision Inputs	Study Boundaries	Decision Rule	Detection Limits
Undisturbed soil matrix	20 soil samples taken along the Aspect 4 transect	None	<5.0 ng/m <sup>3</sup> for minerals 0.2 $\mu$ g/cm <sup>2</sup> for carbon
Burned soil matrix	20 soil samples taken along the Aspect 4 transect	None	<5.0 ng/m <sup>3</sup> for minerals 0.2 $\mu$ g/cm <sup>2</sup> for carbon

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### 3.0 SCOPE OF WORK

#### 3.1 Aspect 1

Worker exposure during the burn will be quantified through the use of high volume ambient air samplers (HVOL), deployed upwind and downwind of the burn area. An upwind HVOL sampler will be used to correct the downwind data for background effects. Contemporaneous data from the existing Radioactive Ambient Air Monitoring Program (RAAMP) sampler network, located along the Site perimeter, will be reviewed to determine whether the prescribed burn impacts fence-line concentrations of radionuclides. Upon completion of the burn, long-term HVOL monitoring will be employed in the southern burn location to quantify longer-term mass resuspension impacts, if any, utilizing the same portable HVOL sampling platforms.

- Existing HVOL samplers and portable generators will be utilized;
- Glass fiber filters will be employed as sample media;
- Gross alpha/beta screens of 47mm filter punches will be performed on Site to semi-quantitatively assess radionuclide activity following 96 hour hold for radon interference to dissipate; and
- Isotopic analyses for radionuclides will be performed on RAAMP samples, which will have clean filters installed just prior to the burn and again upon completion of the burn to bracket burn impacts.
- Field teams, using hand-held Electra  $\alpha/\beta$  counting instruments, will check for evidence of radionuclide activity at regular intervals during burn events, as described in the prescribed burn contingency plan.

#### 3.2 Aspect 2

Plume composition will be characterized through direct sampling, with upwind (control) samplers and in-plume samplers. The upwind samplers will be deployed alongside the Aspect 1 upwind HVOL, on a stationary tripod that puts the sampler head at approximately ten feet above ground. The in-plume samplers will be mounted on a ten foot mast atop a hand cart, allowing the sample heads to be maintained in the plume while keeping a safe distance from the fire itself. Samples will be collected concurrently, using paired samplers, on Teflon and quartz filters.

- MiniVol samplers will be employed, drawing 5 lpm samples on battery power for up to eight hours;
- 47 mm Teflon membrane and quartz fiber filters employed as sample media, in paired sampling trains;
- Teflon filters will be analyzed gravimetrically for total particulate mass and by X-ray fluorescence (XRF) to determine the speciation and quantity of individual soil constituents (silica, aluminum, etc.);
- Quartz filters will be analyzed by thermal/optical reflectance (TOR) for inorganic and organic carbon content determination;
- Total soil resuspension may be determined as the difference between the control and in-plume samples, corrected for carbon fractions and associated estimates of compound structures;
- A mass balance of soil mineral fractions in the control and in-plume samples is proposed, to better characterize soil and combustion-product suspension during the burn event; and
- Aspect 5 will provide a baseline of soil composition for comparison to the Aspect 2 results.

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### 3.3 Aspect 3

The affect of the burn on wind erosion potential of plant material and soil particles may be characterized and quantified through the use of a portable wind tunnel. To assess how quickly the burned surface returns to its pre-burn state, wind tunnel testing is proposed to be conducted at periodic intervals based on vegetative recovery. When sequential wind tunnel tests following the burn indicate that erosion potential has returned to pre-burn condition, testing will conclude.

- Pre-Burn Scenario – Wind tunnel testing of an unburned plot will measure erosion potential, providing a control sample.
- Immediate Post-Burn Scenario – Wind tunnel testing should be conducted just after the burn, in anticipation of the surface providing the highest erosion potential while in an immediate post-burn condition.
- Rate of Recovery Scenario 1 – Vegetative re-growth begins almost immediately after a burn occurs. Wind tunnel testing should be conducted within fifteen days after the burn to provide an initial benchmark on the rate of surface recovery.
- Rate of Recovery Scenario 2 – Wind tunnel testing should be conducted within two to six weeks after the burn to provide a second benchmark on the rate of surface recovery.
- Rate of Recovery Scenario 3 – If Rate of Recovery Scenario 2 test results still indicate an elevated erosion potential compared to Pre-Burn Scenario, then an additional wind tunnel test is warranted. This wind tunnel test may be conducted up to one year after the burn, in anticipation that the intervening period of vegetative growth and decay will have returned the surface to its pre-burn condition, though seasonal differences may bias such a long delay between scenarios.

### 3.4 Aspect 4

Biomass values for fuel loading calculations will be determined for two of the five areas to be burned. These will be used to update model inputs in the AMES.

- Site Ecology group will stake transects and collect vegetation and litter in accordance with Site procedures;
- Dry biomass will be measured in accordance with Site procedures; and
- Samples will be archived as an analytical baseline against future data needs.

### 3.5 Aspect 5

Soil samples will be obtained and analyzed for elemental constituents including carbon. The soil sampling grid will correspond to the vegetative sampling grid from Aspect 4. Samples will be obtained both pre- and post-burn to assess the impacts of the fire on the soil matrix, and to provide a baseline for comparing plume composition to soil composition.

- Samples will be taken by Commodore Analytical Services personnel in accordance with the attached sampling and analysis plan (Appendix 2);
- Samples will be shared with soil erosion staff of the AMES for independent analyses; and
- Though free-release forms have been obtained based on historic data and process knowledge for the burn areas, gross  $\alpha/\beta$  counts of the pre-burn soil samples will be performed.

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### 3.6 Number of Samples

Sample identifications for all anticipated burn monitoring plan samples are included in Appendix 3.

The following table summarizes the sampling and analytical population, assuming 5 burn events:

Aspect	Number and Type of Samples (in <b>BOLD</b> ) with Corresponding Analyses
Aspect 1 (For all 5 burn events)	<p><b>10 – Glass-fiber HVOL samples (8x10)</b>  <b>14 – Glass-Fiber RAAMP samples (8x10)</b>  <b>62 – Glass fiber HVOL samples (8x10)*</b></p> <p>10 – <math>\alpha/\beta</math> analyses of HVOL filter punches (plus 16 isotopic analyses if <math>\alpha/\beta</math> screens show significant activity)            14 – <math>\alpha/\beta</math> analyses of perimeter RAAMP sample filters            28 – Isotopic analyses of perimeter RAAMP sampler filters            62 – Gravimetric analyses of 8-hour upwind and in-plot long-term HVOL samples*</p>
Aspect 2 (For all 5 burn events)	<p><b>10 – Teflon MiniVol samples (47mm)</b>  <b>10 – Quartz MiniVol samples (47mm)</b></p> <p>10 – XRF analyses of Teflon MiniVol filters            10 – T/OR carbon analyses of quartz MiniVol filters            10 – Gravimetric analyses of Teflon MiniVol filters</p>
Aspect 3 (Per wind tunnel scenario)	<p><b>12 Cyclone catch samples</b>  <b>12 Quartz samples (47mm)</b>  <b>12 Backup filter samples</b>  <b>12 Soil samples for soil dustiness determination</b></p> <p>12 – Mass analyses of wind tunnel cyclone catches            12 – T/OR carbon analyses of wind tunnel quartz filters            12 – Mass analyses of backup filters            12 – Soil dustiness analyses using MRI dustiness chamber</p>
Aspect 4 (One-time vegetative sampling)	<p><b>20 Current-year vegetative samples</b>  <b>20 Litter samples</b></p> <p>10 – Biomass analyses, dry weight of vegetation            10 – Biomass analyses, dry weight of litter            10 – Vegetation samples to archive            10 – Litter samples to archive</p>
Aspect 5 (Soil sampling)	<p><b>10 500 ml, 3-cm depth pre-burn homogenized soil samples</b>  <b>10 100 ml, 3-mm depth pre-burn soil scrapes</b>  <b>10 100 ml, 3-cm depth pre-burn <math>\alpha/\beta</math> screening soil samples</b>  <b>10 500 ml, 3-cm depth post-burn homogenized soil samples</b>  <b>10 100 ml, 3-mm depth post-burn soil scrapes</b></p> <p>2 – Compositated pre-burn TSP resuspensions for soil elements including carbon using XRF and TOR analyses            2 – Compositated post-burn TSP resuspensions for soil elements including carbon using XRF and TOR analyses            10 -- <math>\alpha/\beta</math> screen of pre-burn samples</p>

\* two each week for 15 weeks following burn, estimated

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### 3.7 Analytical Detection Limits

The following table summarizes the limits of detection for the air sample analytical methods employed:

Sample	Analysis Method	Absolute Detection Limit	Sample Detection Limit
Glass HVOL	$\alpha/\beta$ screen	0.513 pCi	0.118 pCi/m <sup>3</sup>
Glass RAAMP	$\alpha/\beta$ screen	0.513 pCi	1.47E-3 pCi/m <sup>3</sup>
Glass RAAMP	Isotopic spectroscopy	0.135 pCi	1.66E-5 pCi/m <sup>3</sup>
Glass HVOL (long term)	Gravimetric	3 mg	0.01 mg/m <sup>3</sup>
Teflon MiniVol	Gravimetric	2 mg	3.3 mg/m <sup>3</sup>
Teflon MiniVol	XRF	<5 ng/m <sup>3</sup>	<5 ng/m <sup>3</sup>
Quartz MiniVol	TOR	0.2 $\mu\text{g}/\text{cm}^2$	5.78 $\mu\text{g}/\text{m}^3$
Cyclone, Wind Tunnel	Gravimetric	3 mg	0.33 mg/m <sup>2</sup>
Quartz, Wind Tunnel	TOR	0.2 $\mu\text{g}/\text{cm}^2$	0.38 $\mu\text{g}/\text{m}^3$
Backup, Wind Tunnel	Gravimetric	3 mg	0.33 mg/m <sup>2</sup>

The following table summarizes the assumptions behind the air sample detection limits:

Analysis Method	Sample Size & Media	Sample Time	Sample Rate	Sample Volume
$\alpha/\beta$ screen, HVOL	47mm punch of 8x10 in. glass filter	2 hours	30 cfm	154 ft <sup>3</sup> (4.4 m <sup>3</sup> )
$\alpha/\beta$ screen, RAAMP	47mm punch of 8x10 in. glass filter	5 days	40 cfm	12292 ft <sup>3</sup> (348 m <sup>3</sup> )
Isotopic spectroscopy, RAAMP	Digested 8x10 in. glass & oiled filters	5 days	40 cfm	288000 ft <sup>3</sup> (8155 m <sup>3</sup> )
Gravimetric, long-term HVOL	8x10 in. glass filter	8 hours	30 cfm	14400 ft <sup>3</sup> (408 m <sup>3</sup> )
Gravimetric, MiniVol	47mm Teflon filter	2 hours	5 lpm	600 liters (0.6 m <sup>3</sup> )
XRF, MiniVol	47mm Teflon filter	2 hours	5 lpm	600 liters (0.6 m <sup>3</sup> )
TOR, MiniVol	1 cm <sup>2</sup> punch of 47mm quartz filter	2 hours	5 lpm	34.6 liters (0.035 m <sup>3</sup> )
TOR, wind tunnel sample	1 cm <sup>2</sup> punch of 47mm quartz filter	2 minute / 8 minutes	40 cfm	4.6 ft <sup>3</sup> / 18.4 ft <sup>3</sup> (0.13 m <sup>3</sup> / 0.52 m <sup>3</sup> )
Gravimetric, wind tunnel sample	8x10 in. glass filter	2 minutes / 8 minutes	40 cfm	80 ft <sup>3</sup> / 320 ft <sup>3</sup> (2.3 m <sup>3</sup> / 9.0 m <sup>3</sup> )

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### **4.0 QUALITY ASSURANCE / QUALITY CONTROL**

#### **4.1 Documentation**

A field QA/QC program will be followed to ensure that data quality objectives are met. Sample collection errors will be controlled using standard collection methods, field data forms, and chain-of-custody logs. Samples will be labeled with the project name, sample identification number, analytical method, sampler's name and initials, and date and time of collection. Chain-of-custody logs will reflect the same information as sample labels (see Appendix 3). Site analytical services will follow established Site procedures in tracking samples to and from the analytical laboratories and providing data quality assurance.

#### **4.2 Blanks and Duplicates**

A blank population equal to 10% of the sample population for each air sample matrix will be submitted for analysis. Blank corrections will be performed in accordance with approved Site data analysis procedures. Duplicate analyses will be conducted during analyses in accordance with the established analytical quality programs currently in use by the laboratories contracted to perform this work.

### **5.0 HEALTH AND SAFETY**

Health and safety issues are addressed under separate cover in the Site job hazard analyses and project plans prepared for the burn monitoring plan procurement document package.

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### Appendix 1

#### Vegetation Tissue Collection in Prescribed Burn Areas Field Sampling Plan

#### Vegetation Tissue and Biomass Collection in Prescribed Burn Areas Field Sampling Plan

##### Purpose

The goal of this collection effort is to provide a set of pre-burn vegetation and litter tissue and biomass samples from the prescribed burn locations. Tissue samples will be archived for use as pre-burn radiological benchmark vegetation samples. They will be evaluated as needed in the future. Biomass samples will be used to determine biomass weights.

##### Methods

The methodology used for the tissue and biomass collection sampling will follow that found in the Vegetation Sampling Standard Operating Procedure (4-H64-ENV-ECOL. 10; DOE 1995). The methods outlined in section 6.6 Production Plot A will be used with the following modifications. Two sample sites will be chosen in the areas slated for burning in spring 2000. One sample site will be positioned in each of the two burn units where the wind tunnel experimental plots have been located. Sites will be subjectively chosen so as not to interfere with other burn monitoring events and will represent typical vegetation in the area. One 50 m transect will be located and permanently marked at each sample site (Figure 1). Five 0.25 m<sup>2</sup> quadrats (square in shape) will be randomly located along the right hand side of each transect for biomass sampling. Tissue sampling will be conducted along the left side of the transect using five randomly located 0.25 m<sup>2</sup> quadrats (square in shape). All quadrats will be located with one edge parallel to the transect line at a distance of approximately 10 cm from the transect line. No overlap of quadrats will be allowed. A total of 20 quadrats will be sampled. - 10 tissue sample, 10 biomass sample. No species richness or height of vegetation measurements will be made.

Sampling within each quadrat will be conducted by clipping all current year growth (CYG) of herbaceous species to less than or equal to 1 cm above the ground. No woody plants or cactus species will be clipped. Only those plants rooted within the quadrat will be clipped. No separation of species will be made. Due to the time of year, CYG is defined as vegetation that grew during 1999 (as best as can be determined). In addition, litter (defined as dead pre-1999 plant material) will also be collected from each quadrat as a separate sample. Current year growth and litter will be placed in separate paper bags appropriately labeled with the following information: transect number, quadrat number, date, whether they are a tissue sample (TISSUE) or a biomass sample (BIOMASS), and whether the bag is "1 of 1", "1 of 2", "2 of 2" etc. After each quadrat is sampled and the bags appropriately labeled, the bag tops will be folded over and stapled shut with two staples to prevent material from spilling out. No special handling requirements are required for the completed samples because the samples are not temperature sensitive or originating in radiologically contaminated areas. As each quadrat sample is finished it should be checked off the field data sheet as being completed.

Completed tissue samples will be transferred to the Air Quality Monitoring group once sampling is completed. Chain of custody forms will be used to transfer custody. Completed biomass samples will be dried and weighed to determine the dry weight biomass.

## Working Final Draft

*Subject to pen-and ink revision to address field contingencies and logistical constraints*

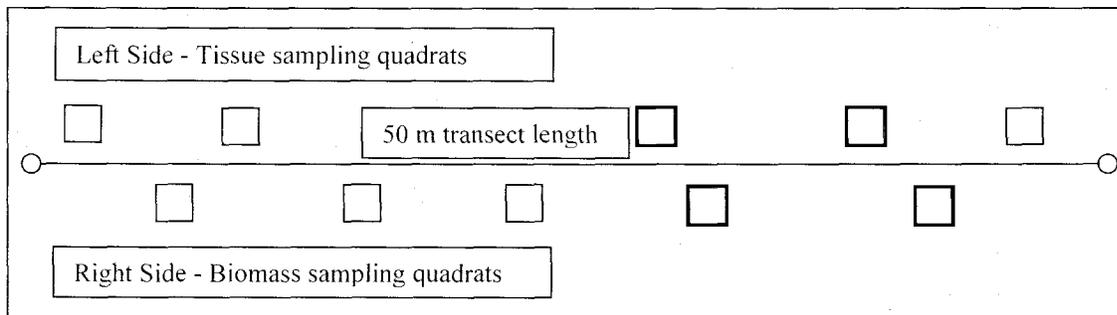
The following method will be used for biomass weighing:

- A. First, the minimum drying time for the set of biomass samples must be determined. This is defined as the length of time needed to dry samples until no significant weight loss ( $>0.1$  g) occurs between consecutive weighings.
  1. Loosely place the sample bags into the preheated ( $65^{\circ}\text{C}$ ) drying oven.
  2. After 5 hours of drying in the oven, remove a few sample bags at a time and weigh them on an electronic balance. Record the weight for each sample on the data sheet to the nearest 0.1 gram.
  3. Put the sample bags in the oven for 1 more hour.
  4. Remove and weigh again. Record weights.
  5. Repeat steps 3 and 4 until no significant weight loss ( $> 0.1$  g) occurs between consecutive weighings.
- B. After the minimum drying period has been established dry all other samples for at least the minimum time determined.
- C. In order to determine the actual weight of the dried vegetation, the weight of the bag must be subtracted. An average paper bag weight should be determined by placing 10 paper bags (each with 2 staples in them) in the drying oven for the minimum amount of time as determined above. All 10 bags should be weighed together and the resulting weight divided by 10. This average weight then will be subtracted from the final dry weights of each of the samples.
- D. Final weights of the dry bags with vegetation, average bag weight, and final vegetation weight for each sample should be recorded on the data sheet.

After biomass samples have been weighed they will be transferred to the Air Quality Group using chain of custody forms.

### Schedule

Sampling will be conducted prior to the prescribed burn in spring 2000.



**Figure 1. Basic sampling transect layout**

**SAMPLING AND ANALYSIS PLAN**

**INVESTIGATION OF THE AFFECTS OF RANGE FIRES  
ON SURFACE SOIL CHARACTERISTICS  
AT THE ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE**

Revision 0

**March 7, 2000**

**Rocky Flats Environmental Technology Site  
Golden, Colorado 80402**

**WORKING COPY, SUBJECT TO REVISION**

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## 1. INTRODUCTION

The purpose of this Sampling and Analysis Plan (SAP) is to direct the collection of surface soil samples from proposed controlled burn areas in the Rock Creek, Woman Creek, and Smart Ditch watersheds at the Rocky Flats Environmental Technology Site (Site). This sampling activity satisfies data needs for the Actinide Migration Evaluation (AME) program and Site range management. The AME is investigating how actinides (plutonium-239,240, americium-241, and uranium isotopes) move in the Site environment to address Closure issues such as cleanup, land configuration, hydrologic configuration, and natural resources management. The AME erosion and air modeling groups are modeling the affects of range fires on actinide mobility. The soil samples proposed for collection will be analyzed to obtain data for modeling the range fire scenarios for air and erosion transport of actinides.

The objective of this SAP is to describe:

- why the sampling is being performed,
- who will perform the sampling,
- where sampling will be performed,
- what will be sampled,
- sampling and analysis requirements,
- specific data requirements, and
- data handling procedures and records management issues.

### 1.1. Background

A prescribed burn is planned for portions of the Rock Creek, Woman Creek, and Smart Ditch watersheds prior to April 15, 2000. The burn will be conducted by the U.S. Forest Service in the areas shown in Figure 1. Burning the rangeland in these areas will help to promote healthy rangeland vegetation and control noxious weeds.

The AME is modeling the affects of range fires on soil erosion via wind and water in order to study how actinides move on contaminated soils that are subject to these natural erosion processes. The characteristics of soils in burned areas could affect actinide mobility. Soil samples will be collected prior to and after the burn to determine if and how the burn changes the soil characteristics.

### **1.2. Previous Sampling**

Previous soil samples collected in the proposed burn areas indicates that the soils do not have elevated actinide content. The latest soil actinide distribution kriging analysis shows the burn areas to have soil activity at background concentrations (Figures 2 and 3).

## **2. PROJECT AND DATA QUALITY OBJECTIVES**

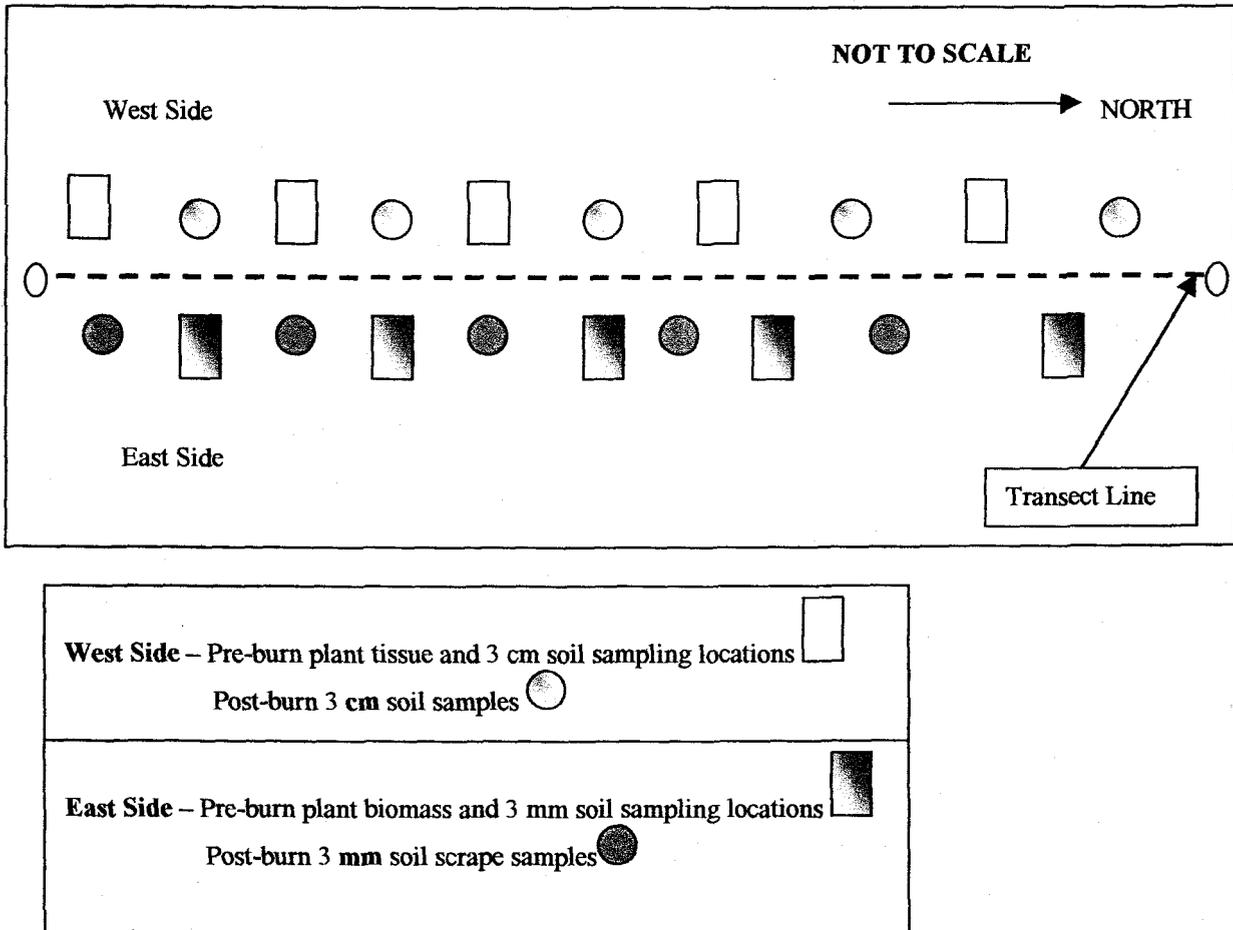
The data collected must be of acceptable quality to use as model input and calibration data for the AME modeling activities. Data-quality objectives for the AME are contained in the document "Data Quality Objectives for the Actinide Migration Evaluation at the Rocky Flats Environmental Technology Site" (KH, 1998).

### **2.1. Sampling Location Selection**

Soil sampling will be done along 2, 50-meter transects that will be set up by the Site Ecology Group. One transect will be set up in the Rocky Creek watershed, and another will be set up in the Smart Ditch or Woman Creek watersheds. Samples of plant tissue will be done along each transect by the Site Ecology Group. Details of the plant tissue sampling are outlined in the Vegetation Tissue and Biomass Collection in Prescribed Burn Areas Field Sampling Plan (PTI Exponent, 2000). The soil samples will be collected along these same transects. Approximate locations of the sampling locations are shown in Figure 4 along with a diagram that depicts how the samples will be collected along the 50-meter transect.



**Figure 4.- Schematic Diagram of Soil and Vegetation Sampling Locations Along a 50-Meter  
Transect.**



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## **2.2. Analytical Laboratory Requirements**

For this activity, data are needed for:

1. Soil sampling location, sample date, sample depth, and soil color;;
2. Soil particle size distribution in the size ranges of: bulk<53microns; 53 microns<10 microns; less than 10 microns;
3. Dustiness analysis by ASTM methods;
4. Soil organic and inorganic carbon content, in percent carbon,
5. Selected total metals: Ca, Na, K, Mg, Si, Al, Fe, Mn; and
6. Scanning electron microscopy of surficial soil materials.

## **2.3. Pre-Burn Sample Collection Specifications**

The following specifications apply to samples collected **before** the rangeland is burned. Samples will be collected at two different depths at ten total locations along each transect (i.e. 10 samples in all) as shown in Figure 4. Fives sample will be collected on one side of each transect from the top 3 millimeters (approximately) of soil, and five additional samples will be collected on the opposite side of each transect from the top 3 centimeters (approximately). Samples should be collected in the same location where vegetation was sampled. Approximately 500 grams (i.e. 500 ml) of soil should be collected for the 3 cm depth samples, and about 100 grams (i.e. 100 ml) of soil should be collected for the 3 mm samples. The 500-gram sample will be split and containerized in two 250-ml containers; one for analysis of items 3,4, and 5 in Section 2.2 and one for archiving for potential analysis at CSM. The 3 mm samples will also be archived. An additional 100 grams will be containerized from the 3 cm depth for a radiation screen by Thermo-Nutech. Each surface soil sample location will be sampled by the Rocky Flats Plant (RFP) Method (RMRS GT.08). All of the samples, except for the radiation screen samples, will be archived for future analysis at laboratories yet to be determined.

#### **2.4. Post-Burn Sample Collection Specifications**

The following specifications apply to samples collected **after** the rangeland is burned. Samples will be collected at two different depths at ten total locations along each transect (i.e. 10 samples in all) as shown in Figure 4. Fives sample will be collected on one side of each transect from the top 3 millimeters (approximately) of soil, and five additional samples will be collected on the opposite side of each transect from the top 3 centimeters (approximately). Samples should not be collected in the same location where vegetation was sampled, nor where pre-burn samples were collected. The sampling area should be burned by the fire. Approximately 500 grams (i.e. 500 ml) of soil should be collected for the 3 cm depth samples, and about 100 grams (i.e. 100 ml) of soil should be collected from the 3 mm samples. Each surface soil sample location will be sampled by the Rocky Flats Plant (RFP) Method (RMRS GT.08). All of the samples, will be archived for future analysis at laboratories yet to be determined.

### **3. Field Logistics**

Sampling sites will be located in the field using rebar stakes. Exponent personnel will install the stakes at the desired sampling transects, and representatives from Exponent will accompany Commodore Advanced Sciences, Inc. (CASI) soil sampling personnel to the transect areas. Exponent personnel will also conduct field measurements of vegetation as specified in: *Vegetation Tissue and Biomass Collection in Prescribed Burn Areas Field Sampling Plan* (Exponent, 2000). The geographic coordinates of the soil sampling locations (as marked by the transects) will be found by Global Positioning System (GPS) by Exponent or RMRS personnel.

Soil samples will be collected in accordance with Procedure GT.08: Soil Sampling. Samples will be handled in accordance with FO.10: Receiving, Labeling, and Handling Environmental Material Containers, and FO.13: Containerization, Preserving, Handling and Shipping of Soil and Water

Samples. Disposable sampling tools will be used wherever possible to eliminate decontamination waste streams.

*Table 1. Applicable Field and Administrative Standard Operating Procedures*

Procedure Number	Procedure Title
2-G18-ER-ADM-17.01	Records Capture and Transmittal
2-S47-ER-ADM-05.14	Use of Field Logbooks and Forms
5-21000-OPS / 4-E42-OPS-GT.08	Soil Sampling
5-21000-OPS-FO.3	General Equipment Decontamination
5-21000-OPS-FO.6	Handling of Personal Protective Equipment
5-21000-OPS-FO.7	Handling of Decontaminated Water and Waste Water
5-21000-OPS-FO.10	Receiving, Labeling, and Handling Environmental Material Containers
5-21000-OPS-FO.11	Field Communications
5-21000-OPS-FO.13	Containerization, Preserving, Handling and Shipping of Soil and Water Samples
5-21000-OPS-FO.16	Field Radiological Measurements
5-21000-OPS-FO.20	Sampling of Environmental Containers.
5-23000-WRP-WO-1101	Solid Radioactive Waste Packaging Outside the PA

If conditions are encountered in the field which make the use of a procedure unsafe or inappropriate for the task at hand, the field crew will consult the Health and Safety representative listed in Section 5. Minor pen and ink changes to project-specific procedures may be made as long as the changes are justified, approved by project management, are detailed in the field logbook, and the resulting changes do not impact safety or data quality objectives of the project.

#### 4. DATA MANAGEMENT

A field logbook will be used during this investigation by both field sampling personnel. The logbook will be used per the protocol described in Site procedure 2-S47-ER-ADM-05.14: Use of Field Logbooks and Forms, in conjunction with the appropriate field data forms utilized by field sampling personnel. It is not necessary to duplicate items recorded on field data forms in the field logbook, but if additional clarification of entries on the forms is required, they should be recorded in the field logbook. The field logbook should include time and date information concerning the field

activities. Information not specifically required by the field data forms should be recorded in the field logbook.

## 5. PROJECT ORGANIZATION

The project team responsibilities are outlined in Table 2

*Table 2. Prescribed Burn Surface Soil Sampling Organizations.*

<b>Project Function</b>	<b>Responsible Individual(s)</b>
Project Manager	Patrick Haines, Radian
Project Engineer(s)	Jody Nelson, Thomas Ryon, Exponent
Sampling Team	Billy Santiago, CASI and other CASI Personnel
Health & Safety Officers	Dave Spruce, CASI & Ken Schmerber, Radian
Analytical Services	V. Ideker & Matt Graves, KH - APO
Radiological Engineering	Paul Smith, RMRS

## 6. REFERENCES

- EPA, 1992, *US EPA Test Methods for Evaluating Solid Waste*, Solid Waste-846, third edition, Method 8260A, Rev. 1., November.
- EPA, 1994, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, September.
- RMRS, 1997, *RMRS Quality Assurance Program Description*, RMRS-QAPD-001, Rev. 1, January.
- EMD Operating Procedures Manual, 1997, Volume I: Field Operations, 5-21000-OPS-FO, Rev 92, March 1992
- EMD Operating Procedures Manual, 1997, Volume III: Geotechnical, 5-21000-OPS-GT, Rev 92, March 1992
- EMD Operating Procedures Manual, 1997, Volume IV: Surface Water, 5-21000-OPS-SW, Rev 92, March 1992
- Kaiser-Hill Company, Analytical Services Division, May 9, 1997, Statement of Work for Analytical Measurements, Module RC01-B.2: Isotopic Determinations by Alpha Spectrometry, Rocky Flats Environmental Technology Site, Golden, CO.
- Kaiser-Hill Company, Analytical Services Division, June 2, 1997, Statement of Work for Analytical Measurements, Module GR01-B.1: General Laboratory Requirements, Rocky Flats Environmental Technology Site, Golden, CO.

## Appendix 3

### Sample Identifiers, Aspects 1-5

Aspect 1 Sample ID's (Release Evaluation 000306-BZ-006)

Sample ID	Sample Media	Sample Material	Handling Requirements	Analyte
AQM1-01U	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-02U	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-03U	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-04U	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-05U	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-06U	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-01D	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-02D	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-03D	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-04D	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-05D	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-06D	8x10 glass filter	TSP		$\alpha/\beta$
AQM1-LT-01U	8x10 glass filter	TSP		Mass
AQM1-LT-02U	8x10 glass filter	TSP		Mass
AQM1-LT-03U	8x10 glass filter	TSP		Mass
AQM1-LT-04U	8x10 glass filter	TSP		Mass
AQM1-LT-05U	8x10 glass filter	TSP		Mass
AQM1-LT-06U	8x10 glass filter	TSP		Mass
AQM1-LT-07U	8x10 glass filter	TSP		Mass
AQM1-LT-08U	8x10 glass filter	TSP		Mass
AQM1-LT-09U	8x10 glass filter	TSP		Mass
AQM1-LT-10U	8x10 glass filter	TSP		Mass
AQM1-LT-11U	8x10 glass filter	TSP		Mass
AQM1-LT-12U	8x10 glass filter	TSP		Mass
AQM1-LT-13U	8x10 glass filter	TSP		Mass
AQM1-LT-14U	8x10 glass filter	TSP		Mass
AQM1-LT-15U	8x10 glass filter	TSP		Mass
AQM1-LT-16U	8x10 glass filter	TSP		Mass
AQM1-LT-17U	8x10 glass filter	TSP		Mass
AQM1-LT-18U	8x10 glass filter	TSP		Mass
AQM1-LT-19U	8x10 glass filter	TSP		Mass
AQM1-LT-20U	8x10 glass filter	TSP		Mass
AQM1-LT-21U	8x10 glass filter	TSP		Mass
AQM1-LT-22U	8x10 glass filter	TSP		Mass
AQM1-LT-23U	8x10 glass filter	TSP		Mass
AQM1-LT-24U	8x10 glass filter	TSP		Mass
AQM1-LT-01D	8x10 glass filter	TSP		Mass
AQM1-LT-02D	8x10 glass filter	TSP		Mass

AQM1-LT-03D	8x10 glass filter	TSP		Mass
AQM1-LT-04D	8x10 glass filter	TSP		Mass
AQM1-LT-05D	8x10 glass filter	TSP		Mass
AQM1-LT-06D	8x10 glass filter	TSP		Mass
AQM1-LT-07D	8x10 glass filter	TSP		Mass
AQM1-LT-08D	8x10 glass filter	TSP		Mass
AQM1-LT-09D	8x10 glass filter	TSP		Mass
AQM1-LT-10D	8x10 glass filter	TSP		Mass
AQM1-LT-11D	8x10 glass filter	TSP		Mass
AQM1-LT-12D	8x10 glass filter	TSP		Mass
AQM1-LT-13D	8x10 glass filter	TSP		Mass
AQM1-LT-14D	8x10 glass filter	TSP		Mass
AQM1-LT-15D	8x10 glass filter	TSP		Mass
AQM1-LT-16D	8x10 glass filter	TSP		Mass
AQM1-LT-17D	8x10 glass filter	TSP		Mass
AQM1-LT-18D	8x10 glass filter	TSP		Mass
AQM1-LT-19D	8x10 glass filter	TSP		Mass
AQM1-LT-20D	8x10 glass filter	TSP		Mass
AQM1-LT-21D	8x10 glass filter	TSP		Mass
AQM1-LT-22D	8x10 glass filter	TSP		Mass
AQM1-LT-23D	8x10 glass filter	TSP		Mass
AQM1-LT-24D	8x10 glass filter	TSP		Mass

Aspect 2 Sample ID's (Release Evaluations 000306-BZ-004 and 000306-BZ-005)

Sample ID	Sample Media	Sample Material	Handling Requirements	Analyte
000306-BZ-004				
AQM2-01TU	47mm Teflon	TSP	Keep cold	Minerals
AQM2-02TU	47mm Teflon	TSP	Keep cold	Minerals
AQM2-03TU	47mm Teflon	TSP	Keep cold	Minerals
AQM2-04TU	47mm Teflon	TSP	Keep cold	Minerals
AQM2-05TU	47mm Teflon	TSP	Keep cold	Minerals
AQM2-01TD	47mm Teflon	TSP	Keep cold	Minerals
AQM2-02TD	47mm Teflon	TSP	Keep cold	Minerals
AQM2-03TD	47mm Teflon	TSP	Keep cold	Minerals
AQM2-04TD	47mm Teflon	TSP	Keep cold	Minerals
AQM2-05TD	47mm Teflon	TSP	Keep cold	Minerals
AQM2-0TTB	47mm Teflon	TSP	Keep cold	Minerals
000306-BZ-005				
AQM2-01QU	47mm Quartz	TSP	Keep cold	Carbon
AQM2-02QU	47mm Quartz	TSP	Keep cold	Carbon
AQM2-03QU	47mm Quartz	TSP	Keep cold	Carbon
AQM2-04QU	47mm Quartz	TSP	Keep cold	Carbon
AQM2-05QU	47mm Quartz	TSP	Keep cold	Carbon
AQM2-01QD	47mm Quartz	TSP	Keep cold	Carbon
AQM2-02QD	47mm Quartz	TSP	Keep cold	Carbon
AQM2-03QD	47mm Quartz	TSP	Keep cold	Carbon
AQM2-04QD	47mm Quartz	TSP	Keep cold	Carbon
AQM2-05QD	47mm Quartz	TSP	Keep cold	Carbon
AQM2-0QTB	47mm Quartz	TSP	Keep cold	Carbon

Aspect 3 Sample ID's, cyclone analyses (Release Evaluation 000306-BZ-007)

Sample ID	Sample Media	Sample Material	Handling Requirements	Analyte
AQM3-A01	Cyclone	>PM-10		Mass
AQM3-A02	Cyclone	>PM-10		Mass
AQM3-A03	Cyclone	>PM-10		Mass
AQM3-A04	Cyclone	>PM-10		Mass
AQM3-A05	Cyclone	>PM-10		Mass
AQM3-A06	Cyclone	>PM-10		Mass
AQM3-A07	Cyclone	>PM-10		Mass
AQM3-A08	Cyclone	>PM-10		Mass
AQM3-A09	Cyclone	>PM-10		Mass
AQM3-A10	Cyclone	>PM-10		Mass
AQM3-A11	Cyclone	>PM-10		Mass
AQM3-A12	Cyclone	>PM-10		Mass
AQM3-A13	Cyclone	>PM-10		Mass
AQM3-A14	Cyclone	>PM-10		Mass
AQM3-A15	Cyclone	>PM-10		Mass
AQM3-A16	Cyclone	>PM-10		Mass
AQM3-A17	Cyclone	>PM-10		Mass

AQM3-A18	Cyclone	>PM-10	Mass
AQM3-A19	Cyclone	>PM-10	Mass
AQM3-A20	Cyclone	>PM-10	Mass
AQM3-A21	Cyclone	>PM-10	Mass
AQM3-A22	Cyclone	>PM-10	Mass
AQM3-A23	Cyclone	>PM-10	Mass
AQM3-A24	Cyclone	>PM-10	Mass
AQM3-A25	Cyclone	>PM-10	Mass
AQM3-A26	Cyclone	>PM-10	Mass
AQM3-A27	Cyclone	>PM-10	Mass
AQM3-A28	Cyclone	>PM-10	Mass
AQM3-A29	Cyclone	>PM-10	Mass
AQM3-A30	Cyclone	>PM-10	Mass
AQM3-A31	Cyclone	>PM-10	Mass
AQM3-A32	Cyclone	>PM-10	Mass
AQM3-A33	Cyclone	>PM-10	Mass
AQM3-A34	Cyclone	>PM-10	Mass
AQM3-A35	Cyclone	>PM-10	Mass
AQM3-A36	Cyclone	>PM-10	Mass
AQM3-A37	Cyclone	>PM-10	Mass
AQM3-A38	Cyclone	>PM-10	Mass
AQM3-A39	Cyclone	>PM-10	Mass
AQM3-A40	Cyclone	>PM-10	Mass
AQM3-A41	Cyclone	>PM-10	Mass
AQM3-A42	Cyclone	>PM-10	Mass
AQM3-A43	Cyclone	>PM-10	Mass
AQM3-A44	Cyclone	>PM-10	Mass
AQM3-A45	Cyclone	>PM-10	Mass
AQM3-A46	Cyclone	>PM-10	Mass
AQM3-A47	Cyclone	>PM-10	Mass
AQM3-A48	Cyclone	>PM-10	Mass
AQM3-A49	Cyclone	>PM-10	Mass
AQM3-A50	Cyclone	>PM-10	Mass
AQM3-A51	Cyclone	>PM-10	Mass
AQM3-A52	Cyclone	>PM-10	Mass
AQM3-A53	Cyclone	>PM-10	Mass
AQM3-A54	Cyclone	>PM-10	Mass
AQM3-A55	Cyclone	>PM-10	Mass
AQM3-A56	Cyclone	>PM-10	Mass
AQM3-A57	Cyclone	>PM-10	Mass
AQM3-A58	Cyclone	>PM-10	Mass
AQM3-A59	Cyclone	>PM-10	Mass
AQM3-A60	Cyclone	>PM-10	Mass
AQM3-A61	Cyclone	>PM-10	Mass
AQM3-A62	Cyclone	>PM-10	Mass

Aspect 3 Sample ID's, backup filter analyses (Release Evaluation 000306-BZ-008)

Sample ID	Sample Media	Sample Material	Handling Requirements	Analyte
AQM3-B01	Glass mat	PM-10		Mass
AQM3-B02	Glass mat	PM-10		Mass
AQM3-B03	Glass mat	PM-10		Mass
AQM3-B04	Glass mat	PM-10		Mass
AQM3-B05	Glass mat	PM-10		Mass
AQM3-B06	Glass mat	PM-10		Mass
AQM3-B07	Glass mat	PM-10		Mass
AQM3-B08	Glass mat	PM-10		Mass
AQM3-B09	Glass mat	PM-10		Mass
AQM3-B10	Glass mat	PM-10		Mass
AQM3-B11	Glass mat	PM-10		Mass
AQM3-B12	Glass mat	PM-10		Mass
AQM3-B13	Glass mat	PM-10		Mass
AQM3-B14	Glass mat	PM-10		Mass
AQM3-B15	Glass mat	PM-10		Mass
AQM3-B16	Glass mat	PM-10		Mass
AQM3-B17	Glass mat	PM-10		Mass
AQM3-B18	Glass mat	PM-10		Mass
AQM3-B19	Glass mat	PM-10		Mass
AQM3-B20	Glass mat	PM-10		Mass
AQM3-B21	Glass mat	PM-10		Mass
AQM3-B22	Glass mat	PM-10		Mass
AQM3-B23	Glass mat	PM-10		Mass
AQM3-B24	Glass mat	PM-10		Mass
AQM3-B25	Glass mat	PM-10		Mass
AQM3-B26	Glass mat	PM-10		Mass
AQM3-B27	Glass mat	PM-10		Mass
AQM3-B28	Glass mat	PM-10		Mass
AQM3-B29	Glass mat	PM-10		Mass
AQM3-B30	Glass mat	PM-10		Mass
AQM3-B31	Glass mat	PM-10		Mass
AQM3-B32	Glass mat	PM-10		Mass
AQM3-B33	Glass mat	PM-10		Mass
AQM3-B34	Glass mat	PM-10		Mass
AQM3-B35	Glass mat	PM-10		Mass
AQM3-B36	Glass mat	PM-10		Mass
AQM3-B37	Glass mat	PM-10		Mass
AQM3-B38	Glass mat	PM-10		Mass
AQM3-B39	Glass mat	PM-10		Mass
AQM3-B40	Glass mat	PM-10		Mass
AQM3-B41	Glass mat	PM-10		Mass
AQM3-B42	Glass mat	PM-10		Mass
AQM3-B43	Glass mat	PM-10		Mass
AQM3-B44	Glass mat	PM-10		Mass
AQM3-B45	Glass mat	PM-10		Mass
AQM3-B46	Glass mat	PM-10		Mass

AQM3-B47	Glass mat	PM-10		Mass
AQM3-B48	Glass mat	PM-10		Mass
AQM3-B49	Glass mat	PM-10		Mass
AQM3-B50	Glass mat	PM-10		Mass
AQM3-B51	Glass mat	PM-10		Mass
AQM3-B52	Glass mat	PM-10		Mass
AQM3-B53	Glass mat	PM-10		Mass
AQM3-B54	Glass mat	PM-10		Mass
AQM3-B55	Glass mat	PM-10		Mass
AQM3-B56	Glass mat	PM-10		Mass
AQM3-B57	Glass mat	PM-10		Mass
AQM3-B58	Glass mat	PM-10		Mass
AQM3-B59	Glass mat	PM-10		Mass
AQM3-B60	Glass mat	PM-10		Mass
AQM3-B61	Glass mat	PM-10		Mass
AQM3-B62	Glass mat	PM-10		Mass

Aspect 3 Sample ID's, carbon analyses (Release Evaluation 000306-BZ-009)

Sample ID	Sample Media	Sample Material	Handling Requirements	Analyte
AQM3-C01	47mm quartz	TSP	Keep cold	Carbon
AQM3-C02	47mm quartz	TSP	Keep cold	Carbon
AQM3-C03	47mm quartz	TSP	Keep cold	Carbon
AQM3-C04	47mm quartz	TSP	Keep cold	Carbon
AQM3-C05	47mm quartz	TSP	Keep cold	Carbon
AQM3-C06	47mm quartz	TSP	Keep cold	Carbon
AQM3-C07	47mm quartz	TSP	Keep cold	Carbon
AQM3-C08	47mm quartz	TSP	Keep cold	Carbon
AQM3-C09	47mm quartz	TSP	Keep cold	Carbon
AQM3-C10	47mm quartz	TSP	Keep cold	Carbon
AQM3-C11	47mm quartz	TSP	Keep cold	Carbon
AQM3-C12	47mm quartz	TSP	Keep cold	Carbon
AQM3-C13	47mm quartz	TSP	Keep cold	Carbon
AQM3-C14	47mm quartz	TSP	Keep cold	Carbon
AQM3-C15	47mm quartz	TSP	Keep cold	Carbon
AQM3-C16	47mm quartz	TSP	Keep cold	Carbon
AQM3-C17	47mm quartz	TSP	Keep cold	Carbon
AQM3-C18	47mm quartz	TSP	Keep cold	Carbon
AQM3-C19	47mm quartz	TSP	Keep cold	Carbon
AQM3-C20	47mm quartz	TSP	Keep cold	Carbon
AQM3-C21	47mm quartz	TSP	Keep cold	Carbon
AQM3-C22	47mm quartz	TSP	Keep cold	Carbon
AQM3-C23	47mm quartz	TSP	Keep cold	Carbon
AQM3-C24	47mm quartz	TSP	Keep cold	Carbon
AQM3-C25	47mm quartz	TSP	Keep cold	Carbon
AQM3-C26	47mm quartz	TSP	Keep cold	Carbon
AQM3-C27	47mm quartz	TSP	Keep cold	Carbon
AQM3-C28	47mm quartz	TSP	Keep cold	Carbon
AQM3-C29	47mm quartz	TSP	Keep cold	Carbon

AQM3-C30	47mm quartz	TSP	Keep cold	Carbon
AQM3-C31	47mm quartz	TSP	Keep cold	Carbon
AQM3-C32	47mm quartz	TSP	Keep cold	Carbon
AQM3-C33	47mm quartz	TSP	Keep cold	Carbon
AQM3-C34	47mm quartz	TSP	Keep cold	Carbon
AQM3-C35	47mm quartz	TSP	Keep cold	Carbon
AQM3-C36	47mm quartz	TSP	Keep cold	Carbon
AQM3-C37	47mm quartz	TSP	Keep cold	Carbon
AQM3-C38	47mm quartz	TSP	Keep cold	Carbon
AQM3-C39	47mm quartz	TSP	Keep cold	Carbon
AQM3-C40	47mm quartz	TSP	Keep cold	Carbon
AQM3-C41	47mm quartz	TSP	Keep cold	Carbon
AQM3-C42	47mm quartz	TSP	Keep cold	Carbon
AQM3-C43	47mm quartz	TSP	Keep cold	Carbon
AQM3-C44	47mm quartz	TSP	Keep cold	Carbon
AQM3-C45	47mm quartz	TSP	Keep cold	Carbon
AQM3-C46	47mm quartz	TSP	Keep cold	Carbon
AQM3-C47	47mm quartz	TSP	Keep cold	Carbon
AQM3-C48	47mm quartz	TSP	Keep cold	Carbon
AQM3-C49	47mm quartz	TSP	Keep cold	Carbon
AQM3-C50	47mm quartz	TSP	Keep cold	Carbon
AQM3-C51	47mm quartz	TSP	Keep cold	Carbon
AQM3-C52	47mm quartz	TSP	Keep cold	Carbon
AQM3-C53	47mm quartz	TSP	Keep cold	Carbon
AQM3-C54	47mm quartz	TSP	Keep cold	Carbon
AQM3-C55	47mm quartz	TSP	Keep cold	Carbon
AQM3-C56	47mm quartz	TSP	Keep cold	Carbon
AQM3-C57	47mm quartz	TSP	Keep cold	Carbon
AQM3-C58	47mm quartz	TSP	Keep cold	Carbon
AQM3-C59	47mm quartz	TSP	Keep cold	Carbon
AQM3-C60	47mm quartz	TSP	Keep cold	Carbon
AQM3-C61	47mm quartz	TSP	Keep cold	Carbon
AQM3-C62	47mm quartz	TSP	Keep cold	Carbon

Aspect 3 Sample ID's, Dustiness Test (Release Evaluation 000306-BZ-003)

Sample ID	Sample Media	Sample Material	Handling Requirements	Analyte
AQM3-DUST-01	Impactor filters	Soil		Size Frac
AQM3-DUST-02	Impactor filters	Soil		Size Frac
AQM3-DUST-03	Impactor filters	Soil		Size Frac
AQM3-DUST-04	Impactor filters	Soil		Size Frac
AQM3-DUST-05	Impactor filters	Soil		Size Frac
AQM3-DUST-06	Impactor filters	Soil		Size Frac
AQM3-DUST-07	Impactor filters	Soil		Size Frac
AQM3-DUST-08	Impactor filters	Soil		Size Frac
AQM3-DUST-09	Impactor filters	Soil		Size Frac
AQM3-DUST-10	Impactor filters	Soil		Size Frac
AQM3-DUST-11	Impactor filters	Soil		Size Frac
AQM3-DUST-12	Impactor filters	Soil		Size Frac

Aspect 4 Sample ID's

Sample ID	Sample Container	Sample Material	Handling Requirements	Analyte
BB1 T1	Bag	Vegetation	Keep dry	TBD
BB1 T2	Bag	Vegetation	Keep dry	TBD
BB1 T3	Bag	Vegetation	Keep dry	TBD
BB1 T4	Bag	Vegetation	Keep dry	TBD
BB1 T5	Bag	Vegetation	Keep dry	TBD
BB2 T1	Bag	Vegetation	Keep dry	TBD
BB2 T2	Bag	Vegetation	Keep dry	TBD
BB2 T3	Bag	Vegetation	Keep dry	TBD
BB2 T4	Bag	Vegetation	Keep dry	TBD
BB2 T5	Bag	Vegetation	Keep dry	TBD
BB1 B1	Bag	Vegetation	Keep dry	Biomass
BB1 B2	Bag	Vegetation	Keep dry	Biomass
BB1 B3	Bag	Vegetation	Keep dry	Biomass
BB1 B4	Bag	Vegetation	Keep dry	Biomass
BB1 B5	Bag	Vegetation	Keep dry	Biomass
BB2 B1	Bag	Vegetation	Keep dry	Biomass
BB2 B2	Bag	Vegetation	Keep dry	Biomass
BB2 B3	Bag	Vegetation	Keep dry	Biomass
BB2 B4	Bag	Vegetation	Keep dry	Biomass
BB2 B5	Bag	Vegetation	Keep dry	Biomass

Aspect 5 Sample ID's (Release Evaluations 000306-BZ-001 and 000306-BZ-002)

Sample ID	Sample Container	Sample Material	Handling Requirements	Analyte
000306-BZ-001				
AQM5-PRE-3CM01 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM02 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM03 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM04 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM05 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM06 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM07 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM08 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM09 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3CM10 A&B	2 Bottles	Soil		Elements
AQM5-PRE-3MM01	Bottle	Soil		Elements
AQM5-PRE-3MM02	Bottle	Soil		Elements
AQM5-PRE-3MM03	Bottle	Soil		Elements
AQM5-PRE-3MM04	Bottle	Soil		Elements
AQM5-PRE-3MM05	Bottle	Soil		Elements
AQM5-PRE-3MM06	Bottle	Soil		Elements
AQM5-PRE-3MM07	Bottle	Soil		Elements
AQM5-PRE-3MM08	Bottle	Soil		Elements
AQM5-PRE-3MM09	Bottle	Soil		Elements

AQM5-PRE-3MM10	Bottle	Soil		Elements
AQM5-RAD-3CM01	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM02	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM03	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM04	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM05	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM06	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM07	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM08	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM09	Bottle	Soil		$\alpha/\beta$
AQM5-RAD-3CM10	Bottle	Soil		$\alpha/\beta$
000306-BZ-002				
AQM5-POST-3CM01	Bottle	Soil		Elements
AQM5-POST-3CM02	Bottle	Soil		Elements
AQM5-POST-3CM03	Bottle	Soil		Elements
AQM5-POST-3CM04	Bottle	Soil		Elements
AQM5-POST-3CM05	Bottle	Soil		Elements
AQM5-POST-3CM06	Bottle	Soil		Elements
AQM5-POST-3CM07	Bottle	Soil		Elements
AQM5-POST-3CM08	Bottle	Soil		Elements
AQM5-POST-3CM09	Bottle	Soil		Elements
AQM5-POST-3CM10	Bottle	Soil		Elements
AQM5-POST-3MM01	Bottle	Soil		Elements
AQM5-POST-3MM02	Bottle	Soil		Elements
AQM5-POST-3MM03	Bottle	Soil		Elements
AQM5-POST-3MM04	Bottle	Soil		Elements
AQM5-POST-3MM05	Bottle	Soil		Elements
AQM5-POST-3MM06	Bottle	Soil		Elements
AQM5-POST-3MM07	Bottle	Soil		Elements
AQM5-POST-3MM08	Bottle	Soil		Elements
AQM5-POST-3MM09	Bottle	Soil		Elements
AQM5-POST-3MM10	Bottle	Soil		Elements

Appendix 4

**Free-Release Forms for Prescribed Burn Monitoring Plan Samples**

COPY



Property



Waste



Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-001 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: Soil Samples for prescribed burn soil impact study - Pre burn. 20 samples plus 10 alpha/beta screening samples (30 samples in total). See attached list.

Current Location: West Buffer Zone, Burn Plots 1 and 4 (see attached map 1)

Destination: T130C Pending release to Analytical Services once analytical protocol and funding is in place.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Samples will be taken from an area with no historic evidence of Rad. Contamination. Limited soil samples and current site isopleths show soil concentrations of radionuclides at only background levels. Area has been approved for prescribed burning.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: [Signature] Emp. No. [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part 1 of this release evaluation form.

Evaluated: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 03/08/00 Ext: 5109

APPROVAL FOR TRANSFER/SHIPMENT

Approved: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 03/08/00 Ext: 5148

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Property



Waste



Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-002 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: Soil Samples for prescribed burn soil impact study - Post burn. 20 samples in total. See attached list.

Current Location: West Buffer Zone, Burn Plots 1 and 4 (see attached map 1)

Destination: T130C Pending release to Analytical Services once analytical protocol and funding is in place.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Samples will be taken from an area with no historic evidence of Rad. Contamination. Limited soil samples and current site isopleths show soil concentrations of radionuclides at only background levels. Area has been approved for prescribed burning.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.

2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part 1 of this release evaluation form.

Evaluated: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 03/08/00 Ext: 5109

APPROVAL FOR TRANSFER/SHIPMENT

Approved: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 3/8/00 Ext: 5148

# COPY

## RELEASE EVALUATION FORM

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Property     Waste     Sample

Release Evaluation No.: 000306-BZ-003 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

### PART I

### SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: Soil samples for dustiness/size analysis as part of prescribed burn wind tunnel study. 12 samples in total. See attached list.

Current Location: West Buffer Zone, Burn Plots (see attached map 1)

Destination: T130C For archiving, pending release to Analytical Services.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Soil samples will be taken after prescribed burning of areas with no historic evidence of Rad. Contamination. Soil isopleths and historic soil samples show soil concentrations of radionuclides at background levels only.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: *[Signature]* Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

### PART II

### RADIOLOGICAL ENGINEERING

**SPECIFIC REQUIREMENTS AND/OR COMMENTS:** Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part 1 of this release evaluation form.

Evaluated: *Paul R Smith* Emp. No: [Redacted] Date: 03/08/00 Ext: 5109  
Radiological Engineer

### APPROVAL FOR TRANSFER/SHIPMENT

Approved: *[Signature]* Emp. No: [Redacted] Date: 3/8/00 Ext: 5148  
Radiological Engineer

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Property

Waste

Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-004 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: 47 mm Teflon filters of prescribed burn air emissions. 11 samples in total. See attached list.

Current Location: West Buffer Zone, Burn Plots (see attached map 1)

Destination: T130C for archiving pending release to Analytical Services.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Air Samples will be taken during prescribed burning of areas with no historic evidence of Rad. Contamination. Soil isopleths and historic soil samples show concentrations of radionuclides at background levels only.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part I of this release evaluation form.

Evaluated: [Signature] Emp. No [Redacted] Date: 03/08/00 Ext: 5109  
Radiological Engineer

APPROVAL FOR TRANSFER/SHIPMENT

Approved: [Signature] Emp. No [Redacted] Date: 3/8/00 Ext: 5148  
Radiological Engineer

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Property

Waste

Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-005 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: 47 mm quartz filters of prescribed burn emissions. 11 samples in total. See attached list.

Current Location: West Buffer Zone Prescribed Burn Plots (see attached map 1)

Destination: T130C for archiving, pending release to Analytical Services.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Air Samples will be taken during prescribed burning of areas with no historic evidence of Rad. Contamination. Soil isopleths and historic soil samples show concentrations of radionuclides at background levels only.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part I of this release evaluation form.

Evaluated: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 03/08/00 Ext: 5109

APPROVAL FOR TRANSFER/SHIPMENT

Approved: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 3/8/00 Ext: 5148

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<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Property	Waste	Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-006 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: 8" x 10" Glass mat ambient air filters used to monitor prescribed burn. 60 samples in total. See attached list.

Current Location: West Buffer Zone Prescribed Burn Plots (see attached map 1)

Destination: T130C for archiving, pending release to Analytical Services.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Air Samples will be taken during and after prescribed burning of areas with no historic evidence of Rad. Contamination. Soil isopleths and historic soil samples show concentrations of radionuclides at background levels only.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part 1 of this release evaluation form.

Evaluated: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 03/08/00 Ext: 5109

APPROVAL FOR TRANSFER/SHIPMENT

Approved: [Signature] Radiological Engineer Emp. No: [Redacted] Date: 3/8/00 Ext: 5148

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Property

Waste

Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-007 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: Cyclone catch (airborne particulates) from wind tunnel of prescribed burn plots. 62 samples in total. See attached list.

Current Location: West Buffer Zone Prescribed Burn Plots (see attached map 1)

Destination: T130C for archiving, pending release to Analytical Services.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Air Samples will be taken after prescribed burning of areas with no historic evidence of Rad. Contamination. Soil isopleths and historic soil samples show concentrations of radionuclides at background levels only.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: *[Signature]* Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part 1 of this release evaluation form.

Evaluated: *[Signature]* Emp. No: [Redacted] Date: 03/08/00 Ext: 5109  
Radiological Engineer

APPROVAL FOR TRANSFER/SHIPMENT

Approved: *[Signature]* Emp. No: [Redacted] Date: 3/8/00 Ext: 5148  
Radiological Engineer

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Property



Waste



Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-008 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: 8" x 10" Glass fiber filters from wind tunnel study pf prescribed burn plots. 62 samples in total. See attached list.

Current Location: West Buffer Zone Prescribed Burn Plots (see attached map 1)

Destination: T130C for archiving, pending release to Analytical Services.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Air Samples will be taken after prescribed burning of areas with no historic evidence of Rad. Contamination. Soil isopleths and historic soil samples show concentrations of radionuclides at background levels only.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part 1 of this release evaluation form.

Evaluated: [Signature] Emp. No: [Redacted] Date: 03/08/00 Ext: 5109  
Radiological Engineer

APPROVAL FOR TRANSFER/SHIPMENT

Approved: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 5148  
Radiological Engineer

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Property

Waste

Sample

RELEASE EVALUATION FORM

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Release Evaluation No.: 000306-BZ-009 EXTENDED: No EXPIRES: N/A Charge No.: NH121000

PART I

SENDER/CUSTODIAN ACKNOWLEDGEMENT

Description of Property/Waste/Sample To Be Released/Transferred: 47 mm quartz filters from wind tunnel study of prescribed burn plots. 62 samples in total. See attached list.

Current Location: West Buffer Zone Prescribed Burn Plots (see attached map 1)

Destination: T130C for archiving pending release to Analytical Services.

New Recipient/Custodian: Patrick Haines, Radian AQM, Ext 7240

History/Process Knowledge: Air Samples will be taken after prescribed burning of areas with no historic evidence of Rad. Contamination. Soil isopleths and historic soil samples show concentrations of radionuclides at background levels only.

Has the specified material ever been in an RBA/CA or contacted DOE controlled radioactive materials? No

- 1) By signing below, I certify information provided in Part I of this release evaluation to be true and accurate.
- 2) By signing below, I agree to comply with the specific requirements noted in Part II of this release evaluation.

Sender/Custodian: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 7240

PART II

RADIOLOGICAL ENGINEERING

SPECIFIC REQUIREMENTS AND/OR COMMENTS: Based on the sample's process history no radiological surveys are required for unrestricted release of the samples itemized in part 1 of this release evaluation form.

Evaluated: [Signature: Paul R Smith] Emp. No: [Redacted] Date: 03/08/00 Ext: 5109  
Radiological Engineer

APPROVAL FOR TRANSFER/SHIPMENT

Approved: [Signature] Emp. No: [Redacted] Date: 3/8/00 Ext: 5148  
Radiological Engineer

Figure 2

**Pu-239 Isopleth (pCi/g)  
(1999 Kriging Analysis)**

- EXPLANATION**
- <= 0.1
  - > 0.1 and <= 1.0
  - > 1.0 and <= 5.0
  - > 5.0 and <= 10.0
  - > 10.0 and <= 25.0
  - > 25.0 and <= 100.0
  - > 100.0 and <= 252.0
  - > 252.0 and <= 1428.0
  - > 1428.0 and <= 10000.0
  - > 10000.0

- Standard Map Features**
- Solar Evaporation Ponds (SEP)
  - Lakes and ponds
  - Streams, ditches, or other drainage features
  - Fences and other barriers
  - Rocky Flats boundary
  - Paved roads
  - Dirt roads

**DATA SOURCE:**  
 Building, road, and fence provided by Rocky Flats Plant, Inc. 1991.  
 Solar Evaporation Ponds (SEP) provided by USDOE (Rocky Flats Plant).

**NOTE:**  
 This map is a kriging analysis of Pu-239 concentration data collected at the Rocky Flats Plant. The map shows the predicted concentration of Pu-239 in the soil. The map is based on data collected in 1999. The map is not a guarantee of the accuracy of the data. The map is for informational purposes only. The map is not to be used for any other purpose.



Scale: 1:21,830  
 1 inch represents approximately 1778 feet

State Plane Coordinate System  
 North American Datum 1983

U.S. Department of Energy  
 Rocky Flats Environmental Technology Site

**Rocky Mountain Remediation Services, L.L.C.**  
 6000 South Information Parkway  
 P.O. Box 484  
 Boulder, CO 80522-0484

MAP ID: 26-0048 December 08, 1999

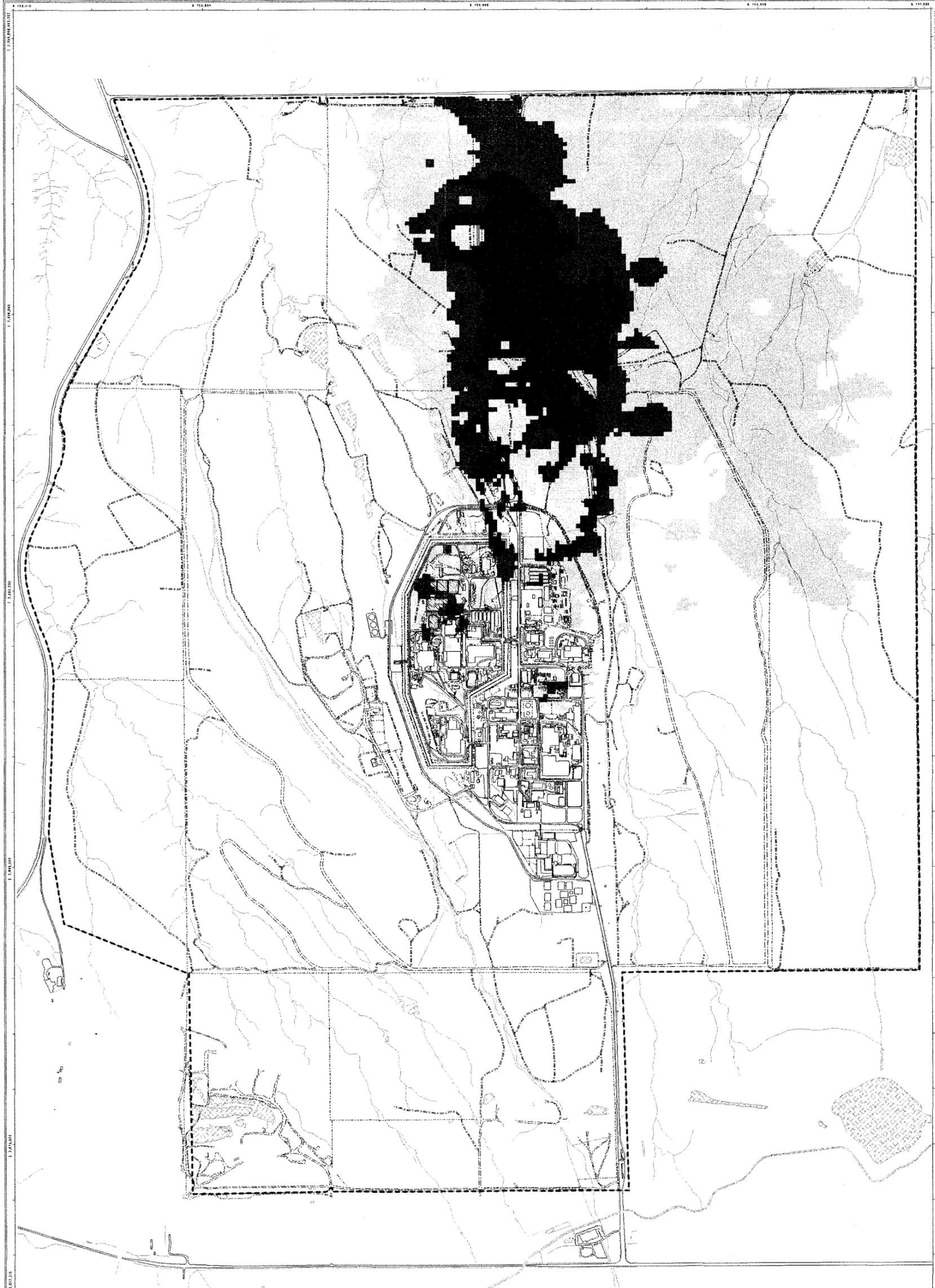


Figure 3

**Am-241 Isopleth (pCi/g)  
(1999 Kriging Analysis)**

**EXPLANATION**

-  <= 0.1
-  > 0.1 and <= 1.0
-  > 1.0 and <= 5.0
-  > 5.0 and <= 10.0
-  > 10.0 and <= 38.0
-  > 38.0 and <= 215.0
-  > 215.0 and <= 500.0
-  > 500.0

**Standard Map Features**

-  Solar Evaporation Ponds (SEP)
-  Lakes and ponds
-  Streams, ditches, or other drainage features
-  Fences and other barriers
-  Rocky Flats boundary
-  Paved roads
-  Dirt roads

**DATA SOURCE:**  
 Buildings, roads, and fences provided by Rocky Flats Environmental Technology Site, Inc. - 1997.  
 Data for Am-241 provided by MUSE (Rocky Flats site).

**DISCLAIMER:**  
 Rocky Flats Environmental Technology Site, Inc. (RFETSI) and Rocky Mountain Remediation Services, L.L.C. are not responsible for the accuracy of the data provided by the U.S. Department of Energy. The data were provided to Rocky Flats Environmental Technology Site, Inc. for use in the site's environmental monitoring program. The data were not intended for use in any other program or project.



Scale = 1 : 21,320  
 1 inch represents approximately 1778 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

U.S. Department of Energy  
 Rocky Flats Environmental Technology Site

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MAP ID: 26-0048

December 05, 1999

