

**Site LF-23 (Solid Waste Disposal Area)**  
**Explanation of Significant Differences to the**  
**Record of Decision for Mountain Home Air Force Base, Operable Unit Nos. 1,**  
**3, 5, and 6, Lagoon Landfill, and Fire Training Area 8**  
**(dated 20 October 1995)**

Prepared by:

United States Air Force  
Mountain Home Air Force Base, Idaho

June 2011



RONALD D. BUCKLEY, Colonel  
U.S. Air Force  
366 FW Commander



Date

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Concurrence by:

United States Environmental Protection Agency, Region 10

June 2011



DANIEL D. OPALSKI, Director  
Environmental Cleanup Office  
U.S. Environmental Protection Agency, Region 10

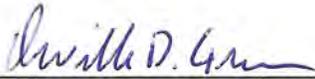
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Concurrence by:

Idaho Department of Environmental Quality

June 2011



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ORVILLE D. GREEN, Administrator  
Waste Management and Remediation Division  
Idaho Department of Environmental Quality

6-7-11

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## **I. Introduction**

This document presents an Explanation of Significant Differences (ESD) for the Record of Decision (ROD), signed 20 October 1995 for Landfill No. 23 (LF-23, Solid Waste Disposal Area), Operable Unit 1 (OU-1) of Mountain Home Air Force Base (MHAFB), in Elmore County, Idaho. The ESD specifically addresses Site LF-23, a former landfill site operated for an unknown period, but present as early as October 1950 and used prior to the 1990s. The ROD was signed by the United States Air Force (USAF), the United States Environmental Protection Agency (EPA) Region 10, and the Idaho Department of Health and Welfare (now Idaho Department of Environmental Quality [IDEQ]), hereinafter referred to as the Agencies.

This ESD was prepared in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Section 300.435(c)(2)(I) of the National Oil and Hazardous Substances Contingency Plan (NCP). The purpose of this ESD is to identify and describe the differences between the “No Action Remedy” selected in the 1995 ROD and the significant changes selected in the revised remedy. This ESD document identifies and describes site-specific land use controls (LUCs) that are needed to ensure long-term protection of human health and the environment. The lead agency for this ESD is the USAF. The EPA and USAF jointly issue this ESD. IDEQ concurs with the need for this ESD.

This ESD will become part of the Administrative Record for MHAFB. The Administrative Record is located at:

366 CES/CEAN  
1181 Desert St., Building 1296  
MHAFB, Idaho, 83648  
Telephone: (208) 828-1685

This ESD will also be available at the Information Repository, located at:

Mountain Home Air Force Base Public Library  
520 Phantom Avenue  
Building 2427  
MHAFB, Idaho, 83648  
Telephone: (208) 828-2326

## **II. Summary of Site History, Contamination Problems, and Selected Remedy**

MHAFB is located in southwestern Idaho in Elmore County, approximately 10 miles southwest of the city of Mountain Home, 50 miles southeast of Boise, and two miles north of the Snake River. The Base occupies approximately 6,900 acres (11 square miles) and is situated at an elevation ranging from 2,985 to 3,049 feet above sea level. The Base was established in 1943 by the U.S. Department of Defense as a training base for several bombardment groups during World War II. The Base was deactivated in the fall of 1945, reactivated as a Strategic Air Command (SAC) Base in 1948, and then deactivated in 1950. The Base was assigned to the Military Air Transport Service in 1951, and served as a training base for Aerial Resupply and Communication wings through 1953. The Base was under SAC jurisdiction until 1965 when the Tactical Air Command (TAC) assumed control. Three Titan I missile complexes were supported by MHAFB from 1960 to 1965. The

366th Tactical Fighter Wing has been assigned to MHAFB since 1972. On 1 June 1992, the base was transferred from TAC to the Air Combat Command (ACC).

In August 1990, MHAFB was listed on the EPA National Priorities List (NPL). A Federal Facility Agreement (FFA), under the statutory authority of Section 120 of CERCLA, was signed on 16 January 1992, between the USAF, EPA Region 10, and the Idaho Department of Health and Welfare (now IDEQ).

To facilitate investigation and cleanup of MHAFB, the suspected contaminated areas were organized into six OUs, based on specific site problems, with a total of 32 sites. Investigation efforts were completed for sites in all the OUs. According to CERCLA guidance, final response actions were recommended in and agreed to by the FFA project managers in EPA 1992 and URS 2009b; EPA 1993; and EPA 1995 URS 2010b.

Site LF-23 was first identified as a 2.25 acre refuse disposal area located in the south-central part of the Base about 100 feet north of the southern base boundary. The site was originally identified in 1985 from aerial photographs and the exact timeframe of its use is not known. However, it is known the area was present as early as October 1950. Its use ended prior to the 1990s, and it reportedly consisted of three potential burial trenches or depressions. The historical boundary of Site LF-23 with these three depressions is included on Figure 1 (all figures are included at the end of this document). In 2007 an additional, larger area of debris was discovered north of the perimeter road. The debris included household refuse, tires, plastic sheeting, construction and demolition debris, and other miscellaneous solid waste. The site also contains coal ash, which was placed at the site from the 1950s or 1960s up until possibly the early 1980s. Figure 2 depicts the debris area as well as the extent of coal ash overlapping Site LF-23. The coal ash was placed at the site to smooth out and level the ground surface due to the presence of a large amount of construction and demolition debris. Additional investigations have now determined that rubble, debris, and coal ash are present beyond the edge of the debris landfill. Some areas with coal ash are not included in the original 2.25 acre area.

Site LF-23 was investigated as part of WCC 1992. Twelve test pits were dug through the suspected burial trenches (depressions) to observe the geology and contents of the trenches and to collect soil samples to evaluate the presence of any contamination at the site. One soil sample was collected from each of the 12 test pits and was analyzed for volatile organic compounds, semivolatile organic compounds (SVOCs), and metals. Several SVOCs (all polynuclear aromatic hydrocarbons [PAHs]) were detected at two sample locations in concentrations less than one order of magnitude above their EPA Region 10 Risk-Based Concentrations (RBCs). The compounds and concentrations that exceeded EPA Region 10 RBCs were:

- benzo(a)anthracene: 1,700 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ )
- benzo(b)fluoranthene: 1,700  $\mu\text{g}/\text{kg}$
- benzo(k)fluoranthene: 830  $\mu\text{g}/\text{kg}$
- benzo(a)pyrene: 130  $\mu\text{g}/\text{kg}$
- indeno(1,2,3-cd)pyrene: 650  $\mu\text{g}/\text{kg}$

These concentrations correspond to cancer risk estimates at the low end of the EPA's range of acceptable cancer risks (1E-6 to 1E-4), based on residential exposure through the soil ingestion pathway (see box below for an explanation of risk values). Other than this comparison to the risk-based concentrations, a site-specific risk assessment was not performed. Although the presence of PAHs can be a concern for impacts to regional groundwater, the soil to groundwater pathway is considered to be insignificant or incomplete at Site LF-23 due to the low mobility of PAHs in the environment, the lack of a driving force at the site, and the depth to groundwater (almost 400 feet) through complexly fractured basalt bedrock.

### Understanding Risk Assessment Results

Carcinogenic and noncarcinogenic health effects were calculated for each type of human receptor.

Noncarcinogenic effects are characterized by comparing potential chemical intakes with acceptable intakes (established reference doses) to get a hazard quotient (HQ) ratio. The HQs for all chemicals of potential concern and relevant pathways are summed to yield a total hazard index (HI). An HI equal to or less than 1.0 indicates that no adverse noncarcinogenic health effects are expected to occur even to sensitive individuals over a lifetime of exposure. An HI above 1.0 indicates a potential cause for concern and the need for further evaluation of assumptions about exposure and toxicity. A noncarcinogenic effect is any noticeable deleterious change to a human receptor.

Potential carcinogenic effects are characterized in terms of the excess probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. The National Contingency Plan, through the Environmental Protection Agency's Superfund program, established a generally acceptable "target range" for excess cancer risks between 1E-6 and 1E-4 for Superfund site-related releases. The Agency strives to manage human health risks within this range as part of a Superfund cleanup. These values are equivalent to a 1 in 10,000 to a 1 in 1,000,000 chance of contracting cancer from the exposure. This means that due to exposure to a chemical over a specific timeframe, no more than one additional cancer case is expected in a population of 10,000 (in the case of a 1E-4 risk) or 1,000,000 (in the case of 1E-6) people. The terms "excess cancer risk" and "additional cancer case" are used because historically or statistically, it is known that there will be about 300,000 cancer cases over a 70-year period in a population of 1,000,000 people due to ordinary exposures from daily activities, family history, genetics, etc.

Debris was only found in one test pit in the southeastern portion of the easternmost depression. The debris in the test pit was encountered at a depth of 5 to 7 feet below ground surface and consisted of scrap metal, household refuse, auto and aircraft tires, plastic sheeting, construction and demolition debris, and broken tiles. However, later investigations revealed debris over a larger area of Site LF-23 (Figure 2).

Site LF-23 was included in the ROD signed in 1995 (EPA 1995). The 1995 ROD determined that no remedial action was necessary under CERCLA for soil or regional groundwater at Site LF-23 to ensure protection of human health and the environment. The ROD assumed that future land use at MHAFB would be industrial.

### III. Current and Anticipated Land Uses

Site LF-23 is currently an inactive landfill. The future land use of Site LF-23 is anticipated to be industrial while the Base is operational (there are no current plans to close the Base).

### IV. Description of the Significant Differences and the Basis for the Differences

Based on investigations and additional risk assessment since the 2001 five-year review, it has been determined that LUCs are necessary for an area of Site LF-23. LUCs are needed in this area

because PAHs are present at concentrations that do not allow for unlimited use/unrestricted exposure (UU/UE). These controls will ensure that Site LF-23 will not be used in a manner that may pose an unacceptable risk.

The following is a description of the Five-Year Reviews, removal actions, site investigations and risk assessment completed since the 1995 ROD.

### **Prior Five-Year Remedy Reviews**

The first Five-Year Remedy Review (FEC 2001) stated that there was uncertainty regarding whether the PAH concentrations detected during the Limited Field Investigation (LFI) pose an unacceptable risk to human health or the environment. Additionally, FEC 2001 noted the 1995 ROD for Site LF-23 did not include site-specific controls to prevent unacceptable risk due to exposure to potentially contaminated soil under an UU/UE scenario. The review recommended an ESD be prepared to address implementing LUCs at Site LF-23.

The second Five-Year Remedy Review (URS 2006a) indicated that an ESD for implementation of LUCs had not been completed for this site. To allow UU/UE, URS 2006a changed the recommendation for Site LF-23. The new recommendation was completion of an Engineering Evaluation/Cost Analysis (EE/CA) and a non-time critical removal action (NTCRA) for soils known to contain elevated concentrations of PAHs.

### **Engineering Evaluation/Cost Analysis**

An Engineering Evaluation/Cost Analysis (EE/CA) was completed for Site LF-23 in 2006 (URS 2006b). The purpose of the EE/CA was to evaluate removal action alternatives to address the site contaminants and debris in Area LF-23A (defined on page 5). The concentrations of some specific PAH compounds exceeded screening level concentrations that, when converted to an equivalent human health risk value, did not allow UU/UE. Removal action alternatives were evaluated based on three criteria: effectiveness, implementability, and cost. The EE/CA concluded that soil excavation and disposal pursuant to a NTCRA was the most appropriate remedy for the site. This decision was documented in an Action Memorandum (URS 2007a).

### **Non-Time Critical Removal Action**

In spring 2007, the USAF excavated soils in the area of PAH-impacted debris and soil identified in the LFI. Based on multi-increment (M-I) sampling following the NTCRA, the concentrations of some specific PAH compounds continued to exceed screening level concentrations.

In addition, coal ash was encountered on the sides of the excavation area. Generally, the coal ash occurred in layers of varying thickness within the 0 to 2 foot depth interval. This led to further characterization activities by the USAF. The investigation included:

- A physical delineation of the coal ash, which indicated that coal ash covered a larger area than previously known.
- An M-I sample of pure coal ash determined that PAH and metals concentrations in coal ash were typically above human health screening levels.

- The investigation, documented in a Removal Action Report (URS 2008), led to the decision to evaluate health risks posed by LF-23 areas where coal ash disposal had occurred.

### **Coal Ash Investigation and Risk Assessment**

The USAF performed additional characterization to support assessment of the risks posed by the site contaminants to human health. Site LF-23 areas with coal ash were divided into two sub-areas based largely on exploratory trenching. This distinction was made because the presence and depth of debris and rubble in one area could influence land use decisions regardless of coal-ash related contamination. The two sub-areas (shown in Figure 2) have the following characteristics:

- Area LF-23A - 0.75 acre area at the margins of Area LF-23B, with little to no debris or rubble. The coal ash is at or near the surface in layers about 3 feet thick or less.
- Area LF-23B - 1.25 acre area adjacent to the base perimeter road. Layers of coal ash are found among debris (tires, concrete chunks, engine parts, etc.) and rubble from the surface to 7 feet in depth or greater.

Under CERCLA, cancer risks between 1 in one million (1E-6) and 1 in ten thousand (1E-4) are in the range where risk management actions may be needed, while risks greater than 1 in ten thousand generally require risk management actions (see box on page 3 for an explanation of risk values). At MHAFFB, the FFA team has agreed that risks of 1 in 100,000 (1E-5) based on residential exposure assumptions are an acceptable remedial action objective for UU/UE, provided the agencies have confidence in the risk estimate.

A human health exposure assessment identifies and evaluates the contaminant sources, release mechanisms, exposure pathways, exposure routes, and receptors. A detailed discussion of the exposure assessment for worker, trespasser, and residential scenarios considered for LF-23 is provided in URS 2009a. Separate estimates of risk were developed for Areas LF-23A and LF-23B for exposure to soil based on the parameters in Table 1 (all tables are included at the end of this document). The risk estimates included ingestion of homegrown produce based on the parameters provided in Tables 2, 3, and 4.

The USAF characterized contamination at Site LF-23 using an approach called multi-increment (M-I) sampling. M-I sampling measures conditions over a given area (decision unit) by combining small samples collected systematically from a large number of locations into one analytical sample. Repeating the sampling (collecting duplicate or triplicate M-I samples) supports a robust assessment of variability in the average. A background area was also sampled using the M-I approach. Samples were collected at two soil depth intervals: the 0 to 2 foot interval represents exposure to surface soils. For the residential scenario, the results are shown as a range to include ingestion of homegrown produce with six different combinations of garden size and percentage of produce that is assumed to be homegrown. The range is based on the highest and lowest risks of the six homegrown produce ingestion scenarios. The 0 to 10 foot interval represents soils that could be brought to the surface, e.g., when excavating for construction of a building or placing below-surface utility lines.

The M-I samples were analyzed for SVOCs, metals, and radionuclides. Sample results from Areas LF-23A and LF-23B were first compared to the background samples. Results for analytes that were

present above background levels were then compared to EPA's Regional Screening Levels (RSLs) (EPA 2010) for metals and preliminary remediation goals (PRGs) for radionuclides (EPA 2007). The comparison of results to RSLs and PRGs was used to select contaminants of concern (COCs), but the site-specific risk scenarios and target risk levels were used to evaluate the total risk. The RSLs and PRGs are contaminant concentrations that correspond to EPA thresholds for cancer risk (1 in one million) and non-cancer adverse effects (hazard quotient of 1.0), using standard residential and industrial exposure assumptions.

The results of radionuclides and metal analyses in Areas LF-23A and LF-23B did not exceed background levels, but results for certain PAHs were present above background. For these PAHs, the USAF estimated the human health risks for the two areas, using the same industrial and residential exposure assumptions as the RSLs. Analytes that exceeded the industrial and/or residential RSL are provided as contaminants of concern in Table 5. For the residential scenario, the USAF separately assessed risks from indoor air vapor intrusion and ingestion of homegrown produce for certain PAH compounds. Analytical data and the human health risk assessment are presented in URS 2010a. The results of the risk assessment are summarized in Table 6.

As shown in Table 6, risks for average and maximum residential exposures are greater than  $1E-4$  in both depth intervals for Area LF-23B. In addition, risks are between  $1E-5$  and  $1E-4$  for the average and maximum residential exposures for the 0 to 2 foot interval and for the maximum residential exposure for the 0 to 10 foot interval for Area LF-23A. Based on these results, Areas LF-23A and LF-23B are acceptable for industrial land use provided the exposures are comparable to the standard assumptions used in the risk assessment, but do not meet the remedial action objective for UU/UE for residential use.

Areas LF-23A and LF-23B are not currently in use as a landfill or for any other purpose. Since contaminants in soils at Areas LF-23A and LF-23B will remain indefinitely; however, LUCs are needed to prevent changes in land use and potential human exposures in the future. This ESD amends the October 1995 ROD to add LUCs for Site LF-23. The ESD specifically prohibits residential land uses at Site LF-23. MHAFB, with EPA and IDEQ concurrence, may allow industrial use at Site LF-23 if evaluation of the risk from exposure to PAHs demonstrates that the risks are less than  $4E-5$ , using site-specific exposure assumptions.

#### **IV.A. Performance Objectives for Site LF-23 LUC Area**

The following LUC performance objectives supplement the no action remedy established for Site LF-23 by the 10 October 1995 ROD:

- The USAF shall limit the future uses of the LUC area at Site LF-23 to the current use (an inactive landfill), industrial use, or future uses that do not pose unacceptable risk. Residential land use and other high contact uses, including but not limited to elementary and secondary schools, childcare facilities, and playgrounds, pose unacceptable risk and are therefore prohibited. Development for uses other than an inactive landfill would require an evaluation of risk and approval by the EPA and IDEQ.
- The USAF shall prevent activities and land uses that disturb the existing ground surface, except as approved by EPA and IDEQ, to minimize contaminant dispersion and limit direct human and ecological contact with contaminated material.

## **IV.B. Implementation Actions for Site LF-23 LUC Area**

These LUCs are implemented and enforced through the USAF land management process and the base comprehensive plan (BCP). Based on an Engineering Estimate, the cost associated with implementing the LUCs at Site LF-23 is estimated to be \$5,000 per year. A description of other LUC-related activities is described in the following subsections. MHAFB will implement the following LUCs:

- Site LF-23 lies on land withdrawn from the public domain. The USAF shall submit a deed notice for recordation at the local recording office, which is the Base Civil Engineer Squadron Real Estate Office. The USAF shall include with the recordation a survey plot and description of the LUCs.
- The USAF shall ensure that the BCP is updated to include the following: a map and details of the LUCs; a discussion of the purpose of the LUCs and regulatory requirements for the LUCs; and Base entities responsible for implementing, monitoring, and enforcing the LUCs.
- The USAF shall notify EPA and IDEQ in advance of any changes to the LUC information or LUC procedures included in the BCP or process changes which alter LUC coverage in the BCP. The USAF shall provide copies of the LUCs from the BCP to EPA and IDEQ.
- The USAF shall review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23. The USAF shall not authorize projects or any other actions which are inconsistent with the LUC objectives or use restrictions or which may interfere with the effectiveness of the LUCs, without prior approval of EPA and IDEQ.

### **IV.B1. LUC – Supporting Activities**

- The USAF shall install and maintain signs that provide notification of the restricted land use within 60 days of final signature of this ESD. The signs shall read as follows: “By Order of Commander – Authorized personnel only. Excavating & Dumping not allowed.”
- The USAF shall perform annual inspections (site visit) of the LUC area designated at Site LF-23 shown in Figure 3 (defined in paragraph IV.C) and assessment of the effectiveness of the LUCs.
- The USAF shall perform annual monitoring of the environmental use restrictions and controls, including a review of the recordation at the Base Civil Engineer Squadron Real Estate Office and dig permit/land use personnel interviews. The monitoring results will be reported and provided to the EPA and IDEQ. The annual reports will be used in preparation of the Five-Year Remedy Review to evaluate the effectiveness of the remedy. The annual report will evaluate the status of the LUCs and whether LUC deficiencies or inconsistencies have been addressed. The report will also address whether the use restrictions and controls referenced above were communicated in the Real Estate Records, and whether use of the property has conformed with such restrictions and controls.

#### **IV.B2. Required USAF Action and Notifications**

- The USAF shall notify EPA and IDEQ as soon as practicable but no later than 10 business days after discovering any activity, either ongoing or completed, that is inconsistent with the objectives or LUCs, or any other action that may interfere with the effectiveness of the LUCs.
- The USAF shall initiate action to address any activity or proposed activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs, as soon as practicable but no later than 10 business days after becoming aware of the activity.
- The USAF shall seek prior approval from EPA and IDEQ before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs at the Site LF-23 LUC area.
- The USAF shall seek approval from EPA and IDEQ of corrective actions MHAFFB will implement to address the activity at issue.
- The USAF shall provide documentation of approved actions or corrective actions to EPA and IDEQ as soon as practicable but not later than the subsequent annual report.
- The USAF shall notify EPA and IDEQ 45 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.
- The USAF shall inform contractors and tenants of the LUCs and shall monitor and enforce adherence to the LUCs.

#### **IV.B3. LUC Termination and Property Transfer**

- The USAF shall seek prior approval from EPA and IDEQ to (a) modify or terminate LUCs or implementation actions, or (b) modify land use from current uses at the Site LF-23 LUC area.
- The USAF shall provide notice to EPA and IDEQ at least six months prior to any transfer or sale of the Site LF-23 LUC area, including transfers to private, state or local entities, so EPA and IDEQ can be involved in discussions to ensure appropriate provisions are included in the transfer terms or conveyance documents to maintain effective LUCs. If it is not possible to notify EPA and IDEQ at least six months prior to any transfer or sale, then the USAF shall notify EPA and IDEQ as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. The USAF shall provide EPA and IDEQ with similar notice, within the same time frames, as to federal-to-federal transfer of property.
- MHAFFB shall provide a copy of executed deed or transfer assembly to EPA and IDEQ.

#### **IV.C. Geographic Location Where LUCs Apply**

Site LF-23 is located just north of the southern base boundary in the south-central portion of the Base. Figure 3 depicts the geographic location of the LUC area for Site LF-23. The portion of Area LF-23B adjacent to the edge of the perimeter road is not included in the LUC boundary because this area appears to have minimal landfill activity. In addition, this area is presently used as a firebreak

and is reworked on an annual basis. The portion of Site LF-23 that includes LUCs has eight points with the following coordinates using the Coordinate System UTM Zone 11N WGS84:

- Point 1 – 4764408.906 north and 592092.464 west
- Point 2 – 4764438.069 north and 592093.563 west
- Point 3 – 4764499.654 north and 592130.184 west
- Point 4 – 4764505.531 north and 592209.935 west
- Point 5 – 4764450.921 north and 592283.692 west
- Point 6 – 4764410.494 north and 592285.53 west
- Point 7 – 4764409.949 north and 592214.902 west
- Point 8 – 4764409.643 north and 592160.093 west

#### **IV.D. Duration of LUCs**

The LUCs at Site LF-23 will be maintained until the concentration of hazardous substances in the soil is at such levels to allow for UU/UE. At MHAFB, the FFA team has agreed that risks of 1E-5 based on residential exposure assumptions are an acceptable remedial action objective for UU/UE, provided the agencies have confidence in the risk estimate. The USAF is responsible for implementing, monitoring, maintaining, reporting on, and enforcing these LUCs at Site LF-23 until and unless the Agencies determine the UU/UE level has been reached.

The USAF recognizes that, at sites where contaminants are left in place above levels allowing UU/UE, LUCs are used to ensure that these contaminants do not pose an unacceptable risk to human health or the environment. Additionally, because contaminants will be left in place, the site is subject to the five-year remedy review as required under CERCLA §121. Where there is failure to meet LUC objectives or failure of LUC implementation actions that could lead directly to remedy failure, the USAF acknowledges the EPA and IDEQ may seek to re-open the remedy decision in addition to exercising any other authorities they may have under CERCLA. The USAF shall not modify or terminate LUCs, implementation actions, or modify land use without approval by EPA and the state.

#### **V. State Agency Comments**

The IDEQ has reviewed this ESD and supports these changes to the selected remedy for Site LF-23.

#### **VI. Public Participation Activities**

MHAFB will publish a notice of availability and a brief description of this ESD in the local newspaper, the Mountain Home News, and provide the opportunity for public comment. In addition, the topic will be discussed during a FY11 Restoration Advisory Board (RAB) meeting for MHAFB.

## VII. Statutory Determinations

The Applicable or Relevant and Appropriate Requirements (ARARs) addressed by the ROD are not modified by this ESD. This ESD identifies LUCs required for Site LF-23 that were not previously included in the 1995 ROD, in furtherance of the USAF guidance referenced in Section III.

The USAF, EPA, and IDEQ believe that the LUCs required by this ESD for Areas LF-23 A and LF-23B will protect human health and the environment, comply with federal and state requirements that were identified in the ROD as ARARs, and are cost-effective.

## VIII. References

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## **TABLES**

**TABLE 1  
PARAMETERS USED TO EVALUATE POTENTIAL EXPOSURE TO SOIL (COAL ASH)  
HUMAN HEALTH RISK ASSESSMENT - SITE LF-23  
MOUNTAIN HOME AFB, IDAHO**

| Exposure Parameters  | Site Worker                    |                     | Excavation Worker   |                     | Trespasser                     |                     | Child Resident      |                     | Adult Resident      |                     |
|--|--------------------------------|---------------------|---------------------|---------------------|--------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|  | CTE                            | RME                 | CTE                 | RME                 | CTE                            | RME                 | CTE                 | RME                 | CTE                 | RME                 |
| Soil Ingestion Rate [IR] (mg/day)                                  | 50 <sup>a</sup>                | 100 <sup>b</sup>    | 100 <sup>c</sup>    | 330 <sup>d</sup>    | 50 <sup>b</sup>                | 100 <sup>c</sup>    | 100 <sup>b</sup>    | 200 <sup>a</sup>    | 50 <sup>b</sup>     | 100 <sup>a</sup>    |
| Exposed Dermal Surface Area - Soil [SA] (cm <sup>2</sup> /day)     | 1,980 <sup>e</sup>             | 3,160 <sup>e</sup>  | 3,160 <sup>e</sup>  | 5,230 <sup>e</sup>  | 5,230 <sup>e</sup>             | 7,780 <sup>e</sup>  | 2,650 <sup>e</sup>  | 5,300 <sup>e</sup>  | 6,400 <sup>e</sup>  | 7,500 <sup>e</sup>  |
| Inhalation Rate of Outdoor Air [IRair] (m <sup>3</sup> /hour)      | 0.5 <sup>f</sup>               | 1.3 <sup>f</sup>    | 1.3 <sup>f</sup>    | 2.5 <sup>f</sup>    | 0.5 <sup>f</sup>               | 1.3 <sup>f</sup>    | 1.0 <sup>f</sup>    | 1.9 <sup>f</sup>    | 1.0 <sup>f</sup>    | 3.2 <sup>f</sup>    |
| Exposure Time [ET] (hours/day)                                     | 4 <sup>g</sup>                 | 8 <sup>g</sup>      | 8 <sup>g</sup>      | 8 <sup>g</sup>      | 2 <sup>g</sup>                 | 4 <sup>g</sup>      | 2 <sup>g</sup>      | 4 <sup>g</sup>      | 2 <sup>g</sup>      | 4 <sup>g</sup>      |
| Oral Fraction Ingested from Contaminated Source [FC] (unitless)    | 0.5 <sup>h</sup>               | 1 <sup>h</sup>      | 1 <sup>h</sup>      | 1 <sup>h</sup>      | 0.25 <sup>h</sup>              | 0.5 <sup>h</sup>    | 0.5 <sup>h</sup>    | 1 <sup>h</sup>      | 0.5 <sup>h</sup>    | 1 <sup>h</sup>      |
| Dermal Fraction Contacted from Contaminated Source [FC] (unitless) | 0.25 <sup>h</sup>              | 1 <sup>h</sup>      | 1 <sup>h</sup>      | 1 <sup>h</sup>      | 0.5 <sup>h</sup>               | 1 <sup>h</sup>      | 0.5 <sup>h</sup>    | 1 <sup>h</sup>      | 0.5 <sup>h</sup>    | 1 <sup>h</sup>      |
| Soil Adherence Rate [AD] (mg/cm <sup>2</sup> )                     | 0.07 <sup>i</sup>              | 0.2 <sup>i</sup>    | 0.14 <sup>i</sup>   | 0.3 <sup>i</sup>    | 0.07 <sup>i</sup>              | 0.2 <sup>i</sup>    | 0.07 <sup>i</sup>   | 0.2 <sup>i</sup>    | 0.07 <sup>i</sup>   | 0.2 <sup>i</sup>    |
| Dermal Absorption Rate [AB] (unitless)                             | Chemical-Specific <sup>j</sup> |                     |                     |                     | Chemical-Specific <sup>j</sup> |                     |                     |                     |                     |                     |
| Exposure Frequency for soil [EF] (days/year)                       | 120 <sup>k</sup>               | 250 <sup>k</sup>    | 20 <sup>k</sup>     | 40 <sup>k</sup>     | 10 <sup>k</sup>                | 20 <sup>k</sup>     | 350 <sup>k</sup>    | 350 <sup>k</sup>    | 350 <sup>k</sup>    | 350 <sup>k</sup>    |
| Exposure Duration [ED](years)                                      | 5 <sup>l</sup>                 | 25 <sup>l</sup>     | 1 <sup>l</sup>      | 1 <sup>l</sup>      | 9 <sup>l</sup>                 | 30 <sup>l</sup>     | 2 <sup>h</sup>      | 6 <sup>h</sup>      | 7 <sup>h</sup>      | 24 <sup>h</sup>     |
| Body Weight [BW] (kg)  | 70 <sup>m</sup>                | 70 <sup>m</sup>     | 70 <sup>m</sup>     | 70 <sup>m</sup>     | 70 <sup>m</sup>                | 70 <sup>m</sup>     | 15 <sup>m</sup>     | 15 <sup>m</sup>     | 70 <sup>m</sup>     | 70 <sup>m</sup>     |
| Averaging Time - Non-carcinogens [AT <sub>nc</sub> ] (days)        | 3285 <sup>n</sup>              | 9125 <sup>n</sup>   | 28 <sup>n</sup>     | 56 <sup>n</sup>     | 3,285 <sup>n</sup>             | 10,950 <sup>n</sup> | 730 <sup>n</sup>    | 2,190 <sup>n</sup>  | 2,555 <sup>n</sup>  | 8,760 <sup>n</sup>  |
| Averaging Time - Carcinogens [AT <sub>c</sub> ] (days)             | 25,550 <sup>o</sup>            | 25,550 <sup>o</sup> | 25,550 <sup>o</sup> | 25,550 <sup>o</sup> | 25,550 <sup>o</sup>            | 25,550 <sup>o</sup> | 25,550 <sup>o</sup> | 25,550 <sup>o</sup> | 25,550 <sup>o</sup> | 25,550 <sup>o</sup> |

Notes:

- <sup>a</sup> Recommended average soil ingestion rate identified by EPA (1997; 2002). Also, lower end of the adult range reported by Calabrese (1987).
- <sup>b</sup> Default adult soil ingestion rate recommended in EPA 1997.
- <sup>c</sup> The upper end of the adult range reported by Calabrese (1987).
- <sup>d</sup> Based on high end adult soil intake rates (EPA 1997, 2002).
- <sup>e</sup> For the site worker, the CTE exposed skin surface area of 1,980 cm<sup>2</sup>/day based on surface area of forearms and hands (EPA 1997); RME surface area of 3,160 cm<sup>2</sup>/day is equivalent to head, forearms, and hands (EPA 1997).  
For the excavation worker, the CTE exposed skin surface area of 3,160 cm<sup>2</sup>/day is based on the surface area of the head, forearms, and hands (EPA 1997).  
For the trespasser, the CTE exposed skin surface area of 5,230 cm<sup>2</sup>/day is equivalent to head, forearms, hands, and lower legs (EPA 1997); RME surface area for the trespasser is 7,780 cm<sup>2</sup>/day, equivalent to head, entire arms, hands, lower legs, and feet (EPA 1997).  
The CTE and RME for the child resident assumes 25% and 50% of the total body surface area.  
The exposed skin surface area of 6,400 cm<sup>2</sup>/day for the adult resident CTE exposure was based on the head, entire arms, lower legs, and hands (EPA 1997).  
The exposed skin surface area of 7,500 cm<sup>2</sup>/day for the adult resident RME exposure was based on the head, entire arms, lower legs, hands, and feet (EPA 1997).
- <sup>f</sup> CTE inhalation rate for site workers and the trespasser is based on an average value of 13.3 m<sup>3</sup>/day (EPA 1997).  
The RME value of 1.0 m<sup>3</sup>/hr is the recommended mean for adult exposures during light activities (EPA 1997).  
For excavation workers, the CTE inhalation rate is the mean hourly inhalation rate for outdoor workers (EPA 1997).  
The RME rate is the mean inhalation rate for outdoor workers engaged in heavy activities (EPA 1997).
- <sup>g</sup> The CTE value for the site worker represents one-half of the standard workday; the RME exposure time represents the standard workday.  
For the construction worker, both the CTE and RME exposure times are assumed to be equal to the standard workday.  
For the trespasser, the CTE and RME exposure times are considered to be conservative estimates of the amount of time a trespasser would spend at the site after work or on weekends.
- <sup>h</sup> The fraction and availability of soil contaminants based on professional judgement. A value of 1 assumes that 100 percent of soil contacted is from the contaminated site.  
Values of 0.5 and 0.25 assumes 50 percent and 25 percent, respectively, contacted soil is from the contaminated site.

- <sup>i</sup> Soil adherence rate for site workers as recommended by EPA (2004).
- <sup>j</sup> A default dermal absorption fraction of 0.10 will be used for SVOCs if chemical specific values are not provided by EPA (2004).  
Dermal absorption rate of 0 percent will be used for VOCs and inorganics, unless a chemical specific value is provided by EPA (2004).
- <sup>k</sup> For the site worker, frequency of exposure is estimated to be 3 days/week for 40 weeks (120 days for CTE (Professional judgement).  
The RME value of 250 days /year is the EPA Standard Default Exposure Factor (EPA 1991, 2004).  
For the excavation worker, exposure frequency was assumed to be 20 days/year (4 work weeks) for the CTE case based on professional judgement.  
Excavation worker RME exposure frequency was assumed to be 40 days/year (8 work weeks) based on professional judgement.  
The CTE exposure frequency for trespassers is assumed to be 10 days/year (Professional judgement).  
The RME exposure frequency for trespassers is assumed to be 20 days/year (Professional judgement).
- <sup>l</sup> The exposure duration for site workers is assumed to be 5 years (CTE) and 25 years (RME) (EPA 1997, 2004).  
Excavation work is assumed to be completed in 1 year for the RME and CTE (Professional judgement).  
The exposure duration for trespassers is assumed to be 9 years (CTE) and 30 years (RME) based on 50th and 90th percentile duration of residence at one location (EPA 1997).
- <sup>m</sup> Recommended average adult body weight (EPA 1997).
- <sup>n</sup> The averaging time for non-carcinogenic effects is base on the length of exposure (e.g., the exposure duration x 365 days/year) (EPA 1989) or actual days spent at the site over a period of 4 weeks for CTE and 8 weeks for RME for the excavation worker.
- <sup>o</sup> The averaging time for carcinogenic effects is based on total lifespan of 70 years (EPA 1989).

**TABLE 2**  
**MASSACHUSETTS CONTINGENCY PLAN NUMERICAL STANDARDS DERIVATION**  
**HOMEGROWN PRODUCE INGESTION ASSUMPTIONS - SITE LF-23**  
**MOUNTAIN HOME AFB, IDAHO**

**Source: Massachusetts Department of Environmental Protection**

Mean quantities of produce consumed per individual for Northeast Region in 1 day

Percentages of individuals consuming

Mean quantities of produce consumed for "consumers only"

1994-1996 Continuing Survey of Food Intakes by Individuals, USDA

| AGE             | EP <sub>1-8</sub> | EP <sub>8-15</sub> | EP <sub>15-31</sub> | White Potatoes   |           |       | Dark-green vegetables |           |       | Deep-yellow vegetables |           |      | Tomatoes         |           |      |
|-----------------|-------------------|--------------------|---------------------|------------------|-----------|-------|-----------------------|-----------|-------|------------------------|-----------|------|------------------|-----------|------|
|                 | years             | years              | years               | IR <sub>ww</sub> | %C        | g/d   | IR <sub>ww</sub>      | %C        | g/d   | IR <sub>ww</sub>       | %C        | g/d  | IR <sub>ww</sub> | %C        | g/d  |
|                 |                   |                    |                     | g/d              | % consume |       | g/d                   | % consume |       | g/d                    | % consume |      | g/d              | % consume |      |
| Males & Females |                   |                    |                     |                  |           |       |                       |           |       |                        |           |      |                  |           |      |
| 1-2             | 2                 |                    |                     | 28               | 40.3      | 69.5  | 6                     | 10.1      | 59.4  | 5                      | 12.7      | 39.4 | 10               | 27.9      | 35.8 |
| 3-5             | 3                 |                    |                     | 30               | 37.1      | 80.9  | 5                     | 6.5       | 76.9  | 7                      | 12.7      | 55.1 | 10               | 37.1      | 27.0 |
| Males           |                   |                    |                     |                  |           |       |                       |           |       |                        |           |      |                  |           |      |
| 6-11            | 2                 | 4                  |                     | 47               | 44.2      | 106.3 | 6                     | 9.1       | 65.9  | 2                      | 8.5       | 23.5 | 20               | 42        | 47.6 |
| 12-19           |                   | 3                  | 4                   | 59               | 40.3      | 146.4 | 2                     | 2.3       | 87.0  | 11                     | 15.8      | 69.6 | 29               | 45.2      | 64.2 |
| 20-39           |                   |                    | 12                  | 76               | 45.1      | 168.5 | 25                    | 14.7      | 170.1 | 4                      | 5.7       | 70.2 | 48               | 50.9      | 94.3 |
| <b>ED:</b>      | 7                 | 7                  | 16                  |                  |           |       |                       |           |       |                        |           |      |                  |           |      |

| IR <sub>ww</sub> | Lettuce |           | Green Beans |           |      | Corn, Green peas, Lima beans |           |      | Melons, berries |     |            | Totals     | Totals    | AGE  |                     |
|------------------|---------|-----------|-------------|-----------|------|------------------------------|-----------|------|-----------------|-----|------------|------------|-----------|------|---------------------|
|                  | g/d     | %C        | g/d         | %C        | g/d  | g/d                          | %C        | g/d  | g/d             | g/d | Wet Weight | Dry Weight |           |      |                     |
|                  |         | % consume |             | % consume |      |                              | % consume |      |                 |     |            |            | % consume |      | g/day               |
| 1                |         | 6         | 16.7        | 7         | 12.1 | 57.9                         | 12        | 15   | 80.0            | 7   | 9          | 77.8       | 436.4     | 43.6 | Males & Females 1-2 |
| 4                |         | 14        | 28.6        | 3         | 5.7  | 52.6                         | 14        | 21.7 | 64.5            | 14  | 11.6       | 120.7      | 506.3     | 50.6 | Males 3-5           |
| 8                |         | 14.9      | 53.7        | 1         | 2    | 50.0                         | 9         | 13.6 | 66.2            | 5   | 5.9        | 84.7       | 498.0     | 49.8 | Males 6-11          |
| 19               |         | 28.7      | 66.2        | 2         | 2.4  | 83.3                         | 14        | 9.9  | 141.4           | 17  | 5          | 340.0      | 998.1     | 99.8 | Males 12-19         |
| 18               |         | 29.6      | 60.8        | 4         | 3.7  | 108.1                        | 12        | 7.3  | 164.4           | 6   | 4.5        | 133.3      | 969.7     | 97.0 | Males 20-39         |

**Homegrown Produce Assumptions**

|                       | Average Body Weight BW kg | Produce Intake Rate PIR g/day | Exposure Frequency |                | Averaging Period AP years | Conversion Constant C1 days/year | Conversion Constant C2 g/kg | Average Daily Produce Intake Rate 1/day |      |
|-----------------------|---------------------------|-------------------------------|--------------------|----------------|---------------------------|----------------------------------|-----------------------------|---|------|
|                       |                           |                               | EF1 days/week      | EF2 weeks/year |                           |                                  |                             |   |      |
| <b>Noncancer Risk</b> |                           |                               |                    |                |                           |                                  |                             |   |      |
| Receptor:             |                           |                               |                    |                |                           |                                  |                             |   |      |
| Resident, Age 1-8     | Age 1-8                   | 17.0                          | 12.1               | 7              | 52                        | 7                                | 7                           | 365                                     | 1000 |
| Receptor Total        |                           |                               |                    |                |                           |                                  |                             |   |      |
| <b>Cancer Risk</b>    |                           |                               |                    |                |                           |                                  |                             |   |      |
| Receptor:             |                           |                               |                    |                |                           |                                  |                             |   |      |
| Resident, Age 1-31    | Age 1-8                   | 17.0                          | 12.1               | 7              | 52                        | 7                                | 7                           | 365                                     | 1000 |
|                       | Age 8-15                  | 39.9                          | 17.8               | 7              | 52                        | 7                                | 7                           |   |      |
|                       | Age 15-31                 | 58.7                          | 24.4               | 7              | 52                        | 16                               | 70                          |   |      |
| Receptor Total        |                           |                               |                    |                |                           |                                  |                             | 365                                     | 1000 |

Average Daily Produce Intake Rate 1/day  
**7.10E-04**

Lifetime Average Daily Produce Intake Rate 1/day  
**2.10E-04**

| Produce Intake, dry weight |                 |                  |             |
|----------------------------|-----------------|------------------|-------------|
|                            | Child 1-8 years | Child 8-15 years | Adult 15-31 |
|                            | g/day           | g/day            | g/day       |
| <b>All Produce:</b>        | 48.4            | 71.2             | 97.7        |
| <b>Homegrown Produce:</b>  | 12.1            | 17.8             | 24.4        |

Percent of Produce Consumed Assumed to be Homegrown:  
**%HG = 25 %**

Percent Moisture of Produce:  
**%M = 90 %**

Notes:  
 %C = percentage of individuals consuming  
 %HG =  
 %M = percent moisture  
 AP = averaging period  
 BW = body weight  
 C = conversion constant  
 DWI = dry weight  
 ED = exposure duration  
 EF = exposure frequency  
 EP = exposure period  
 g/d = grams per day  
 g/kg = grams per kilogram  
 IR<sub>ww</sub> = produce ingestion rate (wet weight)  
 kg = kilogram  
 PIR = produce intake rate  
 USDA = United States Department of Agriculture  
 WWI = wet weight

**TABLE 3  
SUMMARY OF PRODUCE INTAKE RATES FOR HOMEGROWN PRODUCE PATHWAY  
REASONABLE MAXIMUM EXPOSURE - SITE LF-23  
MOUNTAIN HOME AFB, IDAHO**

| Scenario 1            | Average                 | Produce                        | Exposure                      |                                | Exposure              | Averaging             | Conversion                  | Conversion             | Average Daily<br>Produce Intake<br>Rate<br>1/day             |
|-----------------------|-------------------------|--------------------------------|-------------------------------|--------------------------------|-----------------------|-----------------------|-----------------------------|------------------------|--|
|                       | Body Weight<br>BW<br>kg | Intake<br>Rate<br>PIR<br>g/day | Frequency<br>EF1<br>days/week | Frequency<br>EF2<br>weeks/year | Period<br>EP<br>years | Period<br>AP<br>years | Constant<br>C1<br>days/year | Constant<br>C2<br>g/kg |  |
| <b>Noncancer Risk</b> |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Receptor:             |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Resident, Age 1-8     |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Age 1-8               | 17.0                    | 12.1                           | 7                             | 52                             | 7                     | 7                     | 365                         | 1000                   |  |
| Receptor Total        |                         |                                |                               |                                |                       |                       |                             |                        | 7.10E-04   |
| <b>Cancer Risk</b>    |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Receptor:             |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Resident, Age 1-31    |                         |                                |                               |                                |                       |                       |                             |                        | Lifetime<br>Average Daily<br>Produce Intake<br>Rate<br>1/day |
| Age 1-8               | 17.0                    | 12.1                           | 7                             | 52                             | 7                     |                       |                             |                        |  |
| Age 8-15              | 39.9                    | 17.8                           | 7                             | 52                             | 7                     |                       |                             |                        |  |
| Age 15-31             | 58.7                    | 24.4                           | 7                             | 52                             | 16                    |                       |                             |                        |  |
| Receptor Total        |                         |                                |                               |                                | 30                    | 70                    | 365                         | 1000                   | 2.10E-04   |

| Scenario 2            | Average                 | Produce                        | Exposure                      |                                | Exposure              | Averaging             | Conversion                  | Conversion             | Average Daily<br>Produce Intake<br>Rate<br>1/day             |
|-----------------------|-------------------------|--------------------------------|-------------------------------|--------------------------------|-----------------------|-----------------------|-----------------------------|------------------------|--|
|                       | Body Weight<br>BW<br>kg | Intake<br>Rate<br>PIR<br>g/day | Frequency<br>EF1<br>days/week | Frequency<br>EF2<br>weeks/year | Period<br>EP<br>years | Period<br>AP<br>years | Constant<br>C1<br>days/year | Constant<br>C2<br>g/kg |  |
| <b>Noncancer Risk</b> |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Receptor:             |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Resident, Age 1-8     |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Age 1-8               | 17.0                    | 6.0                            | 7                             | 52                             | 7                     | 7                     | 365                         | 1000                   |  |
| Receptor Total        |                         |                                |                               |                                |                       |                       |                             |                        | 3.52E-04   |
| <b>Cancer Risk</b>    |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Receptor:             |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Resident, Age 1-31    |                         |                                |                               |                                |                       |                       |                             |                        | Lifetime<br>Average Daily<br>Produce Intake<br>Rate<br>1/day |
| Age 1-8               | 17.0                    | 6.0                            | 7                             | 52                             | 7                     |                       |                             |                        |  |
| Age 8-15              | 39.9                    | 8.9                            | 7                             | 52                             | 7                     |                       |                             |                        |  |
| Age 15-31             | 58.7                    | 12.2                           | 7                             | 52                             | 16                    |                       |                             |                        |  |
| Receptor Total        |                         |                                |                               |                                | 30                    | 70                    | 365                         | 1000                   | 1.05E-04   |

| Scenario 3            | Average                 | Produce                        | Exposure                      |                                | Exposure              | Averaging             | Conversion                  | Conversion             | Average Daily<br>Produce Intake<br>Rate<br>1/day             |
|-----------------------|-------------------------|--------------------------------|-------------------------------|--------------------------------|-----------------------|-----------------------|-----------------------------|------------------------|--|
|                       | Body Weight<br>BW<br>kg | Intake<br>Rate<br>PIR<br>g/day | Frequency<br>EF1<br>days/week | Frequency<br>EF2<br>weeks/year | Period<br>EP<br>years | Period<br>AP<br>years | Constant<br>C1<br>days/year | Constant<br>C2<br>g/kg |  |
| <b>Noncancer Risk</b> |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Receptor:             |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Resident, Age 1-8     |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Age 1-8               | 17.0                    | 3.0                            | 7                             | 52                             | 7                     | 7                     | 365                         | 1000                   |  |
| Receptor Total        |                         |                                |                               |                                |                       |                       |                             |                        | 1.76E-04   |
| <b>Cancer Risk</b>    |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Receptor:             |                         |                                |                               |                                |                       |                       |                             |                        |  |
| Resident, Age 1-31    |                         |                                |                               |                                |                       |                       |                             |                        | Lifetime<br>Average Daily<br>Produce Intake<br>Rate<br>1/day |
| Age 1-8               | 17.0                    | 3.0                            | 7                             | 52                             | 7                     |                       |                             |                        |  |
| Age 8-15              | 39.9                    | 4.5                            | 7                             | 52                             | 7                     |                       |                             |                        |  |
| Age 15-31             | 58.7                    | 6.1                            | 7                             | 52                             | 16                    |                       |                             |                        |  |
| Receptor Total        |                         |                                |                               |                                | 30                    | 70                    | 365                         | 1000                   | 5.25E-05   |

Notes:

Source: Massachusetts Department of Environmental Protection  
g/day = grams per day  
g/kg = grams per kilogram  
kg = kilogram

**TABLE 4**  
**SUMMARY OF PRODUCE INTAKE RATES FOR HOMEGROWN PRODUCE PATHWAY**  
**CENTRAL TENDENCY EXPOSURE - SITE LF-23**  
**MOUNTAIN HOME AFB, IDAHO**

|                       | Average     | Produce      | Exposure         |                   | Exposure    | Averaging   | Conversion      | Conversion | Average Daily<br>Produce Intake<br>Rate<br>1/day             |
|-----------------------|-------------|--------------|------------------|-------------------|-------------|-------------|-----------------|------------|--|
|                       | Body Weight | Intake       | Frequency        |                   | Period      | Period      | Constant        | Constant   |  |
|                       | BW<br>kg    | PIR<br>g/day | EF1<br>days/week | EF2<br>weeks/year | EP<br>years | AP<br>years | C1<br>days/year | C2<br>g/kg |  |
| <b>Scenario 1</b>     |             |              |                  |                   |             |             |                 |            |  |
| <b>Noncancer Risk</b> |             |              |                  |                   |             |             |                 |            |  |
| Receptor:             |             |              |                  |                   |             |             |                 |            |  |
| Resident, Age 1-8     |             |              |                  |                   |             |             |                 |            |  |
| Age 1-8               | 17.0        | 4.8          | 7                | 52                | 7           | 7           | 365             | 1000       |  |
| Receptor Total        |             |              |                  |                   |             |             |                 |            | 2.82E-04   |
| <b>Cancer Risk</b>    |             |              |                  |                   |             |             |                 |            |  |
| Receptor:             |             |              |                  |                   |             |             |                 |            |  |
| Resident, Age 1-31    |             |              |                  |                   |             |             |                 |            | Lifetime<br>Average Daily<br>Produce Intake<br>Rate<br>1/day |
| Age 1-8               | 17.0        | 4.8          | 7                | 52                | 7           |             |                 |            |  |
| Age 8-15              | 39.9        | 7.1          | 7                | 52                | 7           |             |                 |            |  |
| Age 15-31             | 58.7        | 9.8          | 7                | 52                | 16          |             |                 |            |  |
| Receptor Total        |             |              |                  |                   | 30          | 70          | 365             | 1000       | 8.40E-05   |

|                       | Average     | Produce      | Exposure         |                   | Exposure    | Averaging   | Conversion      | Conversion | Average Daily<br>Produce Intake<br>Rate<br>1/day             |
|-----------------------|-------------|--------------|------------------|-------------------|-------------|-------------|-----------------|------------|--|
|                       | Body Weight | Intake       | Frequency        |                   | Period      | Period      | Constant        | Constant   |  |
|                       | BW<br>kg    | PIR<br>g/day | EF1<br>days/week | EF2<br>weeks/year | EP<br>years | AP<br>years | C1<br>days/year | C2<br>g/kg |  |
| <b>Scenario 2</b>     |             |              |                  |                   |             |             |                 |            |  |
| <b>Noncancer Risk</b> |             |              |                  |                   |             |             |                 |            |  |
| Receptor:             |             |              |                  |                   |             |             |                 |            |  |
| Resident, Age 1-8     |             |              |                  |                   |             |             |                 |            |  |
| Age 1-8               | 17.0        | 2.4          | 7                | 52                | 7           | 7           | 365             | 1000       |  |
| Receptor Total        |             |              |                  |                   |             |             |                 |            | 1.41E-04   |
| <b>Cancer Risk</b>    |             |              |                  |                   |             |             |                 |            |  |
| Receptor:             |             |              |                  |                   |             |             |                 |            |  |
| Resident, Age 1-31    |             |              |                  |                   |             |             |                 |            | Lifetime<br>Average Daily<br>Produce Intake<br>Rate<br>1/day |
| Age 1-8               | 17.0        | 2.4          | 7                | 52                | 7           |             |                 |            |  |
| Age 8-15              | 39.9        | 3.6          | 7                | 52                | 7           |             |                 |            |  |
| Age 15-31             | 58.7        | 4.9          | 7                | 52                | 16          |             |                 |            |  |
| Receptor Total        |             |              |                  |                   | 30          | 70          | 365             | 1000       | 4.21E-05   |

|                       | Average     | Produce      | Exposure         |                   | Exposure    | Averaging   | Conversion      | Conversion | Average Daily<br>Produce Intake<br>Rate<br>1/day             |
|-----------------------|-------------|--------------|------------------|-------------------|-------------|-------------|-----------------|------------|--|
|                       | Body Weight | Intake       | Frequency        |                   | Period      | Period      | Constant        | Constant   |  |
|                       | BW<br>kg    | PIR<br>g/day | EF1<br>days/week | EF2<br>weeks/year | EP<br>years | AP<br>years | C1<br>days/year | C2<br>g/kg |  |
| <b>Scenario 3</b>     |             |              |                  |                   |             |             |                 |            |  |
| <b>Noncancer Risk</b> |             |              |                  |                   |             |             |                 |            |  |
| Receptor:             |             |              |                  |                   |             |             |                 |            |  |
| Resident, Age 1-8     |             |              |                  |                   |             |             |                 |            |  |
| Age 1-8               | 17.0        | 1.2          | 7                | 52                | 7           | 7           | 365             | 1000       |  |
| Receptor Total        |             |              |                  |                   |             |             |                 |            | 7.04E-05   |
| <b>Cancer Risk</b>    |             |              |                  |                   |             |             |                 |            |  |
| Receptor:             |             |              |                  |                   |             |             |                 |            |  |
| Resident, Age 1-31    |             |              |                  |                   |             |             |                 |            | Lifetime<br>Average Daily<br>Produce Intake<br>Rate<br>1/day |
| Age 1-8               | 17.0        | 1.2          | 7                | 52                | 7           |             |                 |            |  |
| Age 8-15              | 39.9        | 1.8          | 7                | 52                | 7           |             |                 |            |  |
| Age 15-31             | 58.7        | 2.4          | 7                | 52                | 16          |             |                 |            |  |
| Receptor Total        |             |              |                  |                   | 30          | 70          | 365             | 1000       | 2.09E-05   |

Notes:  
Source: Massachusetts Department of Environmental Protection  
g/day = grams per day  
g/kg = grams per kilogram  
kg = kilogram

**TABLE 5**  
**ANALYTICAL RESULTS FOR ANALYSES THAT EXCEEDED EPA**  
**INDUSTRIAL AND/OR RESIDENTIAL SOIL REGIONAL SCREENING LEVELS FOR AREAS LF-23A AND LF-23B**  
**MOUNTAIN HOME AFB, IDAHO**

| Area   | Depth                          | Analyte               | Concentration (µg/kg)<br>Sample #1 | Concentration (µg/kg)<br>Sample #2 (duplicate) | Concentration (µg/kg)<br>Sample #3 (triplicate) |
|--------|--------------------------------|-----------------------|------------------------------------|--|---|
| LF-23A | 0 to 2 feet<br>TriPLICATE M-I  | Benzo(a)anthracene    | 57                                 | <b>720</b>                                     | <b>290</b>                                      |
|        |                                | Benzo(a)pyrene        | <b>51</b>                          | 730  | 260   |
|        |                                | Benzo(b)fluoranthene  | 85                                 | <b>1,200</b>                                   | <b>440</b>                                      |
|        |                                | Ideno(1,2,3-cd)pyrene | 36                                 | <b>470</b>                                     | <b>170</b>                                      |
|        | 0 to 10 feet<br>Single M-I     | Benzo(a)anthracene    | <b>350</b>                         | NA   | NA  |
|        |                                | Benzo(a)pyrene        | 290                                | NA   | NA  |
|        |                                | Benzo(b)fluoranthene  | <b>500</b>                         | NA   | NA  |
|        |                                | Ideno(1,2,3-cd)pyrene | <b>160</b>                         | NA   | NA  |
| LF-23B | 0 to 2 feet<br>Single M-I      | Benzo(a)anthracene    | <b>360</b>                         | NA   | NA  |
|        |                                | Benzo(a)pyrene        | 340                                | NA   | NA  |
|        |                                | Benzo(b)fluoranthene  | 530                                | NA   | NA  |
|        |                                | Ideno(1,2,3-cd)pyrene | <b>210</b>                         | NA   | NA  |
|        | 0 to 10 feet<br>TriPLICATE M-I | Benzo(a)anthracene    | <b>1,300</b>                       | 3,600  | 4,000   |
|        |                                | Benzo(a)pyrene        | 1,100                              | 3,200  | 5,500   |
|        |                                | Benzo(b)fluoranthene  | 1,900                              | 5,400  | 6,000   |
|        |                                | Dibenz(a,h)anthracene | 150                                | 500  | 590   |
|        |                                | Ideno(1,2,3-cd)pyrene | <b>610</b>                         | 1,600  | 1,700   |

Notes: Source: URS 2010a

Regional Screening Levels were adjusted to assume an outdoor industrial incidental soil ingestion rate of 200 mg/day, instead of 100 mg/day based on EPA Region 10 guidance.

Bold text indicates the concentration exceeds the Residential Regional Screening Level

Grey shaded text indicates the concentration exceeds the Residential and Industrial Regional Screening Levels RSLs, used to identify COCs, do not factor in vapor intrusion or consumption of homegrown produce.

For risk estimation, site-specific assumptions, including vapor intrusion and homegrown produce, were used.

g/day = grams per day

g/kg = grams per kilogram

kg = kilogram

NA = Not Applicable

**TABLE 6**  
**RESULTS OF RISK ASSESSMENT CALCULATIONS FOR AREAS LF-23A AND LF-23B**  
**MOUNTAIN HOME AFB, IDAHO**

| Area   | Depth                          | Exposure               | Carcinogenic       | Hazard Quotient |
|--------|--------------------------------|------------------------|--------------------|-----------------|
| LF-23A | 0 to 2 feet<br>TriPLICATE M-I  | Residential – max MI   | 7.2E-05 to 9.7E-05 | 0.1 to 0.1      |
|        |                                | Residential – avg'd MI | 3.2E-05 to 4.4E-05 | 0.003 to 0.01   |
|        |                                | Industrial – max MI    | 6.90E-06           | 0.0005          |
|        |                                | Industrial – avg'd MI  | 3.30E-06           | 0.0003          |
|        | 0 to 10 feet<br>Single M-I     | Residential            | 2.60E-05           | 0.002           |
|        |                                | Industrial             | 2.80E-06           | 0.0002          |
| LF-23B | 0 to 2 feet<br>Single M-I      | Residential            | 1.6E-05 to 1.3E-04 | 0.01 to 0.1     |
|        |                                | Industrial             | 3.20E-06           | 0.0002          |
|        | 0 to 10 feet<br>TriPLICATE M-I | Residential – max MI   | 3.50E-04           | 0.03            |
|        |                                | Residential – avg'd MI | 2.60E-04           | 0.02            |
|        |                                | Industrial – max MI    | 3.80E-05           | 0.004           |
|        |                                | Industrial – avg'd MI  | 2.80E-05           | 0.003           |

Source: URS 2010a

max = Where replicate samples were collected, the M-I sample with the highest PAH concentrations was used to calculate risk (for soil exposure and, where applicable, other pathways) because an M-I sample gives an average result.

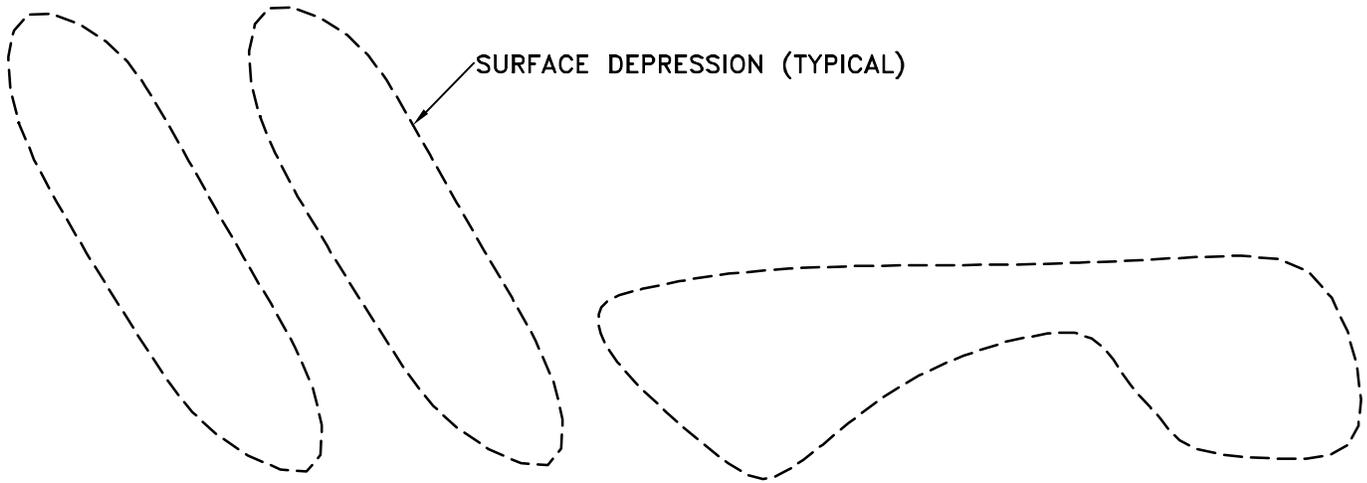
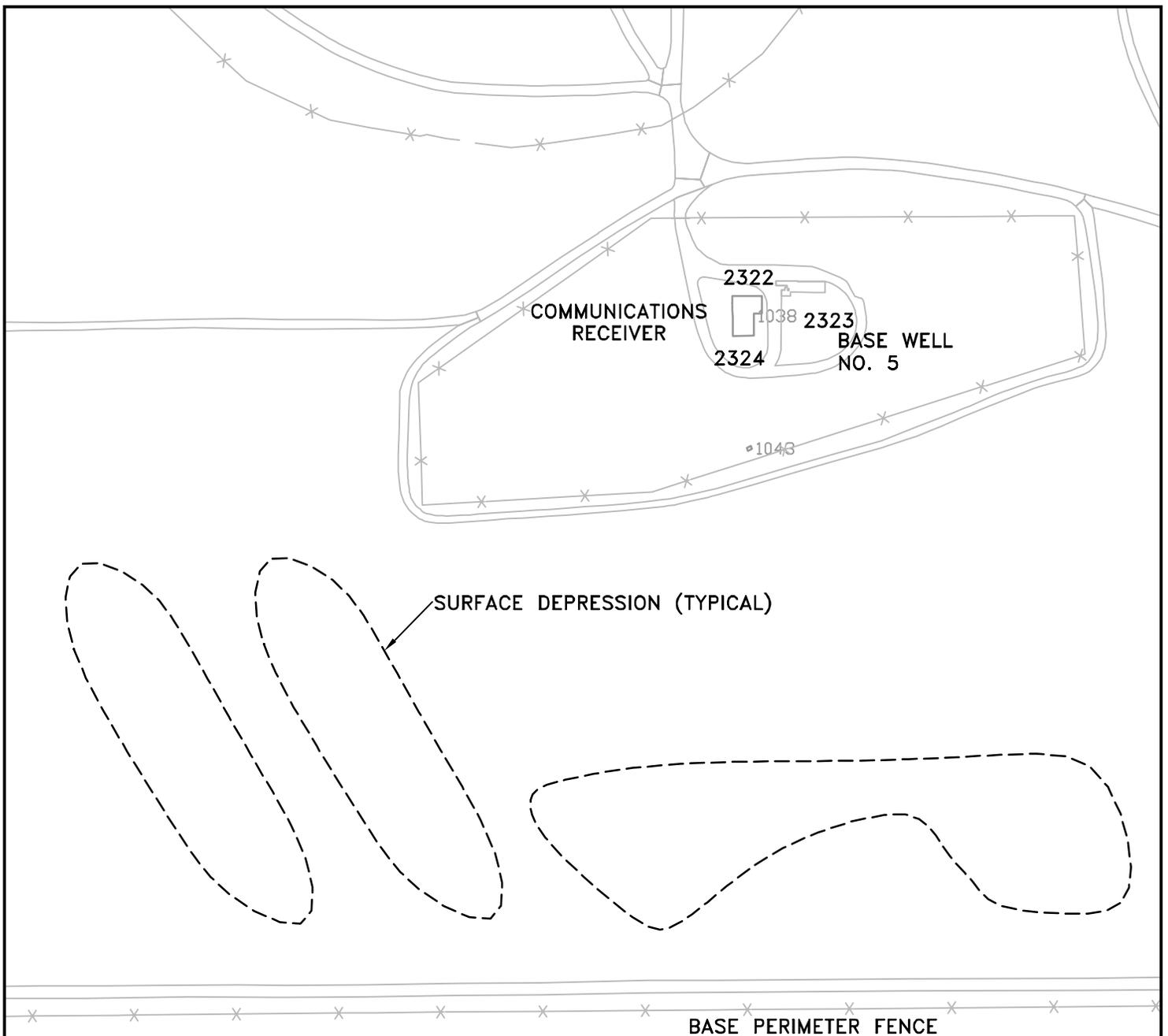
avg'd = Where replicate samples were collected, the arithmetic average of PAH concentrations was used to calculate the risk. If no avg risk is presented for a depth interval, only one M-I sample result is available.

The 0 to 2 feet depth interval considered risks from residential soil exposure, indoor air intrusion, and homegrown produce ingestion pathways. The ranges for this depth interval for the residential scenario are based on the highest and lowest risks of six homegrown produce ingestion scenarios.

The 0 to 10 feet depth interval considered only risks from direct exposure to soil for both residential and industrial scenarios.

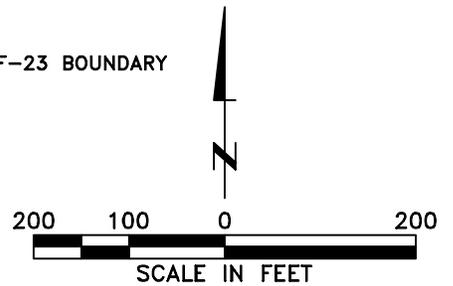
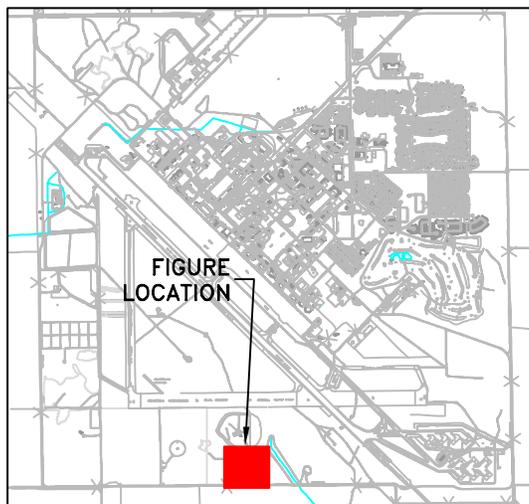
Gray shaded cells include results that exceed the acceptable risk level of 1E-5, identified on page 5 of this document.

## **FIGURES**



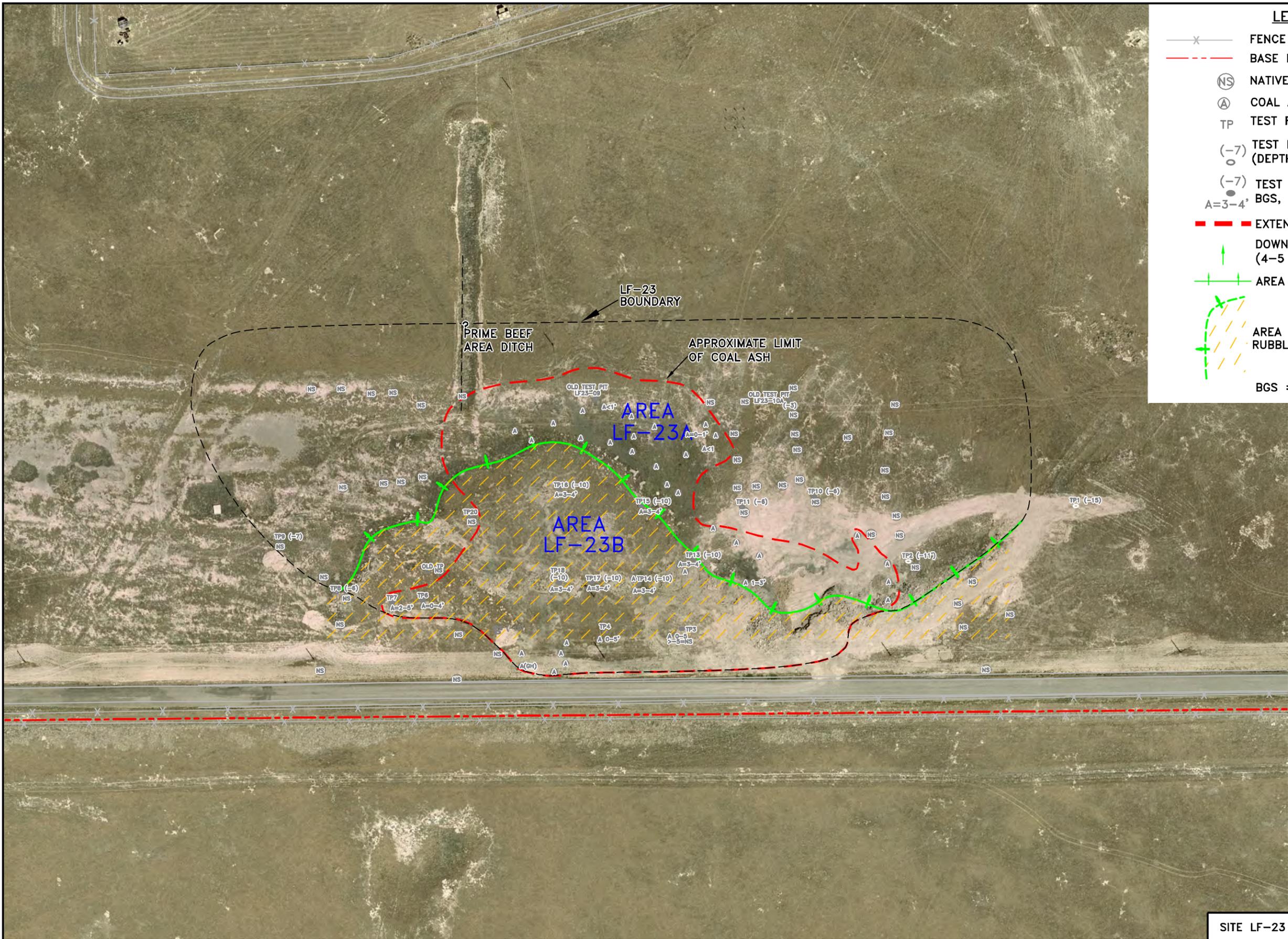
**LEGEND**

- x — FENCE
- - - - HISTORICAL SITE LF-23 BOUNDARY



**SITE LF-23 – HISTORICAL BOUNDARY  
SOLID WASTE DISPOSAL AREA (LF-23)  
MOUNTAIN HOME AIR FORCE BASE, IDAHO**

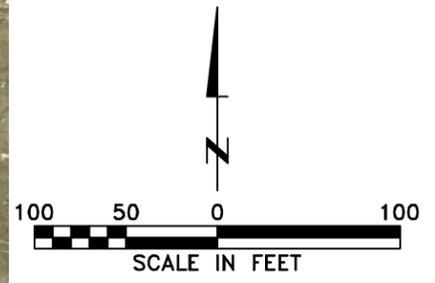
|                |                |                         |               |
|----------------|----------------|-------------------------|---------------|
| DRN. BY: DPG   | DATE: 02/08/11 | PROJECT NO.<br>16169962 | FIG. NO.<br>1 |
| CHK'D. BY: KAS | DATE: 02/08/11 |                         |               |



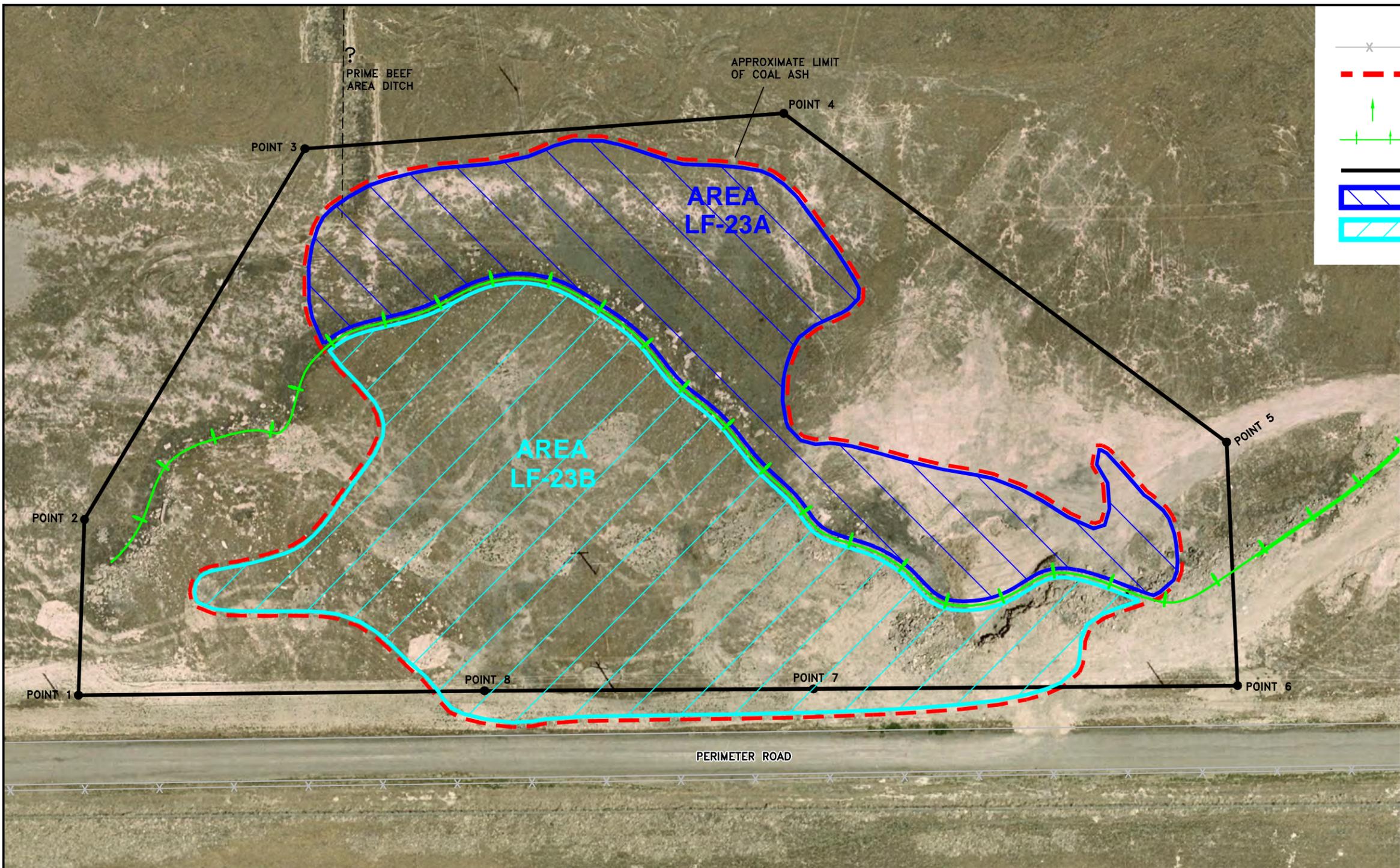
**LEGEND:**

- x— FENCE
- - - BASE BOUNDARY
- (NS) NATIVE SOIL
- (A) COAL ASH
- TP TEST PIT
- (-7) TEST PIT WITHOUT COAL ASH (DEPTH IN FEET BGS)
- (-7) TEST PIT WITH COAL ASH (DEPTH IN FEET BGS, A=DEPTH OF ASH IN FEET BGS)
- - - EXTENT OF COAL ASH (CURRENTLY KNOWN)
- ↑ DOWNWARD SLOPE AT EDGE OF RUBBLE ZONE (4-5 FOOT DROPOFF)
- - - AREA BOUNDARY
- ▨ AREA COVERED WITH CONCRETE AND BASALT RUBBLE

BGS = below ground surface



|  |                |                         |               |
|--|----------------|-------------------------|---------------|
| SITE LF-23 - CURRENT BOUNDARY AND EXTENT OF COAL ASH AND DEBRIS<br>MOUNTAIN HOME AIR FORCE BASE, IDAHO |                |                         |               |
| DRN. BY: DPG   | DATE: 02/08/11 | PROJECT NO.<br>16169962 | FIG. NO.<br>2 |
| CHK'D. BY: KAS   | REVISION: 0    |                         |               |

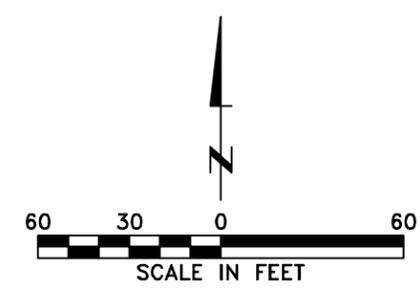
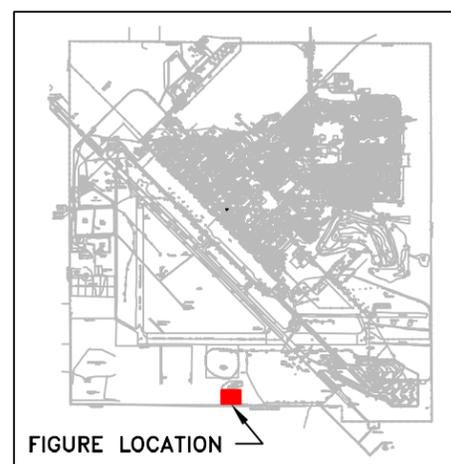
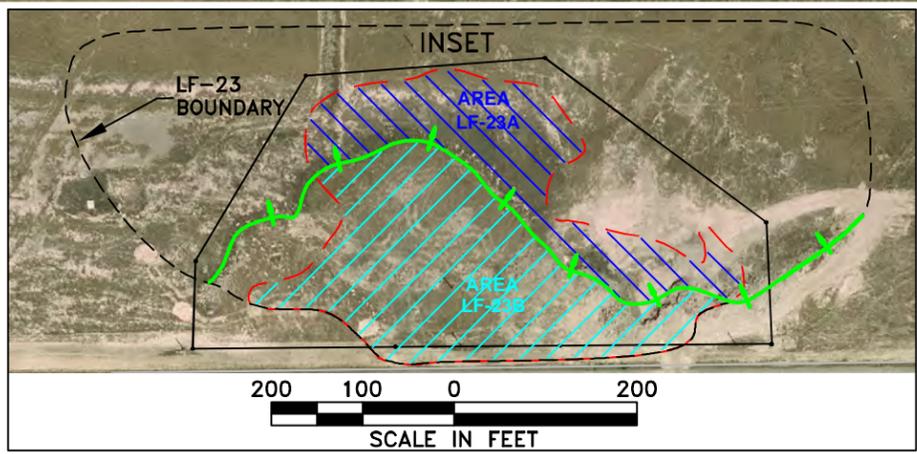


**LEGEND:**

- FENCE
- EXTENT OF COAL ASH (CURRENTLY KNOWN)
- DOWNWARD SLOPE AT EDGE OF RUBBLE ZONE (4-5 FOOT DROPOFF)
- AREA BOUNDARY
- LAND USE CONTROL AREA BOUNDARY
- AREA LF-23A
- AREA LF-23B

**NOTE:**

ONE PORTION OF AREA LF-23B ADJACENT TO THE EDGE OF THE PERIMETER ROAD IS NOT INCLUDED IN THE LAND USE CONTROL BOUNDARY BECAUSE THIS AREA HAS NO SIGNIFICANT EVIDENCE OF LANDFILL ACTIVITY AND IS USED FOR A FIREBREAK.



| SITE LF-23<br>LAND USE CONTROL AREA<br>MOUNTAIN HOME AIR FORCE BASE, IDAHO |               |                         |               |
|--|---------------|-------------------------|---------------|
| DRN. BY: LLS   | DATE: 2/21/11 | PROJECT NO.<br>16169962 | FIG. NO.<br>3 |
| CHK'D. BY: KS  | REVISION: 0   |                         |               |