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EPA Superfund Record of Decision:

**Ellsworth Air Force Base,
Operable Unit 3, Rapid City, SD
6/7/1996**



Final

Record of Decision for Remedial Action at Operable Unit 3 Ellsworth Air Force Base, South Dakota

United States Air Force
Air Combat Command
Ellsworth Air Force Base

June 1996

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- Operable Unit 3 (OU-3), Landfill No. 2 Area, Ellsworth Air Force Base (EAFB), National Priority List Site.
- Meade and Pennington Counties, South Dakota

This decision document describes EAFB's selected remedial action for OU-3, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the contents of the Administrative Record for OU-3, EAFB. The US Environmental Protection Agency (EPA) and the South Dakota Department of Environment and Natural Resources (SDDENR) concur with the selected remedial action.

Actual or threatened releases of hazardous substances from OU-3, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Twelve potentially contaminated areas, or operable units, have been identified at EAFB. This ROD is for a remedial action at OU-3.

The selected alternative, capping, includes the following major components:

- **Placing a soil cover capable of sustaining perennial vegetation, over the landfill area;**
- **A pre-design study to examine the need for landfill gas control measures;**
- **Institutional controls for the landfill area;**
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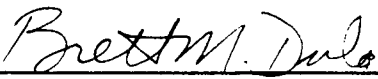
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Because this remedy will result in hazardous substances remaining on-site beneath the landfill cover area at low levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

1.6 SIGNATURE AND AGENCY CONCURRENCE ON THE REMEDY


BRETT M. DULA
Lieutenant General, USAF
Vice Commander

19 Jun 96
Date

JACK W. MCGRAW
Acting Regional Administrator
U.S. Environmental Protection Agency Region 8

Date

NETTIE H. MYERS, Secretary
Department of Environment and Natural Resources
State of South Dakota

Date

1.0 DECLARATION FOR THE RECORD OF DECISION

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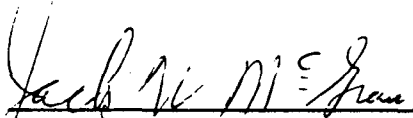
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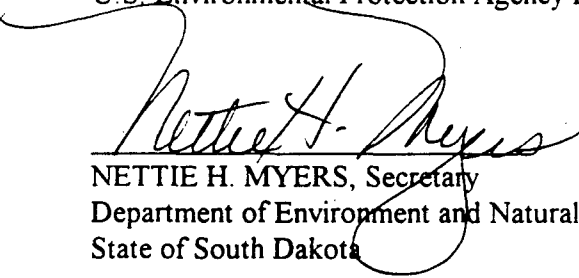
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State of South Dakota

6-7-96
Date

2.0 DECISION SUMMARY

2.1 SITE NAME AND LOCATION

EAFB is a U.S. Air Force Air Combat Command (ACC) installation located 12 miles east of Rapid City, South Dakota, and adjacent to the small community of Box Elder (Figure 2-1).

EAFB covers approximately 4,858 acres within Meade and Pennington counties and includes runways and airfield operations, industrial areas, and housing and recreational facilities (Figure 2-2). Open land, containing a few private residences, lies adjacent to EAFB on the north, south, and west, while residential and commercial areas lie to the east of the Base.

2.2 OU-3 DESCRIPTION/HISTORY AND REGULATORY OVERSIGHT ACTIVITIES

2.2.1 Description/History

EAFB was officially activated in July 1942 as the Rapid City Army Air Base, a training facility for B-17 bomber crews. It became a permanent facility in 1948 with the 28th Strategic Reconnaissance Wing as its host unit. Historically, EAFB has been the headquarters of operations for a variety of aircraft, as well as the Titan I Intercontinental Ballistic Missile, and the Minuteman I and Minuteman II missile systems. The Air Force has provided support, training, maintenance, and/or testing facilities. Presently, the 28th Bombardment Wing (B-1B bombers) is the host unit of EAFB.

OU-3, located in the northeast portion of EAFB, consists of Landfill 2, an approximately one acre site, the four identified trenches to the north and two disturbed soil areas in the southeast and southwest corners (Figure 2-3). The landfill was active for approximately one year (1964-1965) until operational concerns with trash containment resulted in its discontinued use. Methods used to dispose of the refuse included surface filling of a low-lying area (fill area) and trench and fill operations. Combustible trash, described as shop wastes, were burned daily in a burn pit. Four trenches located north of the fill area were used for the disposal of metal and industrial and household refuse. Possible burial sites were identified in the 24 August 1971 aerial photo, but the trench origination dates are not known. Some metal debris currently exposed at OU-3 may be the result of surface disposal of metal waste. Areas of disturbed soil in the southwestern and southeastern corner of OU-3, which may have been dump areas, were also identified in historical aerial photographs of EAFB.

A sign had been located within the boundary of OU-3 indicating a missile disposal/burial site (USAF, 1988). The missile disposal site is basically scrap metal which was salvaged from a test flight and is not a source of chemical release to the environment. According to the USAF, the missile dates from a test firing in the mid-1960s. Information on the missile is still classified at this time.

The area west of Landfill 2 slopes very gently to the south, whereas the area east of Landfill 2 slopes to the east where a tree-like pattern of intermittent drainages has dissected the area.

The southern drainage leads to Boxelder Creek. The eastward drainage at OU-3 is part of an overall northern sloping tree-like pattern that drains toward intermittent drainages which lead to Elk Creek. OU-3 is currently undeveloped and is dominated by relatively undisturbed grassland. Some exposed rubble is evident in fill trenches in the northern portion of the OU.

The shallow aquifer (10 - 50 ft below ground surface) at EAFB is considered a potential drinking water source and possibly discharges to the surface. The ground water is classified as having a beneficial use as a drinking water supply suitable for human consumption (ARSD Chapter 74:03:15, Groundwater Quality Standards).

Deeper bedrock aquifers also exist beneath EAFB. These deeper aquifers are separated from the shallow aquifer by 800 feet of impermeable clays and silts. In the past, EAFB utilized these deeper aquifers for its water supply. The deep aquifer wells are no longer serviceable and have been scheduled for abandonment. Presently, EAFB obtains its potable water from the Rapid City Municipal Distribution System.

2.2.2 Regulatory Oversight Activities

Environmental investigation activities at EAFB were initiated by the Air Force in 1985 through an Installation Restoration Program (IRP) Phase I Installation Assessment/Records Search and Phase II, Confirmation/Quantitation. The Phase I study, dated September, 1985, identified a total of 17 locations at EAFB where releases involving hazardous substances potentially occurred.

In Phase II of the IRP investigation, field activities included soil vapor surveys, geophysical surveys, surface and subsurface soil sampling, ground-water sampling, ground-water hydrologic testing, and ecological investigations.

On August 30, 1990 (55 Federal Register 35509), EAFB was listed on the U.S. EPA's National Priorities List (NPL). A Federal Facility Agreement (FFA) was signed in January 1992 by the Air Force, the U.S. Environmental Protection Agency (EPA), and the State of South Dakota (SDDENR) and went into effect on April 1, 1992. The FFA establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions for EAFB in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). It also states the oversight procedures for EPA and the State to ensure Air Force compliance with the specific requirements. The FFA identified 11 site-specific operable units (OUs) and a Base-wide ground-water operable unit. The Base-wide ground-water OU is primarily used to address contaminated ground water that was not addressed during the investigation of a site-specific OU.

Listing on the NPL and execution of the FFA required the Air Force to perform a remedial investigation/feasibility study (RI/FS) to investigate the 12 OUs. In 1993 and 1994 an extensive RI field program was conducted to characterize conditions at OU-3. The program

included completion of boreholes, installation of monitoring wells, geotechnical analysis of soil samples, ecological evaluation, assessment of human health risks, and review and compilation of previous IRP investigations. Collection and laboratory analysis of soil, ground-water, surface-water, and sediment samples were included in the RI field program.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Community relations activities that have taken place at EAFB to date include:

- **FFA process.** After preparation of the FFA by the USAF, EPA, and SDDENR, the document was published for comment. The FFA became effective April 1, 1992.
- **Administrative Record.** An Administrative Record for information was established in Building 8203 at EAFB. The Administrative Record contains information used to support USAF decision-making. All the documents in the Administrative Record are available to the public.
- **Information repositories.** An Administrative Record outline is located at the Rapid City Library (public repository).
- **Community Relations Plan (CRP).** The CRP was prepared and has been accepted by EPA and the State of South Dakota and is currently being carried out. An update to this plan will be prepared in 1996.
- **Restoration Advisory Board (RAB).** The RAB has been formed to facilitate public input in the cleanup and meets quarterly. In addition to USAF, EPA, and South Dakota oversight personnel, the RAB includes community leaders and local representatives from the surrounding area. An open house format was used during the November 16, 1995 RAB meeting.
- **Mailing list.** A mailing list of all interested parties in the community is maintained by EAFB and updated regularly.
- **Fact sheet.** A fact sheet describing the status of the IRP at EAFB was distributed to the mailing list addressees in 1992.
- **Open house.** An informational meeting on the status of the IRP and other environmental efforts at EAFB was held on May 6, 1993.
- **Newspaper articles.** Articles have been written for the Base newspaper regarding IRP activity.
- **Proposed Plan.** The proposed plan on this action was distributed to the mailing list addressees for their comments.

A public comment period was held from December 28, 1995 to January 27, 1996, and a public meeting was held on January 11, 1996. At this meeting, representatives from EAFB answered questions about the remedial action. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this ROD.

This ROD is based on the contents of the Administrative Record for OU-3, in accordance with the CERCLA, as amended by SARA, and the NCP. The RI/FS reports and the Proposed Plan for OU-3 provide information about OU-3 and the selected remedy. These documents are available at the Information Repositories at EAFB and the Rapid City Public Library.

2.4 SCOPE AND ROLE OF RESPONSE ACTION

The FFA identified 11 potential source area operable units (OUs) as well as a Base-wide ground-water operable unit. The 12 operable units are identified as follows:

OU-1	Fire Protection Training Area
OU-2	Landfills Nos. 1 and 6
OU-3	Landfill No. 2
OU-4	Landfill No. 3
OU-5	Landfill No. 4
OU-6	Landfill No. 5
OU-7	Weapons Storage Area
OU-8	Explosive Ordnance Disposal Area (Pramitol Spill)
OU-9	Old Auto Hobby Shop Area
OU-10	North Hangar Complex
OU-11	Base-wide Ground Water
OU-12	Hardfill No. 1

This ROD is to document the selected remedy for the preferred remedial action (RA) at OU-3. The remedial action objectives (RAOs) are to reduce the potential risks posed by contaminants in surface soils and to reduce the mobility of potential contaminants in the landfill through containment.

The development of alternatives for the landfill was conducted under EPA's Presumptive Remedies Approach [*Presumptive Remedies: Policy and Procedures (EPA 1993a)*; *Presumptive Remedy for CERCLA Municipal Landfill Sites (EPA 1993b)*]. By using this approach, selecting an alternative for remediation is streamlined by using preferred technologies based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation.

The presumptive remedy stipulates containment as the appropriate remedy for landfills. The response action, containment by placement of a vegetated soil cover, would remove risk associated with the ingestion, dermal contact, and inhalation exposure pathways. The area of attainment defines the area over which preliminary remediation goals would be achieved, and is based on the RAOs. The area of attainment would include landfill areas not meeting appropriate

closure standards. The remedy does not address leachate remediation since identified wastes placed in the landfill do not typify that which would normally be associated with leachate production. Ground-water monitoring will identify whether leachate is being produced in the future.

2.5 SITE CHARACTERISTICS

This section describes the presence and distribution of contaminants at OU-3 as a result of past activities. Potential constituents of concern (COCs) exceeding background levels were evaluated in the OU-3 risk assessment.

2.5.1 Soil Vapor

The most commonly reported compound in the trench-area samples was tetrachloroethylene (PCE) with a maximum concentration of 0.192 parts per million (ppm) near the middle part of the western trench. Toluene and xylenes were also reported in soil vapor samples, at concentrations up to 38.23 ppm, total reported benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations up to 99.53 ppm, and trichloroethylene (TCE) at concentrations up to 0.297 ppm. Methane was reported at concentrations up to 50,722 ppm, primarily in samples for which other compounds were also reported. The lower explosive limit for methane is 50,000 ppm, with an upper explosive limit of 150,000 ppm.

Toluene was reported in two samples collected from the burn-pit area at concentrations of 0.53 ppm and 1.21 ppm, respectively. Xylene, methylene chloride, Dichloroethene (DCE), and TCE were reported in samples at concentrations of 1.109 ppm, 0.57 ppm, 1.149 ppm, and 0.003 ppm, respectively. TCE was also reported in a sample at a concentration of 0.014 ppm.

TCE was reported in six samples collected from the southwest corner of OU-3 at a maximum concentration of 0.169 ppm. One sample had a reported total DCE concentration of 0.264 ppm.

2.5.2 GROUND WATER

Volatile Organic Compounds (VOCs)

In the trench area, nine VOCs were reported above quantitation limits for ground-water samples. Vinyl chloride was reported in two of the samples (11.0 micrograms per liter [$\mu\text{g/L}$] and 4.2 $\mu\text{g/L}$), exceeding the federal MCLs and state ground water quality standards. 1,2-dichloroethane was reported in one sample at 17.0 $\mu\text{g/L}$ exceeding the federal MCLs and State Ground Water Quality standard standards. Downgradient from the fill area, VOC samples were obtained from three monitoring wells, but because of insufficient water, no other constituents were analyzed in one of the wells. A total of six VOCs were reported: PCE, TCE, total 1,2-dichloroethene, benzene, ethylbenzene, and xylenes.

Jet Fuel

In the trench area, jet fuel was reported in one sample at a concentration of 370 $\mu\text{g/L}$. This sample was collected near the southwestern trench.

Semi-Volatile Organic Compounds (SVOCs)

In the trench area, diethyl phthalate, a SVOC, was reported at 6.0 $\mu\text{g/L}$.

Pesticides/Polychlorinated Biphenyls (PCBs)

No pesticides/PCBs were reported above quantitation limits in the ground-water samples at any of the OU-3 locations.

Inorganics

In the trench area, the following inorganics were reported above background: total aluminum, dissolved calcium, total and dissolved chromium, cobalt, total and dissolved copper, iron, total and dissolved manganese, total and dissolved nickel, total and dissolved potassium, total and dissolved sodium, dissolved zinc, and total and dissolved mercury. In addition, three ground-water samples were reported above background for total and dissolved arsenic at concentrations ranging from 6.9 $\mu\text{g/L}$ to 2.2 $\mu\text{g/L}$. There was no reported background values for arsenic. As a result, background levels for arsenic was reported as one-half the average detection limit for the compound (2.2 $\mu\text{g/L}$ for total arsenic and 2.15 $\mu\text{g/L}$ for dissolved arsenic).

Downgradient of the fill area, MW870302 and MW950301 were the only wells sampled which yielded sufficient water for inorganic analysis. Total copper (14.7 $\mu\text{g/L}$), total and dissolved potassium (38,500 $\mu\text{g/L}$ and 37,400 $\mu\text{g/L}$, respectively), total and dissolved sodium (1,330,000 $\mu\text{g/L}$ and 1,300,000 $\mu\text{g/L}$), total chromium (7.1 $\mu\text{g/L}$), total and dissolved barium (50.4 $\mu\text{g/L}$, and 55.1 $\mu\text{g/L}$), total and dissolved mercury (0.25 $\mu\text{g/L}$ and 0.21 $\mu\text{g/L}$) and zinc (54.8 $\mu\text{g/L}$) were reported at concentrations which exceeded Basewide background concentrations.

In the burn pit area, total and dissolved sodium, total and dissolved potassium, dissolved chromium, total and dissolved mercury, and total and dissolved selenium were reported at concentrations exceeding background. Total and dissolved selenium were reported at 1,580 $\mu\text{g/L}$ and 1,130 $\mu\text{g/L}$ respectively, compared to the background concentrations of 112.61 and 156.44 $\mu\text{g/L}$, respectively.

In the southwest corner of OU-3, aluminum, total chromium, iron, nickel, and total and dissolved selenium were reported above the corresponding background concentrations. In the southeast corner of OU-3, inorganics reported at concentrations above the corresponding background range included: total chromium, copper, and total and dissolved mercury, dissolved vanadium, dissolved arsenic, and total and dissolved selenium.

2.5.3 SOIL

VOC

In the southeast corner of OU-3, acetone and acetonitrile were reported in a surface soil sample. No subsurface soil VOCs were reported in the southeast corner samples. No surface or subsurface soil VOCs were reported in the southwest corner samples.

In the burn pit, fifteen VOCs were reported in the subsurface soil samples. The highest reported subsurface soil concentration was 12.0 $\mu\text{g/L}$ (1,2-dichloroethene, total).

In the trenches, chloroform and toluene were reported in subsurface soil samples at maximum concentrations of 6.0 $\mu\text{g/kg}$ and 9.0 $\mu\text{g/kg}$, respectively.

Jet Fuel

No jet fuel was reported in any of the subsurface soil samples. In both the fill area and the burn pit, jet fuel was reported at a maximum concentration of 180 $\mu\text{g/kg}$ in surface soil samples. In the southeast corner of OU-3, jet fuel was reported at 170 mg/kg in surface soil samples. No jet fuel was reported in the trenches or in the southwestern corner.

SVOC

In the trench area, di-n-butyl phthalate and bis(2-ethylhexyl) phthalate were reported in subsurface soil samples at a maximum concentration of 2,300 $\mu\text{g/kg}$ (di-n-butyl phthalate). Surface soil samples reported fifteen different SVOCs at a maximum concentration of 860 $\mu\text{g/kg}$ (di-n-butyl phthalate) near the northwestern trench.

In the fill area, no SVOCs were reported in the subsurface soil samples, but fourteen SVOCs were reported in the surface soil samples with a maximum concentration of 2,600 $\mu\text{g/kg}$ (di-n-butyl phthalate).

In the burn pit, twenty different SVOCs were reported in the surface soil samples at concentrations up to 3,900 $\mu\text{g/kg}$ (pyrene). Two SVOCs were reported in the burn pit subsurface soil samples at a maximum concentration of 340 $\mu\text{g/kg}$ (di-n-butyl phthalate).

In the southeastern corner of OU-3, two SVOCs were reported in the subsurface soil samples, the maximum concentration was 3,700 $\mu\text{g/kg}$ (bis(2-ethylhexyl)phthalate). Seven different SVOCs were reported in the surface soil samples at this southeastern location with a maximum concentration of 160 $\mu\text{g/kg}$ (fluoranthene). No SVOCs were reported in the southwestern corner.

Pesticide/PCB

In the fill area, four different pesticides were reported in the surface soil samples at concentrations up to 57 $\mu\text{g/kg}$ (gamma-chlordane). No pesticides were reported in the fill area in the subsurface soil samples.

In the burn pit, two pesticides were reported in the surface soil samples at concentrations up to 7.7 $\mu\text{g/kg}$ (p,p'-DDE). No pesticides were reported in the burn pit area in the subsurface soil samples. No pesticides were reported in either the surface or subsurface soil samples at the southeastern or southwestern corner locations. In the trench area, one pesticide (heptachlor epoxide) was reported at a concentration of 1.2 $\mu\text{g/kg}$.

Inorganics

In the trench area, ten inorganics were reported in surface and subsurface soil samples at concentrations above background concentrations. Most of these concentrations were only slightly higher than the corresponding upper limit of the background concentrations. Only calcium, sodium, thallium, mercury, and manganese (in the surface soil) were reported at concentrations greater than approximately twice the background concentration.

In the fill area, seven inorganics were reported in surface samples at concentrations above background concentrations. Among the highest were lead (495 mg/kg), zinc (837 mg/kg), total chromium (55.8 mg/kg), and mercury (0.34 mg/kg). No subsurface samples were taken within the fill area.

In the burn pit, mercury (0.13 mg/kg) was reported in one surface sample at concentrations only slightly above background (0.10 mg/kg). Cobalt, manganese, nickel, silver, and sodium were reported in one subsurface sample above background. Of these subsurface samples, only manganese (3,190 mg/kg at a depth of 24 ft and 9,000 mg/kg at 42 ft) was substantially above its background concentration of 1,513 mg/kg.

In the southeast corner, no inorganics were reported above background concentrations for surface soil; and beryllium, cadmium, lead, thallium, vanadium, and manganese were reported higher than background for subsurface samples. Of the subsurface samples, only manganese (3,050 mg/kg) was reported at a concentration that exceeded its background concentration (1,513 mg/kg) by more than a slight amount.

2.6 SITE RISK SUMMARY

Human Health Risks

Risk Assessment Process

The assessment of human health risks for this OU considered the following topics:

- (1) Contaminants of concern (COCs) in ground-water and soil samples taken at OU-3;
- (2) Current and future land-use conditions;
- (3) Potential environmental pathways by which populations might be exposed;
- (4) Estimated exposure point concentrations of COCs;
- (5) Estimated intake levels of the COCs;
- (6) Toxicity of the COCs; and
- (7) Uncertainties in the assessments of exposure, toxicity, and general risks.

Noncarcinogenic and carcinogenic risks were calculated for the following five potential exposure groups:

- (1) Current EAFB maintenance personnel mowing grass on-site;
- (2) The future child/adult living on-site who ingests surface soil;
- (3) The future adult living on-site who ingests and showers with shallow ground water;
- (4) Future adolescents who are exposed to surface water and sediment through wading; and,
- (5) Future adult construction workers who excavate on-site for building residences.

A quantitative risk assessment was performed for the ground water, soil, sediment, and air. The risk assessment evaluated potential effects on human health posed by exposure to contaminants within OU-3. Carcinogenic risks were estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential cancer-causing chemical. The acceptable risk range expressed as a probability is one cancer incident in ten-thousand people to one cancer incident in a million people. This level of risk is also denoted by 1×10^{-4} to 1×10^{-6} . Risks within the acceptable risk range may or may not warrant remedial action depending upon site-specific circumstances. Risks below this range cannot be differentiated from the background occurrence of cancer in human populations. Noncarcinogenic health risks are evaluated using a hazard index. If the hazard index is less than or equal to one, the contaminant concentration is considered an acceptable level and generally assumes that the human population may be exposed to it during a 30-year period without adverse health effects. Risks calculated in a risk assessment are potential risks and are excess (i.e., over background) risks due to exposure from contaminants at the OU.

Risk Assessment Results

The risk assessment for OU-3 indicated that the total carcinogenic site risk, calculated using average exposure assumptions, is within the acceptable risk range for the residential scenario. Total carcinogenic risk calculated using the RME exposure assumptions is greater than 1×10^{-4} . The majority of the total carcinogenic site risk for the residential scenario is from exposure to VOC and arsenic in the ground water. The noncarcinogenic risk is due to naturally occurring selenium in ground water. However, due to the heterogeneity of the landfill contents, great uncertainty is associated with the calculated risk values.

Based on the OU-3 risk assessment, the calculated carcinogenic and non-carcinogenic risks for ground water is 2×10^{-4} and 4.8, respectively. The calculated carcinogenic risk level for surface soil is 1×10^{-5} , due to the presence of SVOCs. This is within the acceptable risk range. Based on this calculated acceptable risk, and the low concentrations of contaminants detected in surface soil samples, remediation is not warranted for surface soil as part of OU-3.

Risk Assessment Conclusions

Remedial action is warranted for the landfill based on the uncertainty associated with the calculated risk values. Based on the OU-3 risk assessment, the calculated carcinogenic and non-carcinogenic risks for ground water exceed the acceptable carcinogenic and non-carcinogenic risk ranges. However, remediation is not warranted for ground water at OU-3. The sporadic reported concentrations and lack of localizations of contaminants detected in ground water at OU-3 result in the risk assessment model estimates developed for this site being highly conservative and therefore present uncertainty for interpretation of risks for these contaminants within an OU-wide context. The data do not support the existence of plumes of these contaminants, therefore monitoring of the ground water will provide for the protection of the environment and human receptors as degradation of the COC (vinyl chloride) is monitored overtime.

Rather than attempting to perform additional sampling to gain more certainty in the risk assessment, the Air Force utilized guidance developed by the EPA titled *Presumptive Remedy for CERCLA Municipal Landfill Sites* (OSWER Directive 9355.0-49FS). The presumptive remedy for landfills is containment (capping) of landfill contents. Using the presumptive remedy strategy, a quantitative risk assessment is not necessary to evaluate whether the containment remedy addresses all exposure pathways and contaminants potentially associated with a landfill. Rather, all potential exposure pathways can be identified using the conceptual site model and compared to the pathways addressed by the presumptive remedy. Containment of the landfill contents addresses exposure pathways and risks normally associated with landfills. The contaminant exposure pathways for the potential risks associated with the landfill contents at OU-3 include: (1) direct physical contact with the landfill contents, (2) consumption or contact with ground water that may become contaminated, and (3) surface

erosion of the landfill, thus exposing off-Base residents to contaminants in both surface water and air. Based on these contaminant exposure pathways, remedial action is warranted for the landfill due to the potential risk to human health from future releases of unidentified hazardous substances in the landfill.

Actual or threatened releases of hazardous substances from OU-3, if not addressed by implementing the response action selected in the Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, and the environment.

Ecological Risks

An ecological evaluation of OU-3 was based on a combination of data and literature reviews, field and laboratory analyses, analyte evaluation and screening, and preliminary risk screening. The ecological risk assessment was performed in three phases, or tiers. Tier I was a screening-level risk assessment. Tiers II and III were progressively more detailed risk assessments. The pertinent findings are summarized below.

OU-3 presents a relatively undisturbed environment consisting primarily of mixed grass prairie habitat. Several small weedy areas cover the former landfill and trench areas. A variety of potential receptors were identified that could nest and/or forage in OU-3 habitats. These species include various types of invertebrates, amphibians, birds, and mammals. Because of the altered natural environment at OU-3, rare, threatened, or endangered species are unlikely to utilize the area for more than brief, periodic habitat. Due to the low levels of contaminant concentrations, the contaminants do not pose an unacceptable risk to these species. In addition, the limited contact these species would have with the OU-3 area ensures unacceptable risk to a single individual will not occur.

Terrestrial vegetation and soil faunal communities do not reveal characteristics that indicate chemical-related impacts. This finding is consistent with the relatively low levels of contaminants in the soil. However, terrestrial vegetation and soil fauna communities differ between OU-3 and a reference area. This prompted movement of the OU from Tier I to Tier II ecological evaluation.

Findings of the RI indicate that the contaminants at OU-3 are not affecting species identified in the vicinity of EAFB to sustain themselves in a healthy fashion on a population basis. Due to the small size of the OU-3 source areas (less than 1 acre), an OU-specific Tier III assessment was not conducted. However, the identified contaminants were carried forward into a Tier III Base-wide ecological risk assessment which will be conducted as part of OU-11.

2.7 DESCRIPTION OF ALTERNATIVES

Presumptive Remedy for CERCLA Municipal Landfill Sites, (OSWER Directive 9355.3-11FS) was the basis for the abbreviated feasibility study (FS). The OSWER directive established containment of the contamination within the landfill as the presumptive remedy for CERCLA municipal landfills.

Although not specifically identified as a municipal landfill, OU-3 exhibits characteristics that make this presumptive remedy applicable. The landfill contents at OU-3 exhibits: 1) the potential to produce landfill gas, and 2) no potential to produce significant leachate. The risk assessment did not identify the ground water as a pathway of concern. Even though the landfill contents were not identified as a source of unacceptable risk to human health, the heterogeneity of the landfill contents causes uncertainties in the risk assessment. Therefore, the presumptive remedy focuses on containment of the landfill contents.

- **Alternative 1 - No Action**

- The no-action alternative represents the baseline condition at OU-3 and refers to taking no action at OU-3.

- **Alternative 2 - Institutional Controls**

- Institutional controls (access restrictions and annotation of base records).
- Long-term monitoring of ground water, and long-term maintenance of existing soil cover.

- **Alternative 3 - Capping**

- Placing a soil cover capable of sustaining perennial vegetation, over the landfill area;
- A pre-design study to examine the need for landfill gas control measures;
- Institutional controls for the landfill area;
- Long-term ground-water monitoring; and long-term maintenance of soil cover.

2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The analysis of alternatives coupled with the use of the presumptive remedy combine for a narrower range of feasible approaches to address remedial activities at OU-3.

The remedial action objectives for OU-3 are as follows:

Landfill

- Prevent ingestion and dermal contact with landfill contents.
- Reduce mobility of potential contaminants in the landfill.
- Control surface water runoff and erosion of the landfill cover.

The area of attainment is defined as the area which will achieve the remedial action objectives after remediation is completed. The area of attainment for OU-3 is the extent of Landfill No. 2 and the four trenches, which is approximately five acres in size (Figure 2-4).

Pursuant to Section 300.430(e)(9)(iii) of the EPA's revised National Contingency Plan, the remedial action to be implemented should be selected based upon consideration of nine evaluation criteria. These criteria are as follows:

1. Overall protection of human health and environment.
2. Compliance with applicable or relevant and appropriate requirements (ARARs).
3. Long-term effectiveness and permanence.
4. Reduction of toxicity, mobility, or volume of contamination.
5. Short-term effectiveness.
6. Implementability.
7. Cost.
8. State acceptance.
9. Community acceptance.

The following sections provide a brief review and comparison of the remedial alternatives according to the EPA's evaluation criteria.

2.8.1 Overall Protection of Human Health and the Environment

The assessment of this criterion considers how the alternatives achieve and maintain protection of human health and the environment.

Alternative 1 (no action) does nothing to reduce risk at OU-3. Alternative 2 (institutional controls) provides for maintenance of non-vegetated areas. Access restrictions would reduce risk by reducing exposure. Alternative 3 (soil cover) provides containment of the landfill contents. This would eliminate risk associated with exposure to soil and the future risk associated with potentially contaminated ground water.

2.8.2 Compliance with ARARs

Alternatives are assessed under this criterion in terms of compliance with ARARs. Applicable requirements include cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State of South Dakota laws. These laws specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site.

Relevant and appropriate requirements address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the environmental and technical factors at a particular site. The determination of "relevant and appropriate" emphasizes the similarity and appropriateness of the requirement to a site. ARARs are grouped into these three categories:

- **Chemical-Specific ARARs** are health or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in establishment of the amount or concentration that may be found in, or discharged to, the environment.
- **Location-Specific ARARs** restrict the concentration of hazardous substances or the conduct of activities solely because they are in specific locations such as flood plains, wetlands, historic places, and sensitive ecosystems or habitats.
- **Action-Specific ARARs** are usually technology or activity-based requirements or limitations on actions taken with respect to hazardous wastes.

A summary evaluation of Federal and State ARARs pertinent to this remedial action is provided in Table 2-1 at the end of Section 2.0, and a narrative discussion of compliance with ARARs is provided below for the alternatives considered.

Alternative 1 (No Action):

The No Action alternative does not comply with State of South Dakota Solid Waste Management Regulations. The OU-3 RI concluded that ground water has not been adversely affected and was not a potential transport pathway; therefore ground-water ARARs at the OU are met. Alternative 1 does not meet the remedial action objectives for OU-3. An action would not be taken to prevent human contact with surface soil contaminants, and potential contaminants within the landfill may leach to the ground water.

Alternative 2 (Institutional Controls):

Alternative 2 does not comply with State of South Dakota Solid Waste Management Regulations. The OU-3 RI concluded that ground water has not been adversely affected and was not a potential transport pathway; therefore, ground-water ARARs at the OU are met. Alternative 2 does not meet the remedial action objectives for OU-3.

Alternative 3 (Vegetated Soil Cover):

Alternative 3 would meet State of South Dakota Waste Management Regulations for the disposal of solid waste by providing a two-foot minimum earth cover capable of sustaining perennial vegetation; implementing institutional controls including maintaining access control; filling, grading, and contouring the site; maintenance of the cover and vegetation; and other requirements as set forth in ARSD Chapter 74:27:15. The State is Federally authorized for the Resource Conservation and Recovery Act (RCRA) Subtitle D Municipal Solid Waste Program (8 October 1993, 58 FR 52486). The resulting cover along with natural attenuation will bring OU-3 into compliance with the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and State Ground Water Quality Standards by preventing the downward transport of contaminants to the ground water.

Implementation of the presumptive remedy strategy for landfills has been shown by EPA to prevent ingestion and dermal contact with landfill contents, reduce mobility of potential contaminants in the landfill, and control surface water runoff and erosion of the landfill cover.

2.8.3 Long-Term Effectiveness and Permanence

The assessment of this criterion considered the long-term effectiveness of alternatives in maintaining protection of human health and the environment after response action objectives have been met.

Alternative 1 would not provide additional effectiveness or permanence in reducing the potential for direct contact or ingestion of the surface soil. No further controls for the OU would be developed under this alternative.

Alternative 2 would provide for increased effectiveness of access restrictions (in addition to the general EAFB access restrictions). Additionally, maintaining vegetation on the landfill would reduce erosion potential. Permanency and reliability of these controls would be enhanced through long-term monitoring and maintenance of the OU. Uncertainties exist for the ability to provide long-term access restrictions.

Alternative 3 would offer the highest level of long-term effectiveness. Reduction of risk would be accorded by the vegetated soil cover. Erosion would be limited by the development and maintenance of a vegetated area. Upon completion, long-term maintenance of the cover and monitoring of ground water would be provided. Future land uses will be allowed for the landfill only if the integrity of the landfill cover is not compromised.

2.8.4 Reduction of Toxicity, Mobility, and Volume Through Treatment

The assessment of this criterion involves considering the anticipated performance of specific treatment technologies an alternative may employ.

Alternative 1 would not provide for the reduction of toxicity, mobility, or volume of potential contaminants within the landfill. Alternative 2 would reduce the mobility of contaminants in surface soil through long-term erosion maintenance of existing cover soil. Alternative 3 does not use treatment technologies, but reduces the mobility of the contaminants in the landfill through containment.

2.8.5 Short-Term Effectiveness

The assessment of this criterion considers the effectiveness of alternatives in maintaining protection of human health and the environment during the construction of a remedy until response action objectives have been met.

It is not anticipated that the proposed alternatives would significantly impact worker or community health and safety during the implementation period. Alternatives 2 and 3 may impact

community and worker health and safety through dust emissions during the initial construction phase. The impact could be minimized through dust mitigation.

Alternatives 2 and 3 may create a short-term increase in risk during remedial activities due to the inhalation exposure pathway. Disturbance of surface soil through earthwork and soil disturbance would result in exposure to workers. Dust mitigation during these activities would minimize this potential impact. Alternative 3 would present the potential for temporarily increasing the opportunity for erosion of the disturbed soils, although erosion and sediment control measures will help to minimize this adverse impact.

2.8.6 Implementability

The assessment of this criterion considers the administrative and technical feasibility of implementing the alternatives and the availability of necessary goods and services for implementation of the response action.

Alternative 1 would not be difficult to implement since, aside from long-term monitoring, no further action would be undertaken.

Alternative 2 requires no special or unique activities and could be implemented using locally available materials and contractors. Long-term monitoring would indicate whether additional action would need to be implemented in the future.

Alternative 3 could be implemented with standard construction equipment, materials, and methods. The availability of an on- or off-Base supply of cover material will require further consideration during the Remedial Design Analysis. Land use restrictions (or annotation of base records) can be implemented at EAFB by various administrative means.

2.8.7 Cost

A summary of the costs for each alternative is as follows:

<i>Alternative No. 1 (No Action)</i>	
Total Capital Costs	\$0
Total Annual Costs	\$0
TOTAL 30-Year Present Value¹	\$0

<i>Alternative No. 2 (Institutional Controls)</i>	
Total Capital Costs	\$81,800
Total Annual (Sampling/Analysis/O&M ²) Costs: Years 1-5	\$70,500
Total Annual (Sampling/Analysis/O&M) Costs: Years 6-30	\$36,800
30-Year Present Value for Annual Costs Annual Cost = \$70,500 (Years 1-5) Annual Cost = \$36,800 (Years 6-30) Discount Rate = 5%	\$711,300
TOTAL 30-Year Present Value¹	\$793,100

<i>Alternative No. 3 (Vegetated Soil Cover)</i>	
Total Capital Costs	\$632,200
Total Annual (Sampling/Analysis/O&M) Costs: Years 1-5	\$70,500
Total Annual (Sampling/Analysis/O&M) Costs: Years 6-30	\$36,800
30-Year Present Value for Annual Costs Annual Cost = \$70,500 (Years 1-5) Annual Cost = \$36,800 (Years 6-30) Discount Rate = 5%	\$711,300
TOTAL 30-Year Present Value¹	\$1,343,500

Notes

- 1) The Total 30-Year Present Value is the sum of the total capital costs and the 30-Year Present Value for annual costs.
- 2) Operations & Maintenance

2.8.8 State Acceptance

The assessment of this criterion considered the State's preferences for or concerns about the alternatives.

The State concurs with the selected remedy. The State provided comments on the remedial investigation, feasibility study, Proposed Plan, and this ROD. After incorporating adequate responses to the comments into the respective documents, the State concurred with the remedy.

2.8.9 Community Acceptance

Comments offered by the public were used to assess the community acceptance of the proposed alternative. The community expressed their concerns about the selected remedy during the public comment period. The questions and concerns of the community are discussed in detail in the Responsiveness Summary which is Appendix B of the ROD.

2.9 SELECTED ALTERNATIVE

Based on the requirements of CERCLA, comparative analysis of the nine criteria, public comments, and in consultation with EPA and the State, the Air Force has determined that the selected alternative is Alternative 3, Vegetated Soil Cover. This alternative includes institutional controls in conjunction with physical modification of the OU to reduce potential risk. Five-year reviews of the remedy will be required because potential contaminants will remain at OU-3 following completion of remedial action. Major components of Alternative 3 are:

- **Placing a soil cover capable of sustaining perennial vegetation, over the landfill area;**
- **A pre-design study to examine the need for landfill gas control measures;**
- **Institutional controls for the landfill area;**
- **Long-term ground-water monitoring, and long-term maintenance of soil cover.**

Installation of Soil Cover

An earthen cover will be placed over Landfill No. 2 where existing cover does not comply with State landfill closure requirements (approximately 1 acre). The cover will be graded and contoured to maintain stability and route surface-water runoff away from previously active fill areas and prevent ponding of the water. The cover will be vegetated to enhance evapotranspiration and reduce infiltration and soil erosion. A pre-design study will be conducted to examine the need for landfill gas control measures.

This alternative will meet the remedial action objectives and reduce the potential risk for OU-3 by reducing the mobility of potential contaminants in the landfill. This will be achieved by the

~~construction of the landfill cover and maintenance and possible modification of a drainage~~
channel. If required, wetlands mitigation (as a result of potential drainageway modifications)
could also be implemented with standard construction equipment, materials, and methods.

This alternative meets the statutory requirements of Section 121 of CERCLA as amended by SARA. These statutory requirements include protectiveness of human health and the environment, compliance with ARARs, cost effectiveness, and use of permanent solutions and alternative treatment technologies to the extent practicable.

The statutory preference for treatment is not satisfied; however, the selected alternative is the presumptive remedy (containment) developed by EPA for landfills.

Alternative 3 would achieve significant risk reduction by limiting exposure to landfill materials and to contaminants present in surface soils and ground water at the OU. The selected alternative will be protective of human health and the environment and will comply with ARARs.

Institutional Controls

Institutional controls would be implemented to prevent human exposure to contaminated soil and ground water. These controls will include: (1) issuing a continuing order by the Installation Commander to restrict access to the landfill and to restrict or control temporary construction activities unless proper protective equipment is worn; (2) filing a notice with the State of South Dakota to recommend denial of water appropriation permit applications to install ground-water wells within the landfill boundary and any area which may be affected by potential contaminants; (3) making appropriate annotations to base records.

A continuing order would be issued by the Installation Commander to restrict access to or disturbance of the landfill as long as Ellsworth AFB owns the property. Specifically, it would:

- Restrict or place limitations on the installation of any new underground utilities or other construction activities in the area of the landfill; thus preventing accidental exposures to construction workers.
- Provide for the use of proper protective equipment, in the event that access through the landfill cover is required.
- Require that the integrity of the landfill cover be maintained. Limit future land uses to non-intrusive activities only (or to activities that will not effect the landfill cover). To assist with the institutional controls, a fence may be placed around the landfill and authorized personnel would have access through a locked gate. Access would only be allowed to perform landfill monitoring and maintenance activities. Warning signs would be posted at the landfill to deter unauthorized access.

The continuing order also would mandate that, if the landfill cover was ever removed or breached, the area of attainment would be re-evaluated to determine the need for a replacement cap or other remedial action.

Continuing order requirements will be in effect as long as the property is owned by Ellsworth

The continuing order also would mandate that, if the landfill cover was ever removed or breached, the area of attainment would be re-evaluated to determine the need for a replacement cap or other remedial action.

Continuing order requirements will be in effect as long as the property is owned by Ellsworth AFB. In the case of the sale or transfer of property within OU-3 by the United States to any other person or entity, the Air Force will place covenants in the deed which will restrict access and prohibit disturbance of contaminated soils or the remedial action without approval of the United States. These covenants will be in effect until removed upon agreement of the State of South Dakota, the U.S. Environmental Protection Agency, and the U.S. Air Force or their successors in interest. The Air Force will also include in the deed the covenants required by section 120(h)(3) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), which include (1) a warranty that the United States will conduct any remedial action found to be required by law after the date of the transfer; (2) a right of access in behalf of EPA and the Air Force or their successors in interest to the property to participate in any response or corrective action that might be required after the date of transfer. The right of access referenced in the preceding sentence shall include the State of South Dakota for purposes of conducting or participating in any response or corrective action that might be required after the date of transfer.

Long-Term Monitoring and Long-Term Maintenance

A long-term monitoring program will be developed and implemented during remedial action and is subject to approval of both EPA and SDDENR. Contaminant concentrations in the ground water will be monitored to evaluate the effectiveness of the landfill cover. If ground water contaminants move beyond the landfill boundary, additional work may be required.

A maintenance program would be established to ensure the long-term integrity of the landfill conditions remedy would be maintained. The maintenance program would include development of standard operating procedures (SOPs) to provide for inspections, repairs, and general maintenance of the landfill.

2.10 STATUTORY DETERMINATIONS

The selected remedy meets the statutory requirements of CERCLA as amended by SARA. These requirements include protection of human health and the environment, compliance with ARARs, cost effectiveness, utilization of permanent solutions and alternative treatment technologies to the extent practicable. Containment, by definition, does not attempt to reduce the toxicity or volume of potentially hazardous materials; rather, it reduces the likelihood of exposure to these materials by preventing the movement of materials beyond the boundaries of the landfill and preventing direct contact with landfill materials. The selected remedy represents the best balance of tradeoffs among the alternatives considered.

The manner in which the selected remedy meets each of these requirements is discussed in the sections below.

2.10.1 Protection of Human Health and the Environment

The selected remedy addresses health and environmental issues that were identified in the OU-3 RI report. Specifically, the capping alternative:

- Eliminates exposure to landfill contents by installing an earthen cap.
- Reduces the potential infiltration of contaminants to the ground water.
- Prevents unauthorized access to the area by installing a perimeter fence and restricted access signs.
- Provides for long-term monitoring of ground water to identify potential future risks associated with OU-3.

2.10.2 Compliance with ARARs

Alternative 3 will meet State landfill closure requirements by providing containment of landfill contents, access/development restrictions and long-term monitoring. The OU-3 RI concluded that ground water has not been adversely affected and was not a potential transport pathway; therefore, ground water ARARs at the OU are met. Additional information about ARAR compliance is contained in Section 2.8.2.

Implementation of the presumptive remedy (containment by capping) strategy for landfills has been shown by EPA to meet the remedial action objectives by preventing direct contact with landfill contents.

2.10.3 Cost Effectiveness

The selected remedy provides overall effectiveness in reducing human health risks relative to its costs. The presumptive remedy process insures cost effective remedies are chosen. The chosen landfill cover type ensures containment of the landfill contents. Site specific conditions were used to determine the type of cover necessary for the landfill. Based on the information provided during the remedial investigation, a more costly landfill cover would not be cost effective.

2.10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Extent Possible

EPA has established that proper capping has proven effective in containing landfill contents. This alternative provides long-term prevention of exposure to potential landfill material, prevents unauthorized access, and provides for long-term ground-water

monitoring to detect movement of chemicals from the area. A five-year review of the selected remedy will be performed because contaminants may be remaining in the landfill area. The review will be conducted every five years after the signing of the ROD to ensure the remedy continues to provide adequate protection of human health and the environment.

2.10.5 Preference for Treatment as a Principal Element

Treatment of the landfill contents is not supported based on the findings of the remedial investigation for OU-3. No identifiable hot spots were reported present and the risks associated with OU-3 can be addressed by eliminating exposure to the landfill contents by capping.

2.11 DOCUMENTATION OF SIGNIFICANT CHANGES

The selected action is the same as the preferred alternative presented in the Proposed Plan for OU-3 remedial action. There have been no changes relative to the Proposed Plan.

TABLE 2-1 EVALUATION OF FEDERAL AND STATE ARARS THAT APPLY TO OU-3, ELLSWORTH AFB, SOUTH DAKOTA

Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria and Limitations

Standard, Requirement, Criteria or Limitation	Citations	Description	ARAR Type	Applicability
Safe Drinking Water Act	42 USC 300, f, g			
National Primary Drinking Water Standards	40 CFR Part 141.60-.63	Establishes health based standards for public water systems (maximum contaminant levels)	Chemical	Relevant and appropriate for federal Class II aquifers.
National Secondary Drinking Water Standards	40 CFR Part 143.3	Establishes aesthetic based standards for public water systems (maximum contaminant levels)	Chemical	Relevant and appropriate.
Maximum Contaminant Level Goals	40 CFR 141.50 and Public Law No. 99-330, 100 Stat. 642 (1986)	Establishes drinking water quality goals set at concentrations of unknown or anticipated adverse health effects with an adequate margin of safety	Chemical	Relevant and appropriate.
Clean Water Act	33 USC 1251-1376			
Water Quality Criteria	40 CFR Part 131.36	Establishes criteria for water quality based on toxicity to aquatic organisms and human health	Chemical	Relevant and appropriate. Aquifer may be a federal Class II A (discharge to surface water).
Criteria and Standards for the National Pollutant Discharge Elimination System	40 CFR Part 125.1-3	Establishes criteria and standards for technology-based requirements in permits under the Clean Water Act	Chemical	Relevant and appropriate.
Archaeological and Historic Preservation Act	16 USC 469 40 CFR Part 6.301 (c)	Establishes procedures to provide for preservation of historical and archaeological data which might be destroyed through alteration of terrain as a result of a federal construction project for a federal licensed activity or program	Location	Applicable. OU-3 was used for landfilling activities. No known historic or archaeological value, although no confirmation study has been performed. Applicability will be determined during the Remedial Design (RD).
Clean Air Act of 1983				
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50.1-.6, .8, .9, .11, .12	Establishes standard for ambient air quality to protect public health and welfare.	Action	Applicable. Methane treatment may be required.
National Emission Standards for Hazardous Air Pollutants	40 CFR Part 61	Establishes regulatory standard for specific air pollutants.	Action	Applicable. Methane treatment may be required.

TABLE 2-1 (continued)

Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria and Limitations

Standard, Requirement, Criteria or Limitation	Citations	Description	ARAR Type	Applicability
Solid Waste Disposal Act as amended by Resource Conservation and Recovery Act of 1976	42 USC 6901			
Solid Waste Disposal Facility Criteria	40 CFR Parts 257 and 258	Sets forth revised minimum federal criteria for Municipal Solid Waste Landfills (MSWLFs) for existing and new units	Action	Relevant and appropriate for addressing landfill closure performance standards.
Land Disposal Prohibitions	40 CFR Part 268	Identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which a prohibited waste may continue to be land disposed	Action	Relevant and Appropriate. Alternatives may include the disposal of residual waste due to treatment.
Guidelines for the Land Disposal of Solid Waste	40 CFR Part 241.100-213	Establishes requirements and procedures for the disposal of solid waste.	Action	Relevant and appropriate for meeting landfill closure performance guidelines.
Resource Conservation and Recovery Act of 1976				
Hazardous Waste Management System: General	40 CFR Part 260	Establishes definitions as well as procedures and criteria for modification or revocation of any provision in 40 CFR Parts 260-265	Action	Applicable for identifying hazardous waste during soil placement at OU-2.
Identification and Listing of Hazardous Wastes	40 CFR Part 261	Defines those solid wastes which are subject to regulations as hazardous wastes under 40 CFR Parts 262-265	Action	Applicable for identifying hazardous waste during soil placement at OU-2.
Standards Applicable to Generators of Hazardous Wastes	40 CFR Part 262	Establishes standards for generators of hazardous waste	Action	Applicable to alternatives relating to removal or offsite transport of a hazardous material.
Standards Applicable to Transporters of Hazardous Wastes	40 CFR Part 263	Establishes standards which apply to persons transporting hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262	Action	Applicable for any transport of hazardous materials offsite.

TABLE 2-1 (continued)

Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria and Limitations

Standard, Requirement, Criteria or Limitation	Citations	Description	ARAR Type	Applicability
Standards for Owners and Operators of Hazardous Waste TSDF's	40 CFR Part 264	Establishes standards for acceptable hazardous waste management.	Action	Relevant and Appropriate for performance guidelines for landfill closure.
Standards for Owners and Operators of Hazardous Waste TSDF's with Interim Status	40 CFR Part 265	Establishes standards for acceptable hazardous waste management during interim status.	Action	Relevant and Appropriate for performance guidelines for landfill closure.
Criteria and Standards for the National Pollutant Discharge Elimination System	40 CFR Part 125	Establishes criteria and standards for technology-based requirements in permits under the Clean Water Act	Chemical	Relevant and appropriate.
Toxic Substances Control Act	40 CFR Part 761.1	Substances regulated include, but are not limited to, soils and other materials contaminated as a result of spills	Action	Applicable.
Executive Order No. 11988 on Floodplains Management	42 USC 7401 40 CFR 6.302 (b) & Appendix A	Requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, the adverse impacts associated with direct and indirect development of a floodplain.	Location	Applicable.

TABLE 2-1 (Continued)

Applicable or Relevant and Appropriate State Standards, Requirements, Criteria and Limitations

Standard, Requirement, Criteria or Limitation	Citations	Description	ARAR Type	Applicability
South Dakota Waste Management Regulations	74:26:03:04	Establishes requirements for disposal of hazardous wastes in sanitary landfills	Action	Relevant and appropriate.
South Dakota Waste Management Regulations	74:27:03:11	Defines requirements for closure of solid waste disposal facilities	Action	Relevant and appropriate.
South Dakota Waste Management Regulations	74:27:09:06	Defines criteria for permit applications for other solid waste treatment, storage, and/or disposal (TSD) facilities	Action	Relevant and appropriate.
South Dakota Waste Management Regulations	74:27:15	Establishes standards for landfill closure and post-closure monitoring	Action	Relevant and appropriate.
South Dakota Water Quality Standards	74:03:04:02, 10	Defines use of Box Elder Creek and certain tributaries	Action	Relevant and appropriate.
South Dakota Ground Water Standards	74:03:15	Defines ground water classifications by beneficial use and sets chemical standards	Chemical	Relevant and appropriate.
South Dakota Surface Water Quality Standards	74:03:02	Establishes surface water quality standards.	Chemical	Relevant and appropriate.
South Dakota Remediation Criteria for Petroleum-Contaminated Soils	74:03:32	Establishes requirements for the remediation of soil contaminated with petroleum products.	Chemical	Relevant and appropriate.

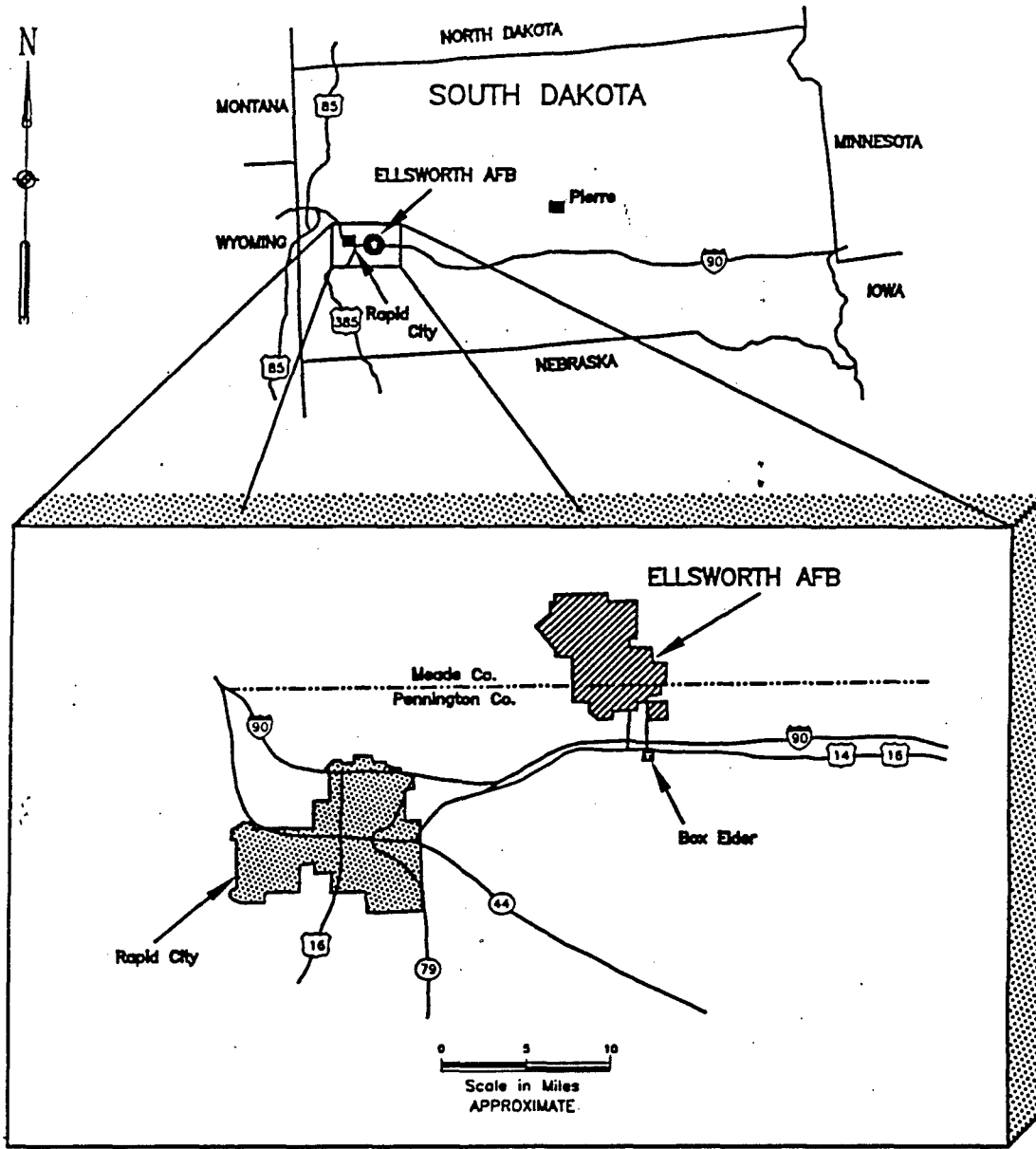
3.0 LIST OF ACRONYMS AND ABBREVIATIONS

ACC:	Air Combat Command
ARARs:	Applicable or Relevant and Appropriate Requirements
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act
CFR:	Code of Federal Regulations
COC:	Chemicals of Concern
CRP:	Community Relations Plan
DCE:	Dichlorethene
EAFB:	Ellsworth Air Force Base
EPA:	Environmental Protection Agency
FFA:	Federal Facilities Agreement
HQ:	Hazard quotient
IRP:	Installation Restoration Program
JP-4:	Jet Propulsion Fuel Number Four; contains both kerosene and gasoline fractions.
MCL:	Maximum Contaminant Levels
μg/KG:	Micrograms per kilogram
μg/l:	Micrograms per liter
mg/KG:	Milligrams per kilogram
mg/l:	Milligrams per liter
MSWLF:	Municipal Solid Waste Landfill
NCP:	National Oil and Hazardous Substances Contingency Plan
NPL:	National Priorities List
OU:	Operable Unit
OU-3:	Operable Unit Number 3, the Landfill 2 study area
O&M:	Operation and maintenance
PAH:	Polynuclear Aromatic Hydrocarbon
PCB:	Polychlorinated Biphenyl; liquids used as a dielectrics in electrical equipment
PCE:	Perchloroethylene; liquids used in degreasing or paint removal.
ppm:	Parts per million by weight
RAB:	Restoration Advisory Board
RAO:	Remedial action objective
RCRA:	Resource Conservation and Recovery Act
RD:	Remedial design
RI/FS:	Remedial Investigation/Feasibility Study
ROD:	Record of Decision


SARA: Superfund Amendments and Reauthorization Act
SACM: Superfund Accelerated Cleanup Model
SDDENR: South Dakota Department of Environment and Natural Resources
SVOC: Semivolatile Organic Compound
TCE: Trichloroethylene
TPH: Total petroleum hydrocarbons
TSD: Treatment, storage or disposal sites/methods
UCLM: Upper confidence limit mean
USAF: United States Air Force
USC: United States Code
U.S. EPA: United States Environmental Protection Agency
VOC: Volatile Organic Compound

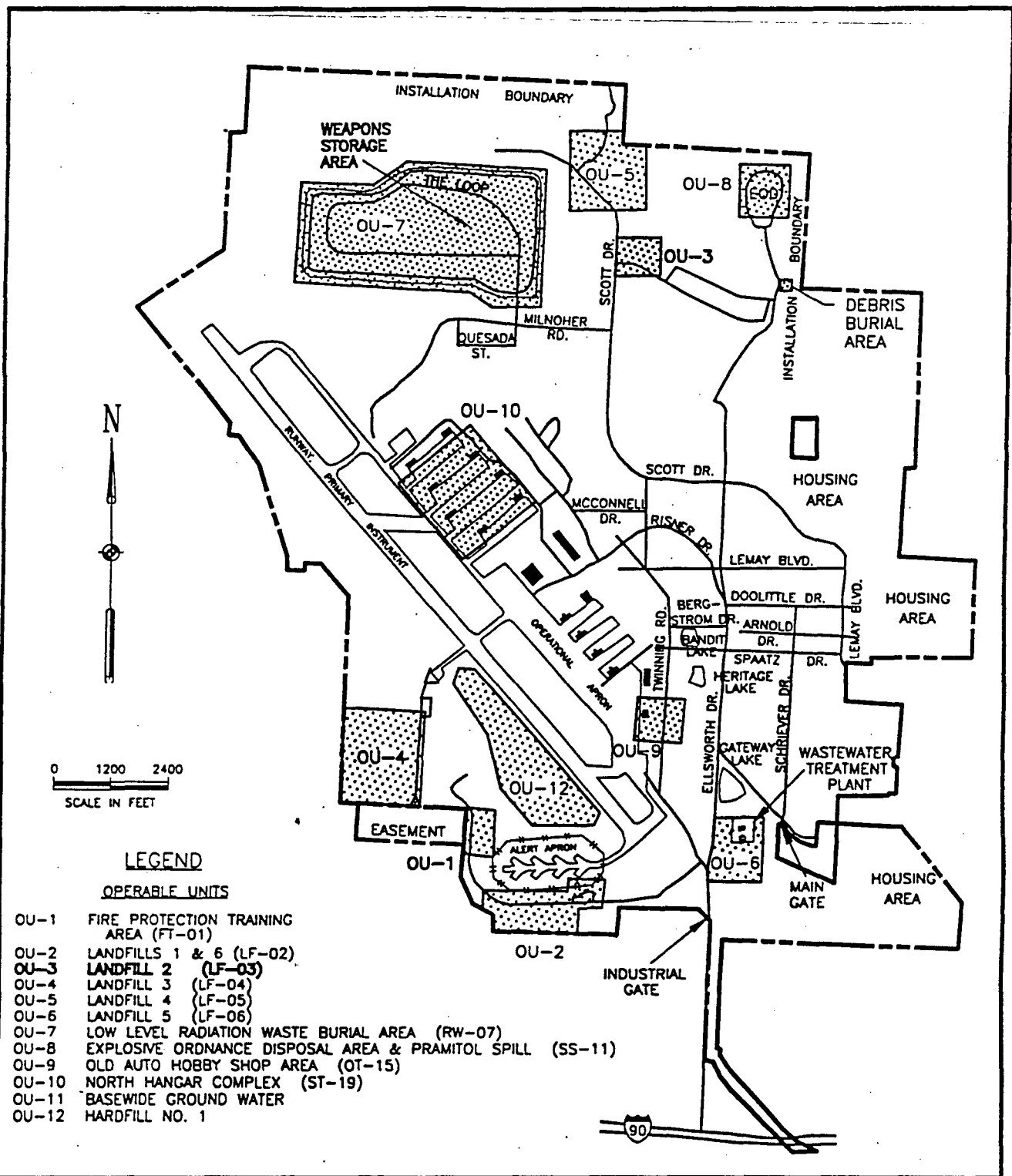
APPENDIX A

FIGURES



DRAWING NAME: F:\HORIZONS\NEW\DUJ\ROD\FIC2-1
 DATE: 12/07/1995 TIME: 09:54

 ELLSWORTH AIR FORCE BASE			ELLSWORTH AFB RAPID CITY, SOUTH DAKOTA			AREA LOCATION MAP	
PROJECT MGR	DESIGNED BY	DRAWN BY MRG	CHECKED BY	SCALE AS SHOWN	DATE DEC 95	PROJECT NO 60378.93	FIGURE: 2-1



DRAWING NAME: F:\HORIZONS\NEW\OU\J\ROD\FIC2-2
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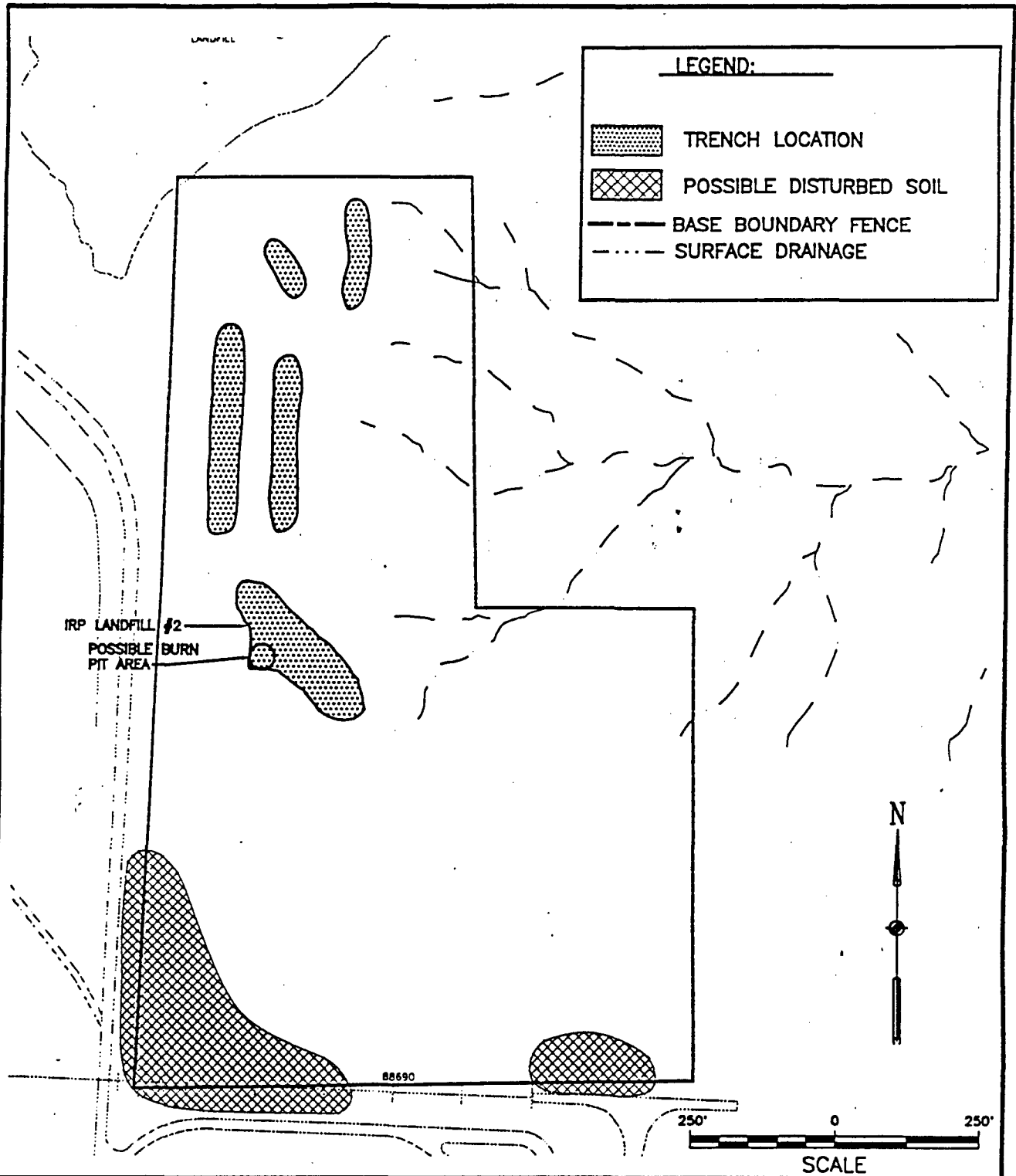


**ELLSWORTH
AIR FORCE BASE**

**ELLSWORTH AFB
RAPID CITY, SOUTH DAKOTA**

SITE LOCATION MAP

PROJECT MGR	DESIGNED BY	DRAWN BY STAFF	CHECKED BY	SCALE AS SHOWN	DATE DEC 95	PROJECT NO 60378.93	FIGURE: 2-2
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DRAWING NAME: F:\HORIZONS\NEW\OU3\ROD\FIG2-3
DATE: 02/21/1996 TIME: 15:58



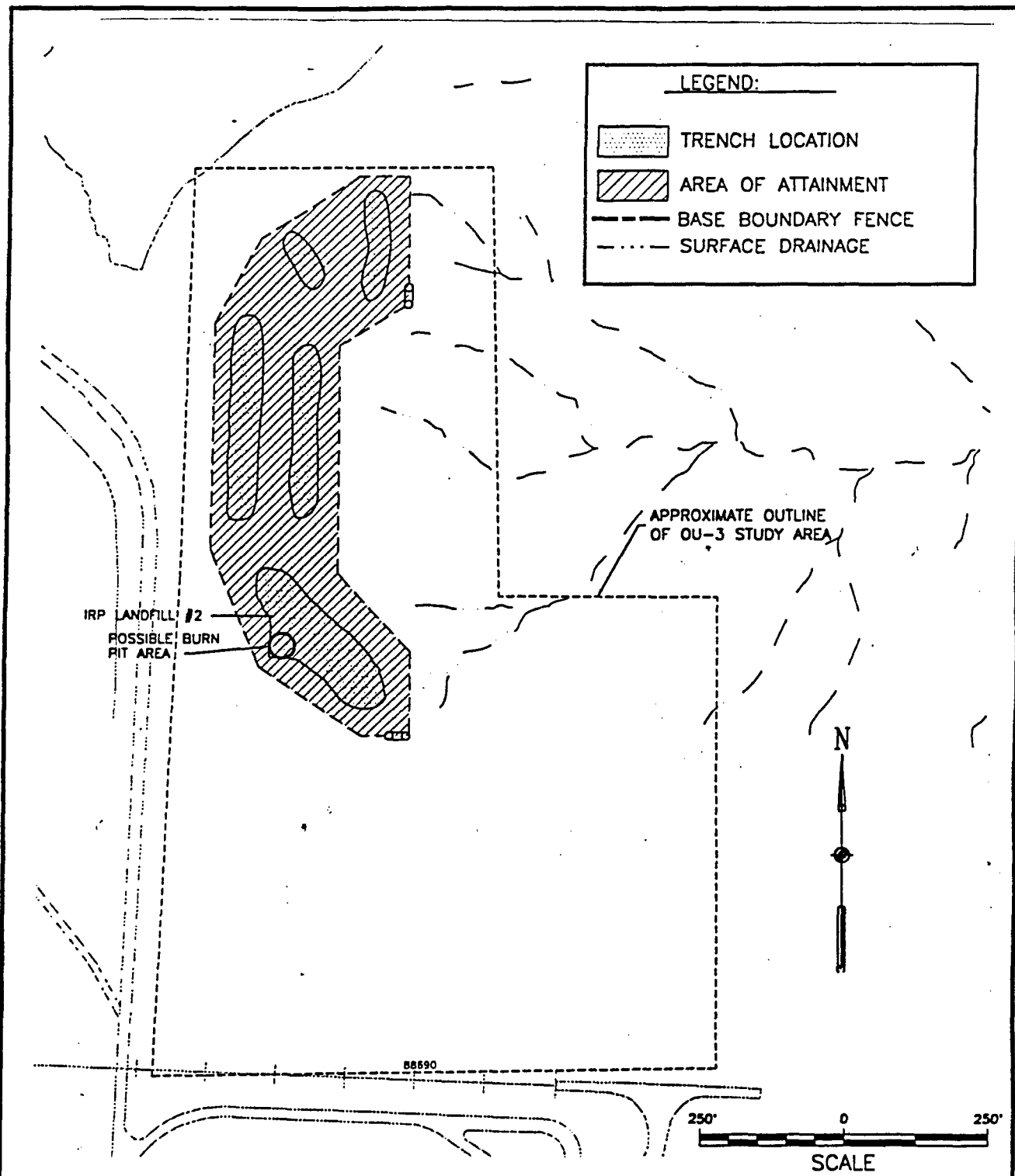
ELLSWORTH
AIR FORCE BASE


ELLSWORTH AFB
RAPID CITY, SOUTH DAKOTA

OU-3
SITE AREA MAP

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
		STAFF		AS SHOWN	DEC 95	60378.93	2-3

DRAWING NAME: F:\HORIZONS\NEW\OU3\ROD\FIC2-4
 DATE: 02/21/1996 TIME: 16:20



		ELLSWORTH AFB RAPID CITY, SOUTH DAKOTA		OU-3 AREA OF ATTAINMENT			
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
		STAFF		AS SHOWN	DEC 95	60378.93	2-4

APPENDIX B

RESPONSIVENESS SUMMARY

FINAL DETERMINATION

**Responsiveness Summary
Remedial Action at Operable Unit Three
Ellsworth Air Force Base, South Dakota**

1. Overview

The United States Air Force (USAF) established a public comment period from December 28, 1995 to January 27, 1996 for interested parties to review and comment on remedial alternatives considered and described in the Proposed Plan for Operable Unit Three (OU-3). The Proposed Plan was prepared by the USAF in cooperation with the U.S. Environmental Protection Agency (USEPA) and the South Dakota Department of Environment and Natural Resources (SDDENR).

The USAF also held a public meeting at 7:30 p.m. on January 11, 1996 in the Box Elder Middle School to outline the proposed remedy to reduce risk and control potential hazards at the Operable Unit (OU).

The Responsiveness Summary provides a summary of comments and questions received from the community at the public meeting and during the public comment period as well as the USAF's responses to public comments.

The Responsiveness Summary is organized into the following sections:

- Background on Community Involvement
- Summary of Comments and Questions Received During the Public Comment Period and USAF Responses
- Remaining Concerns

2. Background on Community Involvement

On August 30, 1990 EAFB was listed on the USEPA's National Priorities List (NPL). A Federal Facilities Agreement (FFA) was signed in January 1992 by the Air Force, EPA, and the State and went into effect on April 1, 1992. The FFA establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions for EAFB.

Community relations activities that have taken place at EAFB to date include:

- **FFA process.** After preparation of the FFA by the USAF, EPA, and SDDENR, the document was published for comment. The FFA became effective April 1, 1992.
- **Administrative Record.** An Administrative Record for information was established in Building 8203 at EAFB. The Administrative Record contains information used to support

USAF decision-making. All the documents in the Administrative Record are available to the public.

- **Information repositories.** An Administrative Record outline is located at the Rapid City Library (public repository).
- **Community Relations Plan (CRP).** The CRP was prepared and has been accepted by EPA and the State of South Dakota and is currently being carried out. An update to this plan will be prepared in 1996.
- **Restoration Advisory Board (RAB).** The RAB has been formed to facilitate public input in the cleanup and meets quarterly. In addition to USAF, EPA, and South Dakota oversight personnel, the RAB includes community leaders and local representatives from the surrounding area.
- **Mailing list.** A mailing list of all interested parties in the community is maintained by EAFB and updated regularly.
- **Fact sheet.** A fact sheet describing the status of the IRP at EAFB was distributed to the mailing list addressees in 1992.
- **Open house.** An informational meeting on the status of the IRP and other environmental efforts at EAFB was held on May 6, 1993. An open house was held November 16, 1995 in conjunction with the Restoration Advisory Board meeting. Information on the status of environmental efforts at EAFB was provided.
- **Newspaper articles.** Articles have been written for the base newspaper regarding IRP activity.

The Proposed Plan for this remedial action was distributed to the mailing list addressees for their comments and additional copies of the Proposed Plan were available at the January 11, 1996 public meeting. A transcript of comments, questions, and responses provided during the public meeting was prepared.

3. Summary of Comments and Questions Received During the Public Comment Period and USAF Responses

Part I - Summary and Response to Local Community Concerns

Review of the written transcript of the public meeting did not indicate community objections to the proposed remedial action. No written comments were received during the public comment period.

The majority of the comments received during the public meeting were in the form of questions about the remedial investigation findings, the remedial action; i.e., what would be done, how it would be done, and what effects the action might have. Representatives of the USAF were available

to provide answers to the questions and also provided an overview presentation during the meeting to describe the proposed actions.

Part II - Comprehensive Response to Specific Technical, Legal and Miscellaneous Questions

The comments and question below are in the order they appear in the written transcript of the January 11, 1996 public meeting.

Comment 1. Vivian Pappel

Asked about whether the landfill was officially closed before, whether the cover present was daily cover, and what type of soil would be used for the proposed closure action.

Response: The landfill was used briefly, and then its use was discontinued. The landfill was not officially closed under State regulations. When use was discontinued, the daily cover was graded. Due to erosion of the cover, a new cover is required. The new cover soil will consist of clay soil that will meet the criteria defined in the State regulations.

