REVISED FINAL

2011 FIVE-YEAR REMEDY REVIEW ACC 4-BASE PBC

MOUNTAIN HOME AIR FORCE BASE, IDAHO

September 2011

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2011 FIVE-YEAR REMEDY REVIEW REPORT
ACC 4-BASE PBC
MOUNTAIN HOME AIR FORCE BASE, IDAHO
September 29, 2011

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FINAL 2011 FIVE-YEAR REMEDY REVIEW REPORT
ACC 4-BASE PBC

MOUNTAIN HOME AIR FORCE BASE, IDAHO
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List of Acronyms and Abbreviations

ACC	Air Combat Command
AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
AFI	Air Force Instruction
API	American Petroleum Institute
ARAR	applicable or relevant and appropriate requirements
AS	air sparging
AST	aboveground storage tank
AVGAS	aviation gas
BCP	Base Comprehensive Plan
BEW	bedrock extraction well
bgs	below ground surface
BMP	best management practice
BRA	Baseline Risk Assessment
BTEX	benzene, toluene, ethylbenzene, and xylenes
CalEPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineer Squadron
CFR	Code of Federal Regulations
COC	chemical of concern
COPC	chemical of potential concern
CO_2	carbon dioxide
CPTM	Continuous Precision Tightness Monitoring
DCE	dichloroethene
DESC	Defense Energy Support Center
DEQ	Idaho Department of Environmental Quality
DLA	Defense Logistics Agency
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ERP	Environmental Restoration Program
ESD	Explanation of Significant Differences
FEC	Foothill Engineering Consultants
FFA	Federal Facility Agreement
FFS	Focused Feasibility Study
FS	Feasibility Study

FYR	Five-Year Remedy Review
FID	flame ionization detector
HEAST	Health Effects Assessment Summary Table
IC	institutional control
IDAPA	Idaho Administrative Procedures Act
IDHW	Idaho Department of Health and Welfare
INEL	Idaho National Laboratory
JP-4	jet propellant 4
JP-8	jet propellant 8
LFI	limited field investigation
LNAPL	light non-aqueous phase liquid
LOX	liquid oxygen
LTM	long-term monitoring
LUC	land use control
MACTEC	MACTEC Engineering and Consulting, Inc.
MCL	maximum contaminant level
MHAFB	Mountain Home Air Force Base
M-I	multi-increment
MILCON	Military Construction
MOGAS	motor gasoline
MSSL	Medium Specific Screening Level
MSW	municipal solid waste
MSWLF	Municipal Solid Waste Landfill
MW	monitoring well
NCP	National Contingency Plan
NFA	No Further Action
NPL	National Priorities List
NRA	No Remedial Action
NTCRA	non-time critical removal action
O&M	operations and maintenance
OSWER	Office of Solid Waste and Emergency Response
O_2	oxygen
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PBC	performance based contract
PCB	polychlorinated biphenyls
POL	petroleum, oil and lubricants
PPRTV	Provisional Peer Reviewed Toxicity Value
PRG	preliminary remediation goal

PRS	product recovery system
PZMW	perched zone monitoring well
RAB	Restoration Advisory Board
RAGS	Risk Assessment Guidance for Superfund
RAO	remedial action objective
RA/O	Remedial Action/Operation
RAWP	Remedial Action Work Plan
RBC	risk-based concentration
RBCA	Risk-Based Corrective Action
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
RDA	removal and disposal action
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RMC	RMC Consultants, Inc.
RME	reasonable maximum exposure
ROD	Record of Decision
ROI	radius of influence
RSL	Regional Screening Level
SC	Site Closure
SDWA	Safe Drinking Water Act
SEW	soil extraction well
SI	site investigation
SRC	Site Response Complete
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCA	trichloroethane
TCE	trichloroethene
TMB	trimethylbenzene
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TSDF	Treatment, Storage, and Disposal Facility
U.S.	United States
USAF	United States Air Force
USGS	U. S. Geological Survey
UST	underground storage tank
URS	URS Group, Inc.
USACE	United States Army Corps of Engineers

USC	United States Code
UU/UE	unlimited use/unrestricted exposure
VE	vapor extraction
VEW	vapor extraction well
VMW	vapor monitoring well
VP	vapor port
VOC	volatile organic compound
WCC	Woodward-Clyde Consultants

List of Symbols

g/L	grams per liter
µg/L	microgram per liter
µg/m^3	microgram per cubic meter
µg/kg	microgram per kilogram
mg/kg	milligram per kilogram

EXECUTIVE SUMMARY

The five-year remedy review (FYR) evaluates the remedy components and monitoring data associated with environmental sites at Mountain Home Air Force Base (MHAFB). This review is required by statute because remedies were selected post-Superfund Amendments and Reauthorization Act and will leave hazardous substances, pollutants, or contaminants onsite above levels that allow for unlimited use and unrestricted exposure (UU/UE) required by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii). As required by the National Contingency Plan (NCP), if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for UU/UE, the lead agency shall review such action no less than every five years after the initiation of the selected remedial action. UU/UE means that the selected remedy will place no restrictions on the potential land use or other natural resources. The remedy review team consists of the United States Air Force (USAF), United States (U.S.) Environmental Protection Agency (EPA) Region 10, and Idaho Department of Environmental Quality (DEQ), as dictated in Section XIX of the Federal Facility Agreement (FFA) for MHAFB (EPA, DEQ, and USAF 1991). The Air Force project team includes MHAFB, the Air Force Center for Engineering and the Environment (AFCEE), and Headquarters Air Combat Command (ACC). This FYR evaluates the selected remedies at MHAFB. This third FYR report is being submitted to fulfill the requirements of the ACC, AFCEE World-Wide Environmental Restoration Contract for services related to the Fixed Price Remediation at MHAFB under URS Group, Inc. (URS) Contract Number FA8903-04-D-8679, Task Order 0053. The initial FYR was submitted in June 2001 (FEC 2001), and the second FYR was completed in June 2006 (URS 2006b).

INSTALLATION DESCRIPTION

MHAFB is located in Elmore County in southwestern Idaho, approximately 10 miles southwest of the city of Mountain Home (Figure 1-1). MHAFB is approximately 50 miles southeast of Boise and is 2 miles north of the Snake River. MHAFB occupies approximately 5,800 acres and is situated at an elevation of approximately 3,000 feet above mean sea level. Approximately 7,500 service men and women and their dependents live at MHAFB.

PURPOSE AND SCOPE

The purpose of the FYR is to determine whether selected remedies as documented in the Records of Decision (RODs) for 33 Environmental Restoration Program (ERP) sites at MHAFB are protective of human health and the environment. The ERP sites are grouped into operable units (OUs) as follows and are shown on Figure 1-2.

- OU-1 - Twenty-one sites for which limited field investigations (LFIs) were completed and the Former Base Landfill (LF-03)
- OU-2 - Two sites, B-Street Landfill (LF-02) and the Lagoon Landfill (LF-01)
- OU-3 - Basewide regional groundwater and six fuel sites that underwent Remedial Investigations (RIs)

- OU-4 - One site, Fire Training Area 8 (FT-08)
- OU-5 - One site, low-level radioactive waste disposal site (RW-14)
- OU-6 - Six sites from OU-1 that underwent further investigations as either Phase II LFIs or RIs and the underground storage tank (UST) at FT-08

Table ES-1 also includes a reference matrix of the ERP sites and their associated OUs.

REVIEW PROCEDURE

The FFA team members agreed the general table of contents and format of the document should follow that used for the 2006 Five-Year Review. The preparation of the FYR document began with data gathering and information assessment in September 2010. Relevant documents were collected for review and are listed in Section 6.

FIVE-YEAR REVIEW DOCUMENT ORGANIZATION

In accordance with EPA guidance (OSWER No. 9355.7-03B-P), the FYR is organized as follows:

Section 1.0	Introduction – purpose and scope of the five-year review, and authority statement
Section 2.0	Site Chronology – summarizes key environmental studies and regulatory actions
Section 3.0	Background – provides a description of the physical characteristics, general geology, hydrology, land and resource use, history of contamination for each site, and basis for selected remedy
Section 4.0	Remedial Actions – provides a description of the remedies selected, implementation, and system operation/operation and maintenance
Section 5.0	Progress Since Last Five-Year Review – protectiveness statements from last review, status of previous recommendations, and results of implemented actions
Section 6.0	Five-Year Review Process – describes the administrative components, community involvement, document review, data review, site inspections, and interviews that were completed for this review
Section 7.0	Technical Assessment – provides a technical assessment of the remedies in place at MHAFB
Section 8.0	Issues
Section 9.0	Recommendations and Follow-Up Actions

Section 10.0 Protectiveness Statement – current protectiveness statements

Section 11.0 Next Review

Section 12.0 References

Summary tables and figures are included in the back of each section following the text.

EVALUATION OF PROTECTIVENESS

The site-specific remedies have been implemented for all sites in accordance with the RODs, Explanations of Significant Differences (ESDs), and ROD amendments. Selected remedies for all sites are protective of human health and the environment currently, in the near term, and in the long term. Each site is depicted on Figure 1-2.

Of the 33 ERP sites, selected remedies are protective of human health and the environment and allow UU/UE for the following 27 sites:

- FT-04, Fire Training Area 4
- FT-05, Fire Training Area 5
- FT-06, Fire Training Area 6
- FT-07, Fire Training Area 7 (includes areas A, B, and C)
- FT-08, Fire Training Area 8 Soils
- DP-09, Waste Oil Disposal Area
- OT-10, Oiled Base Perimeter Road
- ST-11, Fuel Hydrant System Spill
- SD-12, Old Entomology Shop
- ST-13, Petroleum, oil, and lubricants (POL) Yard Underground Storage Tank (UST)
- RW-14, Low-Level Radioactive Waste Disposal Area
- OT-15, Corker Material Burial Sites
- OT-16, Munitions Burial Site
- DP-18, World War II Material Burial Trench
- ST-22, USTs – Building 1333
- SD-24, Liquid Oxygen (LOX) Loading Plant
- SD-25, Flightline Storm Drain
- SS-26, Drum Accumulation Pad
- SD-27, Wash Rack – Building 1354
- SS-28, Wash Water Accumulation Basin

- SS-29, Drum Storage Area
- SS-30, Defense Reutilization and Marketing Office Storage Area
- ST-31, Old Base Exchange Gas Station
- ST-32, Old Military Gas Station
- ST-34, Flightline Fuel Hydrant #9 Leak Area
- ST-35, Jet Propellant (JP)-4 Pipeline Leak
- ST-39, 15,000-gallon UST at FT-08

The selected remedies for the following three sites include institutional controls (ICs) and are protective of human health and the environment:

- LF-01, Lagoon Landfill
- LF-02, B-Street Landfill
- LF-23, Solid Waste Disposal Area

The following site has been closed through the Idaho Central District Health Department and is subject to solid waste laws:

- LF-03, Former Base Landfill

The following site has been closed based on Risk-Based Corrective Action (RBCA) standards and requires no further remediation or monitoring:

- ST-38, POL Storage Area, Resource Conservation and Recovery Act (RCRA) Solid Waste Management Unit (SWMU)

The selected remedy for the following site is protective of human health and the environment in the short term, but follow-up actions to address volatile organic compound (VOC) vapors in bedrock and implement ICs are required for the remedy to be protective in the long term:

- OU-3, Basewide Regional Groundwater

OU-3 is a basewide OU that considers all sites as potential sources of contaminants to a regional groundwater aquifer that underlies MHAFB. Since the 1995 ROD, long-term monitoring (LTM) of the regional groundwater has routinely detected trichloroethene (TCE) above its maximum contaminant level (MCL) in three monitoring wells. VOCs, including TCE, have not been detected above MCLs in any of MHAFB drinking water supply wells or perimeter wells during any sampling events. In addition, relatively high concentrations of TCE in fractured basalt bedrock represent a potential threat to the regional groundwater. Additional details concerning results from the LTM program are included in Table ES-2.

The remedy for OU-3 of No Remedial Action (NRA) with LTM is protective of human health and the environment in the short term. NRA was the term used to describe the remedy in the 1995 ROD; the current term used is No Action. However, expansion of the vapor extraction

systems, installed to remove TCE vapor from soils at Sites FT-08 and SD-24, is recommended, along with ICs, under OU-3 to address contaminant sources in fractured bedrock that pose a potential threat to regional groundwater in the long term.

The remedy at MHAFB is expected to be protective of human health and the environment upon implementation of land use controls (LUCs) at Site LF-23, completion of ongoing remedial actions at Sites FT-08 and ST-11, and implementation of contaminant source removal from the vadose zone. Exposure pathways that could result in unacceptable risks are being controlled in the interim. Barring unanticipated issues, remedial action and implementation of LUCs will likely allow a determination that the remedy is protective sitewide within the next five years.

SUMMARY OF REVIEW AND RECOMMENDED ACTIONS

The initial 2001 FYR identified the need for additional characterization of potential TCE sources and changes to the LTM plan, including replacement of monitoring wells to adequately maintain the monitoring program, and for compliance with the RODs. Based on these recommendations, subsequent site characterization and LTM activities were performed and revealed that additional response action was warranted at several sites to ensure the protectiveness of selected remedies. The 2006 FYR identified the following recommendations:

- No Further Action (NFA) for eight sites (FT-05, FT-06, FT-07, SD-12, ST-11, SD-25, SS-30, and ST-32).
- Continue the Tank 1 petroleum, oil, and lubricants comprehensive engineering evaluation and implementation of the corrective action plan for ST-38 under the RBCA or Risk Evaluation Manual.
- Implement institutional controls for two sites (LF-01 and LF-02) to prevent unacceptable risk due to exposure to potentially contaminated media.
- Complete an Engineering Evaluation/Cost Analysis (EE/CA) and a potential non-time critical removal action for contaminated soils at five sites (FT-04, OT-16, LF-23, SD-27, and SS-29) to achieve unrestricted future land use.
- Complete pilot studies to evaluate potential remedial technologies for three sites (FT-08, ST-11, and SD-24).
- Complete a Baseline Risk Assessment (BRA) amendment, focused feasibility study (FFS), and proposed plan for ST-11, FT-08, and SD-24.
- Continue operations and maintenance activities for the current product recovery system at ST-13 and complete an OU-3 RI/BRA amendment to document the presence of light non-aqueous phase liquid (LNAPL) on regional groundwater in MW24. Additional characterization of the source area of LNAPL in MW24 and hot spots contributing volatile organic compound vapors to the vadose zone for ST-13.
- Revisit TCE toxicity data to evaluate the protectiveness of the selected remedies based on the outcome of the ongoing TCE slope factor review.

Table ES-2 summarizes the current status for all sites and recommendations for eight sites, including OU-3. Section 9 discusses these recommendations and presents a schedule for implementing follow-up actions. Specific Tier 1 and Tier 2 recommendations are provided below and are summarized by site in Table ES-3. Tier 1 recommendations address actions that affect protectiveness, and Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness.

Tier 1

- Complete a pilot study, Feasibility Study (FS), Proposed Plan, and ROD amendment for OU -3
- Implement LUCs for Site LF-23 in accordance with the ESD

Tier 2

- Continue LTM for basewide regional groundwater and perched groundwater, as appropriate
- Continue remedial actions at Sites FT-08 and ST-11 until cleanup objectives are met

NEXT FIVE-YEAR REMEDY REVIEW

Additional FYRs are required since contamination remains above levels that allow UU/UE at some ERP sites located at MHAFB. The next FYR will be due no later than June 2016.

TABLE ES-1
ERP SITE AND OPERABLE UNIT REFERENCE MATRIX
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Site Name	Associated OUs
LF-01	Lagoon Landfill	OU-2*
LF-02	B-Street Landfill	OU-2*
LF-03	Former Base Landfill	OU-1*
FT-04	Fire Training Area 4	OU-1*
FT-05	Fire Training Area 5	OU-1*
FT-06	Fire Training Area 6	OU-1*
FT-7A, B, and C	Fire Training Area 7	OU-1*
FT-08	Fire Training Area 8	OU-4*
DP-09	Waste Oil Disposal Area	OU-1*
OT-10	Oiled Base Perimeter Road	OU-1*
ST-11	Flight Line Fuel Spill	OU-3 (Fuel Sites)
SD-12	Old Entomology Shop	OU-1, OU-6 *
ST-13	POL Yard UST Site	OU-3
RW-14	Low-Level Radioactive Waste Disposal Area	OU-5*
OT-15	Corker Material Burial Site	.
OT-16	Munitions Burial Site	OU-1, OU-6 *
DP-18	World War II Material Burial Trench	OU-1*
ST-22	USTs – Building 1333 (Titan Missile Maintenance Area)	OU-1*
LF-23	Solid Waste Disposal Area	OU-1*
SD-24	Liquid Oxygen Loading Plant and Auto Hobby Shop	OU-1, OU-6 *
SD-25	Flightline Storm Drain	OU-6*
SS-26	Drum Accumulation Pad	OU-1*
SD-27	Wash Rack – Building 1354	OU-1, OU-6 *
SS-28	Wash Water Accumulation Basin	OU-1*
SS-29	Drum Accumulation Pad	OU-1, OU-6 *
SS-30	DRMO Storage Area	OU-1*
ST-31	Old Base Exchange Gas Station	OU-3 Fuel Sites
ST-32	Old Military Gas Station	OU-3 Fuel Sites
ST-34	Flightline Fuel Hydrant # 9 Leak Area	OU-3 Fuel Sites
ST-35	JP-4 Pipeline Leak	OU-3 Fuel Sites
ST-38	POL Storage Area, RCRA SWMU	OU-3 Fuel Sites
ST-39	15,000-gallon UST at FT-08	OU-6*
OU-3 Regional Groundwater	Basewide Regional Groundwater	OU-3
NA	Fuel Management Program	NA

Notes:

*This site is also being addressed by the Basewide Groundwater LTM program under OU-3.

Shading indicate the site status remains unchanged since the 2006 FYR.

TABLE ES-2
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Site Description	Applicable OU No(s).	Status of Response	Selected Remedy	Current Status	Recommendations	Original ROD Chemicals of Concern in Soil
LF-01	Lagoon Landfill	OU-2 OU-3 (LTM)	OU-3 ROD – 1995 ESD – 2006	NRA with LTM of regional groundwater LUCs	• Although modeled groundwater concentrations of compounds (aroclor-1254 and heptachlor epoxide) detected in lagoon sediment exceeded federal MCLs, neither PCBs nor pesticides have ever been detected in groundwater sampled from MW7-2 (WCC 1995a). • An ESD was completed in 2006 with LUCs specified for the area defined by the former burial trenches (now covered with a lagoon sediment monofill). Site closed under the industrial use scenario. • Post-closure activities (inspections) are being completed under the MHAFB compliance program for the lagoon sediment monofill constructed over the footprint of Site LF-01 according to the post-closure plan (MACTEC 2002). These inspections are being reported in the annual LTM reports.	• Continue monitoring regional groundwater at MW7-2 in accordance with the approved work plan. • Continue annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD.	Metals
LF-02	B-Street Landfill	OU-2 OU-3 (LTM)	LF-02 ROD - 1993 ESD - 2006	NRA with LTM of regional groundwater LUCs	• MW3-2 groundwater sampling results indicate that COPCs are not migrating outside of installation boundaries to the north (URS 2006b). MW32 and new well MW37 sampling results suggest that Site LF-02 is not impacting groundwater (URS 2009d). • Rubble areas are being leveled and covered with native soils as part of a MHAFB beautification program. • An ESD was completed separately under OU-2 in 2006 with LUCs specified for the trench area, ash disposal area, and former drum disposal area. The site was closed under the industrial use scenario. Annual inspections are being completed which are being reported in the annual LTM reports.	• Continue monitoring regional groundwater at MW3-2 in accordance with the approved work plan. • Continue annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD.	TCE, PAHs, pesticides, TPH, and metals

TABLE ES-2
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Site Description	Applicable OU No(s).	Status of Response	Selected Remedy	Current Status	Recommendations	Original ROD Chemicals of Concern in Soil
LF-03	Former Base Landfill	OU-1	NA	NA	• Operated under a Conditional Use Permit issued by Elmore County. The DEQ, Central District Health Department provides oversight for the Site LF-03 permit. • Landfill cells closed prior to 1984 are ERP and cells closed after 1984 are covered under the state permit issued by Elmore County. • The Air Force submitted a revised Notice of Intent to close the solid waste construction and demolitions cells to the Central District Health Department on January 14, 2009. This submittal included the dates the cells would no longer be used and a brief description of how the cells would be closed. • The Air Force submitted a Certificate of Completion to the Central District Health Department on January 23, 2009 documenting the relocation of MSW to comply with the 200 foot set-back requirements. • The Air Force will complete post-closure care activities in accordance with 40 CFR 258.61 to include: maintaining the integrity and effectiveness of any final cover and maintaining and operating the gas monitoring system in accordance with the requirements of 40 CFR 258.23. The small landfill exemption status of the municipal landfill exempts MHAFB from the requirements for a leachate collection system and a groundwater monitoring system. This information is included in the MSW Landfill Post-Closure Plan (Sunrise Engineering, Inc. 2009). • The Central District Health Department completed a landfill closure inspection on March 9, 2009, which indicated final closure activities had been completed based on the approved plan and the site review indicated substantial compliance. • The Air Force submitted the 2009 Landfill Closure Certificate to the Central District Health Department of April 13, 2009, which served as the official Notice of Closure for this landfill. • The Air Force submitted a request for waiver for post-closure methane monitoring to the Central District Health Department on May 18, 2009. The Air Force requested to complete monitoring on an annual basis as opposed to a quarterly basis. • A letter from the Central District Health Department dated October 26, 2009 indicating the submitted MSW Landfill Post-Closure Plan was in substantial compliance with the post-closure care requirements as specified in 40 CFR 258.61 and Idaho Code 39-7416. • Site LF-03 is not evaluated under CERCLA or by the FFA and is now closed and subject to solid waste laws. • Site LF-03 meets the conditions for exemption in 40 CFR 258.1 (criteria for Municipal Solid Waste Landfills), therefore groundwater monitoring is not required under that program. • LTM of Site LF-03 is provided by sampling nearby monitoring well MW17-2 as part of the regional groundwater LTM (URS 2007e). • Post-closure activities specified in the MSW Landfill Post-Closure Plan (Sunrise Engineering, Inc. 2009) will be conducted for 30 years and include maintaining the effectiveness of any final cover and maintaining and operating a gas monitoring system. In addition, inspections will be completed on a semi-annual basis for the first year of post-closure care and annually thereafter for the 30-year period.	• Sample MW17-2 in accordance with the approved work plan. • Complete post-closure activities in accordance with the MSW Landfill Post-Closure Plan (Sunrise Engineering, Inc. 2009).	None

TABLE ES-2
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Site Description	Applicable OU No(s).	Status of Response	Selected Remedy	Current Status	Recommendations	Original ROD Chemicals of Concern in Soil
LF-03	Former Base Landfill	OU-1 OU-3 (LTM)	NA	NA	• Access to the landfill will be controlled to prevent damage to the final cover. Access is prevented by a gate at the front entrance of the landfill and a perimeter fence around MHAFB, which is patrolled at all times. In addition, a sign identifies the point of access to the facility. • MHAFB and the landfill will continue to be fenced and will not actively be used after closure. The area will be returned to a natural setting and planted to vegetation similar to the surrounding environment.		
FT-04	Fire Training Area 4	OU-1 OU-3 (LTM)	OU-3 ROD – 1995	NRA with LTM	• The Air Force completed a limited assessment at two "hot spots" for arsenic in soils with arsenic above the DEQ established background concentration (URS 2006c). Additional soil sampling for arsenic analysis was completed. The evaluation indicated the higher arsenic concentrations were associated with deeper soils near basalt bedrock and were not due to site-related activities.	• NFA • Site FT-04 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	Arsenic
FT-05	Fire Training Area 5	OU-1 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site FT-05 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site FT-05 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site FT-05 remains NFA.	None
FT-06	Fire Training Area 6	OU-1 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site FT-06 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site FT-06 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site FT-06 remains NFA.	None
FT-7A, B, and C	Fire Training Area 7	OU-1 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site FT-07 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site FT-07 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site FT-07 remains NFA.	None

TABLE ES-2
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Site Description	Applicable OU No(s).	Status of Response	Selected Remedy	Current Status	Recommendations	Original ROD Chemicals of Concern in Soil
FT-08	Fire Training Area 8 (Adjacent to Existing Fire Training Area)	OU-4 OU-3 (LTM)	OU-4 ROD – 1992 (soil) OU-3 ROD – 1995 (groundwater) OU-4 ROD Amendment – 2009 (soil)	NRA NRA with LTM SVE	• LTM of regional groundwater at MW11-2, MW28, and MW39, and LTM of vapors at MW28 and MW39 (URS 2009d). • Bedrock vadose zone vapor samples collected from MW28 since 2004 (URS 2009d) indicate TCE vapors to a depth of at least 301 feet below ground surface. However, the vapor concentrations are orders of magnitude below the suspected source area at Site SD-24, and groundwater samples from site-related monitoring wells have historically been at consistent 1 to 2 µg/L concentrations for TCE (URS 2007i). • TCE detected in soil samples (URS 2003) show concentrations higher (maximum of 98,000 micrograms per kilogram) than detected during the RI (WCC 1991). • A passive soil gas survey (RMC 2005) suggests TCE in soils possibly more widespread than indicated during the RI, primarily in an area southwest of the former burn pit. BTEX contamination appears to be present mainly in the area of the former burn pit. • SVE pilot studies (URS 2007h) and a remedy optimization study (URS 2008d) support the viability of SVE for the site. • An OU-4 RI/BRA amendment, FS, and Proposed Plan were completed to address TCE and BTEX in soil and soil gas. The FS identified SVE as the Preferred Alternative. The Air Force issued a Proposed Plan for Site FT-08 in August 2009 (URS 2009f). • The OU-4 ROD Amendment for Site FT-08 soil was issued and signed in September 2009 (URS 2009k) with SVE selected as the amended remedy. • A pilot scale SVE system was in operation at Site FT-08 prior to implementation of the remedial action. A RAWP was issued in February 2010 (URS 2010a) to describe the construction of the remedial action selected (SVE). Modifications to the existing pilot system were completed in February 2010 in accordance with the Site FT-08 RAWP to optimize sub-surface vapor flow and overall contaminant extraction rates. • The site achieved construction complete status when the Final Remedial Action Report was issued on December 3, 2010 (URS 2010k). EPA and DEQ have determined that all remedial action construction activities were performed according to the RAWP. Operation and monitoring of the full scale SVE system began on February 26, 2010.	• Continue operation of the selected amended remedy (SVE), which includes the following components: o Apply a vacuum to vadose zone overburden soils to induce the controlled flow of air in the soil and remove volatile contaminants from the soil until residual soil and soil gas contaminant concentrations are reduced to the UU/UE cleanup levels. o Complete vapor effluent sampling and soil and soil gas sampling. o Continue SVE system O&M activities until cleanup levels are met. o Document achievement of cleanup levels with sampling results and FFA team concurrence. o Turn off and dismantle the SVE system. o Complete five-year reviews, as needed.	cis-1,2-DCE, benzene, ethylbenzene, toluene, PCE, TCE, and TPH
DP-09	Waste Oil Disposal Area	OU-1 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site DP-09 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site DP-09 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site DP-09 remains NFA.	None
OT-10	Oiled Base Perimeter Road	OU-1 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site OT-10 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site OT-10 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site OT-10 remains NFA.	None

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ST-11	Flight Line Fuel Spill	OU-3 (Fuel Sites)	OU-3 ROD – 1995 ESD – 2004 OU-3 ROD Amendment – 2010	Limited Action ICs VE	• LTM of perched groundwater at PZMWs: PZMW7 - PZMW17 (URS 2007e) has indicated some perched zone wells exhibit BTEX concentrations exceeding MCLs, and free-product JP-4 is present on perched groundwater. • LNAPL present in one perched zone monitoring well violates Idaho Administrative Procedures Act 58.01.02.852.04 for free product thickness (0.10 inch) (URS 2009d). • Fluctuations in perched zone groundwater levels and LNAPL present in some wells indicate system is not static (RMC 2003a). • LTM of regional groundwater and vapors at MW20 and MW26 (URS 2007e) are used to monitor for impacts to deeper vadose zone bedrock and regional groundwater. • An ESD was completed in 2004 to clarify and enhance the ICs for the site. • VE pilot studies (URS 2007g and 2009a) indicate that VE technology is effective for VOC recovery in both shallow soils and deeper bedrock. • A FS and Proposed Plan were completed to evaluate remedial alternatives for fuel constituents in perched zone groundwater. The FS identified VE as the Preferred Alternative (URS 2009l). The Air Force issued a Proposed Plan for Site ST-11 in March 2010 (URS 2010b). • The ROD Amendment for OUs 1, 3, 5, and 6, which included an amended remedy for Site ST-11, was issued in September 2010 and signed in October 2010 (URS 2010h) with VE selected as the amended remedy. • Modifications to the existing pilot study system were completed in September and October 2009. • EPA and DEQ have determined that all remedial action construction activities were performed in an acceptable manner. Operation and monitoring of the full scale VE system began in March 2010. • As part of the remedial action, chemical oxidant injection activities were completed at Site ST-11 in May 2011. Approximately 6,612 pounds of sodium persulfate and 11,000 pounds of sodium hydroxide were injected into PZMWs 7, 8, 12, and 15. To treat the BTEX mass estimated to be present in perched groundwater.	• Continue annual inspections and assessment of the effectiveness of the ICs in accordance with the ESD until and unless it is demonstrated that perched groundwater at Site ST-11 is no longer a threat to human health and the environment. • Continue operation of the selected amended remedy (VE), which includes the following components: o Vapor extraction o Continuation of ICs established by the 1995 ROD and 2004 ESD o Monitoring including engineering controls and perched/regional groundwater monitoring to document remedy effectiveness and whether or not biodegradation or other types of natural attenuation are occurring o Passive LNAPL recovery o *In situ* treatment consisting of passive bioventing	BTEX
SD-12	Old Entomology Shop	OU-1 OU-6 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site SD-12 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site SD-12 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site SD-12 remains NFA.	None

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ST-13	POL Yard UST Site	OU-3	Site underwent RCRA closure in 1989. OU-3 ROD - 1995	NRA with LTM	• Operation and maintenance activities are currently performed for the product recovery system at MW24 on a quarterly basis (URS 2007e). Measurable product is ephemerally present in the well for brief periods in the late fall. • Operation of the product recovery system at MW24 subsequent to December 2004 has produced over 100,000 gallons of water with recovery of about 1 gallon of LNAPL. • Regional groundwater samples from MW24 have indicated elevated concentrations of JP-4 constituents. Maximum benzene concentrations were reported at 360 µg/L in April 2003. Benzene concentrations have steadily declined, with benzene detected below the MCL for the first time during the April 2007 sampling event at a concentration of 2 µg/L (URS 2009d). Benzene has been below the MCL since that event. Light non-aqueous phase liquid was not observed in MW24 in 2009 or 2010 (URS 2010c and 2011b). • Results of vapor sampling from MW24 indicate elevated concentrations of JP-4 fuel constituents, including benzene, are present in the deep vapor port (URS 2009d). • An evaluation of the subsurface physical conditions at Site ST-13 (URS 2007f) has suggested that the past presence of free product in MW24 was due to inadvertent introduction of product through the borehole drilled for MW24 as opposed to leakage from former Site ST-13 USTs. • The site meets UU/UE and remediation is no longer warranted for this site. Continued LTM for regional groundwater and occurrence of LNAPL (including continued use, as necessary, of a passive fuel absorbent sock) at MW24 are the only actions necessary at this time. Continued LTM will be addressed under OU-3.	• NFA • Site ST-13 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews. • Continued LTM for regional groundwater and occurrence of LNAPL will be addressed under OU-3.	None
RW-14	Low-Level Radioactive Waste Disposal Area	OU-5 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment	NRA with LTM NFA	• Site RW-14 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site RW-14 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site RW-14 remains NFA.	None
OT-15	Corker Material Burial Site	OU-1 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment	NRA with LTM NFA	• Site OT-15 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site RW-14 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site OT-15 remains NFA.	None

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OT-16	Munitions Burial Site	OU-1 OU-6 OU-3 (LTM)	OU-3 ROD - 1995 EE/CA - 2006	NRA with LTM NTCRA	• In lieu of LUCs, the Air Force elected to complete a NTCRA of the munitions debris/scrap and underlying soils that contain PAHs at concentrations that prevent UU/UE. Air Force weapons safety personnel approval was required for the NTCRA due to the potential hazard of live ordnance in the removal area. • An EE/CA (URS 2006d) was produced for the NTCRA. • The Air Force initiated a NTCRA at Site OT-16 between August 5 and October 28, 2008 for the residual munitions related scrap material and soils underlying the debris that were impacted with PAHs at concentrations that exceeded residential screening criteria, and were preventing the site from meeting UU/UE criteria. • The site meets UU/UE criteria as documented in the Final Non-Time Critical Removal Action Completion Report for Site OT-16 (URS 2009b).	• NFA • Site OT-16 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	PAHs
DP-18	World War II Material Burial Trench	OU-1 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment	NRA with LTM NFA	• Site DP-18 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site DP-18 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site DP-18 remains NFA.	None
ST-22	USTs – Building 1333 (Titan Missile Maintenance Area)	OU-1 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment	NRA with LTM NFA	• Site ST-22 meets the criteria of UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site ST-22 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site ST-22 remains NFA.	None
LF-23	Solid Waste Disposal Area	OU-1 OU-3 (LTM)	OU-3 ROD - 1995 EE/CA - 2006 ESD - 2011	NRA with LTM NTCRA LUCs	• An EE/CA (URS 2006d) was produced for the NTCRA. • The Air Force initiated a NTCRA at Site LF-23 between March 12 and June 26, 2007 on the original subject area of the site (at the location of historic test pit LF23-10B). An NTCRA and disposal report was produced to document the site activities (URS 2008a). • An extensive deposit of coal ash was discovered during the initiation of the NTCRA, which was documented in a technical memorandum (URS 2007l). • A work plan addendum to address the coal ash at LF-23 and the vicinity was completed (URS 2009i). • Additional work was completed in September 2009 to define the nature and extent of contamination of the coal ash and complete a site-specific risk assessment to estimate the potential risks to human health posed by constituents of the coal ash deposit south of and overlapping the historical ERP site boundary for Site LF-23 (URS 2010f). • An ESD was issued in July 2011 for the 1995 ROD, which documents site-specific LUCs for Site LF-23. The LUCs ensure long-term protection of human health and the environment and prevent inappropriate land use in the future.	• Complete annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD. • Submit a deed notice for recordation at the Base Civil Engineer Squadron Real Estate Office; update the BCP and provide copies of the updated BCP to the EPA and DEQ; review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23; and 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 DEQ.	PAHs

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SD-24	Liquid Oxygen Loading Plant and Auto Hobby Shop	OU-1 OU-6 OU-3 (LTM)	OU-3 ROD - 1995	NRA with LTM	• LTM is being completed on regional groundwater and vapors at MW25, MW27, MW33, and MW35 (URS 2007e). • Impacts to shallow bedrock, including solvent-like odors and possible free- or aqueous-phase product, have been described in the evaluation of shallow bedrock cores at 46 to 50 feet of depth during assessment activities in 2004 and 2006 (RMC 2005 and URS 2007h). • Bedrock vadose zone vapor samples collected from MW27 exhibit the highest vapor concentrations on MHAFB for TCE and other VOCs (maximum of 130,000 µg/m^3 of TCE). A bedrock vapor to indoor air intrusion sampling and risk evaluation suggests that there are no unacceptable human health risks from this pathway (URS 2007k). • The Final OU-3 RI Report Amendment (URS 2008b) identified Site SD-24 as an ERP site still considered a potential or likely threat to regional groundwater quality. • Injection of a chemical oxidizing agent (sodium permanganate) was completed on January 15 and 16, 2008 to treat the small amount of remaining TCE-impacted soil present below an active water line at the source area. (URS 2008c). • Recent VE pilot studies and Pilot Remedy Optimization Testing (URS 2008d) indicate VE is an effective remedial candidate for the shallow bedrock to depths of 50-feet at the source area, with initial indications that high mass removal rates can be achieved. • An SD-24 Remedy Optimization Work Plan Addendum (URS 2009h) was prepared to address additional SD-24 activities associated with the continued operation of the VE system and collection of more frequent LTM data. • The ROD Amendment for OUs 1, 3, 5, and 6 (URS 2010h) concluded the impacted soil source is now removed from the site and soil meets UU/UE criteria. The ROD Amendment also indicated the need for further active remediation of the fractured bedrock at Site SD-24 as a full-scale remedial action was not known until the additional data obtained from the pilot scale VE testing could be fully evaluated. • The VE system operated until August 2010, with comprehensive results provided in the Final SD-24 Data Report (URS 2011f). • During a meeting on January 26, 2011, the FFA team agreed to close Site SD-24 because site soils meet UU/UE criteria. The FFA team also agreed to continue VE activities under OU-3 to address residual contamination in bedrock vadose zone vapors. • Residual contamination is present in bedrock vadose zone vapors in the vicinity of Site SD-24. To support protection of the regional groundwater, bedrock vapor contamination will be addressed and concluded under OU-3, Basewide Regional Groundwater.	• NFA • Site SD-24 soil meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews. • Bedrock vapor contamination in the vicinity of Site SD-24 will be addressed and concluded under OU-3, Basewide Regional Groundwater.	TCE, TRPH, and lead

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SD-25	Flightline Storm Drain	OU-6 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment	NRA with LTM NFA	• Site SD-25 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site SD-25 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary. • Based on recommendations to implement BMPs in the 2006 FYR, construction was completed between May 2008 and September 2008 to convert the open storm ditch to approximately 1,200 feet of 54-inch reinforced concrete storm pipe and install a lift station (concrete vault only) at the end of the existing flight line pipe culvert. Additional construction activities were initiated in September 2010 and are estimated to be completed by June 30, 2011. Activities include adding a 360 foot by 360 foot treatment basin (membrane-lined basin with 2 to 4 inches of treatment rock), mechanical and electrical components to the lift station, and another 700 feet of 48-inch reinforced concrete storm pipe along Cedar Street. The treatment basin will be a detection basin with an outfall, and the rock will act as a treatment medium for stormwater (CH2M Hill 2007).	• The recommendation for Site SD-25 remains NFA.	None
SS-26	Drum Accumulation Pad	OU-1 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment	NRA with LTM NFA	• Site SS-26 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site SS-26 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site SS-26 remains NFA.	None
SD-27	Wash Rack – Building 1354	OU-1 OU-6 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment EE/CA - 2006	NRA with LTM An EE/CA was recommended NTCRA	• The 2006 Five-Year Remedy Review (URS 2006b) recommended an EE/CA and NTCRA. • An EE/CA (URS 2006d) was completed for the NTCRA. • The Air Force initiated a NTCRA at Site SD-27 between March 12 and June 26, 2007. A NTCRA and disposal report was produced to document that the site now meets UU/UE criteria (URS 2008a).	• NFA • Site SD-27 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	PAHs
SS-28	Wash Water Accumulation Basin	OU-1 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment	NRA with LTM NFA	• Site SS-28 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site SS-28 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site SS-28 remains NFA.	None
SS-29	Drum Accumulation Pad	OU-1 OU-6 OU-3 (LTM)	OU-3 ROD - 1995 2010 ROD Amendment EE/CA - 2006	NRA with LTM An EE/CA was recommended NTCRA	• The 2006 Five-Year Remedy Review (URS 2006b) recommended an EE/CA and NTCRA. • An EE/CA (URS 2006d) was completed for the NTCRA. • The Air Force initiated a NTCRA at Site SS-29 between March 12 and June 26, 2007. A NTCRA and disposal report was produced to document that the site now meets UU/UE criteria (URS 2008a).	• NFA • Site SS-29 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	PAHs

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SS-30	DRMO Storage Area	OU-1 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site SS-30 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site SS-30 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site SS-30 remains NFA.	None
ST-31	Old Base Exchange Gas Station	OU-3 Fuel Sites	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site ST-31 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site ST-31 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site ST-31 remains NFA.	None
ST-32	Old Military Gas Station	OU-3 Fuel Sites	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site ST-32 meets the criteria for UU/UE and was recommended for NFA in the2 006 five-year remedy review (URS 2006b). Therefore, Site ST-32 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site ST-32 remains NFA.	BTEX, GRO
ST-34	Flightline Fuel Hydrant # 9 Leak Area	OU-3 Fuel Sites	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site ST-34 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site ST-34 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site ST-34 remains NFA.	None
ST-35	JP-4 Pipeline Leak	OU-3 Fuel Sites	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site ST-35 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site ST-35 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• The recommendation for Site ST-35 remains NFA.	None

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ST-38	POL Storage Area, RCRA SWMU	OU-3 Fuel Sites	FRI – 1996	NA	• The 2006 Five-Year Remedy Review recommended continuing the investigation and remediation of the POL release at Tank 1 under the RBCA or Risk Evaluation Manual to assess the long-term protectiveness (URS 2006b). • Tank 1A was removed at Site ST-38 between July 30, 2007 and September 18, 2007. Impacted soil was removed and confirmation sampling was completed. Soil analytical results showed no BTEX detections and two locations with PAHs above the reporting limit (URS and Weston Solutions, Inc. 2008). • No measurable LNAPL was present in any well during the 2nd Quarter 2010 sampling round. Low levels of PAHs and BTEX have been detected in perched groundwater during quarterly groundwater monitoring events (URS and Weston Solutions, Inc. 2010). • Quarterly groundwater sampling and LNAPL removal was completed from October 2003 to October 2010 as recommended by the Corrective Action Plan (Washington Group, Inc. et al. 2003). • According to the Tier 1 RBCA evaluation, no further remediation or monitoring is required because no measureable LNAPL was detected for a year and COC concentrations in perched groundwater have been stable and declining in recent years (URS 2011g). • DEQ issued a letter dated July 21, 2011 stating no additional remediation or monitoring of petroleum hydrocarbon contamination related to the delineated area of the Tank 1A release in the POL yard is required at this time. • Site ST-38 has been closed based on RBCA standards and requires no further remediation or monitoring.	• None	VOCs, SVOCs, DRO, GRO, and metals
ST-39	15,000-gallon UST at FT-08	OU-6 OU-3 (LTM)	OU-3 ROD – 1995 2010 ROD Amendment	NRA with LTM NFA	• Site ST-39 meets the criteria for UU/UE and was recommended for NFA in the 2006 five-year remedy review (URS 2006b). Therefore, Site ST-39 does not require re-evaluation during this or subsequent five-year reviews, barring new information that indicates further review is necessary.	• None	None

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OU-3 Regional Groundwater	Basewide Regional Groundwater	OU-3	OU-3 ROD – 1995 OU-3 ROD Amendment – 2010	NRA with LTM NRA with LTM	• The 2006 FYR recommended continuing regional groundwater and vapor monitoring in accordance with the approved work plan; completing an OU-3 RI amendment followed by a BRA amendment, FFS, PP, and ROD amendment; and re-evaluating the monitoring needs of the LTM program at least every other year (URS 2006b). • Groundwater is currently sampled from four regional groundwater monitoring wells on a quarterly basis, four regional groundwater monitoring wells on a semiannual basis, and seven wells on an annual basis. • Sixteen wells have vapor monitoring ports installed for a total of 49 sampling ports. • Semiannual groundwater sampling is completed at nine perched zone monitoring wells located at Site ST-11. • Of the 33 ERP sites, Site SD-24 has been identified as the likely primary source of TCE contamination to the regional groundwater and bedrock vapors. • Since the 1995 ROD, LTM of the regional groundwater has routinely detected TCE above its MCL in three monitoring wells (MW25, MW33, and MW35). Consistent with past results, widespread low-level TCE has been detected at eight other regional groundwater well locations during the LTM sampling events. • TCE concentrations in bedrock vapors have been monitored since September 2002. Vapor ports in monitoring wells MW25, MW27, MW33, and MW35 have detected the highest TCE concentrations at MHAFB. All these wells are in the northwest portion of MHAFB, near Site SD-24. • To provide additional source control in the bedrock vapor, expansion of the existing VE system in the northwest portion of MHAFB is recommended.	• Continue water level measurements on all available wells in the spring and fall each year. • Continue vapor sampling at the existing vadose zone vapor ports and monitoring regional and perched groundwater in accordance with the approved work plan. • Track VOC monitoring under the MHAFB drinking water program. • Complete a pilot study, FS, PP, and ROD amendment for OU-3 to address VOC mass removal from unsaturated bedrock and implement ICs.	Not Applicable

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MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Site Description	Applicable OU No(s).	Status of Response	Selected Remedy	Current Status	Recommendations	Original ROD Chemicals of Concern in Soil
NA	Fuel Management Program	NA	NA	NA	• While the Fuel Management Program is under the authority of DLA/DESC, the 1995 ROD specified a requirement for a leak detection program as part of the Limited Action remedy for Site ST-11. The purpose of the leak detection program is to ensure early detection of any future petroleum leaks at the site. The program includes petroleum inventory and annual flight line leak detection programs. As such, the current status of the Fuel Management Program is included in this FYR. • The MHAFB continues to operate the leak detection program initiated in 1995, which includes a tracer tightness test. The Tracer Tightness Leak test is performed for the POL Hydrant Piping System and USTs. In addition, tracer tests are performed on the primary fuel lines, which include the Holly Corporation Pipe Line (JP-8) that runs to the Bulk Storage Area and the fuel line that runs along A-Street to refueling hydrants 1 through 12 located along the taxiway. The pipeline is tested quarterly, and the five USTs are tested annually. • During 2nd quarter 2006 integrity testing a leaking camlock on the low point drain next to Probe 1271 (northwest end of Building 1317) was discovered on the JP-8 pipeline. This leak was repaired. Approximately one cup of JP-8 was estimated to have been released as a result of the defective camlock. A new camlock was installed in July 2006 (URS 2007j). • A Mass Technology CPTM System was installed in Tanks 2 and 3 in January 2008 and February 2008, respectively. The CPTM system included valve replacement to provide automatic isolation of the tanks from the piping system when not in use. Monitoring results are generated monthly and reported on a quarterly basis (URS 2009d). • On June 19, 2009 an individual monitoring test of Tank 2 had a result above the minimum detectable leak rate. The tank was shut down to allow for additional testing to be performed, with results indicating a loss of 0.75 gallons per hour (URS 2010c). Tank 2 was taken out of service, emptied, cleaned out and an API 653 inspection was performed. Hydrostatic testing was also completed on the pipe lines that go to and from the tank to determine if they were the source of the leak. On 26 June 2009 testing resumed and stopped on 30 June 2009 with confirming results of 0.95 gallon per hour leak rate (URS 2009d). • From June 30 to July 8, 2010, Tank 3 was isolated and tested over a 186 hour period with failing results. The testing indicated a leak rate of 1.47 gallons per hour. Tank 3 was taken out of service following confirmation testing (URS 2011b). • Tank 2 was returned to service on June 30, 2010 and passed a Mass Technology integrity test to a 0.1 gallon per hour minimum leak rate. Tracer Tight integrity tests were performed on Tank 2 in August, September, and November 2010, with a failing result in September. A follow-up Tracer Tight integrity test was completed on Tank 2 in September 2010, which also failed. An integrity test using the CPTM system was performed from October 8 through October 11, 2010. This 72-hour test certified Tank 2 to a minimum detectable leak rate of 0.3 gallon per hour. The CPTM system test indicated there was no product loss over a 72-hour test period greater than 0.3 gallons per hour, resulting in a passing test result (URS 2011b). • A CPTM integrity test on Tanks 2 and 3 was performed from December 17, 2010 through January 3, 2011. Tanks 2 and 3 were integrity tested with no detectable leak above the test method's minimum detectable leak rate of 0.2 gallons per hour (URS 2011b).	Track the following actions to be taken by DLA/DESC: • Continue the leak detection program for the POL Hydrant Piping System and USTs. • Continue the leak detection program for Tanks 2 and 3.	None

TABLE ES-2
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Site Description	Applicable OU No(s).	Status of Response	Selected Remedy	Current Status	Recommendations	Original ROD Chemicals of Concern in Soil
NA	Consent Order Sites	NA	NA	NA	• Two sites at MHAFB that include potential asbestos contamination from transite pipe removal and chlordane in soils in the family housing area are managed by the Base Compliance Program under Consent Order Idaho Code §§ 39-108 and 4413 with DEQ. . Under the Consent Order, MHAFB will sample and assess the extent of inadvertent chlordane pesticide and transite asbestos concrete pipe fragmentation in military family housing and evaluate health risk to family housing occupants. • The problem arose with contract work in the demolition phase of military family housing. The potential contamination threat from the past use of chlordane as a termiticide under and around building foundations was not recognized early on in the project. In addition, a potential contamination threat existed due to the cutting and crushing of asbestos concrete water lines being abandoned as part of the project. An impact to the water line occurred during the trenching operations for new sewer and water lines and scattered asbestos pipe fragments over the site. • Compliance with assessment, disposition, and cleanup of these site conditions in military family housing is being strictly enforced and followed under the DEQ Consent Order. It is not anticipated this will become a CERCLA compliance issue.	• None, since these sites are being addressed with the State under a Consent Order and are not managed under CERCLA.	None

Notes: TCE is the primary COC for regional groundwater, and COCs included LNAPL fuels in regional groundwater at Site ST-13 (JP-4) and in perched groundwater at Sites ST-11 (JP-4) and ST-38 (JP-8). NRA was the term used to describe the remedy in the 1995 ROD; the current term used is No Action.

UU/UE for Site FT-04 is based on background values for arsenic since arsenic is naturally occurring in the MHAFB vicinity.

UU/UE for all other sites is defined as a cancer risk less than 10E-5 or in the low 10E-5 risk range and a hazard index less than 1 for the residential scenario.

API = American Petroleum Institute
BCP = Base Comprehensive Plan
BMP = best management practice
BRA = Baseline Risk Assessment
BTEX = benzene, toluene, ethylbenzene, and xylenes
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
COPC = chemical of potential concern
CPTM = Continuous Precision Tightness Monitoring
DCE = dichloroethene
DEQ = Idaho Department of Environmental Quality
DESC = Defense Energy Support Center
DLA = Defense Logistics Agency
DRO = diesel ranged organics
DRMO = Defense Reutilization and Marketing Office
EE/CA = Engineering Evaluation/Cost Analysis
EPA = Environmental Protection Agency
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
FS = Feasibility Study
FFA = Federal Facility Agreement
FFS = Focused Feasibility Study
FRI = Fuel Release Investigation
FYR = five-year remedy review
GRO = gasoline ranged organics
IC = institutional control
JP-4 = Jet Propulsion Fuel Type 4
JP-8 = Jet Propulsion Fuel Type 8
LNAPL = light non-aqueous phase liquid
LTM = long-term monitoring
LUC = land use control
MACTEC = MACTEC Engineering & Consulting, Inc.
MCL = maximum contaminant level
MHAFB = Mountain Home Air Force Base
µg/L = micrograms per liter
µg/m^3 = micrograms per cubic meter
MOGAS = motor gasoline
MSW = municipal solid waste
MW = monitoring well
NA = Not Applicable
NFA = No Further Action
No. = number
NRA = No Remedial Action
NTCRA = non-time critical removal action
OU = Operable Unit
O&M = operations and maintenance
PAH = polynuclear aromatic hydrocarbon
PCE = perchloroethene
PCB = polychlorinated biphenyl
PP = Proposed Plan
POL = petroleum, oil, and lubricants
RAWP = Remedial Action Work Plan
PZMW = Perched Zone Monitoring Well
RBCA = Risk-Based Corrective Action
RCRA = Resource Conservation and Recovery Act
RDA = Removal and Disposal Action
RI = Remedial Investigation
RMC = RMC Consultants, Inc.
ROD = Record of Decision
SVE = soil vapor extraction
SWMU = Solid Waste Management Unit
SVOC = semi volatile organic compounds
TCE = trichloroethene
TPH = total petroleum hydrocarbons
TRPH = total recoverable petroleum hydrocarbons
UU/UE = unlimited use/unrestricted exposure
URS = URS Group, Inc.
UST = underground storage tank
VE = vapor extraction
VOC = volatile organic compound
WCC = Woodward-Clyde Consultants

TABLE ES-3
SUMMARY OF RECOMMENDATIONS AND FOLLOW-UP ACTIONS FOR TIER 1 AND TIER 2 SITES
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Recommendations & Follow-Up Actions	Party Responsible	Oversight Agency	Schedule
TIER 1 – RECOMMENDATIONS AFFECTING PROTECTIVENESS				
LF-23	• Complete annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD. • Submit a deed notice for recordation at the Base Civil Engineer Squadron Real Estate Office. • Update the BCP and provide copies of the updated BCP to the EPA and DEQ. • Review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23; and 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 DEQ.	Air Force	EPA and DEQ	July 2012 June 2011 August 2011 As needed, in accordance with ESD
OU-3	• Continue water level measurements on all available wells in the spring and fall each year. • Continue vapor sampling at the existing vadose zone vapor ports and monitoring regional and perched groundwater in accordance with the approved work plan. **• Complete a pilot study, FS, PP, and ROD amendment for OU-3 to address VOC mass removal from unsaturated bedrock and implement ICs.**	Air Force	EPA and DEQ	2011 **Complete Pilot Study – August 2011** **Final FS/PP – October 2011** **Final OU-3 ROD Amendment – June 2012**
TIER 2 – RECOMMENDATIONS NOT AFFECTING PROTECTIVENESS TO TRACK FOLLOW-UP ITEMS				
LF-01	• Continue groundwater sampling at MW7-2 in accordance with the approved work plan. • Continue annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD.	Air Force	EPA and DEQ	In accordance with approved Work Plan May 2012

TABLE ES-3
SUMMARY OF RECOMMENDATIONS AND FOLLOW-UP ACTIONS FOR TIER 1 AND TIER 2 SITES
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Recommendations & Follow-Up Actions	Party Responsible	Oversight Agency	Schedule
LF-02	• Continue monitoring regional groundwater at MW3-2 in accordance with the approved work plan. • Continue annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD.	Air Force	EPA and DEQ	In accordance with approved Work Plan November 2011
FT-08	• Continue operation of the selected amended remedy (SVE). • Complete removal action at former burn pit area of Site FT-08.	Air Force	EPA and DEQ	In accordance with approved Work Plan August 2011
ST-11	• Continue annual inspections and assessment of the effectiveness of the ICs in accordance with the ESD until and unless it is demonstrated that perched groundwater at Site ST-11 is no longer a threat to human health and the environment. • Continue operation of the selected amended remedy (VE).	Air Force	EPA and DEQ	August 2011 In accordance with approved Work Plan
ST-13	• NFA • Continue LTM for regional groundwater and occurrence of LNAPL at MW24 under OU-3. • Site ST-13 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	Air Force	EPA and DEQ	Not Applicable
Fuel Management Program*	Track the following actions to be taken by DLA/DESC: • Continue the leak detection program for the POL Hydrant Piping System and USTs. • Continue the leak detection program for Tanks 2 and 3.	Air Force	DEQ	In accordance with approved Work Plan

Notes:
*The Fuel Management Program is not an ERP site, but is tracked by the ERP.
Recommendations and follow-up actions that affect the protectiveness of the selected remedies are in **bolded blue text**.
Tier 1 recommendations address actions that affect protectiveness.
Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness.

TABLE ES-3
SUMMARY OF RECOMMENDATIONS AND FOLLOW-UP ACTIONS FOR TIER 1 AND TIER 2 SITES
MOUNTAIN HOME AIR FORCE BASE, IDAHO

BCP = Base Comprehensive Plan
DEQ = Idaho Department of Environmental Quality
DESC = Defense Energy Support Center
DLA = Defense Logistics Agency
EPA = Environmental Protection Agency
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
FS = Feasibility Study
IC = institutional control
LNAPL = light non-aqueous phase liquid
LTM = long-term monitoring
LUC = land use control
MW = monitoring well
OU = Operable Unit
POL = petroleum, oil and lubricants
PP = Proposed Plan
RBCA = Risk-Based Corrective Action
ROD = Record of Decision
SVE = soil vapor extraction
UU/UE = unlimited use/unrestricted exposure
VE = vapor extraction
VOC = volatile organic compound

FIVE-YEAR REVIEW SUMMARY FORM

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name *(from WasteLAN)*: Mountain Home Air Force Base (AFB)

EPA ID *(from WasteLAN)*: 2B

Region: 10 **STATE:** ID **City/County:** Mountain Home AFB / Elmore

SITE STATUS

NPL status: ☒ Final ☐ Deleted ☐ Other (specify): _____

Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete

Multiple OUs?* ☒ YES ☐ NO **Construction completion date:** / /

Has site been put into reuse? ☐ YES ☒ NO (active base)

REVIEW STATUS

Lead agency: ☐ EPA ☐ State ☐ Tribe ☒ Other Federal Agency: Air Force

Author name: URS Group, Inc.

Author title: NA **Author affiliation:** NA

Review period:** 9 / 2010 to 6 / 23/ 2011

Date(s) of site inspection: 11/01/2010 and 5/25/2011

Type of review:

☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only

☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐ Regional Discretion

Review number: ☐ 1 (first) ☐ 2 (second) ☒ 3 (third) ☐ Other (specify): _____

Triggering action:

☐ Actual RA Onsite Construction at OU#__ ☐ Actual RA Start at OU#__

☐ Construction Completion ☒ Previous Five-Year Review Report

☐ Other (specify): _____

Triggering action date *(from WasteLAN)*: 6 / 27 / 2006

Due date *(five years after triggering action date)*: 6 / 23 / 2011

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form (Continued)

Issues:

Summarize issues.

Issues identified during this five-year remedy review (FYR) are associated with maximum contaminant level (MCL) exceedances and the potential for future exceedances due to residual trichloroethene (TCE) mass in the vadose zone vapor for OU-3. Since the 1995 Record of Decision (ROD), TCE concentrations detected in three monitoring wells have routinely exceeded the Federal MCL. However, an exposure pathway that could result in unacceptable risks associated with the exposure to or the ingestion of contaminated groundwater does not currently exist because regional groundwater samples from Mountain Home Air Force Base (MHAFB) production wells have not reported TCE above the Federal MCL. The OU-3 remedy of No Remedial Action (NRA) with long-term monitoring (LTM) is protective of human health and the environment in the short term, but vapor concentrations in unsaturated bedrock are a potential source of TCE in groundwater and groundwater use is not restricted in the long term. While some TCE mass has been removed from soil and shallow bedrock at Sites FT-08 and SD-24, the Air Force plans to take further action by implementing institutional controls (ICs) and removing TCE mass to protect regional groundwater.

Recommendations and Follow-up Actions:

The recommendations and follow-up actions listed below are associated with findings from this FYR.

A pilot study, Feasibility Study, Proposed Plan, and ROD amendment are recommended for OU-3. No Further Action (NFA) is recommended for seven sites (FT-04, ST-13, OT-16, SD-24, SD-27, SS-29, and ST-38).

Protectiveness Statement(s):

Include individual operable unit protectiveness statements. For sites that have reached construction completion and have more than one OU, include an additional and comprehensive protectiveness statement covering all of the remedies at the site.

The selected remedies for the following sites are protective for unlimited use/unrestricted exposure (UU/UE): FT-04, ST-13, OT-16, SD-24, SD-27, and SS-29. The selected remedies for Sites LF-01, LF-02 and LF-23 include ICs and are protective of human health and the environment. In addition, Site ST-38 has been closed based on Risk-Based Corrective Action standards and requires no further remediation or monitoring.

The selected remedy for the OU-3 is protective of human health and the environment in the short term, but follow-up actions to address volatile organic compound (VOC) vapors in bedrock and implement ICs are required for the remedy to be protective in the long term.

The selected remedy at Site FT-08 (NRA with LTM) was amended as part of the OU-4 ROD Amendment. Soil vapor extraction (SVE) was selected as the amended remedy. Construction of the SVE system was completed in February 2010, is currently operating as designed, and is expected to achieve cleanup levels. As a result, the selected amended remedy is protective in the short term and will be protective in the long term once the remedy is completed.

The selected remedy at Site ST-11 (Limited Action) was amended as part of the ROD Amendment for OUs 1, 3, 5, and 6. Vapor extraction (VE) was selected as the amended remedy. Construction of the VE system was completed in October 2009 as part of a pilot study, is currently operating as designed, and is expected to achieve remedial action objectives. As a result, the selected amended remedy is protective in the short term and will be protective in the long term once the remedy is completed.

Five-Year Review Summary Form (Continued)

The remedy at MHAFB is expected to be protective of human health and the environment upon implementation of land use controls (LUCs) at Site LF-23, completion of ongoing remedial actions at Sites FT-08 and ST-11, and implementation of contaminant source removal from the vadose zone. Exposure pathways that could result in unacceptable risks are being controlled in the interim. Barring unanticipated issues, remedial action and implementation of LUCs will likely allow a determination that the remedy is protective sitewide within the next five years.

Other Comments:

Make any other comments here.

The 33 ERP sites are grouped into OUs as follows:

- OU-1 - Twenty-one sites for which limited field investigations (LFIs) were completed and the Former Base Landfill (LF-03)
- OU-2 - Two sites, Lagoon Landfill (LF-01) (later removed from OU-2) and B-Street Landfill (LF-02)
- OU-3 - Basewide regional groundwater and six fuel sites that underwent Remedial Investigations (RIs)
- OU-4 - One site, Fire Training Area 8 (FT-08)
- OU-5 - One site, low-level radioactive waste disposal site (RW-14)
- OU-6 - Six sites from OU-1 that underwent further investigations as either Phase II LFIs or RIs and the UST at FT-08

The selected remedies specified in the original RODs for 32 of the ERP sites consisted of NRA, which includes a minimum of annual LTM for regional groundwater at MHAFB. The Limited Action alternative was selected as the remedy for Site ST-11. However, the remedy for some sites has changed since completion of the 1992, 1993, and 1995 RODs.

Three RODs, two ROD amendments, four Explanation of Significant Differences (ESDs), and four Action Memoranda are in-place and signed by representatives of the Air Force, Idaho Department of Environmental Quality (DEQ), and/or Environmental Protection Agency (EPA) for all 33 ERP sites with the exception of Site ST-38. The OUs are addressed in these decision documents as follows:

- 1992 ROD for OU-4, which addresses soils at the Fire Training Area 8 (FT-08)
- 1993 ROD for OU-2, which addresses the B-Street Landfill (LF-02)
- 1995 ROD for OUs 1, 3, 5, 6, the Lagoon Landfill, and the UST at the Fire Training Area 8 (FT-08)
- 2004 ESD to the 1995 ROD to provide additional detail for the LUCs implemented for Site ST-11
- 2006 ESD to the 1995 ROD to document site-specific ICs for Site LF-01
- 2006 ESD to the 1993 ROD to document site-specific ICs for Site LF-02
- 2007 Action Memorandum for the Site OT-16
- 2007 Action Memorandum for the Site LF-23
- 2007 Action Memorandum for the Site SD-27
- 2007 Action Memorandum for the Site SS-29

Five-Year Review Summary Form (Continued)

- 2009 ROD Amendment for OU-4, which addresses soils at Site FT-08
- 2010 ROD Amendment for OUs 1, 3, 5, 6, the Lagoon Landfill, and the UST at the Fire Training Area 8 (FT-08)
- 2011 ESD to the 1995 ROD to document site-specific LUCs for Site LF-23

This third post-Record of Decision (ROD) five-year remedy review (FYR) report evaluates the selected remedy at Mountain Home Air Force Base (MHAFB). The review team is comprised of environmental managers from the 366th Environmental Flight, Idaho Department of Environmental Quality (DEQ), United States(U.S.) Environmental Protection Agency (EPA) Region 10, and the Air Force Center for Engineering and the Environment (AFCEE). This review is required by statute because remedies were selected post-Superfund Amendments and Reauthorization Act and will leave hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure (UU/UE) (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] §121). This remedy review evaluates the implementation and performance of selected remedies in-place at MHAFB from June 2006 through June 2011.

1.1 PURPOSE AND SCOPE OF FIVE-YEAR REVIEW

As required by statute under CERCLA and associated amendments, the remedy review is conducted to determine whether or not the selected remedies continue to be protective of human health and the environment. The 33 Environmental Restoration Program (ERP) National Priorities List (NPL) sites are grouped into operable units (OUs) with their respective sites as follows:

- OU-1 - Twenty-one sites for which limited field investigations (LFIs) were completed and the Former Base Landfill (LF-03)
  - LF-03, Former Base Landfill
  - FT-04, Fire Training Area 4
  - FT-05, Fire Training Area 5
  - FT-06, Fire Training Area 6
  - FT-07, Fire Training Area 7 (includes areas A, B, and C)
  - DP-09, Waste Oil Disposal Area
  - OT-10, Oiled Base Perimeter Road
  - SD-12, Old Entomology Shop (also part of OU-6)
  - OT-15, Corker Material Burial Sites
  - OT-16, Munitions Burial Site (also part of OU-6)
  - DP-18, World War II Material Burial Trench
  - ST-22, Underground Storage Tanks (USTs) – Building 1333
  - LF-23, Solid Waste Disposal Area
  - SD-24, Liquid Oxygen (LOX) Loading Plant (also part of OU-6)
  - SD-25, Flightline Storm Drain (also part of OU-6)
  - SS-26, Drum Accumulation Pad

  - SD-27, Wash Rack – Building 1354 (also part of OU-6)
  - SS-28, Wash Water Accumulation Basin
  - SS-29, Drum Storage Area (also part of OU-6)
  - SS-30, Defense Reutilization and Marketing Office (DRMO) Storage Area

- OU-2
  - LF-01, Lagoon Landfill (later removed from OU-2)
  - LF-02, B-Street Landfill

- OU-3 - Basewide regional groundwater and six fuel sites that underwent Remedial Investigations (RIs)
  - Basewide Groundwater
  - ST-11, Fuel Hydrant System Spill
  - ST-31, Old Base Exchange Gas Station
  - ST-32, Old Military Gas Station
  - ST-34, Flightline Fuel Hydrant #9 Leak Area
  - ST-35, Jet Propellant (JP)-4 Pipeline Leak
  - ST-38, Petroleum, oil, and lubricants (POL) Storage Area, Resource Conservation and Recovery Act (RCRA) Solid Waste Management Unit (SWMU)

- OU-4
  - Site FT-08, Fire Training Area 8 Soils

- OU-5
  - RW-14, Low-Level Radioactive Waste Disposal Area

- OU-6 - Six sites from OU-1 that underwent further investigations as either Phase II LFIs or RIs and the UST at FT-08
  - SD-12, Old Entomology Shop
  - OT-16, Munitions Burial Site
  - SD-24, LOX Loading Plant
  - SD-25, Flightline Storm Drain
  - SD-27, Wash Rack – Building 1354
  - SS-29, Drum Storage Area
  - ST-39, 15,000-gallon UST at FT-08

- No Specific OU
  - LF-01, Lagoon Landfill

Three RODs, two ROD amendments, four Explanations of Significant Differences (ESDs), and four Action Memoranda are in-place and signed by representatives of the United States Air Force (USAF), DEQ, and/or EPA for 32 of the 33 ERP sites. The OUs are addressed in these decision documents as follows:

- 1992 ROD and 2009 ROD amendment for OU-4, which addresses the Fire Training Area 8 (FT-08) soils
- 1993 ROD for OU-2, which addresses the B-Street Landfill (LF-02)
- 1995 ROD and 2010 ROD amendment for OUs 1, 3, 5, 6, the Lagoon Landfill, and the UST at the Fire Training Area 8 (FT-08)
- 2004 ESD to the 1995 ROD to provide additional detail for the land use controls (LUCs) implemented for Site ST-11
- 2006 ESD to the 1995 ROD to document site-specific institutional controls (ICs) for Site LF-01
- 2007 Action Memorandum for the Site OT-16 non-time critical removal action (NTCRA) Engineering Evaluation/Cost Analysis (EE/CA)
- 2007 Action Memorandum for the Site LF-23 NTCRA EE/CA
- 2007 Action Memorandum for the Site SD-27 NTCRA EE/CA
- 2007 Action Memorandum for the Site SS-29 NTCRA EE/CA
- 2006 ESD to the 1993 ROD to document site-specific ICs for Site LF-02
- 2011 ESD to the 1995 ROD to document site-specific LUCs for Site LF-23

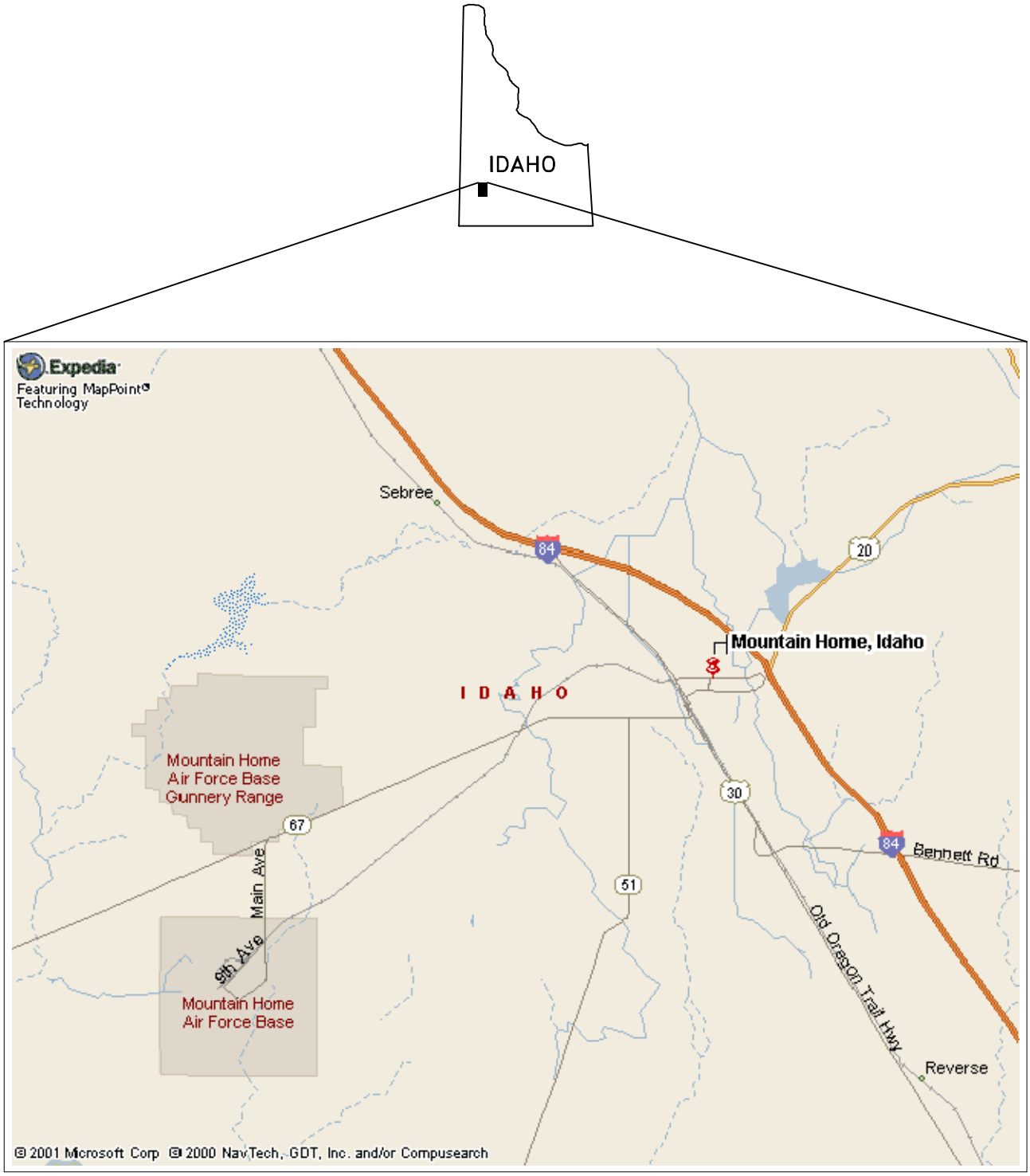
A summary of ERP sites is provided in Table ES-2 of the Executive Summary. Thirteen of the 33 ERP sites, including OU-3, required evaluation during this review. During the 2001 FYR, No Further Action (NFA) was recommended for the following 12 sites: LF-03, RW-14, DP-9, OT-10, ST-13, OT-15, DP-18, SS-26, SS-28, ST-34, ST-35, and ST-39. In addition, during the 2006 five-year review, NFA was recommended for the following eight sites: FT-05, FT-06, FT-07, SD-12, ST-22, SD-25, SS-30, and ST-32. The No Remedial Action (NRA) remedy remains protective for all these sites, for which NFA was previously recommended, except Site ST-13. NRA was the term used to describe the remedy in the 1995 ROD; the current term is No Action. Site ST-13 was one of the ERP sites evaluated during the 2006 FYR due to new site information (indicating the presence of free product) since the previous review and is evaluated again in this review. Site ST-31 is not addressed in this five-year review because USTs at Site ST-31 were closed under the RCRA and does not warrant further review under CERCLA. The closure report for the USTs removed from Site ST-31 was filed with DEQ in August 1996.

MHAFB Location Map and the Site Location Map with the 33 ERP site locations are presented as Figures 1-1 and 1-2, respectively.

1.2 AUTHORITY STATEMENT

The Air Force has conducted this review pursuant to the following:

- CERCLA §121
- Executive Order 12580 (Superfund Implementation)
- National Contingency Plan
- Federal Facility Agreement for MHAFB (January 1992)



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REGIONAL LOCATION MAP
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 02/07/11	PROJECT NO. 16169962	FIG. NO. 1-1
CHK'D. BY: KAS	DATE: 02/07/11		

SOURCE: MHAFB GIS IMAGE FILES

LEGEND:

ERP SITE

SITE	
LF–01	LAGOON LANDFILL
LF–02	"B" STREET LANDFILL
LF–03	CURRENT BASE LANDFILL
FT–04	FIRE TRAINING AREA 4
FT–05	FIRE TRAINING AREA 5
FT–06	FIRE TRAINING AREA 6
FT–07	FIRE TRAINING AREA 7A, 7B, 7C
FT–08	FIRE TRAINING AREA 8
DP–09	WASTE OIL DISPOSAL AREA
OT–10	OILED BASE PERIMETER ROAD
ST–11	FLIGHT LINE FUEL SPILL
SD–12	OLD ENTOMOLOGY SHOP YARD
ST–13	POL YARD UST SITE
RW–14	LOW–LEVEL RADIOACTIVE WASTE DISPOSAL AREA
OT–15	CORKER MATERIAL BURIAL SITE
OT–16	MUNITIONS BURIAL SITE
DP–18	WORLD WAR II MATERIAL
ST–22	USTs BUILDING 1333 TITAN MISSILE MAINTENANCE AREA
LF–23	SOLID WASTE DISPOSAL AREA
SD–24	LIQUID OXYGEN LOADING PLANT & AUTO HOBBY SHOP
SD–25	FLIGHT LINE STORM DRAIN
SS–26	DRUM ACCUMULATION PAD
SD–27	VECHICLE WASH RACK BUILDING 1354
SS–28	FORMER WASH WATER ACCUMULATION BASIN
SS–29	DRUM ACCUMULATION PAD
SS–30	DRMO STORAGE AREA
ST–31	OLD BASE EXCHANGE STATION
ST–32	OLD MILITARY GAS STATION
ST–34	FLIGHT LINE FUEL HYDRANT #9 LEAK AREA
ST–35	JP–4 PIPLINE LEAK
ST–38	POL STORAGE AREA, RCRA SWMU
ST–39	15,000–GALLON UST AT FT–08
OU–3	BASEWIDE REGIONAL GROUNDWATER*
	*NOTE: ENCOMPASSES ENTIRE BASE

N

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ERP SITE LOCATION MAP
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 02/07/11	PROJECT NO.	FIG. NO.
CHK'D. BY: KAS	REVISION: 0	16169962	1–2

Section Two provides dates and major events, key environmental studies, decision documents (including Records of Decision [RODs] Amendments, Explanations of Significant Differences, and Action Memoranda), and Five-Year Remedy Reviews completed at Mountain Home Air Force Base. A summary of key environmental studies and regulatory actions are provided in Table 2-1. A summary of major site events is presented in Table 2-2.

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TABLE 2-1
SUMMARY OF KEY ENVIRONMENTAL STUDIES AND REGULATORY ACTIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Key Environmental Studies/ Regulatory Actions	Details	Date
Phase I and Phase II Records Search and Pre-survey	17 sites studied; 5 recommended for field investigation.	July and October 1983
EPA Hazard Ranking System Scoring of Mountain Home AFB	Declaration of an observed release of bromoform in groundwater.	December 1987
RCRA Facility Assessment	The State of Idaho conducted an RFA as part of the Base permitting process. The FFA covers all investigations or corrective actions recommended by the State's RFA.	1990
Mountain Home AFB listed on the NPL	Hazard rank listing was less than the ranking for Hanford, Rocky Flats, and Weldon Spring, but greater than the Oak Ridge, INEL, and Savannah River. The Base was placed on the NPL of hazardous waste sites under CERCLA because contaminants were detected in groundwater used as a drinking water supply.	August 1990
Limited Field Investigation of OU-1 (20 sites)	No Further Action recommended on 14 sites; remedial investigation recommended for 6 sites which were incorporated into OU-6.	October 1991
Air Force, EPA, and IDHW signed the FFA	5 OUs established which included 25 sites; schedule of reports set.	January 1992
Record of Decision, OU-4, FT-08	No Further Action; deferral of groundwater impact to OU-3.	May 1992
Removal action, low-level radioactive waste burial RW-14, OU-5	Two containers (lengths of pipe and welded drums) and two cubic yards of soil removed to a licensed Richland, Washington facility.	August 1992
RI/BRA Report for OU-2	No unacceptable risks.	September 1992
RCRA permit signed	The RCRA permit covered the TSDF at the DRMO, the SWMUs associated with the 1990 RFA, and the post closure at the UST removal site at building 1307. The RCRA part B permit (ID3572124557) was renewed in 2003 and only included corrective action for Site ST-13 with the stipulation that it will become active if post closure isn't adequately address under the FFA.	October 1992
Groundwater contaminant fate and transport modeling for the OU-3 BRA	No predicted risk higher than EPA's acceptable cancer risk range (1×10^{-6} to 1×10^{-4}).	January 1993
Record of Decision, OU-2, LF-02	No Further Action; deferral of groundwater impact to OU-3.	May 1993
Amendment to FFA	Modification to the FFA in March 1993 states that sources from LFI OU-1 that require an RI/FS will be addressed in OU-6. The October 1993 modification states that RI/FS at source area ST-38 is added to OU-3.	March and October 1993
OU-3 Groundwater RI/BRA/ERA Reports	No unacceptable risks to human health or the environment under current use scenarios based on an acceptable carcinogenic risk range of 1×10^{-6} to 1×10^{-4}.	October 1994

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Key Environmental Studies/ Regulatory Actions	Details	Date
Record of Decision on OU-1, OU-3, OU-5, OU-6, LF-01, FT-08	The selected remedies consist of No Remedial Action, which includes a minimum of annual LTM for regional groundwater at MHAFB, and the Limited Action alternative for ST-11, which includes a notice of restriction, leak detection program, and perched groundwater monitoring.	October 1995
Groundwater Monitoring Plan	Annual sampling of regional groundwater and quarterly sampling for one or more years of ST-11 (one well PZMW7 located in the perched water).	May 1996
Preliminary Close-Out Report by EPA Region 10	Documentation that MHAFB has completed all construction activities required in RODs for all sites investigated under CERCLA, as amended.	September 1998
2001 Five-Year Remedy Review Report	Evaluates the remedy components and monitoring data associated with environmental sites at MHAFB.	June 2001
Assessment of Water-Level Change in PZMW7 and Sources of Recharge to ST-11	Objectives of study included monitoring water levels and depth of LNAPL in PZMW7, identifying sources of recharge to ST-11, and comparing the chemical character of sources of contamination, JP-4 and JP-8, to LNAPL in PZMW7.	March 2002
Flight Line Fuel Spill (ST-11) Investigation and 2002 LTM Annual Report	Reports the findings of the additional investigation of the ST-11 fuel spill site, and the results of the 2002 LTM program.	July 2003
Vapor Monitoring Report	Reports the findings of the first comprehensive investigation of bedrock vapors initially detected while installing MW20. The report details the findings of a six-month vapor monitoring program using vapor ports installed at MW20, MW25, MW26, and VW1.	December 2003
Report for Site Investigation at Multiple Sites	A site investigation was completed for seven sites with concerns identified by the FFA review team and documented in the Final 2001 Five-Year Remedy Review Report.	February 2003
ESD issued for 1995 ROD	The ESD was prepared to address deficiencies in the ROD description of the ICs and modify the IC requirements for ST-11.	March 2004
Report for 17 Sites Evaluation/Investigation	Seventeen sites that were considered for re-investigation during the 2001 five-year review were evaluated. Seven of the 17 sites were investigated through completion of additional soil sampling for target analytes.	September 2004
2006 Five-Year Remedy Review Report	Evaluates the remedy components and monitoring data associated with environmental sites at MHAFB.	June 2006
LF-01 ESD	The ESD was prepared to address identify and describe site-specific LUCs that are needed to ensure long-term protection of human health and the environment.	September 2006
LF-02 ESD	The ESD was prepared to address identify and describe site-specific LUCs that are needed to ensure long-term protection of human health and the environment.	September 2006

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Key Environmental Studies/ Regulatory Actions	Details	Date
Final NTCRA EE/CA	Evaluates three separate NTCRA alternatives for Sites OT-16, LF-23, SD-27, and SS-29 because under the current conditions, the sites pose a risk to future residents and do not meet the criteria for NFA with UU/UE.	October 2006
Action Memorandum for the Site LF-23 NTCRA EE/CA	Presents the recommended remedial action for Site LF-23 based on the EE/CA.	January 2007
Action Memorandum for the Site OT-16 NTCRA EE/CA	Presents the recommended remedial action for Site OT-16 based on the EE/CA.	January 2007
Action Memorandum for the Site SD-27 NTCRA EE/CA	Presents the recommended remedial action for Site SD-27 based on the EE/CA.	January 2007
Action Memorandum for the Site SS-29 NTCRA EE/CA	Presents the recommended remedial action for Site SS-29 based on the EE/CA.	January 2007
Final Vapor Intrusion to Indoor Air Sampling/Evaluation Report	Investigated the vapor intrusion pathway (i.e., potential intrusion from bedrock vadose zone vapors through soil to indoor air) and evaluated this pathway for potential human health risks. Results demonstrated there were no unacceptable human health risks or adverse non-carcinogenic health effects due to the bedrock vapor intrusion to indoor air pathway.	July 2007
Final Vapor Extraction Pilot Study Technical Report, Fire Training Area 8	Reports the findings of pilot scale VE tests completed at Site FT-08. The report concluded that VE technology would be highly effective for remediation of VOCs in shallow soils.	July 2007
Final Vapor Extraction Pilot Study Technical Report for Flightline Hydrant System Leak/Fuel Spill (ST-11)	Reports the findings of pilot scale VE tests completed at Site ST-11. The report concluded that VE technology would be effective for VOC recovery in both shallow soils and deeper fractured bedrock.	July 2007
Final Vapor Extraction Pilot Study Technical Report for LOX Loading Plant (SD-24)	Reports the findings of pilot scale VE tests completed at Site SD-24. The report concluded that VE technology would be highly effective in recovering TCE and cis-1,2 DCE from the shallow bedrock well BEW-1.	July 2007
Technical Memorandum, LF-23 Site Status and Coal Ash	Presents history and new information for Site LF-23 relative to the discovery of coal ash near this site, including preliminary documentation of the NTCRA and initial exploratory work completed to define the lateral extent of the coal ash.	September 2007
Final NTCRA Report - ERP Sites LF-23, SD-27, and SS-29	Presents results of the NTCRAs at the three sites.	March 2008
Final OU-3 Remedial Investigation Report Amendment	Presents additional information concerning identified impacts and potential threats to regional groundwater at MHAFB that have been revealed since the completion of the pre-OU-3 ROD work at the ERP sites.	April 2008

TABLE 2-1
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Key Environmental Studies/ Regulatory Actions	Details	Date
Technical Memorandum for Injection of Chemical Oxidant into Site Soils for Site SD-24	Presents the results of the field effort to inject chemical oxidant into contaminated overburden soil at Site SD-24.	May 2008
Draft Pilot Remedy Optimization Testing Technical Report for ERP Sites FT-08 and SD-24	Presents the findings of ongoing pilot-scale remedy optimization VE and SVE tests completed for Sites FT-08 and SD-24.	December 2008
Final NTCRA Report for ERP Site OT-16	Describes the NTCRA completed at Site OT-16. Based on the results of this NTCRA, Site OT-16 now meets UU/UE criteria from the unexploded ordnance and chemical exposure standpoints.	February 2009
Technical Memorandum Report - VEW-3 & VEW-6 SVE Pilot Test Results, Site ST-11	Presents the results of a short duration SVE step test on two existing VEWs at Site ST-11. Results suggest that VE from the wells tested (VEW-3 and VEW-6) would be an effective alternative for remediation of petroleum-related compounds in shallow soils and shallow bedrock.	February 2009
Final FT-08 Remedial Investigation/Baseline Risk Assessment Addendum	Presents the additional information that has been collected and to reassesses the potential for unacceptable human or ecological health risks at the site to determine whether remedial action is warranted.	February 2009
Final Site FT-08 FS Report	Identifies and evaluates remedial action alternatives for Site FT-08 to remediate chlorinated and petroleum-related VOCs primarily in soils, and secondarily in bedrock in the vapor phase only.	June 2009
Final FT-08 (OU-4) Proposed Plan	Describes remedial alternatives evaluated for Site FT-08 and presents the alternative preferred by the Air Force to address soil and soil gas contamination at Site FT-08.	August 2009
Record of Decision Amendment for OU-4, Site FT-08 Soil	Presents the amended remedy of SVE for OU-4, ERP Site FT-08.	September 2009
Draft Final ST-11 FS	Identifies and evaluates remedial action alternatives for Site ST-11, which includes benzene in perched groundwater above the MCL and free-product in fractured basalt bedrock and perched groundwater that is located within the fractured basalt bedrock.	November 2009
Final Municipal Solid Waste Landfill Post-Closure Plan	Documents the activities that will occur during the 30-year post-closure care period at three MSWLF cells closed in 1995, 1998, and 2003; and the two MSWLF cells closed in 2009.	April 2010
Record of Decision Amendment for OUs 1, 3, 5, and 6 with a Proposed Remedy for Site ST-11	Presents the amended remedy of VE for Site ST-11 and documentation of changes in status for a number of other ERP sites.	September 2010

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Key Environmental Studies/ Regulatory Actions	Details	Date
SD-24 Data Report	Presents the results of long-term VE pilot remedy optimization activities that have been completed at Site SD-24.	April 2011
Site LF-23 ESD	The ESD was prepared to address identify and describe site-specific LUCs that are needed to ensure long-term protection of human health and the environment.	July 2011

Notes:
Bolded text indicates the item is a decision document.
AFB = Air Force Base
BEW = bedrock extraction well
BRA = Baseline Risk Assessment
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
DCE = dichloroethene
DRMO = Defense Reutilization and Marketing Office
EE/CA = Engineering Evaluation/Cost Analysis
EPA = U.S. Environmental Protection Agency
ERA = Ecological Risk Assessment
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
FFA= Federal Facility Agreement
FS = Feasibility Study
IC = institutional control
IDHW = Idaho Department of Health and Welfare
INEL = Idaho National Laboratory
JP-4 = jet propellant 4
JP-8 = jet propellant 8
LFI = limited field investigation
LNAPL = light non-aqueous phase liquid
LOX = liquid oxygen
LTM = long-term monitoring
LUC = land use control
MCL = maximum contaminant level
MHAFB = Mountain Home Air Force Base
MSWLF = Municipal Solid Waste Landfill
MW = monitoring well
NFA = no further action
NPL = National Priorities List
NTCRA = non-time critical removal action
OU = Operable Unit
PZMW = perched zone monitoring well
RCRA = Resource Conservation and Recovery Act
RFA = RCRA Facility Assessment
RI = Remedial Investigation
ROD = Record of Decision
SVE = soil vapor extraction
SWMU = Solid Waste Management Unit
TCE = trichloroethene
TSDF = Treatment, Storage, and Disposal Facility
UST = underground storage tank
UU/UE = unlimited use/unrestricted exposure
VE = vapor extraction
VEW = vapor extraction well
VOC = volatile organic compound
VW = vapor well

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Event	Date
Lagoon Landfill (LF-01)	
The Lagoon Landfill served as the main MHAFB sanitary landfill.	1952 - 1956
Wastewater lagoon numbers 2 and 3 were built on top of the Lagoon Landfill.	1961 - 1962
An RI/BRA was performed for the Lagoon Landfill.	1992
As part of the OU-3 RI, additional lagoon water samples were collected and analyzed for general water quality parameters.	1995
No remedial action was the selected remedy for LF-01 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
The lagoons were no longer needed with the construction of the MHAFB wastewater treatment facility.	1997
An ESD to address implementing institutional controls was recommended for LF-01 in the Final Five-Year Remedy Review Report.	June 2001
The dried sludge that was present in the lagoon cells was contained in a monofill constructed over the footprint of LF-01, under a vegetated earth cover. The sewage lagoons that overlie LF-01 were closed as a condition of the state-issued permit to land-apply wastewater effluent.	2003
The 2006 Five-Year Remedy Review Report recommended monitoring of the regional groundwater at MW7-2 and MW31 and vapors at Site LF-01 and preparation of an ESD to address implementing institutional controls at Site LF-01 prevent unacceptable risk due to exposure to potentially contaminated media and ensure future protectiveness.	June 2006
An ESD was issued in 2006 for the 1995 ROD to document site-specific ICs for Site LF-01.	September 2006
B-Street Landfill (LF-02)	
The B-Street Landfill served as the main MHAFB sanitary landfill.	1956 - 1959
The B-Street Landfill also served as a disposal site for construction debris, rubble, empty drums, and coal ash.	1956 - 1990
A Phase I records search identified LF-02 as one of three sites at MHAFB with the greatest potential for environmental	1983
All landfill activity ceased except for occasional disposal of asbestos waste in Trench 3.	1990
An RI/BRA and human health and ecological risk assessment of the B-Street Landfill were performed.	1992
The ROD was signed for LF-02, OU-2; no remedial action was the selected remedy.	June 1993
An ESD to address implementing institutional controls was recommended for LF-02 in the Final Five-Year Remedy Review Report.	June 2001
The 2006 Five-Year Remedy Review Report recommended monitoring of the regional groundwater and vapors at MW32 at Site LF-02 and preparation of an ESD to address implementing institutional controls at Site LF-02 to limit exposure to soil.	June 2006
An ESD was issued in 2006 for the 1993 ROD to document site-specific ICs for Site LF-02.	September 2006
Fire Training Area 4 (FT-04)	
FT-04 was the original fire training area for MHAFB.	1943 - 1944
A soil gas survey of the site was conducted as part of the LFI study for OU-1.	1991

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
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Event	Date
No remedial action was the selected remedy for FT-04 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
An ESD to address implementing institutional controls was recommended for FT-04 in the Final 2001 Five-Year Remedy Review Report.	June 2001
Confirmation soil sampling was conducted at FT-04 during the evaluation and/or investigation of 17 sites at MHAFB.	June 2004
An EE/CA and a potential non-time-critical removal action was recommended for contaminated soils in the Final 2006 Five-Year Remedy Review Report.	June 2006
A limited assessment was completed at two "hot spots" for arsenic in soils with arsenic above the DEQ established background concentration. Additional soil sampling for arsenic analysis was completed. The evaluation indicated that the higher arsenic concentrations were associated with deeper soils near basalt bedrock and were not due to site-related activities.	August 2006
The status of Site FT-04 was documented in the ROD Amendment as meeting UU/UE criteria.	September 2010
Fire Training Area 8 (FT-08)	
FT-08 is MHAFB's fire department training area.	1962 - present
Contaminants were identified in soil sampled from FT-08 during the ERP Phase II, Stage 1 investigation.	1986
Additional soil sampling was conducted at FT-08 during the ERP Phase IV-A investigation.	1986 and 1988
An RI/BRA was performed for FT-08.	1991
The ROD was signed for FT-08, OU-4; no remedial action was the selected remedy.	June 1992
A site investigation was completed for FT-08 to evaluate the site's potential as a source of TCE to regional groundwater.	February 2003
A 100-foot by 100-foot passive soil gas survey was conducted at FT-08 to identify and delineate potential TCE source areas or "hot spots".	July 2004
The Final 2006 Five-Year Remedy Review Report concluded Site FT-08 would not meet the criteria for UU/UE and recommended additional evaluation of potential human health risks.	June 2006
Soil and bedrock vapor extraction pilot tests were completed from July 12 to August 25, 2006. The results were documented in the pilot study technical report.	June 2007
Pilot Remedy Optimization Testing resumed starting in July 2007 to gather additional information on SVE at the site. Evaluation of collected data through August 2008 supported the viability of SVE for the site.	July 2007 - August 2008
A RI/BRA Addendum was completed to present the additional information collected and reassess the potential for unacceptable human health or ecological risks to determine whether remedial action is warranted.	February 2009
A FS was completed to identify remedial action objectives and to evaluate, screen, and develop remedial alternatives for the site. The FS evaluated the following alternatives: no action; institutional controls; soil removal and landfill; SVE; and enhanced biodegradation.	July 2009
The Air Force issued a Proposed Plan for Site FT-08 in August 2009, with a public comment period from August 18, 2009 through September 16, 2009 and a public meeting on September 9, 2009 to present the Proposed Plan.	August - September 2009

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Event	Date
The ROD amendment was signed for FT-08, OU-4; SVE was the selected remedy.	September 2009
A RAWP was submitted to describe the construction of the remedial action selected (SVE). The RAWP documents planned modifications for the existing pilot system to optimize sub-surface vapor flow and overall contaminant extraction rates.	February 2010
A Remedial Action Report was submitted to describe the construction of the remedial action selected (SVE) and the completed modifications to the existing pilot system.	December 2010
Operation of SVE system.	February 2010 - present
Fuel Hydrant System Spill (ST-11)	
A leak occurred from a 0.75-inch diameter vent line for a 16-inch diameter subsurface fueling pipeline that transported jet fuel (JP-4); an estimated 50,000 to 90,000 gallons of fuel may have been released via the vent line leak.	1957
Another fuel spill occurred when a 50,000-gallon defueling storage tank located next to Fuel Hydrant No. 4 overflowed, resulting in an estimated 14,000 gallons of fuel spilled onto the ground surface.	Late 1950s
An ERP Phase II, Stage 1 investigation was conducted for the flight line fuel spill at locations west of the 50,000-gallon defueling storage tank.	1986
A remedial investigation was conducted for the flight line fuel spill at locations west of the 50,000-gallon defueling storage tank.	1990
A layer of LNAPL (presumably JP-4) was first observed floating on top of the perched water in one well at the onset of perched zone monitoring.	February 1994
Soil gas samples, soil samples, rock cores, and perched groundwater samples were collected at Site ST-11 during the OU-3 Fuel Sites RI/FS.	1995
An ESD was issued for the 1995 ROD to provide additional detail for the LUCs implemented for Site ST-11.	March 2004
The 2006 Five-Year Remedy Review Report recommended the continued use, as necessary, of fuel absorbent socks at PZMWs where LNAPL is present and longer term (24 to 36 hours) pilot studies to evaluate an air-based VE and sparge system as a potential remedial technology for addressing perched groundwater and shallow bedrock.	June 2006
Soil and bedrock VE pilot tests were completed July 15 to August 7, 2006.	July - August 2006
The potential for human health risks due to intrusion of bedrock volatile organic compound vapors into indoor air was evaluated in 2006. Building 1229 located near the Site ST-11 area was included in the indoor air sampling effort.	2006
Focused VE pilot studies were completed on VEW-3 (soil) and VEW-6 (bedrock).	November 2008
A FS was completed to identify remedial action objectives and to evaluate, screen, and develop remedial alternatives for the site. The FS evaluated the following alternatives: no action, institutional controls and long-term monitoring, vapor extraction, monitored natural attenuation, and multi-phase extraction.	November 2009
The Air Force issued a Proposed Plan for Site ST-11 in March 2010, with a public comment period from March 18, 2010 through April 16, 2010 and a public meeting on April 15, 2010 to present the Proposed Plan.	March - April 2010
The ROD amendment was issued for Site ST-11; VE was the selected remedy.	September 2010

TABLE 2-2
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Event	Date
A Remedial Action Report was submitted to describe the construction of the remedial action selected (VE) and the completed modifications to the existing pilot system.	December 2010
A Work Plan Addendum was completed to present the planned field effort to inject chemical oxidant into contaminated perched groundwater at Site ST-11. Chemical oxidant injection will address perched groundwater contaminated with benzene.	February 2011
Chemical oxidant injection was completed to address benzene contamination in perched groundwater. Sodium persulfate was used as the oxidant, with sodium hydroxide as the activator.	May 2011
Operation of VE system.	Spring 2010 - present
POL/MOGAS Tank Site (ST-13)	
Four 12,000- to 15,000-gallon USTs (date of installation unknown) used to temporarily store segregated POL wastes prior to reuse, resale, or disposal were removed and disposed by U.S. Pollution Control, Inc. Contaminated soils were removed during the UST removal and the excavation was filled and capped. Site closure was performed under the regulatory authority of RCRA.	June 1988
No remedial action was the selected remedy for ST-13 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
No Further Action was recommended for ST-13 in the Final Five-Year Remedy Review Report.	June 2001
LNAPL was first measured at MW24 with a product thickness of 0.93 feet.	August 2004
A product recovery system was installed at MW24 for the removal of LNAPL product (JP-4).	December 2004
The 2006 Five-Year Remedy Review Report recommended continued monitoring of the bedrock vadose zone vapors at MW24 and VW-1 in the POL Yard, as well as continued O&M activities for the product recover system, as needed, at MW24 as long as LNAPL is present in the well.	June 2006
Site ST-13 was one of four ERP sites considered a potential or likely threat to regional groundwater quality and examined in the OU-3 RI Report Amendment. The report concluded that remedial action is not warranted for Site ST-13 at this time.	April 2008
The ROD amendment including Site ST-13 was issued. The document concluded current site conditions indicate that active remediation is not warranted for this site, and continued LTM for regional groundwater and occurrence of LNAPL at MW24 are the only actions warranted at this time. If at the completion of the 2011 LTM program LNAPL remains mostly absent from MW24 and benzene concentrations remain below the MCL, the FFA team will discuss whether closure of the site under UU/UE is appropriate.	September 2010
Munitions Burial Site (OT-16)	
The facility was built sometime between 1950 and 1957 and consisted of two burn operation areas operated by EOD personnel.	1950 - 1957
The open burn pit has not been used since April 1990 and the popping furnace located at the other burn operation area was dismantled in the fall of 1992.	1990 - 1992
Soil sampling was conducted at the site as part of the LFI for OU-1.	1991
The site was included in a Phase II LFI/BRA completed for OU-6.	1993

TABLE 2-2
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No remedial action was the selected remedy for OT-16 as documented in the ROD signed for OUs 1,3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
An ESD to address implementing institutional controls was recommended for OT-16 in the Final Five-Year Remedy Review Report.	June 2001
Soil sampling was conducted at OT-16 during the evaluation and/or investigation of 17 sites.	June 2004
The 2006 Five-Year Remedy Review Report recommended an EE/CA and a possible NTCRA of the munitions debris/scrap and underlying soils that contain elevated concentrations of PAHs in lieu of land use controls to achieve UU/UE.	June 2006
The EE/CA concluded that a NTCRA (excavation of selected soil, mechanical separation, and off-site disposal) was the most appropriate remedy for the site.	June 2006
The decision to complete a NTCRA as recommended in the EE/CA was documented in an Action Memorandum for the site.	January 2007
An NTCRA, including soil and debris removal and disposal, was completed at Site OT-16 to address the residual munitions related scrap material and soil impacted with PAHs.	August - October 2008
The status of Site OT-16 was documented in the ROD Amendment as meeting UU/UE criteria.	September 2010
Solid Waste Disposal Area (LF-23)	
Twelve test pits were excavated at LF-23 to depths of 10 to 16 feet as part of the LFI study. The Used Tire Disposal Area (DP-17) ERP site was combined with this site for the LFI study.	August 1991
No remedial action was the selected remedy for LF-23 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
An ESD to address implementing institutional controls was recommended for LF-23 in the Final Five-Year Remedy Review Report.	June 2001
The 2006 Five-Year Remedy Review Report recommended an EE/CA and a possible NTCRA of the soils that contain elevated concentrations of PAHs in lieu of LUCs to achieve UU/UE.	June 2006
The EE/CA concluded that a NTCRA was the most appropriate remedy for the site.	October 2006
The decision to complete a NTCRA as recommended in the EE/CA was documented in an Action Memorandum for the site.	January 2007
An NTCRA, including soil and debris removal and disposal, was completed at Site LF-23 to address the landfill debris and soil impacted with PAHs.	March 2008
A technical memorandum was prepared that provides detailed information concerning the coal ash at Site LF-23, and tentative plans for further work at the site.	September 2007
Additional work was completed in September 2009 to define the nature and extent of contamination of the coal ash and complete a site-specific risk assessment to quantitatively estimate the potential risks to human health posed by constituents of the coal ash deposit in the vicinity of Site LF-23.	July 2010
The ESD was prepared to address identify and describe site-specific LUCs that are needed to ensure long-term protection of human health and the environment.	July 2011

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Event	Date
LOX Loading Plant (SD-24)	
This facility was originally built as a liquid oxygen production and helium loading plant.	1960 - 1961
The facility became the Auto Hobby Shop. Discharge drain lines were added to the waste collection tank/oil sump and drain trough sump at this time.	1965
Some waste oil was placed in the drain trough and on the surface soils located southwest of the building.	1965 - 1974
The drain trough and trough sump were capped with concrete.	mid-1980s
Soil samples were collected from Site SD-24, as part of the LFI for OU-1.	1991
The site was included in the RI/BRA completed for OU-6.	1993
No remedial action was the selected remedy for Site SD-24 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
The effluent collection box at Site SD-24, along with an approximate soil margin of 2 feet, was removed as part of a MILCON project to improve the MHAFB storm water system. However, much of the impacted soil was left in-place during this removal effort.	1997
Additional characterization was recommended for Site SD-24 in the Final Five-Year Remedy Review Report.	June 2001
A site investigation was completed for Site SD-24 to evaluate the site's potential as a source of TCE to regional groundwater, as documented in the Site Investigations at Multiple Sites Final Report.	February 2003
Site SD-24 was included in the passive soil gas survey completed for the Northwest Industrial Area.	Spring 2004
A soil removal action was completed at Site SD-24 to eliminate shallow soil contamination as a potential future source for petroleum and solvents to the regional groundwater.	November 2004
The 2006 Five-Year Remedy Review Report concluded that the selected remedy for Site SD-24 (NRA with LTM) was not protective currently or in the long-term for UU/UE and a protectiveness determination with respect to potential exposure to contaminated vapors could not be made at this time.	June 2006
Bedrock VE pilot tests were completed from July 18 to August 31, 2006.	July - August 2006
The potential for human health risks due to intrusion of bedrock volatile organic compound vapors into indoor air was evaluated in 2006. Building 1340 located adjacent to Site SD-24 was included in the indoor air sampling effort.	2006
Extraction of water released from a fire hydrant to bedrock at Site SD-24 has been ongoing from VE well BEW-1 since the fall of 2007.	Fall 2007 - present
The OU-3 Remedial Investigation Report Amendment identified Site SD-24 as one of four ERP sites still considered a potential or likely threat to regional groundwater quality that warrants remedial action.	April 2008
Injection of chemical oxidant into site soils with residual contamination was completed.	January 2008
Pilot Remedy Optimization Testing resumed in July 2007 to gather additional information on VE at the site. Evaluation of collected data supports the viability of VE for the site.	July 2007 - August 2010
The Final SD-24 Data Report was submitted to present the results of long-term VE pilot remedy optimization activities.	April 2011

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Event	Date
Wash Rack – Building 1354 (SD-27)	
A concrete wash rack was constructed at the site, north of Building 1354.	1960s
Wash water was discharged to the unlined wash rack drainage ditch, and soils and sediment were reportedly removed from the ditch on an annual basis until about 1990.	1960s - 1990
Leaking and overfilled waste oil drums and visibly stained soils were reported at the site's drum storage area, located east of the wash rack.	1986
Soil was sampled from SD-27 as part of the LFI study for OU-1.	1991
The wash rack drainage ditch was graded over, and a new OWS and piping were installed to receive the wastewater discharges from the Equipment Wash Rack.	Fall 1993
The site was included in the RI/BRA completed for OU-6.	1993
No remedial action was the selected remedy for SD-27 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
Additional characterization was recommended for SD-27 in the Final Five-Year Remedy Review Report.	June 2001
Additional site characterization was completed for SD-27, as documented in the Site Investigations at Multiple Sites Final	February 2003
Soil sampling was conducted at SD-27 during the evaluation and/or investigation of 17 sites.	June 2004
The 2006 Five-Year Remedy Review Report recommended an EE/CA and a possible NTCRA of the soils that contain elevated concentrations of PAHs in lieu of land use controls.	June 2006
The EE/CA concluded that a NTCRA was the most appropriate remedy for the site.	October 2006
The decision to complete a NTCRA as recommended in the EE/CA was documented in an Action Memorandum for the site.	January 2007
An NTCRA, including soil and sediment removal and disposal, was completed at Site SD-27 to address the soil and sediment impacted with PAHs.	March - June 2007
The status of Site SD-27 was documented in the ROD Amendment as meeting UU/UE criteria.	September 2010
Drum Storage Area (SS-29)	
Chemical wastes, including solvents (TCA and PD-680), penetrants, emulsifiers, fuel, and hydraulic oil, were stored in drums on the drum accumulation pad.	mid-1970s - 1990
Spilled waste was reportedly observed along the outside of the fence that encloses the drum accumulation pad.	1986
Soil sampling was conducted at the site as part of the LFI for OU-1.	1991
The site was included in the RI/BRA completed for OU-6.	1993
No remedial action was the selected remedy for Site SS-29 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
Additional characterization was recommended for Site SS-29 in the Final 2001 Five-Year Remedy Review Report.	June 2001
Soil sampling was conducted at Site SS-29 during the evaluation and/or investigation of 17 sites.	June 2004

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Event	Date
The 2006 Five-Year Remedy Review Report recommended an EE/CA and a possible NTCRA of the soils that contain elevated concentrations of PAHs in lieu of land use controls.	June 2006
The EE/CA concluded that a NTCRA was the most appropriate remedy for the site.	October 2006
The decision to complete a NTCRA as recommended in the EE/CA was documented in an Action Memorandum for the site.	January 2007
An NTCRA, including soil and sediment removal and disposal, was completed at Site SS-29 to address the soil impacted with PAHs.	March 2007
The status of Site SS-29 was documented in the ROD Amendment as meeting UU/UE criteria.	September 2010
POL Storage Area, RCRA Solid Waste Management Unit (ST-38)	
The yard originated as a tank farm to store aviation fuel when MHAFB was established in the 1940s. Sixteen horizontally placed ASTs were located in the northeast quarter of the present yard for the storage of AVGAS.	1940 - 1950
Three 1.5- million gallon ASTs were constructed in the POL Yard for storage of JP-4. Another steel AST for storage of diesel fuel and the large and intermediate pump houses were also constructed at this time.	1950 - 1960
Most of the horizontal ASTs were removed from the POL Yard.	1969 - 1974
U. S. Pollution Control, Inc. removed four USTs from an area southeast of the small pump house area (ST-13) used for temporary storage of segregated POL wastes. Soil samples collected prior to and during the removal indicated the presence of VOCs. Tank excavations were backfilled with clean fill and covered with a clay cap.	June 1988
The site was identified as requiring investigation during a UST removal.	1992
The site was expanded to include the entire POL Yard, after several “pockets” of contamination were identified.	April 1993
Soil gas sampling was conducted at the POL Yard as part of the RI for OU-3.	1994
The human health risk assessment was conducted as part of the RI for ST-38.	1994
ST-38 was transferred from the OU-3 Fuel Sites and reallocated to state authorities; therefore, ST-38 was not included in the 1995 ROD.	November 1994
A fuel release investigation was conducted at Area No. 6 to characterize the nature and extent of the contamination discovered during the RI.	1996
No further action was recommended for ST-38 based on the 1994 risk assessment and fuel release investigation risk assessment for Area No. 6.	1998
Further investigation was recommended for the POL Yard in the Final Five-Year Remedy Review Report.	June 2001
A two-phased environmental site investigation was completed in the POL Yard in response to a jet fuel 8 release from Tank 1.	October 2001 - June 2002
A Corrective Action Plan was submitted for the Tank 1 Fuel Release site.	August 2003
ST-38 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
An Integrated Contingency Plan for Oil Spill Prevention and Response was completed.	April 2005
A portion of the concrete encasement and liner were removed from the eastern portion of the Tank 1A berm, while the outer wall was left intact. The berm material directly under removed concrete was excavated to the top of the surrounding ground	December 2005
Tank 1A was demolished and the surrounding soil berm and concrete were removed.	July - September 2007

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Event	Date
Excavation and disposal of impacted subsurface soils beneath Tank 1A and protective berm.	October 2007
JP-8 impacted soils beneath the demolished tank were excavated. Soils in the vicinity of the JP-8 leak (northeast third of the tank) exhibited the highest impact were excavated down to bedrock which ranged from 12 feet to 16 feet bgs. Confirmation soil sampling was performed on the walls (interior and exterior) and floor of the excavation. Soil analytical results showed no BTEX detections and two locations with PAHs above the reporting limit.	October 2007
Quarterly groundwater sampling and LNAPL removal are being completed.	November 2007 - 2011
DEQ issued letter indicating that no further remedition or monitoring is required at this time	July 2011
Regional Groundwater (OU-3)	
An RI and Base-Wide Groundwater and Ecological Risk Assessment was performed for OU-3. Field activities included installation and/or sampling of 16 monitoring wells, 11 base production wells and 12 off-base irrigation/domestic wells. Fate and transport modeling was used to evaluate the potential for chemical releases to soil or surface water to impact groundwater.	May 1995
The no remedial action alternative for the regional groundwater was selected in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8. The ROD required at least annual LTM to address uncertainties associated with the fate and transport modeling.	October 1995
The groundwater LTM program was initiated for MHAFB.	May 1996
Regional groundwater and vapor monitoring well MW20 was installed as part of the OU-3 LTM program. Bedrock vapors initially were detected during the installation of MW20.	May 2002
Ten PZMWs (PZMW8 through PZMW17) were installed around PZMW7 in the area of Site ST-11. These wells were included in the 2002 LTM Report and added to the LTM program.	July 2002
Three regional groundwater monitoring wells (MW16-2, 17-2 and 18-2) were constructed as replacement wells for wells MW16, 17, and 18.	2003
Thirteen new regional groundwater and vapor sampling wells (MW24 through MW36), with up to three vapor ports per well, were installed to better delineate the extent of the groundwater and bedrock vapor contamination, identify potential sources, and provide sentry wells in relation to MHAFB's active production wells.	2003 (3 wells) & 2004 (10 wells)
A TCE concentration of 6.6 µg/L was reported above the MCL of 5.0 µg/L in MW25.	June 2003
Weathered JP-4 LNAPL layer measured on the water table at MW24.	Fall 2003
A product recovery system was constructed at MW24 to pump and treat contaminated groundwater and LNAPL.	December 2004
Regional groundwater monitoring well MW37 was installed with vapor ports, approximately 2,000 feet northeast of MW27.	March 2006
The 2006 Five-Year Remedy Review Report recommended continued monitoring of the OU-3 basewide regional groundwater and bedrock vadose zone vapors for as long as contaminants remain at concentrations that prevent UU/UE to ensure selected remedies remain protective of human health and the environment.	June 2006

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Event	Date
An indoor air sampling effort was completed to provide sufficient data to evaluate the potential for bedrock vadose zone VOC vapors to infiltrate into overburden soils and ultimately into indoor air spaces.	April - June 2006
The OU-3 Remedial Investigation Report Amendment presents the additional information concerning identified impacts and potential threats to regional groundwater at MHAFB that have been revealed since the completion of the pre-OU-3 ROD work at ERP sites as documented in the original OU-3 RI/BRA.	April 2008
A new monitoring well (MW39) was installed at Site FT-08. This well was installed in order to monitor site conditions in the bedrock vadose zone and in regional groundwater during remedial action and LTM.	January 2009

Notes:

AST = aboveground storage tank
AVGAS = aviation gas
BEW = bedrock extraction well
bgs = below ground surface
BRA = Baseline Risk Assessment
BTEX = benzene, toluene, ethylbenzene, and xylenes
DEQ = Idaho Department of Environmental Quality
DRMO = Defense Reutilization and Marketing Office
EE/CA = Engineering Evaluation/Cost Analysis
EOD = Explosive Ordnance Disposal
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
FFA = Federal Facility Agreement
FS = Feasibility Study
FT = Fire Training (Area)
IC = Institutional Control
JP = jet propellant
LF = Landfill
LFI = Limited Field Investigation
LNAPL = light non-aqueous phase liquid
LTM = long-term monitoring
LOX = liquid oxygen
LUC = land use control
MCL = maximum contaminant level
µg/L = microgram per liter
MHAFB = Mountain Home Air Force Base
MILCON = Military Construction
MOGAS = motor gasoline
MW = monitoring well
NFA = No Further Action
NTCRA = non-time critical removal action
No. = number
NRA = No Remedial Action
O&M = operations and maintenance
OU = operable unit
PAH = polynuclear aromatic hydrocarbon
PD-680 = Stoddard Solvent
POL = petroleum, oil and lubricants
PZMW = perched zone monitoring well
RAWP = Remedial Action Work Plan
RCRA = Resource Conservation and Recovery Act
RI = Remedial Investigation
ROD = Record of Decision
SVE = soil vapor extraction
TCA = trichloroethane
TCE = trichloroethene
USACE = United States Army Corps of Engineers
USGS = United States Geological Survey
UST = underground storage tank
UU/UE = unlimited use/unrestricted exposure
VE = vapor extraction
VEW = vapor extraction well
VW = vapor well
VOC = volatile organic compound

3.1 PHYSICAL CHARACTERISTICS

The Mountain Home Air Force Base (MHAFB) is located in Elmore County in southwestern Idaho, approximately 10 miles southwest of the city of Mountain Home (Figure 1-1). MHAFB is approximately 50 miles southeast of Boise and is 2 miles north of the Snake River. MHAFB occupies approximately 5,800 acres, and is situated at an elevation ranging from 2,985 to 3,049 feet above mean sea level.

The following sections provide a brief overview of the generalized geology and hydrogeology in the vicinity of MHAFB. More detailed descriptions of the geology and groundwater with respect to the nature and extent of contamination found at sites are covered in their respective Remedial Investigation (RI) reports, the operable unit (OU)-3 RI Report Amendment, and the annual long-term monitoring (LTM) reports.

3.1.1 Generalized Geology

In the vicinity of Mountain Home, Idaho and MHAFB, the upper bedrock unit is mostly Middle to Late Pleistocene-age basalts of the Snake River Group (Malde et al. 1963). Stratigraphic sequences immediately below the Snake River Group include the olivine basalt flows of the Bruneau Formation, an upper unit of the Idaho Group. The Bruneau Formation crops out over broad areas west, north, and east of MHAFB and the city of Mountain Home, and is likely continuous beneath MHAFB. The nature of and depth to the contact between the two basalt units beneath MHAFB (i.e., Snake River Group and the Bruneau Formation) generally lies between 30 to 50 feet below ground surface (bgs).

Idaho Group formations are Late Miocene to Middle Pleistocene in age (between 12 and one million years in age). The Idaho Group formations are characterized by fluvial and lacustrine sediments with interbedded olivine basalt flows and volcanic ash layers (Malde et al. 1963). The early to middle Pleistocene (1.5 to 0.7 million years ago) Bruneau Formation includes coarse sand fan deposits, lacustrine silt layers, and vesicular flood basalts characterized by the presence of olivine. The basalt unit is up to 800 feet thick and comprises the principle aquifer in the Mountain Home area (Idaho Department of Environmental Quality [DEQ] 1996). Key information regarding the site geology is summarized below:

- Unconsolidated silt or fine sand from a few feet to more than 20 feet thick covers basalt over most of MHAFB.
- Basalt beneath MHAFB is between 490 and 580 feet thick.
- Several interflow (windblown or water lain sediments that might impede the vertical movement of water in the unsaturated zone) intervals are present in the basalt below MHAFB. Rubbly, broken, or horizontally fractured zones exist within the basalt flows that facilitate horizontal movement of water in the vadose or phreatic zone.

Available data suggest that all of these interbed or interflow intervals are discontinuous across MHAFB; however, some intervals are continuous across small portions of MHAFB.

3.1.2 Hydrogeology

Water level data were collected from on-Base and off-Base wells from 1990 to 1994 (Woodward-Clyde Consultants [WCC] 1995a) and have been collected since 1996 during the LTM program (Foothills Engineering Consultants [FEC] 2001; RMC Consultants, Inc. [RMC] 2006). The principal conclusions drawn from the water-level measurement program are as follows:

- The regional water table is generally found between 360 and 375 feet bgs and within the Bruneau Formation (a member of the Idaho Group) basalt across MHAFB.
- The direction of groundwater movement at MHAFB is generally to the south-southwest.
- The water table gradient is most uniform during the fall and winter months when there is no irrigation pumping and when the demands on Base production wells are the lowest; at this time, the water table gradient is between 0.001 and 0.00001 foot per foot.
- During the summer months a depression in the water table forms in the central portion of MHAFB and trends in a direction northwest-southeast. Groundwater flow along the southern boundary of MHAFB is reversed with flow to the north and toward MHAFB production wells. Pumping by off-Base production wells has the greatest impact on the western side of MHAFB; however, impact to the water levels in this part of MHAFB is offset somewhat by groundwater recharge from the rapid infiltration basins.
- An abrupt change in water levels northeast of MHAFB boundary has been observed on all monthly water table maps. Water levels measured in wells 1 to 2 miles northeast of MHAFB boundary are consistently 30 to 40 feet higher than levels measured in wells to the south. This discontinuity represents an aquifer boundary, and leakage across the boundary undoubtedly occurs; however, the discontinuity apparently limits the rate of groundwater recharge to MHAFB via underflow. For this reason, the water table below MHAFB has a much lower gradient than the regional water table gradients predicted by U.S. Geological Survey (USGS) water table maps.

The regional aquifer (generally referred to as the Bruneau Formation aquifer) water table is present at the time of this report at an approximate depth of 370 feet bgs or 2,620 feet above mean sea level. The potentiometric surface of the regional aquifer is relatively flat. The regional flow direction is to the south-southwest, toward the Snake River; however, seasonal irrigation and water-supply pumping in the vicinity of MHAFB coupled with long-term declines in groundwater levels have introduced local variations in the aquifer flow direction. Regional groundwater elevation maps constructed using only water levels measured in wells with deviation surveys for the spring and fall 2010 sampling events are presented as Figures 3-1 and 3-2, respectively.

Perched groundwater occurs in small localized zones within the basalt bedrock above the regional water table. The perched water zone at Site ST-11 is present in a fractured zone in the basalt bedrock at depths between 16 and 38 feet bgs. This fractured zone is underlain by a silty fine sand interflow layer. This silty sand layer was observed to be dry during drilling activities

(RMC 2003a). The lateral extent of the perched water is uncertain, but it appears to be at least 300 feet by 600 feet at this location. Additional discussion on the findings of the site investigation at Site ST-11 and perched groundwater elevation data is included in the Flight Line Fuel Spill Investigation and 2002 LTM Annual Report (RMC 2003a). An assessment of water-level change in perched zone monitoring well (PZMW) 7 and sources of recharge to Site ST-11 was completed by USGS in March 2002.

In addition to Site ST-11, perched groundwater has also been observed at the petroleum, oil and lubricants (POL) Yard (Site ST-38) in the vicinity of Tank 1A at depths ranging from approximately 49 to 54 feet. This perched water is within and controlled by the upper vesicular zone of Flow 3 and appears to be limited in areal extent (Washington Group, Inc. et al. 2002). Basalt flows were numbered sequentially beginning with the first flow encountered (upper flow) downward to the last flow identified in the deepest boring drilled during the Phase I and Phase II site investigations performed at MHAFB POL Yard between October 2001 and June 2002.

3.2 LAND AND RESOURCE USE

MHAFB was established by the U.S. Department of Defense (DoD) in 1943 as a training base for several bombardment groups during World War II. In addition to supporting military operations, current land use within MHAFB includes a residential area with approximately 7,500 service men and women and their dependents living at MHAFB. Prior to 1943, the land was undeveloped.

Adjacent land usage includes agricultural use. Agricultural activities dominate the economy of the Snake River Plain, and in 1980, more than 3 million acres were irrigated. Approximately one-third of the irrigated acres were supplied by groundwater (Lindholm and Goodell 1986). Groundwater is also the source for most municipal, industrial, and domestic water supplies on the plain. In 1980, an area of about 200 square miles immediately north of the Snake River, which includes Mountain Home, Idaho and MHAFB, had an estimated total volume of groundwater pumpage of approximately 25,000 acre-feet (approximately 8 billion gallons). In all of Elmore County during 1980, industrial use of groundwater accounted for 40 acre-feet (approximately 13 million gallons), and public and rural water supplies accounted for 4,400 acre-feet (approximately 1.4 billion gallons).

3.3 HISTORY OF CONTAMINATION AND INITIAL RESPONSE

Since the inception of MHAFB and during completion of its mission, the Air Force has stored and used a number of hazardous materials on MHAFB. Through previous practices that may have been acceptable at the time, but that are no longer considered acceptable, and through accidental spillage or loss from storage, chemicals have been released to the environment at MHAFB. Some examples of these practices and accidental releases are:

- Former fire protection training areas where fuel and POL wastes were spread on ground that had been saturated with water, were ignited, and were extinguished as part of training exercises.

- Suspected disposal of POL wastes and pesticides/herbicides in former municipal solid waste landfills.
- Disposal of rinsate from applicators of pesticides/herbicides directly to soil.
- Burial of burn residues from detonation of out-of-date small arms ammunition.
- Accidental release of solvents and mixed POL wastes to soils from temporary holding tanks.
- Accidental release of fuels for military and private vehicles and for military aircraft from storage tanks and fuel lines to soil.

Prior to 1969, wastes used and generated at MHAFB for aircraft maintenance and other industrial operations, as well as sanitary sewage and refuse, were disposed of by incineration, dumping at the Lagoon Landfill (Site LF-01) or the B-Street Landfill (Site LF-02), discharge to the sanitary sewer, road oiling, and/or collection by a contractor for disposal off-site. Since 1969, all wastes have been collected by a contractor for recycling, disposal in the installation sanitary landfill, off-site disposal, or sent to the Defense Reutilization and Marketing Office for final disposition. MHAFB was placed on the National Priorities List (NPL) of hazardous waste sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in August 1990.

The history of contamination and the pre-Record of Decision (ROD) activities (initial response) performed at each site are summarized in Table 3-1. The scope of the pre-ROD investigations is discussed in the 2001 Five-Year Review (FYR) Report (FEC 2001). Post-ROD activities and investigations are provided in the site-specific sections below.

3.4 BASIS FOR TAKING ACTION/SELECTED REMEDY

Many of the remedies selected and documented in the RODs were based on human health and ecological risk screening and/or risk assessment results for exposure to soils, and concentration comparisons with maximum contaminant levels (MCLs) for exposure to groundwater. Decisions made on human health risk screening results were based on comparisons of site concentrations to risk-based concentrations (RBCs) applicable at the time. RBCs included either U.S. Environmental Protection Agency (EPA) Region 3 or EPA Region 10 RBCs for residential soil exposure. Human health protectiveness goals in the ROD were based on EPA's acceptable risk goals, including a non-carcinogenic hazard index not to exceed 1 and a carcinogenic risk range of 1×10^{-6} to 1×10^{-4}. Although the pre-ROD activities considered residential RBCs and hypothetical residential risks at various sites, site decisions, as documented in the RODs, were based on an assumption that there would be no residential use of the site and workers at the site should be protected at the 1×10^{-4} risk level. As a result, a clearly stated protectiveness goal for unrestricted use is not provided in the 1995 ROD.

The following discussion summarizes the findings from the pre-ROD site investigations, which consisted primarily of RIs, risk assessments, and limited field investigation (LFIs) completed in 1991 through 1995. Conclusions derived from pre-ROD investigations provided the basis for selecting the remedy at each site based on protectiveness goals for industrial use. Deficiencies in

the selected remedies identified post-ROD are discussed in Section 7.0, Technical Assessment. The analytical results from the pre-ROD investigations are summarized in the 2001 FYR Report (FEC 2001). In addition, post-ROD activities completed are summarized below. Decisions made based on post-ROD activities that led to further actions are discussed for applicable sites in Section 4.

3.4.1 Site LF-01 (Lagoon Landfill)

RI/Baseline Risk Assessment (BRA) (WCC 1991) conclusions indicated there was no unacceptable risk to human health or ecological receptors from shallow soil, lagoon sediment, or wastewater exposure pathways based on an acceptable excess cancer risk range of 1×10^{-6} to 1×10^{-4}, an unlikely future residential use scenario, and a concern that the ecological risk was overestimated. While analytical data from the RI/BRA conducted in 1991 indicated that leachate from the landfill had not impacted the regional groundwater, evidence was not conclusive. Water quality parameter results associated with the OU-3 RI indicated the regional groundwater has been affected by infiltrating lagoon water. However, arsenic was the only analyte detected in the regional groundwater monitoring wells (MWs) near the lagoons at concentrations that exceeded RBCs, but below the range of arsenic background concentrations. No Remedial Action (NRA) was recommended and selected in the ROD. Since the lagoons were considered a potential continuous source of contaminants to the regional groundwater, Site LF-01 was included in the OU-3 basewide groundwater investigation.

The following paragraphs summarize activities completed after the 1995 ROD.

2001 FYR (FEC 2001)

The 2001 FYR recommended preparation of an Explanation of Significant Differences (ESD) to address implementing institutional controls at LF-01 for current use and future unrestricted use.

Final Closure and Post-Closure Maintenance Plan (MACTEC Engineering and Consulting, Inc. [MACTEC] 2002)

The Final Closure and Post-Closure Maintenance Plan (MACTEC 2002) summarizes post-closure activities, which include annual inspection and maintenance of the monofill cover.

Sewage Lagoon Closure (2004)

The former sewage lagoons located at the site were closed in 2004 with the construction of a monofill and a protective cover over the LF-01 landfill trenches. The monofill consists of dried sludge from the sewage lagoons and a two-foot vegetated earth cover engineered to direct runoff away from the monofill. The dried sludge present in the lagoon cells was contained in a monofill constructed over the footprint of LF-01, under a vegetated earth cover. The sewage lagoons that overlie LF-01 were closed as a condition of the state-issued permit to land-apply wastewater effluent. Construction of the monofill minimized further leaching of chemicals of concern

(COCs) the regional groundwater and limits future residential exposure to lagoon sediments (URS Group Inc. [URS] 2006b).

17 Sites Evaluation/Investigation (URS 2004c)

Site LF-01 was included in the 17 Sites Evaluation (URS 2004c) for potential further characterization. The evaluation determined that since Site LF-01 required institutional controls (ICs), no additional sampling was warranted at that time.

2006 FYR (URS 2006b)

The 2006 FYR recommended monitoring of the regional groundwater at MW7-2 and MW31 and vapors at Site LF-01 to ensure that levels of COCs (specifically trichloroethene [TCE]) in groundwater do not increase with time and remain below the MCL, and to further characterize vapor concentrations in the vadose zone bedrock. In addition, the review recommended preparation of an ESD to address implementing ICs at Site LF-01 to prevent unacceptable risk due to exposure to potentially contaminated media and ensure future protectiveness. The FYR concluded that Site LF-01 does not appear to pose a threat to the regional aquifer at this time.

Explanation of Significant Differences issued for 1995 ROD (MHAFB 2006a)

An ESD was issued on September 29, 2006 for the 1995 ROD to document site-specific ICs for Site LF-01 to ensure long-term protection of human health and the environment, ensure the integrity of the engineered containment (protective cover) for Site LF-01, and prevent inappropriate land use in the future. The 2006 ESD was prepared in accordance with Section 117(c) of CERCLA and 40 Code of Federal Regulations (CFR) 300.435(c)(2)(i).

Site Closure

Site closure was achieved for Site LF-01 under the industrial use scenario. LTM is performed for site-related monitoring wells to monitor groundwater quality and ensure post-closure activities are being completed according to the post-closure plan (MACTEC 2002).

3.4.2 Site LF-02 (B-Street Landfill)

The RI revealed generally low levels of contamination found in soil samples. No "hot spots" or localized areas of contamination by hazardous substances were evident, although pesticides and polychlorinated biphenyls (PCBs) were detected more often in Trenches 1 and 2 than in the other trenches. The results of the risk assessment indicated the site does not pose an unacceptable risk for chronic occupational exposures based on an acceptable carcinogenic risk range of 1×10^{-6} to 1×10^{-4}. NRA was recommended and selected in the ROD. However, the excess cancer risk calculated for future on-site residential scenario exceeded 1×10^{-6}.

2001 FYR (FEC 2001)

The 2001 FYR recommended preparation of an ESD to address implementing ICs at Site LF-02 for future unrestricted use. In addition to ICs, the FYR recommended restricting access to the area with an entrance gate and/or fencing. Furthermore, although it was determined during the OU-3 basewide groundwater RI and ecological risk assessment that regional groundwater monitoring would not be necessary, MW3-2, located due north of Site LF-02, was recommended for inclusion in the future LTM program.

17 Sites Evaluation/Investigation (URS 2004c)

Site LF-02 was included in the 17 Sites Evaluation (URS 2004c) for potential further characterization. The evaluation determined that since Site LF-02 required ICs and physical restriction would not make sampling possible, no additional sampling was completed.

2006 FYR (URS 2006b)

The 2006 FYR recommended monitoring of the regional groundwater and vapors at MW32 to ensure that levels of COCs (specifically TCE) in groundwater do not increase with time and remain below the MCL, further characterize vapor concentrations in the vadose zone bedrock, and ensure that COCs associated with LF-02 are not migrating outside of installation boundaries. In addition, the review recommended preparation of an ESD to address the implementation of ICs at Site LF-02 to limit exposure to soil for unlimited use/unrestricted exposure (UU/UE) (URS 2006b).

Explanation of Significant Differences issued for 1995 ROD (MHAFB 2006b)

An ESD was issued on September 29, 2006 for the 1993 ROD to document site-specific ICs for Site LF-02 to ensure long-term protection of human health and the environment and prevent inappropriate land use in the future. The 2006 ESD was prepared in accordance with Section 117(c) of CERCLA and 40 CFR 300.435(c)(2)(i).

Site Closure

Site closure was achieved for Site LF-02 under the industrial use scenario. LTM is performed for site-related monitoring wells to monitor groundwater quality, and MW3-2 groundwater sampling results indicate that chemical of potential concern (COPCs) are not migrating outside of installation boundaries to the north (URS 2006b). MW32 and MW37 sampling results suggest that LF-02 is not impacting groundwater (URS 2009d). In addition, annual landfill inspections of the land use control (LUC) area are being completed in accordance with the ESD.

3.4.3 Site FT-04 (Fire Training Area 4)

A soil gas survey was performed in 1991 for Site FT-04 during the LFI study for OU-1. Results for total volatile organic compounds (VOCs) did not exceed background levels, and no soil

samples were collected for analysis. Based on the soil gas results, the NRA alternative was recommended during the LFI study and selected in the ROD.

The Air Force completed a limited assessment at two "hot spots" for arsenic in soils with arsenic above the DEQ established background concentration (URS 2006c). Additional soil sampling for arsenic analysis was completed. The evaluation indicated the higher arsenic concentrations were associated with deeper soils near basalt bedrock and were not due to site-related activities.

3.4.4 Site FT-08 (Fire Training Area 8)

The extent of contamination was determined from the boreholes advanced in 1986 and 1988 during the Environmental Restoration Program (ERP) Phase IV-A Investigation (Resources Conservation Company 1989). Concentrations in soil samples were generally highest within and below the bermed area and decreased with depth (vertically) and horizontally from the bermed area. The results of the risk assessment indicated reasonable maximum exposures (RMEs) to soils and airborne contaminants for both residential and industrial use are not expected to result in adverse non-carcinogenic health effects (indicated by a hazard index less than 1) or unacceptable excess cancer risks based on a target risk range (1×10^{-6} to 1×10^{-4}) applicable at the time of the RI/BRA. However, it was noted that the RME excess cancer risk for the hypothetical on-site resident (for an adult) was 3.9×10^{-5} indicating potential unacceptable human health risks.

The following paragraphs summarize activities that were completed after the 1992 ROD.

2001 FYR (FEC 2001)

The 2001 FYR summarized previous risk assessment results as follows: the excess cancer risk calculated for the current occupational worker (2.9×10^{-6}), future construction worker (1.8×10^{-6}), and a hypothetical on-site resident (3.9×10^{-5}) exceeded the protectiveness goal considered at that time for future unrestricted use of 1×10^{-6}. In addition, the 1992 ROD did not include controls to prevent unacceptable risk due to exposure to potentially contaminated soil under other use scenarios. The report recommended additional characterization to reassess whether Site FT-08 posed a threat to regional groundwater and whether impacted media at Site FT-08 posed any unacceptable human health risks.

Site Investigation (SI) at Multiple Sites (URS 2003)

Field activities for Site FT-08 completed during the SI included the following:

- Seventeen direct-push soil gas samples were collected at the soil/bedrock contact, and the samples were analyzed with a field gas chromatograph for VOCs.

- Six soil borings were completed to bedrock with locations based on the soil gas sampling results; two soil samples per boring were analyzed by a fixed-base analytical laboratory for VOCs.

- A vacuum radius of influence (ROI) test was completed to evaluate the feasibility of soil vapor extraction (SVE) as a method to remediate site soils.

The results of the soil gas sampling were mapped in the field and were used to locate the six soil borings. These soil gas analytical results indicated that the highest concentrations of VOCs in soil vapor are present in an area about 75 feet southwest of the former burn pit. Detected chemical concentrations exceeded preliminary remediation goals (PRGs) at several locations and depth intervals, with the highest concentration of TCE in soil (98 milligrams per kilogram [mg/kg]) occurring at a depth of 3 feet at soil boring SB-03. The TCE concentration of 98 mg/kg was the highest concentration reported in the soil at Site FT-08. It is also located about 75 feet southwest of the limits of the former fire training burn pit at the site.

The vacuum ROI test for Site FT-08 was completed in the area of the highest detected TCE concentrations in soil gas. The purpose of the test was to estimate soil vapor permeability at the site and to evaluate the appropriateness of SVE for soil remediation. Assumptions used for the test evaluation are described in the SI at Multiple Sites Report (URS 2003). Analysis of the data led to the conclusion that the SVE would be a highly effective remedial technology for the site for the following reasons:

- The site soils are highly transmissive to air, are dry to moist, have a low organic carbon component, and are a maximum of 15 to 18 feet deep. Therefore, the volatile chemicals of concern in the subsurface are expected to desorb from soil particles and be removed easily using SVE.

- A "cap" exists over the site consisting of compacted crushed asphalt that was probably placed during the site's operational period, and was subsequently compacted by heavy vehicle traffic (i.e., fire trucks). This would result in decreased short-circuiting of air from the atmosphere above the site impacted area during any SVE activities at the site.

- Conditions in the subsurface (reduced oxygen [O_2]) and elevated carbon dioxide (CO_2) concentrations) are suggestive of past robust intrinsic aerobic bioremediation of petroleum-related aliphatic hydrocarbons. Introduction of O_2 and removal of CO_2 from the subsurface during SVE would likely "restart" the intrinsic bioremediation process for the non-chlorinated compounds that are present in the subsurface.

Passive Soil Gas Sampling (RMC 2005)

Additional qualitative evaluation of contaminants in soil at Site FT-08 was completed during the summer of 2004 (RMC 2005) using GORE-SORBER® passive vapor samplers. For the survey, 30 passive samplers were installed on a 100-foot grid across the Site FT-08 area. The sampling devices were installed in the soil at depths of 32 to 36 inches and left in place for about 14 days before removal and analysis by fixed-base laboratory for VOCs. Sample results, although more qualitative than quantitative, were also compared to the available laboratory soil-sample analyses. The GORE-SORBER® sample result figures are included in the 2004 LTM Report (RMC 2005).

A single benzene, toluene, ethylbenzene, and xylenes (BTEX) "hot spot" was detected at sample location 4B, which was located about 45 feet northwest of soil sample location FT-08-SB-03, where TCE was reported at 98 mg/kg. Tetrachloroethene and dichloroethene (DCE) also had their highest GORE-SORBER® concentrations at sample location 4B. TCE was detected at its highest GORE-SORBER® concentration at sample location 5B, which was 60 feet southeast of FT-08-SB-03. The two sample locations are approximately 80 feet southwest of the former burn pit. Since the distribution of COPCs from the passive survey and the SI did not directly correlate to the location of the former burn pit, it was postulated that the contaminant distribution may be indicative of past spillage or leakage from combustible material storage area near the former burn pit.

2006 FYR (URS 2006b)

The 2006 FYR concluded the calculated RME excess cancer risk for the hypothetical on-site adult resident (3.9×10^{-5}) exceeded the protectiveness goal considered at that time (an excess carcinogenic risk not to exceed 1×10^{-6}).

The 2006 FYR recommended selection of a remedial system for soils at Site FT-08 that would result in closure using EPA Region 9 residential PRGs as remedial target levels. A pilot study was also recommended to evaluate SVE as a potential remedial technology for removing COCs from the shallow overburden soils and shallow bedrock. The report concluded that a BRA amendment, Focused Feasibility Study (FFS), and Proposed Plan should be completed to consider active remediation of Site FT-08 to address TCE contaminant levels in soils and remediation of soils and shallow bedrock. Furthermore, the report noted a ROD amendment was required to select and implement a remedial technology for Site FT-08. The report also stated the Air Force prefers active remediation of Site FT-08 rather than ICs due to the land use limitations and restrictions and long-term costs associated with the implementation of LUCs (URS 2006b).

Vapor Extraction Pilot Study, Site FT-08 (URS 2007i)

Soil and bedrock vapor extraction (VE) pilot tests were completed from July 12 to August 25, 2006 to verify the technology is appropriate for Site FT-08 soil conditions and to obtain the necessary information to design a full-scale remedial system expected to achieve closure with UU/UE. Soil samples were collected to confirm that pilot test VE wells were located within zones of significant contaminant sources. Soil samples were analyzed for VOCs, total organic carbon, and moisture content. Results of the pilot tests concluded VE technology would be highly effective for remediation of VOCs in shallow soils. In addition, the pilot test data for the bedrock tests suggested COCs are recoverable at Site FT-08 from the one bedrock extraction well (BEW) installed and tested. Removal rates in bedrock were less than 1.1 and 0.3 pounds per day of TCE and BTEX, respectively. The report recommended implementation of a longer-term remedy optimization study to obtain additional information.

Pilot Remedy Optimization Testing, Sites FT-08 (URS 2008d)

Pilot remedy optimization testing resumed at Site FT-08 in June 2007 to verify the technology was appropriate for Site FT-08 soil conditions and to obtain the necessary longer term information to design a full-scale remedial system. Based on the results of the pilot remedy optimization SVE tests conducted at Site FT-08, it was concluded that SVE technology was highly effective for remediation of VOCs in the overburden soils at Site FT-08.

Final OU-3 RI Report Amendment (URS 2008b)

The RI report amendment recommended remedial actions for Site FT-08 to mitigate the risk to human health resulting from COCs present in site soils that would not allow for UU/UE (i.e., residential land use). The report indicated bedrock vapor concentrations measured at Site FT-08 during the VE pilot study (URS 2007i) and during LTM sampling (URS 2009d) did not pose an unacceptable risk to human health through inhalation exposure. Concentrations of COCs in regional groundwater at Site FT-08 did not exceed MCLs, and have consistently been measured at concentrations of 1 to 2 micrograms per liter (µg/L) or less. The report concluded that the bedrock vapor is not considered a threat to regional groundwater quality. However, it noted if monitoring results of bedrock vapor and groundwater through the Basewide OU-3 LTM demonstrate an applicable or relevant and appropriate requirement (ARAR) exceedance (i.e., MCLs for groundwater) or concentrations showed an increasing trend that warranted action, as agreed upon by the Federal Facility Agreement (FFA) team, a contingency remedy would be identified and considered for these media.

Remedial Investigation/BRA Addendum (URS 2009c)

Since the original RI/BRA in 1991, Site FT-08 underwent several additional phases of investigation and/or evaluation as summarized above. A RI/BRA Addendum was completed to present the additional information that was collected and reassess the potential for unacceptable human health or ecological risks to determine whether remedial action is warranted. This was considered necessary because new, higher concentrations of some COPCs (primarily TCE) were detected in Site FT-08 soil since the pre-ROD investigations, and the presence of VOC vapors in the bedrock vadose zone was also discovered since the original RI/BRA. Detailed results are included in the Final FT-08 RI/BRA Addendum (URS 2009c). RI/BRA Addendum recommendations included the following:

- Based on the potential human health risks, Site FT-08 is not protective for occupational or hypothetical future residential receptors in the near or long term and should be evaluated for remedial action.

- The PRGs that are considered protective of human health should be carried forward to a Feasibility Study (FS) to determine the most appropriate remedial alternative for Site FT-08.

- Site FT-08 is considered a potential source of TCE to the bedrock vadose zone and ultimately to regional groundwater. MW39 (installed in 2009) will be used, in conjunction with other site and nearby wells, to monitor conditions in the bedrock and groundwater at Site FT-08.

- Future documents (e.g., Remedial Action Work Plan) should develop criteria for determining if and when active remediation of bedrock vapors is needed based on the bedrock vapor and regional groundwater analytical data results of future sampling at all applicable Site FT-08 monitoring wells.

Feasibility Study (URS 2009e)

A FS was completed to identify remedial action objectives (RAOs) and to evaluate, screen, and develop remedial alternatives for Site FT-08. The FS evaluated the following alternatives: no action, institutional controls, soil removal and landfill, and SVE.

Proposed Plan (URS 2009f)

In accordance with the National Contingency Plan (NCP), the Air Force issued a Proposed Plan for Site FT-08 in August 2009. The Proposed Plan identified the Preferred Alternative, SVE, for chlorinated- and petroleum-related VOC contamination in soil at Site FT-08. The Air Force issued a public notice of availability, provided a public comment period, and held a public meeting as required by the NCP. No significant changes were made to the preferred remedial action alternative identified in the Proposed Plan as a result of the public meeting and comment period.

OU-4 (FT-08) ROD Amendment (URS 2009k)

A ROD Amendment was completed in 2009 and presented the amended remedy at OU-4, Site FT-08. The remedy selected for Site FT-08 soil (OU-4) in 1992 was No Action. The amended remedy for OU-4 addresses the medium of concern (soil) as identified in previous investigations, and comprises the final remedial action for Site FT-08. The amended remedy for OU-4, Site FT-08, was SVE. Sections 4.1.3 and 4.2.3 describe implementation and operation of this remedy.

3.4.5 Site ST-11 (Flight Line Fuel Spill)

Results of the RI indicated fuel contamination containing BTEX compounds is present at the site. Benzene was present in concentrations above the RBCs in soils near the release point and along the fuel line. BTEX concentrations in soil within 20 feet of the surface did not exceed 1994 EPA Region 3 RBCs. Benzene was detected above the EPA Region 3 RBC (0.36 µg/L) for water ingestion and the MCL (5 µg/L) in perched water sampled from a fractured zone in the basalt bedrock at approximately 32 feet bgs.

Because the perched water at Site ST-11 may yield sufficient quantities of water to support one residential household, a residential risk was calculated for the perched water. Results for a hypothetical future residential use scenario indicated that exposure to perched groundwater could

pose an unacceptable excess cancer risk of $1x10^{-2}$. Evaluation of alternatives in a FFS identified ICs prohibiting groundwater use for the site as the preferred alternative. Under this alternative, the site conditions would be re-evaluated if a change in site use was proposed in the future.

The following paragraphs summarize activities completed after the 1995 ROD.

2001 FYR (FEC 2001)

The 2001 FYR Report (FEC 2001) indicated that even though the selected remedy for Site ST-11 had been implemented (LTM of perched groundwater and ICs), continuing concerns about the site required evaluation to ensure that the remedy remained protective of human health. The following recommendations were made:

- Install a regional monitoring well near Site ST-11 to evaluate potential jet propellant 4 (JP-4) fuel impacts to regional groundwater.
- Install additional perched groundwater monitoring wells to evaluate the extent of light non-aqueous phase liquid (LNAPL) detected at well PZMW7 and to determine the hydrogeological characteristics of the perched aquifer.
- Complete a FFS and pilot test to determine if an active remediation system would be effective in removing COCs from the subsurface.
- Verify that MHAFB fuel system leak detection procedures are adequate to minimize unaccounted fuel loss.
- Prepare an ESD to the 1995 OU-3 ROD to revise the then-current LUCs to incorporate EPA Region 10 IC language into the selected remedy to ensure long-term protectiveness with respect to human exposure to perched groundwater at Site ST-11.

USGS Water Recharge Study (Parliman 2002)

An assessment of water-level change in PZMW7 and identification of potential sources of water recharge to Site ST-11 was completed by the USGS in March 2002 (Parliman 2002). Findings from this study suggested a consistent and non-seasonal source of recharge to the perched water body (or bodies) at Site ST-11 since about 1999. However, no conclusive decision was reached about the exact source, or sources, of water recharge at Site ST-11. Indications were that recharge is either from precipitation runoff from the flight line or from leaks in the storm water or sanitary sewer drainage system adjacent to the site.

Regional Groundwater Monitoring Wells (FEC 2002, RMC 2003a)

Two regional groundwater monitoring wells, MW20 and MW26, were installed near Site ST-11, each with three depth-discrete bedrock vapor sampling ports. Hazardous vapors in the bedrock vadose zone were initially detected during standard health and safety monitoring activities performed during the drilling and well installation process at MW20 in May 2002. These wells

have been included in annual LTM sampling since being installed. To date, no analytes of concern have been detected at concentrations that exceed the chemical-respective federal MCLs.

Flight Line Fuel Spill Investigation (RMC 2003a)

Additional investigation of the Site ST-11 fuel spill site was performed in the summer of 2002 and included the installation of 10 PZMWs (PZMW8 through PZMW17); collection of soil samples, soil gas samples, rock cores, and perched groundwater samples from each perched zone boring/well location; installation of three shallow bedrock and three vapor extraction wells (VEW)-1 through VEW-6; and completion of two short-term vacuum ROI tests. Findings from the additional Site ST-11 investigation are presented with the results of the 2002 LTM Annual Report (RMC 2003a).

Explanation of Significant Differences issued for 1995 ROD (MHAFB 2004)

An ESD was issued on March 23, 2004 for the 1995 ROD to provide additional detail for the LUCs implemented for Site ST-11. The ESD was prepared for Site ST-11 primarily to ensure the site decision remains protective under the current and potential future use scenarios. The ESD provided additional language to strengthen the provisions of the LUCs for the site, to accurately document the geographic area subject to the LUCs, and to specify management requirements to enforce the LUCs. LUCs are summarized in Section 4.1.5 with more detail provided in the ESD (MHAFB 2004).

2006 FYR (URS 2006b)

The 2006 FYR Report recommended the continued use, as necessary, of fuel absorbent socks at PZMWs where LNAPL is present to remove the product from the wells. The presence of LNAPL, which has been detected in perched groundwater in as many as four PZMWs, violates Idaho Administrative Procedures Act (IDAPA) 58.01.02.852.04 of the Rules of the DEQ, "Water Quality Standards." Additionally, benzene has historically been present in perched groundwater in several wells at concentrations exceeding the MCL, and monitored natural attenuation of fuel constituents in perched zone groundwater has been demonstrated to not be effective due to site conditions (an oxygen deficient system and the presence of LNAPL). As a result, the FYR also recommended longer term (24 to 36 hours) pilot studies using VE/air sparging (AS) at the existing wells on site to evaluate an air-based VE and sparge system as a potential remedial technology for addressing perched groundwater and shallow bedrock.

As discussed previously, since the contamination at Site ST-11 is purely jet fuel, state law fully applies and must be met at Site ST-11. The 2006 FYR also stated LTM of the perched groundwater at Site ST-11, and regional groundwater and bedrock vadose zone vapors at MW20 and MW26, should be continued as part of MHAFB's LTM program. Completion of a BRA amendment, FFS, and Proposed Plan were also recommended for Site ST-11.

Indoor Air Intrusion Evaluation and Risk Assessment (URS 2007k)

An analysis of the potential for subsurface vapor intrusion to indoor air and potential human health risks from this exposure pathway was completed in 2007. This was a basewide study that also included the Site ST-11 area. Samples of soil vapor under the floor slab and of indoor air in the nearest building to Site ST-11 (Building 1229) were collected and analyzed for jet fuel related chemicals. This evaluation concluded there are no predicted unacceptable human health risks from subsurface vapor intrusion into indoor air anywhere on MHAFB, including Site ST-11. EPA risk assessment guidance was updated after the 2006 vapor intrusion study. Among other things, the guidance called for assessment of ethylbenzene as a carcinogen for the inhalation pathway. The Air Force evaluated ethylbenzene levels at Site ST-11 and confirmed inhalation risks are within with acceptable range based on residential exposure assumptions.

Site ST-11 Rock Evaluation (URS 2007m)

An evaluation of the bedrock at Site ST-11 was completed to further the understanding of subsurface conditions. This study provided additional evaluation and interpretation of all data collected at the site, mainly from collected and archived rock cores, and confirmed the known extent of impacts to site media. Some of the key conclusions from this study were:

- The clay-rich mudstone layer present at a depth of about 40 feet bgs is expected to provide a relatively high degree of resistance to downward movement of water and contaminants.

- LNAPL, when present, is generally an indication that the screen and filter pack are in contact with the fractured basalt. LNAPL probably resides in fractures that will introduce LNAPL to PZMWs when conditions are right (i.e., declining water levels allow occluded [obstructed or closed off] LNAPL to drain, or dynamic pressures within the system favor flow out of a fracture).

- Measurement of PZMW water level responses during various studies at the site suggest that although there is possibly a slight degree of hydraulic connection in the subsurface at the site, this connection is limited and probably through tortuous (twisting and winding) bedrock fractures that may be lengthy, but are ultimately limited in extent and interconnectivity.

Vapor Extraction Pilot Tests (URS 2007g and URS 2009a)

VE pilot-scale tests were completed at Site ST-11 from July 15 to August 7, 2006. These tests were completed to verify the VE portion of the remedy identified by the FFA team (VE/AS) as the remedial technology that was likely most appropriate for the site conditions and to obtain the necessary information to design a full-scale remedial system that would meet the remedial objectives for the site. The results of the pilot-scale tests indicated VE technology was effective for VOC recovery in both shallow soils and deeper bedrock. The vapor analytical results indicated the mass removal rate for target VOCs in bedrock exceeded that of the shallow soils, and VE provided significant mass removal rates for COCs in both shallow (soil) and deeper (bedrock) wells. The results also concluded natural attenuation via aerobic bioremediation has

probably been an important degradation mechanism for the hydrocarbons, but is currently hindered by a lack of oxygen.

The pilot tests also indicated perched groundwater occurring in existing PZMWs was recoverable with sufficient vacuum. Prior investigations at Site ST-11 have documented the presence of free phase fuel (JP-4) in some PZMWs; however, no free phase hydrocarbons were recovered during the execution of the VE pilot tests. Considering these site characteristics, the Site ST-11 VE pilot study concluded that multiphase extraction (free product and soil vapor) together with bioventing (to provide oxygen to support aerobic bioremediation) would be an effective remedial strategy for Site ST-11 (URS 2007g). However, dewatering of the perched groundwater zones was not considered a desirable remedial process at Site ST-11 due to uncertainties concerning whether the perched water is preventing downward migration of LNAPL. A more detailed presentation and interpretation of the data collected during the four separate VE tests is provided in the Final Pilot Study Technical Report (URS 2007g).

In addition to the 2006 VE pilot tests, focused VE pilot studies were completed on VEW-3 (soil) and VEW-6 (bedrock) in November 2008. These studies evaluated the efficacy of using only the VEWs nearest to manhole Number 1 and determined whether a full scale remedial system could utilize just these two VEWs and affect the subject media and area of the site. Findings from VEW-3/VEW-6 VE studies indicated installation of a full scale VE remediation system at Site ST-11 using only VEW-3 and VEW-6 was expected to be an effective system for remediating the petroleum-related contaminants in the subsurface at the site. Coupled with passive free product recovery techniques and limited bioventing, the site contaminants could undergo rapid attenuation through both physical removal and restimulation of natural aerobic biodegradation processes. The results of the 2008 focused VEW-3/VEW-6 VE studies are documented in the Technical Memorandum Report for VEW-3 & VEW-6 SVE Pilot Test Results (URS 2009a).

OU-3 Remedial Investigation Report Amendment (URS 2008b)

The Final OU-3 RI Report Amendment (URS 2008b) identified Site ST-11 as an ERP site still considered a potential threat to regional groundwater quality that warranted remedial action. The report indicated remedial action was required due to the presence of free phase JP-4 on perched groundwater, which violates IDAPA 58.01.02.852.04 of the Rules of the DEQ, "Water Quality Standards." Furthermore, free product and contaminated perched groundwater (with recent and historic exceedance of benzene's MCL) were considered a potential source of COCs to the vadose zone bedrock, and ultimately a potential threat to regional groundwater through infiltration / percolation.

Feasibility Study (URS 2009l)

A FS was completed to identify RAOs and to evaluate, screen, and develop remedial alternatives for Site ST-11. The FS evaluated the following alternatives: no action, ICs and LTM, VE, monitored natural attenuation, and multi-phase extraction.

Proposed Plan (URS 2010b)

In accordance with the NCP, the Air Force issued a Proposed Plan in March 2010. The Proposed Plan identified the Preferred Alternative, VE, for JP-4 contamination in shallow fractured basalt bedrock and perched groundwater at Site ST-11. The Air Force issued a public notice of availability, provided a public comment period, and held a public meeting as required by the NCP. No significant changes were made to the preferred remedial action alternative identified in the Proposed Plan as a result of the public meeting and comment period.

Record of Decision Amendment for OUs 1, 3, 5, and 6 (URS 2010g)

A ROD Amendment was completed in 2010 and presented the amended remedy for Site ST-11. The original remedy selected for Site ST-11 in the 1995 ROD was limited action including: notice of restriction, leak detection, and perched groundwater sampling. The amended remedy for Site ST-11 is VE. Sections 4.1.4 and 4.2.4 describe implementation and operation of this remedy.

3.4.6 Site ST-13 (POL Yard UST Site)

Soil samples collected before and during the underground storage tank (UST) removal indicated soil had been contaminated by VOCs including tetrachloroethene (11.8 mg/kg), TCE (106 mg/kg), and total xylenes (106 mg/kg). Contaminated soils were removed during the UST removal and the excavation was filled and capped. A CERCLA investigation, human health risk assessment, and ecological risk assessment were not completed at the site because contaminated soils were removed, and the site was closed under the Resource Conservation and Recovery Act (RCRA).

Site ST-13 was included in the OU-3 RI as a potential source of impacts to regional groundwater. The RI included verification sampling to evaluate the adequacy of the soil removal action completed at the site. Fate and transport modeling was conducted to evaluate possible impacts of site chemicals on groundwater. Results of the fate and transport modeling indicated that site COCs would not reach groundwater in concentrations that exceeded RBCs. Model results were corroborated by a rock core drilled to a depth of 50 feet bgs completed in the POL Yard 60 feet east of Site ST-13. No evidence of petroleum hydrocarbon contamination was found in the rock core below 30 feet bgs. No further investigation was recommended.

The following paragraphs summarize activities completed after the 1995 ROD.

2001 FYR (FEC 2001)

The 2001 FYR Report (FEC 2001) stated the selected remedy for Site ST-13 was expected to be protective of human health and the environment under current, near term, and long term uses (unrestricted use), because contaminated soils were mostly removed, and the site is covered with a clay cap. The recommendation for Site ST-13 was therefore No Further Action (NFA).

Well Installation (RMC 2003b)

Discussions among the FFA project team members subsequent to the 2001 FYR Report (FEC 2001) identified an unfulfilled requirement from the site post-closure plan for installation of a regional groundwater monitoring well to monitor Site ST-13. In March 2003, MW24 was installed with vapor ports approximately 35 feet northeast of Building 1307 and approximately 60 feet south of the former UST area (RMC 2004). Since MW24 was installed, groundwater has been sampled 13 times with results indicating decreasing benzene concentrations from 360 µg/L in April 2003 to 0.47 µg/L in October 2009 (URS 2010c). Dissolved groundwater contaminants and vadose zone contaminant vapors appear to be petroleum-related. Additional information concerning installation of this well is documented in the April 2003 Groundwater and Vapor Sampling Results Technical Memorandum (RMC 2003b).

On August 26, 2004, 0.6 feet of free product or LNAPL was measured on groundwater in MW24 at a depth of 371 feet bgs (URS 2007f). Chemical fingerprinting identified the LNAPL as probable weathered JP-4 fuel (RMC 2005). Monitoring of groundwater and LNAPL levels in MW24 has suggested LNAPL is present in the well only when water levels decline in the summer and fall (high water demand periods). Apparent LNAPL thicknesses in the well have been measured in the range of 0.5 to 1 feet during periods of lowered water table; however, accurate product measurements are difficult at the depths below ground (almost 400 feet) that are present at this well, and there is probably some inaccuracy associated with the product measurements.

Product Recovery System (RMC 2005)

A product recovery system (PRS) was installed at MW24 in December 2004. The PRS consisted of a total fluids pump and an associated oil/water separator system installed in an on-site equipment shed. The PRS pumped approximately 98,000 gallons of water since installation; however, no measurable quantity of fuel was recovered during the operation of the PRS (RMC 2005). The PRS was turned off in the fall of 2005 due to the inability to extract LNAPL from the well, and on November 16, 2005, the pump was removed. Additionally, it was discovered that the screen in MW24 had been damaged, presumably by pump installation and removal activities. A description of the PRS and its operation is provided in the Final 2004 LTM Annual Report (RMC 2005).

A passive fuel recovery absorbent sock was initially installed in MW24 in the fall of 2006 and has been used on an as needed basis when LNAPL has been intermittently detected at MW24. An estimated quarter of a gallon was removed during the 2008 LTM using the absorbent sock in MW24 (URS 2009d). LNAPL was not detected in MW24 during the 2009 LTM. As a result, passive fuel recovery activities were not completed for MW24 at any time in 2009 (URS 2010c).

2006 FYR (URS 2006b)

The 2006 FYR (URS 2006b) recommended continued monitoring of the bedrock vadose zone vapors at MW24 and vapor monitoring well VW-1 in the POL yard, as well as continued

operations and maintenance (O&M) activities for the PRS, as needed, at MW24 as long as LNAPL is present in the well. Recommendations also included additional characterization of the source of LNAPL in MW24 and hot spots contributing VOC vapors to the vadose zone. The 2006 FYR stated that an OU-3 RI/BRA amendment, FFS, and Proposed Plan should be completed for Site ST-13, if warranted, to support a remedy selection in the OU-3 ROD amendment.

Site ST-13 Rock Evaluation (URS 2007f)

A detailed evaluation of the geological system was completed at Site ST-13 and presented in the ST-13 Rock Evaluation Technical Memorandum (URS 2007f). This technical memorandum described and assessed the hydrogeologic conditions at Site ST-13 in order to provide a framework for evaluating the limited fuel contamination observed in regional groundwater monitoring well MW24. This document concluded that the less than one gallon of LNAPL, identified in 2004 on the regional groundwater at MW24, was probably inadvertently introduced by drilling through a fuel contaminated perched aquifer. The borehole likely provided a vertical conduit that allowed LNAPL-contaminated and microorganism-contaminated water to reach the regional aquifer during the open-hole interval during well drilling and construction.

OU-3 Remedial Investigation Report Amendment (URS 2008b)

The OU-3 RI Report Amendment (URS 2008b) indicated the most likely source of the LNAPL fuel observed in MW24 was from a shallow zone containing perched groundwater that has been observed to contain LNAPL during historic investigations in the POL Yard. This was supported by the data collected since 2004 on the occurrence of LNAPL and groundwater VOC concentrations in MW24, which suggested a one-time limited source that was introduced relatively quickly. The most compelling evidence for a limited source of fuel contamination at MW24 was the steady decrease in the occurrence of LNAPL in the well and the steady decrease of concentrations of dissolved fuel constituents measured in groundwater samples since contamination was discovered at MW24. The low frequency of benzene detections in vapor port (VP) 1 and VP2 further supported the idea that drilling may have introduced LNAPL to the regional aquifer.

LTM (URS 2011b)

The regional groundwater and bedrock vadose zone vapor in monitoring well MW24 continue to be sampled as part of MHAFB's LTM program. The LTM program at MW24 also includes monitoring for the presence of free product. The historical trend in dissolved benzene concentrations for MW24 indicates the dissolved benzene concentrations have been steadily declining since LNAPL was first reported in MW24. The presence of LNAPL has been ephemerally observed in MW24 since late 2005 with periods, during high water levels, of LNAPL being absent. LNAPL was not observed in MW24 in 2009 or 2010. Although free product present in MW24 has resulted in benzene concentrations historically exceeding the MCL (5 µg/L), the MCL has not been exceeded since 2007. The April and October 2010 sampling events reported concentrations of benzene as non-detect with a reporting limit of 0.13 µg/L.

Record of Decision Amendment for OUs 1, 3, 5, and 6 (URS 2010g)

The site status for Site ST-13 was documented in the OUs 1, 3, 5, and 6 ROD Amendment. Current site conditions indicate active remediation is no longer warranted for this site, and continued LTM for regional groundwater and occurrence of LNAPL (including continued use, as necessary, of a passive fuel absorbent sock) at MW24 are the only actions needed at this time. Regional groundwater LTM at MW24 will be continued at least through 2011. Based on current site conditions, the FFA team agrees the site now meets UU/UE criteria and warrants NFA at this time.

3.4.7 Site OT-16 (Munitions Burial Site)

The results of the Phase I and Phase II LFIs indicated that the site soils in the burn pit contained VOCs, explosive compounds, and polynuclear aromatic hydrocarbons (PAHs). The risk assessment results indicated no unacceptable risks relative to the protectiveness goal at the time of 1×10^{-4} excess cancer risk for industrial use. As a result of the two LFI investigations and risk assessment, the NRA alternative was recommended and selected in the ROD.

The following paragraphs summarize activities completed after the 1995 ROD.

2001 FYR (FEC 2001)

The 2001 FYR Report (FEC 2001) stated Site OT-16 did not pose an unacceptable human health risk for occupational and residential receptors based on a carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. However, the excess cancer risk, based on a screening level comparison, for the future occupational and future residential receptors exceeded criteria for UU/UE. Additionally, the 2001 FYR noted that the 1995 ROD for Site OT-16 did not include site-specific controls to prevent unacceptable risk due to exposure to potentially contaminated soil under a UU/UE scenario. The review recommended an ESD be prepared to address implementing ICs at Site OT-16 to prevent future unrestricted use.

17 Sites Evaluation Investigation (URS 2004c)

Additional samples for on-site analysis were collected from a test pit dug in the burn pit area as part of the 17 Sites Investigation (URS 2004c). The purpose of the additional sampling was to determine if perchlorate was present in a white crystalline substance that was previously encountered during the Phase I LFI. The results of the analysis indicated perchlorate was not present at the site.

2006 FYR (URS 2006b)

The 2006 FYR (URS 2006b) indicated neither the preparation of an ESD or the implementation of ICs, which were both recommended for Site OT-16 during the previous five-year review, had been completed for this site. The 2006 FYR recommendation for Site OT-16 was to complete an Engineering Evaluation/Cost Analysis (EE/CA) and a possible non-time critical removal action

(NTCRA) of the munitions debris/scrap and underlying soils that contain elevated concentrations of PAHs in lieu of LUCs to achieve UU/UE. These recommendations led to further actions which are summarized in Sections 4.1.5 and 4.2.5.

3.4.8 Site LF-23 (Solid Waste Disposal Area)

The extent of contamination detected during the excavation of 12 test pits at Site LF-23 in August 1991 was confined to the bottom portion of the trenches in an area around one test pit (10B). The mobility of PAHs in the soil-water system was considered low. Therefore, a risk assessment was not conducted for exposure to site soils and groundwater and the NRA alternative was recommended during the 1991 LFI and selected in the ROD.

The following paragraphs summarize activities completed after the 1995 ROD.

2001 FYR (FEC 2001)

The 2001 FYR Report (FEC 2001) stated that because no risk assessment was completed, there was uncertainty regarding whether these detected PAH concentrations posed an unacceptable risk to human health or the environment. Additionally, the 2001 FYR noted that 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 a UU/UE scenario. The review recommended an ESD be prepared to address implementing ICs at Site LF-23 for future unrestricted use.

17 Sites Evaluation/Investigation (URS 2004c)

Site LF-23 was included in the 17 Sites Evaluation (URS 2004c) for potential further characterization. The evaluation determined that since the site was protective in the short term and a removal action was being considered for the site, additional sampling was not warranted at that time.

2006 FYR (URS 2006b)

The 2006 FYR (URS 2006b) indicated neither the preparation of an ESD or the implementation of ICs, which were both recommended for Site LF-23 during the previous five-year review, had been completed for this site. The 2006 FYR recommendation for Site LF-23 was to complete an EE/CA and a possible NTCRA for soils that contain elevated concentrations of PAHs in lieu of LUCs to achieve UU/UE. These recommendations led to further actions, which are summarized in Sections 4.1.6 and 4.2.6.

LF-23 Site Status and Coal Ash Technical Memorandum (URS 2007l)

During the NTCRA, described in Section 4.2.6, coal ash was discovered at Site LF-23. Based on this discovery, various MHAFB personnel with work histories dating back to the operational period of the former MHAFB coal-fired heat plant were interviewed. These interviews were completed in May 2007. The interviews determined the coal ash had been placed at Site LF-23 since the 1950s or 1960s, and possibly through the early 1980s. The coal ash was hauled from

the former MHAFB coal-fired heat plant to the Site LF-23 area to fill in the low areas and to cover the hardfill, tires, and tree stumps present there. The heat plant was converted to natural gas starting in either 1992 or 1997. The heat plant was officially closed in the 2001/2002 time frame.

Exploratory work was completed in order to quickly evaluate the extent of the coal ash, and to secondarily define the general site conditions (e.g., extent of hardfill rubble). A 100-foot grid was laid out over the site, and the boundaries of the coal ash were mapped. The extent of the rubble area was determined by direct observation of sporadic rubble at the surface, observation of rubble within test pits, and observation of surface topography and grade (e.g., hummocky surface) as compared to the surrounding terrain. A technical memorandum (URS 2007l) was prepared to detail the additional exploration work including test pitting (21 test pits), hand dug exploratory holes, and visual observations (including spoils from animal burrows) that was completed in late April and early May 2007 in order to define the vertical and lateral extent of the coal ash.

Based on the available information, which was presented in the technical memorandum (URS 2007l), the following conclusions were made concerning Site LF-23 and the discovery of coal ash:

- The actual time of the formation of the three depressions (i.e., suspected borrow site excavations) that defined the Site LF-23 boundary is not known with certainty, but probably dates to the early operational period of MHAFB (1940s to 1950s).

- The landfill debris found in test pit LF23-10B and the area surrounding test pit LF23-10B, the subject of the NTCRA, was placed prior to the disposal of the coal ash, based on the fact that it underlies the coal ash layer.

- According to the historical Phase I Records Search information (CH2M Hill 1983), the site area operated as a used tire disposal area at the time of the site visits in 1983. There is no reference to "coal ash or hardfill disposal" in this report. However, according to the interviews with present MHAFB workers, the general area of Site LF-23 was reportedly used as a dumping ground for coal ash from the MHAFB coal-fired heat plant from an unspecified time in the 1950s or 1960s up until the early 1980s. However, since the coal ash was observed to overlie most of the used tires, a portion of the coal ash was likely disposed at the time of, and after, placement of used tires. This is supported by the interviewee supplied reason for placing coal ash at this site, which was to fill in the hummocky hard filled area and cover tires and tree stumps. Therefore, there is evidence in the available record that suggests coal ash was disposed in this area up until the early 1980s; however, the exact timeframe of coal ash disposal cannot be determined with certainty.

- The coal ash was likely dumped immediately off of the north side of the south perimeter road and then was spread over the land surface to the north. The coal ash was observed to be present in a monofill layer above the zone of used tires and the underlying fill soil layer

and landfill debris, but beneath and intermixed with some of the concrete and basalt rubble. This suggests some of the hardfill rubble was placed after the coal ash disposal.

Coal Ash Investigation and Risk Assessment (URS 2010d)

Additional work was completed to define the nature and extent of the coal ash and related contamination including a site-specific screening level risk assessment to quantitatively estimate the potential risks to human health posed by constituents of the coal ash deposit at Site LF-23. The primary objective of the investigation was to determine if Site LF-23 poses an unacceptable risk to human health or the environment. The primary work elements associated with additional site characterization of the coal ash layer are presented in the ERP Site LF-23 and Vicinity Coal Ash Characterization and Risk Assessment Work Plan Addendum (URS 2009i).

To evaluate the need for remedial action, 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 areas 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 MHAFB 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.

The 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 occupational site workers, trespasser, and hypothetical on-site resident scenarios considered is provided in the ERP Site LF-23 and Vicinity Coal Ash Characterization and Risk Assessment Work Plan Addendum (URS 2009i). Estimates of risk were developed for Areas LF-23A and LF-23B by evaluating exposure to soil for the occupational worker, trespasser, and hypothetical on-site resident. In addition, estimates of risk were developed by evaluating ingestion of homegrown produce.

Multi-increment (M-I) sampling was used to collect representative samples from Area LF-23A and LF-23B for semivolatile organic compounds (SVOCs), metals, and radionuclide analysis. 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. 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.)

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) as listed in EPA Regional Screening Levels for Chemical

Contaminants at Superfund Site (EPA 2010) for metals and PRG's for radionuclides as listed in Radionuclide Toxicity and Preliminary Remediation Goals for Superfund Sites (EPA 2007a).

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 human health risks were estimated for the two areas, using the same industrial and residential exposure assumptions as the RSLs. For the residential scenario, risks from indoor air vapor intrusion and ingestion of homegrown produce for certain PAH compounds were assessed. Analytical data and the human health risk assessment are presented in Final LF-23 Coal Ash Characterization and Risk Assessment Report (URS 2010d).

Risks for average and maximum residential exposures were greater than 1×10^{-4} in both depth intervals for Area LF-23B. Risks for industrial exposures are in the 1×10^{-6} risk range, but exceed the 1×10^{-5} risk range for residential exposures for Area LF-23A. Areas LF-23A and LF-23B are both 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 or residential use. Area 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, LUCs were needed to prevent human exposures in the future.

This assessment led to further actions which are summarized in Sections 4.1.6 and 4.2.6.

3.4.9 Site SD-24 (Old Liquid Oxygen Loading Plant and Auto Hobby Shop)

Results from the LFI and RI investigation at Site SD-24 indicated site soils and sediment are contaminated with varying concentrations of VOCs (primarily TCE), SVOCs (primarily PAHs), petroleum hydrocarbons, and metals. The highest concentrations of VOCs (TCE, xylenes, and toluene) and PAHs were detected in soil samples collected next to the waste collection tank/oil sump. Lower concentrations were detected in soil samples collected near the west side of the facility parking lot. PAHs, petroleum hydrocarbons, and metals were also detected in sediment samples from the outfalls of the waste collection tank lines, which discharge to the main MHAFB drainage ditch.

The risk assessment results indicated no unacceptable health risks relative to the protectiveness goals at the time of 1×10^{-4} excess cancer risk for industrial use. In addition, the RI concluded petroleum hydrocarbons and metals did not pose unacceptable risk based on a qualitative assessment. As a result of the LFI and RI site investigations and risk assessment, the NRA alternative was recommended and selected in the ROD.

The following paragraphs summarize activities completed after the 1995 ROD.

Removal of Effluent Collection Box (MHAFB 1998)

The effluent collection box was excavated and removed from service in 1997 along with soils within a margin of about 2 feet around the structure. Confirmatory soil samples indicated VOCs

and total petroleum hydrocarbon contamination remained in the open excavation; however, the excavation was backfilled, and the site was restored (MHAFB 1998).

MW19 Well Installation (FEC 2000)

Regional groundwater monitoring well MW19 was installed in July 2000 approximately 100 feet south of Site SD-24. Information concerning installation of this well is documented in the Monitoring Well Installation Letter Report for MW19 (FEC 2000). MW19 was not equipped with vapor sampling ports, as bedrock vapors had not been discovered at that point. MW19 is close enough to a subsequently installed monitoring well (MW27) that it is currently (as of 2007) no longer sampled in the LTM program. From the time of its installation through 2004, nine samples collected from MW19 had measured TCE concentrations that varied from a low of 1.3 µg/L to a maximum of 2.2 µg/L.

2001 FYR (FEC 2001)

The 2001 FYR Report (FEC 2001) noted the BRA-calculated excess cancer risk from exposure to soils at Site SD-24 exceeded the level that would allow for unrestricted (residential) future land use (at or below 1 x 10^{-6} excess cancer risk). Additionally, it was stated that uncertainty existed concerning the potential for Site SD-24 to be a continuing source of contaminants to regional groundwater based on the available information. The following recommendations were made: additional characterization to address concerns that the site was a potential source of contaminants to the regional aquifer; implementation of ICs to limit or restrict future use of the site in accordance with EPA Region 10's policies on ICs at federal facilities; and continued LTM of monitoring well MW19 to monitor whether contaminant concentrations remain below MCLs.

Site Investigation (URS 2003)

An SI was completed for Site SD-24 to evaluate the site's potential as a source of TCE to regional groundwater during the 2002 Site Investigations at Multiple Sites (URS 2003). The SI included the collection of additional direct-push soil gas samples in the area surrounding the removed effluent collection box location at Site SD-24 followed by drilling and sampling of three soil borings in the areas of the highest suspected TCE contamination. Soil sample analytical results were compared to screening criteria (EPA Region 9 PRGs), with the only exceedances being from TCE. The maximum concentration of TCE detected during the SI was 14 mg/kg at the bedrock surface immediately adjacent to the location of the former effluent collection box. The soil gas sampling results also suggested the effluent collection box was a likely source area. Detailed results of the SI are documented in the Final SI Report (URS 2003).

Passive Soil Gas Survey (RMC 2005)

Site SD-24 was included in the passive soil gas survey completed for the northwest industrial area in the spring and summer of 2004 to evaluate Site SD-24 as a potential source for TCE and as a potential threat to regional groundwater quality (RMC 2005). For the survey, GORE-SORBER® passive soil vapor samplers were installed on a 100-foot grid across the general Site

SD-24 area. The sampling devices were installed in the soil at depths of 32 to 36 inches for about 14 days before removal and analysis by a fixed-base laboratory for VOCs. The survey identified the former (removed) sub-grade concrete effluent collection box to Building 1340 as an apparent high concentration source area for TCE contamination. Results of the passive soil gas survey are provided in the Final 2004 Annual LTM Report (RMC 2005).

Soil Boring/Rock Core (RMC 2005)

A shallow soil/rock core borehole (SD24-R1) was advanced immediately north of the location of the former effluent collection box to a total depth of 50 feet bgs in July 2004. Elevated concentrations of TCE (19 mg/kg) in the soil sample collected at the soil bedrock contact and elevated photoionization detector/flame ionization detector headspace readings at various intervals down to 46 feet bgs in the shallow bedrock were detected. The presence of a solvent-like odor was also noted in the evaluation of the rock core. The results of the soil sampling and rock core observations are provided in the Final 2004 LTM Annual Report (RMC 2005).

17 Sites Evaluation/Investigation (URS 2004c)

Site SD-24 was re-evaluated as part of the 17 Sites Evaluation/Investigation with no sampling proposed at that time.

Removal and Disposal Action (URS 2005)

In November 2004, a removal and disposal action (RDA) was completed for impacted soils at the location of the removed effluent collection box at Site SD-24. The results of the RDA are documented in the Final SD-24/SD-25 RDA Report (URS 2005). Impacted soils were excavated to the bedrock surface over an area of approximately 25 by 40 feet at the site. Soils were excavated until field and fixed-base laboratory analytical results were below the risk-based screening action levels for the site (EPA Region 9 PRGs at the $1x10^{-6}$ risk level for all VOCs except TCE, and at the $1x10^{-5}$ risk level for TCE [0.53 mg/kg]) through agreement with the DEQ and EPA Region 10. A small volume of soil with TCE concentrations (1.4 and 12 mg/kg) that exceeded the action level could not be excavated due to an active water line; the remaining TCE-impacted soil was later treated in place by chemical oxidation. The excavation was backfilled with compacted clean fill soil. Approximately 460 cubic yards of impacted soil were removed and disposed at off-base disposal facilities.

2006 FYR (URS 2006b)

A 2006 FYR Report (URS 2006b) determined the selected remedy for Site SD-24 (NRA with LTM) was not protective currently or in the long term for UU/UE due to the remaining TCE-contaminated soil present under the water line at concentrations above the EPA Region 9 residential PRG. In addition, a protectiveness determination, with respect to potential exposure to contaminated vapors, could not be made at this time.

The 2006 FYR recommended a pilot study to evaluate the effectiveness of VE as a potential remedial technology for removing COCs from the bedrock and the removal or treatment of the remaining contaminated soils left in-place during the 2004 RDA. Completion of an indoor vapor intrusion evaluation was also recommended to determine whether exposure pathways via indoor air and/or ambient air exist. The report concluded that a BRA amendment, FFS, and Proposed Plan should be completed to consider active remediation of the site to address the residual solvent and petroleum compounds that are present in the shallow bedrock and their effect on vadose zone vapors and potentially regional groundwater. Furthermore, the report indicated a ROD amendment may be required to select and implement a remedial technology for the site.

Bedrock Vapor Intrusion to Indoor Air Sampling and Evaluation (URS 2007k)

The potential for bedrock vadose zone VOC vapors to infiltrate into overburden soils and ultimately into indoor air spaces was evaluated to determine whether a complete pathway exists and whether a potential unacceptable human health risk may be present from this pathway. To complete this evaluation, an indoor air sampling effort was completed during the late spring/early summer of 2006 to provide sufficient data to allow for the evaluation. Building 1340 located adjacent to Site SD-24 was included in the indoor air sampling effort. The results of the evaluation demonstrated there were no unacceptable current or future human health risks or adverse health effects due to vapor intrusion to indoor air pathways for any use scenario (industrial or residential).

Vapor Extraction Pilot Study, Site SD-24 (URS 2007h)

Several step and constant rate bedrock VE pilot studies were completed at Site SD-24 from July 18 to August 31, 2006 to verify the technology as appropriate for the site conditions and obtain the necessary information to design a full-scale remedial system. Five separate VE pilot-scale tests were performed for the shallow (50 foot) bedrock source zone at BEW-1 and the deeper (100 foot) bedrock at BEW-2. Results of the VE pilot tests concluded VE technology would be highly effective in recovering TCE and cis-1,2-DCE from the shallow bedrock well BEW-1. Significant mass removal rates for TCE and cis-1,2-DCE of 12.5 and 2.5 pounds per day, respectively, were measured at BEW- 1, even at the conclusion of four tests (one short duration stepped vacuum and three longer duration tests totaling 133 hours).

The pilot test data for the deeper (100 foot) bedrock well BEW-2 indicated that, like BEW-1, TCE and cis-1,2-DCE comprised the greater mass fractions of target VOCs in the extracted vapor. Unlike BEW-1, however, contaminant concentrations were much lower, and mass removal rates for these compounds were approximately one order of magnitude smaller, even with a specific well capacity approximately one order of magnitude greater.

Efforts to document the zone of vacuum influence afforded by vacuum applied to the shallow (BEW-1) or deeper well (BEW-2) were not successful using the monitoring network set up for this purpose.

Pilot Remedy Optimization Testing (URS 2008d)

Pilot remedy optimization testing has been conducted at Site SD-24 to collect additional and extended field and laboratory data to further evaluate the operational effectiveness of the VE remedy and to gather information necessary to determine long-term operational parameters for the system should it become a full-scale remedial system in the future (URS 2008d). The tests consisted primarily of VE from BEW-1. Additionally, four rock cored borings were drilled in the source area around BEW-1 in order to obtain additional information on the horizontal and vertical nature and extent of shallow bedrock impacted with aqueous and/or free phase contaminants. These new rock corings were completed as VE or vacuum monitoring points, with vacuum responses measured during active extraction from BEW-1. This testing included data collection beginning in July 2007 and being completed in August 2010. Results of the pilot remedy optimization testing support the 2006 VE pilot study results, which concluded VE is a viable and applicable technology for Site SD-24 (URS 2008d).

OU-3 Remedial Investigation Report Amendment (URS 2008b)

The Final OU-3 RI Report Amendment (URS 2008b) identified Site SD-24 as an ERP site still considered a potential or likely threat to regional groundwater quality that warrants remedial action. The rationale regarding the need for remedial action was based on data suggesting the site is the ultimate source of the vapor-phase chlorinated VOCs in the fractured basalt vadose zone. The report recommended remediation of the heavily impacted shallow bedrock source zone (down to about 50 feet bgs) to lessen or eliminate the threat to regional groundwater quality.

Injection of Chemical Oxidant into Site Soils (URS 2008c)

Injection of a chemical oxidizing agent (sodium permanganate) was completed on January 15 and 16, 2008 to treat the small amount of remaining TCE-impacted soil present below an active water line adjacent to the previous RDA excavation limits. Results indicated an adequate radius of influence and depth for the dispersion of the oxidant was obtained, and the subject impacted soil zone was adequately treated. Although confirmation soil sampling of the soils directly underneath the water line was precluded by the presence of the water line, the quantity and concentration of the sodium permanganate injected was more than adequate to effectively treat the subject soils so the resultant TCE concentrations are well below the target TCE concentration (URS 2008c). Based on the results of the injection activities, the soil at Site SD-24 now meets UU/UE criteria.

Pilot Remedy Optimization Testing, Site SD-24 (URS 2010g)

Pilot remedy optimization testing was continued at Site SD-24 to collect additional and extended field and laboratory data to further evaluate the operational effectiveness of the VE remedy in accordance with the SD-24 Remedy Optimization Work Plan Addendum (URS 2009h). Testing also served to gather information necessary to determine long-term operational parameters for

the system should it become a full-scale remedial system in the future. The tests consisted primarily of VE from BEW-1.

Testing was continued at Site SD-24, and as of January 2010, all five BEWs were connected to the extraction system, and a larger blower was also installed in the VE system shed. The testing began in July 2007 and was completed in August 2010. The results from the remedy optimization testing indicated the VE system is a viable remedial technology for Site SD-24. System data collected since 2007, including analytical data, indicated the following:

- The primary source of contaminant mass in the shallow bedrock beneath the release area has been effectively removed with the operation of the VE system, possibly as early as late 2007.
- Only vapor phase contamination appears to remain present in the fractured basalt bedrock in the subsurface. This is confirmed by the fact that observed effluent TCE concentrations did not rebound above the outlying bedrock vapor concentrations (MW27-VP1) during the VE system run cycles.
- Continued operation of the VE system would likely result in a small TCE mass removal rate from only shallow fractured basalt bedrock as no discernable effects on deeper vapor ports could be observed during the 2007 to 2010 VE activities.
- To date, about 250 pounds of TCE and 75 pounds of cis-1,2-DCE has been removed throughout all VE activities that have been completed (URS 2010g).

Based on the January 26, 2011 FFA Team meeting, Site SD-24 is recommended for NFA since soil meets UU/UE criteria. Bedrock vapor contamination in the vicinity of Site SD-24 will be addressed under OU-3, Basewide Regional Groundwater.

3.4.10 Site SD-27 (Equipment Wash Rack)

The results of the LFI and RI showed that the site soils near the drum storage pad and sediments in the wash rack drainage ditch were contaminated with varying amounts of VOCs, SVOCs, pesticides, total recoverable petroleum hydrocarbons (TRPH), and metals.

The risk assessment results indicated no significant unacceptable health risks relative to the MHAFB protectiveness goals at the time of 1×10^{-4} excess cancer risk for industrial use. As a result, the NRA alternative was recommended for Site SD-27 and selected in the ROD.

The following paragraphs summarize activities completed after the 1995 ROD.

2001 FYR (FEC 2001)

The 2001 FYR Report (FEC 2001) stated that Site SD-27 did not pose an unacceptable human health risk for occupational receptors based on a carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. However, the excess cancer risk calculated for current occupational, future occupational, and future residential receptors exceeded criteria for UU/UE (1×10^{-6}). Additionally, the 2001 FYR noted that the 1995 ROD for Site SD-27 did not include site-specific controls to prevent

unacceptable risk due to exposure to potentially contaminated soil or sediment under a UU/UE scenario. The review recommended an ESD be prepared to address implementing ICs at Site SD-27 for future unrestricted use. The review also concluded that additional characterization of Site SD-27 was warranted to address concerns that TCE in soil and sediment may be acting as a source of contamination to regional groundwater.

17 Sites Evaluation/Investigation (URS 2004c)

Due to concentrations of PAHs in historical soil samples, Site SD-27 was included in the 17 Sites Evaluation (URS 2004c). Additional soil samples were co-located with historical borings/samples where PAH contamination was detected at high concentrations. The results of the investigation indicated the PAH concentrations in soil remain similar in magnitude to the historic sampling. The most significant concentrations of PAHs in soil generally were in the shallow soil of the shallow drainage ditch that historically carried wash water from the wash rack to the main MHAFB drainage ditch and a narrow area immediately adjacent to the drum storage pad.

2006 FYR (URS 2006a)

The 2006 FYR (URS 2006a) indicated neither the preparation of an ESD or the implementation of ICs, which were both recommended for Site SD-27 during the previous five-year review, had been completed for this site. The 2006 FYR recommendation for Site SD-27 was to complete an EE/CA and a possible NTCRA for soils that contain elevated concentrations of PAHs in lieu of LUCs to achieve UU/UE. These recommendations led to further actions which are summarized in Sections 4.1.8 and 4.2.8.

3.4.11 Site SS-29 (Drum Accumulation Pad)

The results of the LFI and RI indicated site soils were contaminated with varying amounts of VOCs, SVOCs, TRPH, and metals with most of the soil contamination confined in an area of exposed surface soil off the northwest and southwest sides of the drum storage pad. The risk assessment results indicated no significant unacceptable risks relative to the MHAFB protectiveness goal at the time of 1×10^{-4} excess cancer risk for industrial use. As a result of the LFI and RI site investigations and risk assessment, the NRA alternative was recommended for Site SS-29 and selected in the ROD.

2001 FYR (FEC 2001)

The 2001 FYR Report (FEC 2001) stated that Site SS-29 did not pose an unacceptable human health risk for occupational receptors based on a carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. However, the excess cancer risk calculated for current occupational, future occupational, and future residential receptors exceeded criteria for UU/UE (1×10^{-6}). Additionally, the 2001 FYR noted the 1995 ROD for Site SS-29 did not include site-specific controls to prevent unacceptable risk due to exposure to potentially contaminated soil or sediment under a UU/UE scenario. The review recommended an ESD be prepared to address implementing ICs at Site SS-29 for future

unrestricted use. The review also concluded that additional characterization of Site SS-29 was warranted to address concerns that TCE in soil may be acting as a source of contamination to regional groundwater.

The following paragraphs summarize activities completed after the 1995 ROD.

17 Sites Evaluation/Investigation (URS 2004c)

Due to concentrations of PAHs in historical soil samples, Site SS-29 was included in the 17 Sites Evaluation (URS 2004c). Soil borings were co-located with historical borings where PAH concentrations were suspected to be greatest. Additional borings were drilled and sampled in order to provide additional information on contaminant nature and extent. The results of the investigation confirmed PAHs remain present in the shallow soils surrounding and beneath the concrete drum accumulation pad to a maximum depth of 5 to 6 feet bgs. Below this depth concentrations of PAHs were noted to be either very low or non-detect.

2006 FYR (URS 2006b)

The 2006 FYR (URS 2006b) indicated neither the preparation of an ESD or the implementation of ICs, which were both recommended for Site SS-29 during the previous five-year review, had been completed for this site. The 2006 FYR recommendation for Site SS-29 was to complete an EE/CA and a possible NTCRA for soils that contain elevated concentrations of PAHs in lieu of LUCs to achieve UU/UE. These recommendations led to further actions which are summarized in Sections 4.1.19 and 4.2.19.

3.4.12 Site ST-38 (POL Storage Area, RCRA Solid Waste Management Unit)

The 1994 RI results for Site ST-38 indicated site soils were contaminated with residual fuel compounds. The COCs in the soil included BTEX. The risk assessment determined that hazardous substances remaining in the soil pose no unacceptable risks to human health or the environment under current and probable future use scenarios based on an acceptable human health excess cancer target risk range of 1×10^{-6} to 1×10^{-4}. As a result of the RI and risk assessment, the NFA alternative was recommended for Site ST-38. However, an additional investigation was conducted in 1996.

During the 1996 RI, VOCs, SVOCs, diesel range organics, and gasoline range organics were detected in soil and perched groundwater samples collected at Site ST-38, Area No. 6. In addition, LNAPL was measured in one perched zone well, and petroleum odors were noted in all perched groundwater samples. The LNAPL in the perched zone was targeted for removal under a Corrective Action Plan. Water quality parameters of the perched water indicated the zone was unusable as a drinking water source, even without the fuel impacts from the POL Yard. Therefore, the perched water was not considered an exposure pathway for humans.

The results of the human health risk assessment indicated no unacceptable health risks are expected from exposure to soils at Site ST-38, Area No. 6. The maximum detected

concentrations in subsurface soil samples were below the RBCs for residential soil ingestion. Vadose zone and groundwater transport modeling indicated that COCs found in the site soils will not reach regional groundwater in concentrations of concern. NFA was recommended in 1998 based on the 1994 risk assessment and the fuel release investigation risk assessment for Area No. 6.

The following paragraphs summarize activities completed after the 1995 ROD.

The 2006 FYR recommended continuing the investigations and remediation of the POL release at Tank 1 under the Risk-Based Corrective Action (RBCA) or Risk Evaluation Manual to assess the long-term protectiveness (URS 2006b).

Tank 1A was removed at Site ST-38 between July 30, 2007 and September 18, 2007. Impacted soil was removed and confirmation sampling was completed. Soil analytical results showed no BTEX detections and two locations with PAHs above the reporting limit (URS and Weston Solutions, Inc. 2008).

No measurable LNAPL was present in any well during the 2nd Quarter 2010 sampling round. Low levels of PAHs and BTEX have been detected in perched groundwater during quarterly groundwater monitoring events (URS 2010c). Quarterly groundwater sampling and LNAPL removal are being completed as recommended by the Corrective Action Plan (Washington Group, Inc. et al. 2003).

A RBCA evaluation was completed in 2011 for the jet propellant 8 release from Tank 1A. Tier 1 risk-based screening levels (RBSLs) from Table 7-3 in the RBCA Guidance Document (DEQ 1996) were used for comparison to the maximum site contaminant concentrations for each potential complete exposure pathway. Evaluated pathways included Outdoor Inhalation of Volatile Emissions from Subsurface Soil and Outdoor Inhalation of Volatile Emissions from Shallow Groundwater. The evaluation concluded concentrations of COCs for these pathways were below Tier 1 RBSLs. In addition, the evaluation indicated LNAPL was not detected in measurable quantities from February 2010 to February 2011, and PAH and BTEX concentrations in perched groundwater have been stable to declining in recent years. The RBCA Summary Report concluded no further remediation was considered necessary based on the RBCA evaluation and the unique setting and location of MHAFB, which includes site restrictions and security. Furthermore, future land use is expected to be limited to military use and institutional controls are in place at the POL yard (URS 2011g). DEQ issued a letter dated July 21, 2011 stating no additional remediation or monitoring of petroleum hydrocarbon contamination related to the delineated area of the Tank 1A release in the POL yard is required at this time.

3.4.13 OU-3 (Basewide Regional Groundwater)

OU-3 represented the final operable unit investigated at MHAFB and addressed known or suspected fuel releases at six sites and the groundwater pathway ecological risk from all 33 ERP sites. The objective of the OU-3 groundwater investigation was to determine if COCs have been released to the regional groundwater at concentrations that pose an unacceptable human health

risk. All sites identified as possible contributors of chemicals to the environment were considered during the OU-3 basewide groundwater investigation. The initial OU-3 groundwater investigation was documented in the Final RI Report (WCC 1995b) submitted in May 1995.

In the four rounds of groundwater sampling conducted during the RI, TCE was the only contaminant that was consistently detected, ranging from less than 0.5 µg/L to 2.5 µg/L. Metals were also detected, but were within or near apparent background concentration ranges, or present at concentrations below EPA MCLs.

Fate and transport modeling was also done as part of the OU-3 RI/BRA, and results suggested the following:

- The Ash Disposal Area, B-Street Landfill, (LF-02), had a model-estimated peak 30-year average concentration of arsenic in groundwater of 14 µg/L, which exceeded the RBCs for excess cancer risk of 1×10^{-6} and 1×10^{-4} of 0.038 µg/L and 3.8 µg/L, respectively. The model-estimated vadose travel time for arsenic to reach groundwater was greater than 6,000 years.
- Fire Protection Training Area FT-7B had model-estimated peak 30-year average concentrations for 1,1,2-trichloroethane, TCE, and chloroform (3.7 µg/L, 9.4 µg/L, and 2 µg/L, respectively) in groundwater that exceeded the RBCs for excess cancer risk of 1×10^{-6} (0.19 µg/L, 1.6 µg/L, and 0.15 µg/L, respectively), but were below the RBCs for excess cancer risk of 1×10^{-4} (19 µg/L, 160 µg/L, 15 µg/L, respectively). The model-estimated peak 30-year average concentration for TCE exceeded the MCL (5 µg/L) for this compound.
- Fire Protection Training Area FT-7C had model-estimated peak 30-year average concentrations for TCE and chloroform (4.9 µg/L and 0.6 µg/L, respectively) in groundwater that exceeded the RBCs for excess cancer risk of 1×10^{-6} (1.6 µg/L and 0.15 µg/L, respectively) but were below the RBCs for excess cancer risk of 1×10^{-4} (160 µg/L and 15 µg/l, respectively).
- Fire Protection Training Area FT-08 had a model-estimated peak 30-year average concentration of TCE (1.7 µg/L) in groundwater that exceeded the RBC for excess cancer risk of 1×10^{-6} (1.6 µg/L) but was below the RBC for excess cancer risk of 1×10^{-4} (160 µg/L).
- Estimated cumulative risks for the groundwater pathway were 3.7×10^{-5} for Site LF-02, 3.8×10^{-5} for Site FT-7B, 7×10^{-6} for Site FT-7C, and 1.1×10^{-6} for Site FT-08. Cumulative risk from the model-estimated chemical concentrations in groundwater did not pose an unacceptable human health risk based on an acceptable risk range of 1×10^{-6} to 1×10^{-4}.

Note: The RBCs referred to above are 1994 EPA Region 3 risk-based concentrations for residential tap water based on 1×10^{-6} and 1×10^{-4} excess cancer risks and a hazard quotient of 1.0 for non-cancer effects. Modeling concentrations are the peak 30-year annual average concentrations that are estimated to occur at the location of the present-day peak concentration in groundwater as predicted by the model. That is, the fate and transport model was used to predict

the location in the groundwater of the highest concentration of each analyte from each source area.

The following paragraphs summarize activities completed after the 1995 ROD.

MW27 Well Installation (RMC 2005)

A regional groundwater monitoring well with bedrock vapor ports (MW27) was installed in the fall of 2004 at a location immediately north of previously-installed MW19 and approximately 20 feet southeast of the anticipated horizontal extent of surface contamination associated with Site SD-24. The primary reason for installation of MW27 was to provide a monitoring well with vapor monitoring ports associated with Site SD-24. Additional information concerning installation of this well is documented in the Final 2004 LTM Annual Report (RMC 2005).

MW27 has been included in the regional groundwater LTM sampling program since installation. Although the well is installed immediately adjacent to Site SD-24, TCE concentrations in groundwater have never exceeded MCLs. However, TCE and cis-1,2-DCE concentrations in vapors from MW27 have been detected at the highest concentrations of any vapor ports at MHAFB.

Groundwater LTM Program

PZMWs are sampled semiannually for BTEX analysis as part of the OU-3 LTM program. Benzene was detected in all of the six wells sampled during the 2010 LTM events and the Spring 2011 LTM event. Benzene was the only compound detected above its MCL of 5 µg/L (in wells PZMW7, PZMW8, PZMW12, and PZMW15 at concentrations ranging from 120 to 1,300 µg/L during the Spring 2011 LTM event). LNAPL previously typed as degraded JP-4 was observed in PZMW7, PZMW8, PZMW12, and PZMW15 during the 2005 LTM sampling events. As of March 2011, free product was only detected from PZMW12 at thickness of 0.02 feet. Historical perched groundwater analytical results for BTEX and LNAPL measurements are provided in Table 3-2.

Regional groundwater and vapor monitoring wells MW20 and MW26, located in the vicinity of Site ST-11, are also sampled during the fall and spring LTM events. TCE was the only analyte detected in regional groundwater at monitoring well MW20 during the January and April 2010 LTM sampling events. Analytes detected at MW26 during the 2010 LTM sampling events included cis-1,2-DCE and TCE. However, TCE and cis-1,2-DCE are not considered site-related contaminants since they are not fuel-related constituents. In January 2010, TCE was detected in the groundwater sample from MW35 at 4.9 µg/L, and in 17 samples collected from this well since 2004 it has generally ranged from a high of 10 to 4.9 µg/L. In October 2010, TCE was detected in the groundwater sample from MW26 at 0.85 µg/L, and in 13 samples collected since 2002 it has been below 2 µg/L, with the exception of the October 2003 groundwater sample with a concentration of 2.2 µg/L. Historical regional groundwater TCE analytical results are included in Table 3-3.

Vadose Zone Vapor

Hazardous vapors in the bedrock vadose zone were initially detected during the installation of regional groundwater monitoring well MW20 (FEC 2002). The vapors were detected during standard health and safety monitoring during the drilling and well installation process. In addition to MW20, up to three discrete vapor monitoring ports were installed at each of the regional monitoring wells MW24 through MW36 in 2002 through 2004. An additional single-zone vapor monitoring well (VW1) was installed at the POL Yard in June 2002 during an investigation of a fuel release (Washington Group. et al, 2002). Subsequent monitoring wells were also equipped with vapor ports. MW37, installed in 2006, includes three discrete vapor monitoring ports, and MW39, installed in 2009, includes four (URS 2009d). Activities completed in relation to vadose zone vapor since the previous FYR are presented in the following paragraphs.

Bedrock Vapor Intrusion to Indoor Air Sampling and Evaluation

Based on recommendations from the 2006 FYR, an indoor air vapor intrusion evaluation was completed during the late spring/early summer of 2006. Buildings with a history of subsurface contamination and/or the highest potential for occupational or residential exposure were selected for vapor intrusion sampling. The sampling effort was completed to provide sufficient data to evaluate the potential for bedrock vadose zone VOC vapors to infiltrate into overburden soils and ultimately into indoor air spaces at Buildings 1229 and 1340, a military dormitory, and a vacant Eagle View housing unit in the MHAFB's housing area. Sampling results for indoor air and subslab vapors were used to determine whether a complete pathway exists and whether a potential unacceptable human health risk may be present from this pathway. The results of the evaluation demonstrated there were no unacceptable human health risks or adverse health effects due to vapor intrusion to indoor air pathways for any use scenario (industrial or residential) (URS 2007k).

MW37 Installation

The 2006 FYR recommended installing an additional regional groundwater monitoring well (MW37), with at least three vapor ports, approximately 2,000 feet northeast of MW27. MW37 was installed in the spring of 2006, and included three vapor ports, as recommended. MW37 successfully defined the northern boundary of vadose zone vapor contamination through the installation of three depth-discrete bedrock vapor monitoring ports. In addition, MW37 provides an additional upgradient groundwater monitoring location.

Vapor LTM Program

The vapor monitoring program began in 2002, and sampling and analysis were completed monthly from September 2002 through February 2003. Sampling and analysis of bedrock vapor have been completed semiannually since that time. Historical bedrock vapor results for TCE and benzene are included in Table 3-4. Conclusions drawn from monitoring that has occurred since the 2006 FYR include the following:

- The existing vapor monitoring network has reasonably defined the areas of greatest contaminant concentrations and the most likely source areas for vapor contaminants at MHAFB.
- Vapor sample results continue to indicate Site SD-24 is the primary source of TCE to the vadose zone vapors detected in the bedrock at MHAFB. The concentration of TCE from MW27-VP1, screened from 64 to 79 feet bgs, was reported at 16,000 micrograms per cubic meter ($\mu g/m^3$) for the March 2011 monitoring event. The concentration of TCE detected in the middle vapor port (VP2), screened from 169 to 183 feet bgs, was reported at 6,700 $\mu g/m^3$, and the concentration of TCE detected in the deep vapor port at MW27 (VP3), screened from 340 to 345 feet bgs, was reported at 6,800 $\mu g/m^3$.
- Site FT-08 has been identified as a potential secondary source of shallow vadose zone TCE contamination. TCE was detected in vapors from the vapor ports of MW28, which is located within Site FT-08. Concentrations were reported at 3,400 $\mu g/m^3$ (shallow), 2,700 $\mu g/m^3$ (middle), and 1,700 $\mu g/m^3$ (deep) in these vapor ports in October 2010. All other regional wells with elevated bedrock vapor concentrations are located within the general vicinity of Site SD-24 and MW27.
- The isoconcentration contours of TCE in bedrock vapor for the three depth intervals are shown for the October 2010 LTM event on Figures 3-3 through 3-5. These depictions of TCE isoconcentrations are essentially unchanged from the spring 2009 sampling results and prior years' sampling data and are considered representative of overall conditions at MHAFB. The distribution of TCE on Figures 3-3 through 3-5 suggests a source in the northwest industrial area of the MHAFB at the location of Site SD-24, which is viewed as the most likely significant source of TCE contamination in groundwater. The bedrock vapor TCE isoconcentration contours are centered on Site SD-24.

TABLE 3-1
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO

Site ID	History of Contamination	Initial Response
LF-01	The Lagoon Landfill served as the main base sanitary landfill between 1952 and 1956. The Phase I records search (CH2M Hill 1983) reported the landfill received general refuse and an estimated six drums per month of mineral oils, hydraulic fluids, engine oils, and solvents such as TCE and carbon tetrachloride. No reliable records exist that confirm the total volumes and exact contents of material disposed. General refuse was placed in trenches and burned, and POL products were dumped in reserved areas within the trenches. Wastewater lagoon numbers 2 and 3 were built on top of LF-01 in 1961 and 1962. The lagoons served as primary treatment ponds for wastewater from the Base until 1997. The types of contaminants discharged to the system included organic solvents, phenols (cleaners and paint strippers), fuels, heavy metals, pesticides, and herbicides from sources such as base shops, residences, offices, and storm runoff.	• An RI/BRA was performed for the Lagoon Landfill in 1991 and additional lagoon water samples were collected and analyzed for general water quality parameters as part of the 1995 OU-3 RI.
LF-02	Materials disposed of at the site from 1956 to 1990 included general refuse (garbage, concrete, rubble, crushed empty drums, trees, hardware, rock, brick, mortar), industrial wastes (waste oils, coal fly ash from a central heating plant, solvents, waste jet fuel, and tank cleaning sludge), and possibly up to 20 drums of DDT (CH2M Hill 1983; Dames and Moore 1986). However, this has not been verified by historical records, interviews, or field investigation. The refuse and wastes were placed in five shallow trenches (2 to 14 feet deep), four of which are approximately 50 feet wide by 400 feet long and one is 40 feet wide by 100 feet long (WCC 1992). At least one of the trenches received asbestos waste. The Rubble Area encompasses more than half of the B-Street Landfill and the Ash Disposal and Miscellaneous Refuse Area, which contained coal fly ash, solid waste, and concrete rubble, occupies the remaining delineated LF-02 area. The Coal Ash Area is approximately 1,000 feet by 462 feet, with a total volume of ash estimated to be approximately 924,000 cubic feet, assuming an average depth of approximately 2 feet. The Burn Area, which had been used to burn trash such as roots, wood, and other miscellaneous combustible products, has been estimated at 20 feet wide by 20 feet long in total area (Radian 1990). The Drum Disposal Area is roughly circular, with a diameter of 80 feet (approximately 5,000 square feet).	• Regional groundwater monitoring wells were installed and soil samples were collected at the B-Street Landfill as part of the Phase II Stage 1 site investigation completed in 1984 and a Phase II RI conducted in 1987 and 1988. • An RI/BRA and human health and ecological risk assessment of the B-Street Landfill were performed in 1992.
FT-04	Site FT-04 was used for fire fighting exercises during 1943 and 1944. Motor and aviation fuels, solvents, waste oils, and petroleum lubricants were poured onto a mock-up aircraft within the burn pit (measuring approximately 60 feet wide by 140 feet long) and ignited. Training exercises were conducted approximately twice per week, using 200 to 300 gallons of combustible material. The training fires were extinguished primarily with protein foam and water.	• A soil gas survey of the site was conducted in 1991 as part of the LFI study for OU-1.

TABLE 3-1
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO

Site ID	History of Contamination	Initial Response
FT-08	Site FT-08 has been the Base's fire department training area from 1962 to the present. A typical training exercise in the old burn pit involved 300 to 500 gallons of fuel and possibly used solvents and POL wastes (EPA 1992). Aviation gasoline was used from 1962 through 1975 and jet fuel exclusively has been used from 1976 through the present. Until approximately 1972, the fire-extinguishing agent used at FT-08 was protein foam that was mixed with water and became aerated upon dispersal. The investigation area associated with Site FT-08 included the bermed fire training area and an approximate 100-foot area surrounding the bermed area. An underground fuel storage tank (ST-39) was once located at the site and was investigated as part of OU-6.	• An ERP Phase II, Stage 1 was conducted in 1986. • An ERP Phase IV-A investigation was conducted in 1986 and 1988. • The USACE installed three regional groundwater-monitoring wells in 1989. • An RI/BRA was performed for Site FT-08 in 1991.
ST-11	In 1957, a leak occurred from a 0.75-inch diameter vent line for a 16-inch diameter subsurface fueling pipeline. The fueling pipeline transported jet fuel (JP-4) from the POL Yard to fueling hydrants along the flight line. There is a parallel 4-inch defueling line next to the 16-inch fuel line. The 16-inch and 4-inch fuel lines are housed in a corrugated metal pipe sleeve. The leak occurred soon after the fueling system was installed during the first half of 1957. Interview information indicates that the leak was intermittent and ongoing for a period of 2 to 3 months. During this time, between 50,000 and 90,000 gallons of fuel may have been released via the vent line leak. Upon discovery of the leak, the vent line was repaired and new access manholes were installed over the fueling line at the leak location. Another fuel spill occurred in this same general area in the late 1950s when the 50,000-gallon defueling storage tank located next to Fuel Hydrant No. 4 overflowed, resulting in an estimated 14,000 gallons of fuel spilled onto the ground surface.	• An ERP Phase II, Stage 1 was conducted in 1986. • A RI was conducted in 1990. • The OU-3 Fuel Sites RI/FS was conducted in 1995.
ST-13	Four 12,000- to 15,000-gallon USTs were located in the south corner of the site and used to temporarily store segregated POL wastes prior to reuse, resale, or disposal. The installation date of the USTs is unknown. In June 1988, the four USTs were removed. Soil samples collected before and during the UST removal indicated that soil had been contaminated by VOCs including tetrachloroethene (11.8 mg/kg), TCE (106 mg/kg), and total xylenes (106 mg/kg).	• Contaminated soils were removed during the UST removal and the excavation was filled and capped. • Fate and transport modeling was conducted to evaluate possible impacts of site chemicals on groundwater.
OT-16	The Munitions Burial Site consisted of two burn operation areas operated by explosive ordnance disposal personnel. The facility was built sometime between 1950 and 1957. One burn operation was fueled by a 50-gallon diesel fuel tank. This operation included a popping furnace located in the center of a large circular graded area approximately 500 feet in diameter. It consisted of a concrete and steel structure with a steel plate that was heated to detonate munitions. A second burn area was an open burn pit approximately 60 feet long and 30 feet wide. Munitions were placed in the pit along with wood and fuel, ignited, and allowed to detonate. The open burn pit has not been used since April 1990. The popping furnace was dismantled in the fall of 1992.	• Soil sampling was conducted at Site OT-16 in 1991 as part of the LFI for OU-1. • A Phase II LFI was performed in 1993. • A human health risk assessment was performed for Site OT-16.

TABLE 3-1
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO

Site ID	History of Contamination	Initial Response
LF-23	The former Solid Waste Disposal Area consists of three alleged burial areas. These areas reportedly contained tires, household wastes, and other solid waste. The trenches were reportedly covered with soil. The Used Tire Disposal Area (DP-17) ERP site was combined with this site for the LFI study.	• Soil samples were collected from 12 test pits excavated at Site LF-23 in August 1991.
SD-24	This facility was originally built in 1960 and 1961 as a LOX production and helium loading plant. The original plant included LOX and liquid nitrogen storage vessels, a chemical waste collection tank and oil sump, a concrete-lined blow-down trench (including a trough sump and a dry sump at the south end), and a drainage flume and rock infiltration gallery used to control surface water runoff. The dry sump is an infiltration gallery connected to the trough sump by a pipe. The facility became the Auto Hobby Shop in 1965. Discharge drain lines were added to the waste collection tank/oil sump and drain trough sump at this time. Waste oil was typically removed from the site; however, between 1965 and 1974, some waste oil was placed in the drain trough and on the surface soils located southwest of the building. According to one interview record, in 1985 waste solvents were disposed of in animal holes located within the fenced yard. The drain trough and trough sump were capped with concrete in the mid-1980s (WCC 1994). The MTMS has occupied the facility since about 1982. Inspections of the MTMS have indicated no out-of-compliance handling of hazardous wastes (WCC 1994).	• Soil sampling was conducted at the site as part of the 1991 LFI for OU-1. • The site was included in the 1993 RI. • A risk assessment was completed for Site SD-24.
SD-27	The Wash Rack at Building 1354 site is used to clean construction vehicles. The site consists of a concrete wash rack located north of Building 1354 that was built in the 1960s, the wash rack drainage ditch, and a concrete drum storage pad located northeast of the wash rack area. Prior to the mid-1980s, a petroleum-distillate-based degreasing agent was used to clean grease and asphalt from vehicles. Wash water was discharged to the unlined wash rack drainage ditch, and soils and sediment were reportedly removed from the ditch on an annual basis until about 1990. An interview record alleges a spill of mixed solvent wastes from four drums on the parking area located east of the wash rack. Bulk storage of drums occurred within the fenced drum storage area. Leaking and overfilled waste oil drums and visibly stained soils were reported at the drum storage area in 1986. The wash rack drainage ditch was graded over in the fall of 1993, and a new OWS and piping were installed to receive the wastewater discharges from the Equipment Wash Rack.	• Soil sampling was conducted at the site as part of the 1991 LFI for OU-1. • The site was included in the 1993 RI. • A risk assessment was completed for Site SD-27.
SS-29	The Drum Storage Area site consists of a concrete pad approximately 20 feet by 35 feet in size that was used by the Propulsion Shop (Building 1225) and the Nondestructive Testing Laboratory (Building 1222). Chemical wastes, including solvents (TCA and PD-680), penetrants, emulsifiers, fuel, and hydraulic oil, were stored in drums on the pad from the mid-1970s until 1990. Spilled waste was reportedly observed along the outside of the fence that encloses the site in 1986 (WCC 1991).	• Soil sampling was conducted at the site as part of the 1991 LFI for OU-1. • The site was included in the 1993 RI. • A risk assessment was completed for Site SS-29.

TABLE 3-1
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO

Site ID	History of Contamination	Initial Response
ST-38	The POL Yard had its origin as a tank farm to store aviation fuel as the Base became operational in the 1940s, and it now serves as the main distribution center for all fuels at the Base. The POL Yard consisted of three 1,500,000-gallon above-ground tanks of JP-8, one 30,000-gallon above-ground diesel tank, one 6,000-gallon above-ground diesel tank, two 10,000-gallon above-ground gasoline tanks, two 20,000-gallon above-ground tanks of ethylene glycol, four 50,000-gallon JP-8 USTs, and one 25,000-gallon JP-8 UST. The yard also consisted of piping, valves, and manifold systems for delivery and receipt of product. The site was identified as requiring investigation during a UST removal conducted in 1992. Contaminated soil was evident from 10 to 25 feet bgs in the excavation. The site was expanded to include the entire POL Yard in April 1993, after several "pockets" of contamination were identified.	• Site ST-38 was investigated in 1994 as part of the RI for OU-3. • A risk assessment was completed for Site ST-38. • In 1996, a fuel release investigation was conducted at Area No. 6 to characterize the nature and extent of the contamination discovered during the RI.
OU-3	In the four rounds of groundwater sampling conducted during the RI, TCE was the only contaminant that was consistently detected. During the LTM program, TCE detections at MW25 and MW35 have routinely exceeded the Federal SDWA MCL for TCE (5 µg/L) since 2003 and 2004, respectively. An LNAPL layer consisting of weathered JP-4 was first encountered at MW24 in August 2004. The LNAPL layer has reappeared each of the last two years beginning in late summer through early fall, which corresponds to the lower seasonal water table at the Base. LNAPL thickness was measured at 0.6 and 0.93 feet in August and September 2004, respectively, and between 0.04 feet on July 27, 2005 to 0.87 feet on September 9, 2005. Hazardous vapors were initially detected during the installation of regional groundwater monitoring well MW20 in May 2002. Most of the VOC vapors detected in the vapor ports are related to either solvents or fuel constituents. TCE is the solvent VOC detected most frequently and in the highest concentrations. The biodegradation product cis-1,2-DCE is also a commonly detected VOC. BTEX compounds are the fuel-related VOCs detected in the highest concentrations; however, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene are also detected in relatively high concentrations. In general, the highest concentrations of TCE and the degradation product, cis-1,2-DCE, have been detected near Site SD-24, the suspected primary source of the bedrock vadose zone vapors. Concentrations of both compounds near Site FT-08 suggest a possible separate solvent release that has had much less impact on vapor concentrations in the vadose zone as bedrock vapor concentrations at FT-08 are orders of magnitude below those of Site SD-24.	• The OU-3 Base-Wide Groundwater and Ecological Risk Assessment RI Report was completed in 1995.

TABLE 3-1
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO

Notes:

bgs = below ground surface
BRA = Baseline Risk Assessment
BTEX = benzene, toluene, ethylbenzene, and xylenes
DCE = dichloroethene
DDT = dichlorodiphenyltrichloroethane
ERP = Environmental Restoration Program
FS = Feasibility Study
FT = Fire Training (Area)
JP = jet propellant
LFI = limited field investigation
LNAPL = light non-aqueous phase solution
LOX = liquid oxygen
LTM = long-term monitoring
MCL = maximum contaminant level
mg/kg = milligram per kilogram
µg/L = microgram per liter
MTMS = Munitions Trailer Maintenance Shop
MW = monitoring well
OU = Operable Unit
OWS = oil water separator
PD-680 = Stoddard Solvent (degreaser)
POL = petroleum, oil and lubricants
RI = Remedial Investigation
SDWA = Safe Drinking Water Act
TCA = trichloroethane
TCE = trichloroethene
URS = URS Group, Inc.
USACE = United States Army Corps of Engineers
UST = underground storage tank
VOC = volatile organic compound
WCC = Woodward-Clyde Consultants

TABLE 3-2
HISTORICAL PERCHED GROUNDWATER ELEVATION
AND BTEX ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO

Well ID	Sample/ Monitoring Date	Casing Elevation (NAVD 1988)	Depth to Water (ft)	Depth to LNAPL (ft)	Groundwater Elevation (NAVD 1988)	BTEX by Method SW8260B (µg/L)				Total BTEX
						B	T	E	X	
PZMW7	6/26/2002	2,987.53	32.56	----	2,954.97	**4,900**	ND (20)	**140**	ND (20)	**5,040**
	8/19/2002		32.94	----	2,954.59	**4,200**	**20 J**	**150**	ND (18)	**4,370**
	9/28/2002		33.07	----	2,954.46	**2,400**	ND (10)	**50**	**7.0 J**	**2,457**
	4/19/2003		33.44	----	2,954.09	**1,700**	ND (25)	**86 J**	**39**	**1,825**
	10/4/2003		32.35	----	2,955.18	**4,400 J**	ND (10)	**180 J**	**20 J**	**4,600**
	5/8/2004		32.88	----	2,954.65	**4,500 J**	**0.97 J**	**150**	**22.5 J**	**4,672.5**
	10/31/2004		33.42	----	2,954.11	**4,000**	ND (0.5)	**120**	**15**	**4,135**
	4/23/2005		32.83	----	2,954.70	**4,600 D**	ND (0.5)	**170**	**35 J**	**4,805**
	9/24/2005		32.24	32.23	2,955.29	NS	NS	NS	NS	NS
	4/15/2006		32.81	Fuel Sock	2,954.72	NS	NS	NS	NS	NS
	9/30/2006		32.59	Fuel Sock	2,954.94	NS	NS	NS	NS	NS
	4/14/2007		33.99	Fuel Sock	2,953.54	NS	NS	NS	NS	NS
	10/13/2007		33.11	Fuel Sock	2,954.42	NS	NS	NS	NS	NS
	4/21/2008		34.03	Fuel Sock	2,953.50	**6,500**	ND (20)	**240**	ND(20)	**6,740**
	10/16/2008		33.99	----	2,953.54	**5,900**	ND (20)	**220**	ND (20)	**6,120**
	4/24/2009		34.19	----	2,953.34	**6,400**	**0.97F**	**220**	ND (20)	**6,620.97**
	10/1/2009		32.82	----	2,954.71	**4,500**	ND (20)	**230**	ND (20)	**4,730**
	4/28/2010		32.11	----	2,955.42	**2,600**	**1.5 F**	**150**	**38.1**	**2,789**
	7/14/2010		30.48	----	2,957.05	**1,100 J**	**4.5 F**	**69 J**	**48.1 J**	**1,221.6 J**
	9/15/2010		31.68	----	2,955.85	**980**	**5.5 F**	**64**	**32.3 F**	**1,081.8 F**
	10/18/2010		32.41	----	2,955.12	**2,100**	**2.9 F**	**84**	**22 F**	**2,184 F**
	3/25/2011		31.15	----	2,956.38	**1100 J**	**ND (67)**	**99**	ND (130)	**1,199 J**
PZMW8	8/18/2002	2,987.59	29.66	----	2,957.93	**2,500**	**7.4 J**	**270**	**10**	**2,787**
	9/28/2002		31.11	----	2,956.48	**3,100**	ND (10)	**310**	**5.6 J**	**3,416**
	4/19/2003		31.97	----	2,955.62	**2,500**	ND (50)	**370**	**33 J**	**2,903**
	10/4/2003		28.71	----	2,958.88	**3,300 J**	ND (1.0)	**250 J**	**8.2 J**	**3,558**
	5/8/2004		29.87	----	2,957.72	**2,000 J**	**0.64 J**	**270**	**3.8**	**2,273.80**
	10/31/2004		29.71	29.58	2,957.88	NS	NS	NS	NS	NS
	4/23/2005		28.87	28.75	2,958.72	NS	NS	NS	NS	NS
	9/24/2005		27.71	----	2,959.88	**2,100 D**	ND (5)	**190 D**	**3.4 J**	**2,293.4**
	4/15/2006		28.13	Fuel Sock	2,959.46	NS	NS	NS	NS	NS
	9/30/2006		28.25	Fuel Sock	2,959.34	NS	NS	NS	NS	NS
	4/14/2007		30.06	Fuel Sock	2,957.53	**2,100**	ND (5)	**210**	ND	**2,310**
	10/13/2007		29.15	Fuel Sock	2,958.44	NS	NS	NS	NS	NS
	4/21/2008		30.05	Fuel Sock	2,957.54	**2,700**	ND (10)	**210**	ND (10)	**2,910**
	10/17/2008		29.72	----	2,957.87	**3,800**	ND (10)	**230**	ND (10)	**4,030**
	4/24/2009		30.86	----	2,956.73	**2,100**	ND (5)	**220**	ND(10)	**2,320**
	10/5/2009		28.42	----	2,959.17	**3,300**	ND (4)	**230**	ND (4)	**3,530**
	4/28/2010		28.80	----	2,958.79	**2,600**	ND (10)	**240**	ND (10)	**2,840**
	7/15/2010		27.54	----	2,960.05	**1,700**	ND (67)	**190**	ND (67)	**1,890**
	9/15/2010		27.74	----	2,959.85	**1,400**	**3.4 F**	**180**	ND (50)	**1,583.4 F**
	10/19/2010		28.20	----	2,959.39	**1,600**	**0.69 F**	**230**	ND (50)	**1,830.7 F**
	3/25/2011		27.54	----	2,960.05	**1,300**	**1.3 F**	**210**	ND (10)	**1,510 F**
PZMW9	8/18/2002	2,987.83	Dry	----	----	----	----	----	----	----
	9/28/2002		Dry	----	----	----	----	----	----	----
	5/8/2004		Dry	----	----	----	----	----	----	----
	10/31/2004		Dry	----	----	----	----	----	----	----
PZMW10 (P&A'd)	8/18/2002	----	Dry	----	----	----	----	----	----	----

TABLE 3-2
HISTORICAL PERCHED GROUNDWATER ELEVATION
AND BTEX ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO

Well ID	Sample/ Monitoring Date	Casing Elevation (NAVD 1988)	Depth to Water (ft)	Depth to LNAPL (ft)	Groundwater Elevation (NAVD 1988)	BTEX by Method SW8260B (µg/L)				Total BTEX
						B	T	E	X	
PZMW11	8/18/2002	2,987.31	31.41	----	2,955.90	**0.62**	**2.7 J**	ND (1.0)	ND (1.0)	**3**
	9/29/2002		34.97	----	2,952.34	**1.1 J**	**2,958.88**	ND (1.0)	**1.1 J**	**2,961**
	4/19/2003		28.06	----	2,959.25	**14**	ND (1.0)	**21**	**2.1 J**	**37**
	10/4/2003		28.76	----	2,958.55	**8.9 J**	ND (1.0)	**15 J**	**7.3 J**	**31**
	5/8/2004		28.67	----	2,958.64	**3.9 J**	**0.32 J**	**5.4**	**2.5**	**11.8**
	10/31/2004		29.92	----	2,957.39	**2.4**	ND (0.5)	**4.9**	**5.8**	**13.1**
	4/23/2005		27.23	----	2,960.08	**2.3**	ND (0.5)	**3.9**	**2.5 J**	**8.7**
	9/24/2005		28.11	----	2,959.20	**32**	ND (0.5)	**6.8**	ND (0.5)	**38.8**
	4/15/2006		27.21	----	2,960.10	**0.71**	ND (1.0)	**1**	ND (1.0)	**1.71**
	9/30/2006		29.52	----	2,957.79	**1.9**	ND (1.0)	**1.8**	**0.44 J**	**4.14**
	4/14/2007		35.40	----	2,951.91	**0.56**	ND (1.0)	**0.3 J**	ND	**0.86**
	10/13/2007		35.54	Dry*	2,951.77	NS	NS	NS	NS	NS
	4/21/2008		35.40	----	2,951.91	**1.10**	ND (1)	ND (1)	ND (1)	**1.10**
	10/16/2008		35.43	Dry*	2,951.88	NS	NS	NS	NS	NS
	4/24/2009		35.36	----	2,951.95	**0.19F**	UJ (1.0)	UJ (1.0)	UJ (1.0)	**0.19F**
	10/5/2009		35.51	Dry*	2951.80	NS	NS	NS	NS	NS
	4/27/2010		33.68	----	2953.63	**0.35 F**	ND (1)	**.18 F**	ND (1.0)	**0.53 F**
	7/15/2010		28.76	----	2958.55	**0.82**	ND (1.0)	**0.37 F**	**0.22 F**	**1.41**
	10/18/2010		33.77	----	2953.54	**0.38 F**	ND (1.0)	**0.14 F**	ND (5)	**0.52 F**
	3/25/2011		31.88	----	2955.43	**0.55**	0.14 F	ND (1)	ND (1)	**0.69 F**
PZMW12	8/18/2002	2,986.81	36.61	----	2,950.20	**210**	**8.1 J**	**270**	**160**	**648**
	9/28/2002		36.58	36.55	2,950.23	NS	NS	NS	NS	NS
	4/19/2003		35.91	35.74	2,950.90	NS	NS	NS	NS	NS
	10/5/2003		36.08	35.80	2,950.73	**150 J**	ND (50)	**320 J**	**67 J**	**537**
	5/8/2004		36.01	35.65	2,950.80	NS	NS	NS	NS	NS
	10/31/2004		35.94	35.77	2,950.87	NS	NS	NS	NS	NS
	4/23/2005		34.80	34.57	2,952.01	NS	NS	NS	NS	NS
	9/24/2005		36.11	35.51	2,950.70	NS	NS	NS	NS	NS
	4/15/2006		33.14	Fuel Sock	2,953.67	NS	NS	NS	NS	NS
	9/30/2006		35.96	Fuel Sock	2,950.85	NS	NS	NS	NS	NS
	4/14/2007		34.56	Fuel Sock	2,952.25	NS	NS	NS	NS	NS
	10/13/2007		35.66	Fuel Sock	2,951.15	**110**	ND (10)	**290**	ND (10)	**400**
	4/21/2008		35.43	----	2,951.38	**110**	ND (10)	**490 J**	ND (10)	**600**
	10/16/2008		36.44	----	2,950.37	**110**	ND (2)	**300**	ND (2)	**410**
	4/23/2009		35.20	----	2,951.61	**100**	ND (10)	**310**	ND (10)	**410**
	10/5/2009		36.2	36.13	2950.61	NS	NS	NS	NS	NS
	4/28/2010		34.37	----	2952.44	**150**	ND (67)	**310**	ND (67)	**460**
	7/14/2010		33.70	----	2953.11	**200**	ND(1.0)	**340**	ND (1.0)	**540**
	9/15/2010		33.41	----	2953.40	**130**	**3.7 F**	**440**	ND (20)	**573.7 F**
	10/18/2010		33.26	----	2953.55	**130**	ND (100)	**430**	ND (500)	**560**
	3/25/2011		30.15	30.13	2956.66	**120**	ND (40)	**330**	ND (80)	**450**
PZMW13	8/18/2002	2,987.16	30.80	----	2,956.36	**13**	**2.1 J**	**3.4**	ND (1.0)	**19**
	9/28/2002		30.66	----	2,956.50	**4.6**	**1.2 J**	**1.7**	**0.42 J**	**8**
	4/19/2003		32.25	----	2,954.91	**7.9**	ND (1.0)	**13**	ND (1.0)	**21**
	10/5/2003		29.20	----	2,957.96	**0.62 J**	ND (1.0)	**0.52 J, J**	UJ (1.0)	**1**
	5/8/2004		30.65	----	2,956.51	ND (0.5)	**0.29 J**	**0.17 J**	**0.76 J**	**0.93**
	10/31/2004		29.91	----	2,957.25	**0.36 J**	ND (0.5)	**0.26**	**0.82**	**1.44**
	4/23/2005		30.18	----	2,956.98	**0.34 J**	ND (0.5)	ND (0.5)	**1.67 J**	**2.01**
	9/24/2005		28.62	----	2,958.54	**0.27 J**	**0.13 J**	ND (0.5)	ND (0.5)	**0.4**
	4/15/2006		29.1	----	2,958.06	**0.27 J**	ND (1.0)	ND (1.0)	ND (1.0)	**0.27**
	9/30/2006		28.59	----	2,958.57	**0.28 J**	ND (1.0)	ND (1.0)	ND (1.0)	**0.28**
	4/14/2007		30.2	----	2,956.96	ND (0.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	10/13/2007		29.08	----	2,958.08	ND (0.4)	ND (1.0)	**0.24 J**	ND (1.0)	**0.24**
	4/21/2008		30.17	----	2,956.99	ND (0.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	10/17/2008		29.59	----	2,957.57	ND (0.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	4/24/2009		30.64	----	2,956.52	**2.90**	**0.33F**	**1.30**	ND (1.0)	**4.53**
	10/5/2009		28.66	----	2,958.50	ND (.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	4/27/2010		29.75	----	2,957.41	ND (0.4)	ND (1.0)	**0.16 F**	ND (1.0)	**0.16 F**
	7/14/2010		28.85	----	2,958.31	ND (0.4)	ND(1.0)	**9.4 F**	ND (1.0)	**9.4 F**
	10/19/2010		29.56	----	2,957.60	**0.33 F**	**0.25 F**	**0.94 F**	ND (10)	**1.52 F**
	3/25/2011		28.80	----	2,958.36	**0.57**	**0.13 F**	**0.78 F**	ND (1)	**1.48 F**

TABLE 3-2
HISTORICAL PERCHED GROUNDWATER ELEVATION
AND BTEX ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO

Well ID	Sample/ Monitoring Date	Casing Elevation (NAVD 1988)	Depth to Water (ft)	Depth to LNAPL (ft)	Groundwater Elevation (NAVD 1988)	BTEX by Method SW8260B (µg/L)				Total BTEX
						B	T	E	X	
PZMW14	8/18/2002	2,987.37	31.00	----	2,956.37	**19**	**2.7 J**	ND (1.0)	ND (1.0)	**22.0**
	9/28/2002		30.86	----	2,956.51	**0.96**	**1.0 J**	**0.27 J**	**0.47 J**	**3.0**
	4/19/2003		33.44	----	2,953.93	**8.9**	ND (1.0)	**1.5 J**	ND (1.0)	**10**
	10/5/2003		29.41	----	2,957.96	UJ (50)	ND (1.0)	UJ (1.0)	UJ (1.0)	----
	5/8/2004		30.85	----	2,956.52	**0.41 J**	ND (1.0)	ND (1.0)	**0.53 J**	**0.94**
	10/31/2004		30.17	----	2,957.20	ND (0.5)	**0.24 J**	ND (1.0)	**0.55**	**0.55**
	4/23/2005		30.46	----	2,956.91	**0.25 J**	ND (0.5)	ND (0.5)	**0.94 J**	**1.19**
	9/24/2005		28.88	----	2,958.49	ND (0.5)	ND (0.5)	**0.3 J**	ND (0.5)	**0.3**
	4/15/2006		29.41	----	2,957.96	ND (0.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	9/30/2006		28.76	----	2,958.61	**25**	ND (1.0)	ND (1.0)	ND (1.0)	**25**
	4/14/2007		30.49	----	2,956.88	ND (0.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	10/13/2007		29.31	----	2,958.06	ND (0.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	4/21/2008		30.47	----	2,956.90	**0.29 J**	ND (1.0)	ND (1.0)	ND (1.0)	**0.29**
	10/17/2008		29.91	----	2,957.46	**0.19 J**	ND (1.0)	ND (1.0)	ND (1.0)	**0.19**
	4/24/2009		30.97	----	2,956.40	**6.3**	**0.22F**	**2.80**	ND (1.0)	**9.32**
	10/5/2009		28.89	----	2,958.48	ND (.4)	ND (1.0)	**0.34F**	**0.23F**	**0.57**
	4/27/2010		30.46	----	2,956.91	ND (.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	7/14/2010		30.15	----	2,957.22	**0.78**	**0.12 F**	**5.90**	ND (1.0)	**6.80**
	10/19/2010		30.75	----	2,956.62	ND (0.4)	**0.085 F**	ND (1)	ND (5)	**0.085 F**
	3/25/2011		29.17	----	2,958.20	ND (.4)	**0.08 F**	**0.55 F**	ND (1)	**0.63 F**
PZMW15	8/18/2002	2,987.90	Dry	----	----	----	----	----	----	----
	9/28/2002		Dry	----	----	----	----	----	----	----
	4/19/2003		37.30	----	2,950.60	**6,700**	ND (100)	**310**	**1,300**	**8,310**
	10/5/2003		36.57	----	2,951.33	NS	NS	NS	NS	NS
	5/8/2004		36.81	----	2,951.09	NS	NS	NS	NS	NS
	10/31/2004		36.49	36.37	2,951.41	NS	NS	NS	NS	NS
	4/23/2005		36.22	36.14	2,951.68	NS	NS	NS	NS	NS
	9/24/2005		36.25	35.11	2,951.65	NS	NS	NS	NS	NS
	4/15/2006		36.09	Fuel Sock	2,951.81	NS	NS	NS	NS	NS
	9/30/2006		36.25	Fuel Sock	2,951.65	NS	NS	NS	NS	NS
	4/14/2007		36.02	Fuel Sock[#]	2,951.88	NS	NS	NS	NS	NS
	10/13/2007		36.28	Fuel Sock[#]	2,951.62	NS	NS	NS	NS	NS
	4/21/2008		36.30	Fuel Sock	2,951.60	NS	NS	NS	NS	NS
	10/17/2008		36.49	Fuel Sock	2951.41	NS	NS	NS	NS	NS
	4/23/2009		36.45	Fuel Sock	2951.45	NS	NS	NS	NS	NS
	10/5/2009		32.85	30.96	2,955.05	NS	NS	NS	NS	NS
	4/27/2010		29.73	Fuel Sock	2,958.17	NS	NS	NS	NS	NS
	7/15/2010		29.80	----	2,958.10	**1,500**	ND (5.0)	**210**	**830**	**2,540**
	9/15/2010		30.20	----	2,957.70	**1,300**	**8 F**	**220**	**625.1**	**2,153.10**
	10/18/2010		31.16	----	2,956.74	**1,500**	**4.4 F**	**210**	**750**	**2,464.4 F**
	3/25/2011		30.94	----	2,956.96	**520**	**1.3 F**	**88**	**52.4 F**	**661.7 F**
PZMW16	8/18/2002	2,983.92	15.22	----	2,968.70	**1.9**	**6 J**	**19**	**6.1 J**	**33**
	9/29/2002		15.77	----	2,968.15	**2.2 J**	**2.7 J**	**17**	**1.9 J**	**24**
	4/20/2003		12.78	----	2,971.14	**1.6 J**	ND (1.0)	**12 J**	**4.9 J**	**19**
	10/5/2003		14.48	----	2,969.44	**7.5 J**	ND (1.0)	**3.8 J**	**1.3**	**13**
	5/8/2004		13.81	----	2,970.11	**1 J**	**0.43 J**	**1.9 J**	**1.1**	**4**
	10/30/2004		14.70	----	2,969.22	**2.1 J**	ND (0.5)	**6.2**	**1.7**	**10**
	4/24/2005		13.17	----	2,970.75	**0.93 J**	ND (0.5)	**2.3**	**2.01 J**	**5.24**
	9/25/2005		14.48	----	2,969.44	**1.8 J**	U J	**1.1 J**	ND (0.5)	**0.2**
	4/15/2006		11.59	----	2,972.33	ND (0.4)	ND (1.0)	ND (1.0)	ND (1.0)	----
	9/30/2006		14.57	----	2,969.35	**0.18 J**	ND (1.0)	**0.71 J**	**3.4**	**4.29**
	4/14/2007		13.18	----	2,970.74	**0.17 J**	ND (1.0)	**0.78 J**	ND (1.0)	**0.95**
	10/13/2007		15.05	----	2,968.87	**0.21 J**	ND (1.0)	**0.84 J**	ND (1.0)	**1.05**
	4/21/2008		13.94	----	2,969.98	**7.6**	ND (1.0)	**3.5**	**0.28 J**	**7.88**
	10/17/2008		16.18	----	2,967.74	**0.3 J**	ND (1.0)	**1.3**	**0.16 J**	**0.46**
	4/27/2009		13.23	----	2,970.69	**0.55**	ND (1.0)	**.43F**	ND (1.0)	**0.98**
	10/6/2009		14.79	----	2,969.13	**0.16F**	ND (1.0)	**.13F**	ND (1.0)	**0.29**
	4/29/2010		12.72	----	2,971.20	ND (0.4)	**0.078 F**	**0.22 F**	ND (1.0)	**0.30**
	7/15/2010		12.92	----	2,971.00	ND (0.4)	ND (1.0)	**0.24 F**	ND (1.0)	**0.24 F**
	10/20/2010		14.50	----	2,969.42	ND (0.4)	**0.93 F**	**0.19 F**	ND (5)	**1.12 F**
	3/24/2011		11.32	----	2,972.60	ND (.4)	ND (1.0)	ND (1.0)	ND (1.0)	**---**

TABLE 3-2
HISTORICAL PERCHED GROUNDWATER ELEVATION
AND BTEX ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO

Well ID	Sample/ Monitoring Date	Casing Elevation (NAVD 1988)	Depth to Water (ft)	Depth to LNAPL (ft)	Groundwater Elevation (NAVD 1988)	BTEX by Method SW8260B (µg/L)				Total BTEX
						B	T	E	X	
PZMW17	8/18/2002	2,984.73	Dry	**----**	----	----	----	----	----	----
	9/29/2002		Dry	**----**	----	----	----	----	----	----
	4/20/2003		Dry	**----**	----	----	----	----	----	----
	10/5/2003		Dry	**----**	----	----	----	----	----	----
	5/8/2004		49.09	**----**	2,935.64	NS	NS	NS	NS	NS
	10/30/2004		49.38	**----**	2,935.35	**0.65**	ND (0.5)	**2.60**	**16.5 J**	**19.75**
	4/24/2005		49.06	**----**	2,935.67	**0.56**	ND (0.5)	**2.20**	**12.7**	**15.46**
	9/25/2005		48.52	**----**	2,936.21	ND (0.5)	UJ	ND (0.5)	ND (0.5)	**0.11**
	4/15/2006		48.42	**----**	2,936.31	**0.48 J**	ND (1.0)	**1.9**	**5.5**	**7.88**
	9/30/2006		47.21	**----**	2,937.52	**0.74 J**	ND (1.0)	**3.4**	**8.1**	**12.24**
	4/14/2007		49.05	**----**	2,935.68	**0.27 J**	**0.61 J**	**2.2**	**13.4**	16.48
	10/13/2007		49.70	Dry*	2,935.03	NS	NS	NS	NS	NS
	4/21/2008		49.72	Dry*	2,935.01	NS	NS	NS	NS	NS
	10/17/2008		49.71	Dry*	2,935.02	NS	NS	NS	NS	NS
	4/27/2009		49.72	----	2,935.01	NS	NS	NS	NS	NS
	10/6/2009		49.32	----	2,935.41	**1.0 J**	**0.7 F**	**4.5 J**	**8.9 J**	**15.1**
	4/29/2010		47.72	----	2,937.01	**0.86 J**	**0.22 F**	**5.3 J**	**7.4 J**	**13.8**
	10/20/2010		48.24	----	2,936.49	ND (0.4)	ND (1)	**0.22 F**	**0.332 F**	**0.552 F**
	3/24/2011		46.84	----	2,937.89	0.14 F	0.34 F	**1.30**	**3.30**	**4.6**

Notes:

= LNAPL returned to PZMW15 within 20 minutes of fuel sock removal during the spring and fall sampling events at depths of 35.97 and 36.28 feet, respectively.

* = Insufficient recharge for sample collection after bailing the well dry

ft = feet

B = benzene

BTEX = benzene, toluene, ethylbenzene and total xylenes.

D = The reported result is from a dilution

E = ethylbenzene

F = Value is between the Method Detection Limit and methoc Reporting Limit.

ID = identification

J = Estimated value .

LNAPL = light non-aqueous phase liquid

µg/L = microgram per liter

msl - mean sea level

NAVD = North American Vertical Datum

ND = Not detected with the method reporting limit shown in parenthesis

NS = Not sampled

P&A'd = Plugged and abandoned

T = Toluene

UJ = The analyte was not reported above the practical quantitation limit, but the reported quantitation limit is approximate (due to compromised quality control or inherent ability to analyze the sample).

X = Total xylenes

Bold = Above detection level

Shaded values exceed the maximum contaminant level of 5 ug/L for benzene.

TABLE 3-3
HISTORICAL REGIONAL GROUNDWATER TCE ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO

Date Sampled	BPW1	BPW4	BPW5	BPW9	BPW12	MW7 7-2	MW11 11-2	MW16 16-2	MW17 17-2	MW3-2	MW19	MW20	MW25	MW26
10/21/1987	ND	ND												
11/12/1987						ND								
12/27/1988	0.5	0.9												
2/28/1989	1.7	0.5												
4/6/1989							1.5							
5/30/1989	1.8	ND												
8/28/1989	1.2	1												
10/17/1989	1.5	1.2		1.2										
11/6/1989	1.3	1.3		1.4										
12/18/1989	0.9	1.6		1.4										
2/14/1990	1.1	0.66		ND										
4/2/1990	1.9	1.1	0.2	1.4			1.3							
5/2/1990		1.1	0.2											
5/3/1990	1.7													
6/21/1990	1.6	1.2	0.2											
7/25/1990		1.2	ND											
8/13/1990			ND	2										
8/24/1990	2.4	1.6												
9/21/1990	1.5		ND											
10/16/1990	1.7	1	0.2											
1/9/1991	2	0.58		1.5										
2/13/1991				1										
3/20/1991				1.8										
7/11/1991	14.7													
7/24/1991		3.4		4.7										
8/20/1991	1.88													
9/5/1991	1.1	1		1.8										
11/21/1991	1.9			2.1		0.2	1.3							
11/29/1991			0.5											
12/8/1991			ND	1.6										
12/10/1991	1.8	1												
6/3/1992								ND	ND					
7/27/1992		0.79		1.55										
10/28/1992		0.9		1.75										
1/11/1993		1.3		2.2										
5/18/1993		1		2.4		ND	1.6	ND	ND					
9/26/1993		1				0.22		ND						
9/27/1993				2.4			1.5		ND					
9/29/1993	1.9													
2/15/1994	1.9	1.1		3		ND	2.7	ND	ND					
5/15/1996	2.2	1.3	5 U	2.8		5 U	5 U	5 U	5 U					

TABLE 3-3
HISTORICAL REGIONAL GROUNDWATER TCE ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO

Date Sampled	BPW1	BPW4	BPW5	BPW9	BPW12	MW7/ 7-2	MW11/ 11-2	MW16/ 16-2	MW17/ 17-2	MW3-2	MW19	MW20	MW24	MW25	MW26
4/2/1997	2.8	1 U	1 U	3		1 U	1.5	1 U	1 U						
12/3/1997					0.7										
2/17/1998					0.7										
4/29/1998		**	1 U	3.2	1.1	1 U	2.5	1 U	1 U						
5/29/1998	2.6														
10/7/1998	1.8		0.5 U	2.7	1.1	0.5 U		0.5 U	0.5 U						
1/20/1999	2.6		0.5 U	2.6	0.9	0.5 U		0.5 U	0.5 U						
4/13/1999	2.5	1.3	0.5 U	2.6	0.9	0.5 U		0.5 U	0.5 U						
7/20/1999	1.6	1.7	0.5 U	0.5 U***	0.8			0.5 U	0.5 U						
4/5/2000	2	1.8	0.5 U	2.3***		0.5 U	1	0.5 U	0.5 U						
7/00 - 8/00***		1.6	0.5 U	2.2			0.99				1.6				
5/6/2001	1.8		0.5 U	2.3		0.5 U	0.94	0.5 U	0.5 U	0.5 U	1.4				
10/9/2001	1.4		1 U	2		0.15 J	0.83 J		1 U	1 U	1.3				
6/27/2002	1.9		0.5 U	1.9		0.17 J	0.85		0.5 U	0.5 U	2.2	1.3			
9/28/2002	2.1		0.5 U	2		0.12 J	1	0.5 U	0.5 U	0.5 U	1.9	1.8		3.3	2.1
4/20/2003	2.4			2.1		0.5 U	1.1	0.5 U	0.5 U	0.5 U	1.7	1.9	0.5 U	4.5	2
6/16/2003												2.1	0.10 U	6.6	
7/22/2003												2	2.5 U	6.8	
8/19/2003												1.6	2.5 U	5.2	
10/3/2003	1.9	1.7		2		0.5 U	1.2	0.5 U	0.5 U	0.5 U	1.7	1.8	0.85 J	4.5	2.2
5/7/2004		1.6				0.21 J	1	0.5 U	0.5 U	0.5 U	1.8	1.2	2.5 U	5.4	1.8
10/28/2004		1.7				0.18 J	1.3	0.5 U	0.5 U	0.5 U	2.2	1.5		4.6	1.8
4/23/2005												1	ND	5.1	1.7
9/24/2005						UJ		UJ	UJ	UJ		1.4		7.3	1.7
4/18/2006												0.87 F	ND	5.6	1.2
10/1/2006												1.1		6.6	1.2
4/13/2007						ND						0.79 F	0.39 F	5.6	0.94 F
10/14/2007												1.3	0.89 F	6	1.1
1/9/2008													0.89 F		
4/22/2008												0.72 F	0.52 F	4.8	0.96 F
10/19/2008												1.2	ND†	4.8	0.99 F
1/7/2009													ND		
4/24/2009						.15F		ND	ND	ND		1.1	0.34F	5.3	1
7/23/2009														6.5	
10/6/2009												1.2	0.13F	5.3	0.94 F
1/20/2010														5.3	
2/9/2010				0.8	1.5										
4/28/2010												0.85 F	ND	5.4	0.76 F
7/19/2010														6	
10/15/2010												1.1	ND	6.5	0.85 F
2/9/2011														4.7	
3/24/2011						0.14F						0.67F		5.7	0.6F

TABLE 3-3
HISTORICAL REGIONAL GROUNDWATER TCE ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO

Date Sampled	BPW2	MW18-2	MW27	MW28	MW29	MW30	MW31	MW32	MW33	MW34	MW35	MW36	MW37	MW39
5/7/2004		0.18 J				1.4	0.59			1.4		2.7		
8/19/2004					0.16 J			0.5 U			8.8			
9/23/2004											7.7			
10/28/2004	0.31 J	0.5 U	1.9	0.98	0.15 J	1.3	0.51	0.5 U	1.1	1.7	7.7	2.3		
4/23/2005			1.6	1.4	0.33 J	1.5	0.29 J	ND	1.2	1.9	8.7	2.7		
9/24/2005			1.9	1.3	0.16 J	1.2	1.1	ND	1.3	1.7	13	2.7		
4/18/2006			1.3		0.25 F	1.1	0.27 F	ND	1.3		11	2	ND	
10/1/2006			1.6	1	ND	0.94 F		ND	1.4	1.4	10	1.9	ND	
4/13/2007			2.2								11			
10/14/2007			1.9	0.91 F	ND	1.1			1.5	1.2	8.3	1.6	ND	
4/18/2008			2.2				.2 F				8.5			
10/19/2008			2.5 F	0.83 F	ND	1.3		ND	2.2	1.1	4.4	1.6	ND	
1/26/2009											1.8			
3/4/2009														0.95 F
4/24/2009		.21F	3.2								5.5			1.1
7/23/2009			2.9								5.4			
10/6/2009			2.9	0.75 F	ND	0.99 F		ND	7.3	0.97 F	6	1.3	ND	1.1
11/5/2009									6.3					
1/20/2010			2.8						2.3		3.5			
4/28/2010			3.4				0.27 F		1.8		4.6			0.97 F
7/19/2010			3						0.79		4.5			
10/15/2010			1.5		ND	1.1		ND	5.9	0.86 F	6.3	1.3	ND	0.86 F
2/9/2011			3.5						3.5		4.9			
3/26/2011			3.8						2		5.1			0.76F

Notes:

* Results reported in µg/L (parts per billion). Analytical results prior to May 15, 1996 are taken from Woodward-Clyde (1995).

** BPW12 was sampled in place of BPW4 due to depressed water table level.

*** Duplicate sample labeled BPW29 was collected in 7/20/99 and 4/05/00 sampling events. Duplicate TCE results were 2.0 and 2.2 µg/L, respectively.

**** Comparison of results for diffusion samplers to traditional purge sampling was conducted in July and August 2000. The greatest value reported for the two sampling methods is listed.

Shaded results indicate the concentration is equal to or greater than the MCL of 5 µg/L for TCE.

Blank cells indicate well was not sampled.

† = Sampled 1/7/08, but coidered part of the fall 2008 testing season.

BPW = base production well

F = The result is an estimated value between the Method Detection Limit and Method Reporting Limit.

J = estimated

µg/L = micrograms per liter

MCL = maximum contaminant level

MW = monitoring well

ND = Not detected

TCE = trichloroethene

U = Not detected above the shown method reporting limit.

UJ = The analyte was not reported above the practical quantitation limit, but the reported quantitation limit is approximate (due to compromised QC or inherent ability to analyze the sample).

Note: MW7 and MW11 were replaced with MW7-2 and MW11-2 in April 2000. MW17 was replaced with MW17-2 in March 2001. MW16 was replaced with MW16-2 in August 2002. The replacement wells are located within 10 feet of the old wells.

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	POL YARD				MW20												MW24											
Vapor Port	VW1				VP1				VP2				VP3				VP1				VP2				VP3			
Perforated Interval (feet bgs)	(88-100)				(125-145)				(179-206)				(328-338)				(64-77)				(132-156)				(328-338)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)
September-02					1,080	200		<6.3	864	160	21.44	6.7		<370		<630												
October-02					1,728	320		<8.8	1,296	240		<0.86		<270		<450												
November-02					1,242	230		<1.4	1,242	230		<1.4		<250		<420												
December-02					1,242	230		<0.85	1,080	200		<0.85	16.7	3.1														
January-03					2,592	480		<8.5	1,404	260		<2.1	32.4	6.0														
February-03					1,242	230		<0.86	1,296	240		<2.1		<1.5														
April-03					1,134	210		<0.87	918	170		<0.87	10.3	1.9			248	46.0		<2.9	497	92.0		<0.43	29.2	5.4		<290
July-03					1,566	290	9.0	2.8	1,404	260	3.20	1.0	9.72	1.8	672	210	265	49.0	22.1	6.9	356	66.0	8.64	2.7	51.8	9.6	5,760	1,800
October-03					1,674	310		<2.2	453.6	84.0	2.21	0.69	9.72	1.8	57.6	18.0	286	53.0		<0.43	459	85.0		<0.42	64.8	12.0	2,080	650
May-04					1,296	240		<4.1	1,458	270		<4.1	10.8	2.0	800	250	286	53.0		<.40	648	120		<0.41	45.4	8.4	4,800	1,500
August-04																												
October-04					1,512	280		<0.83	1,242	230		<0.83	11.9	2.2	512	160	1,134	210		<4.2	864	160		<0.84	140	26.0	23,680	7,400
April-05					1,404	260		<0.85	1,350	250		<0.86		<1.4	704	220	459	85.0		<0.44	756	140		<0.44	54.0	10.0	8,960	2,800
September-05					1,296	240		<1.7	1,080	200		<1.7	20.5	3.8	512	160	448	83.0		<2.9	702	130		<4.2	64.8	12.0	18,560	5,800
April-06					1,134	210	1.3	0.40	1,404	260	1.82	0.57		<1.4		<92.0	648	120	0.19	0.06	756	140	0.77	0.24	51.3	9.5	9,920	3,100
October-06					1,674	310		<7.2	1,188	220		<3.5		<1.5	448	140	405	75.0	768	240	702	130	28.5	8.9	140	26.0	5,760	1,800
April-07																												
October-07					1,242	230		<6.5	864	160	1.15	0.36		<45.0	1184	370									167	31.0	54.4	17.0
April-08																												
October-08					1,026	190		<4.1	972	180		<4.4		<22.0	83.2	26.0									443	82.0	76.8	24.0
March-09																												
April-09																												
July-09																												
October-09					920	170	<3.3		970	180	<3.3																	
January-10																												
April-10	280	51.9	<220	<40.0													15.0	2.8	2.3	0.72	2.8	0.52	2.4	0.75				
July-10																												
October-10					950	176	0.53	0.17	870	161	0.41	0.13	<1,200	<222	<720	<133	410	75.9	320	100	210	38.9	290	90.6	<580	<107	1,600	500
February-11																												
March-11																												

Notes:
Blank cells indicate no sample collected on that date
< = Not detected above the stated detection limit
bgs = below ground surface
µg/m^3 = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	MW25								MW26											
Vapor Port	VP1				VP2				VP1				VP2				VP3			
Perforated Interval (feet bgs)	(200.5-215.5)				(336.5-342.5)				(104-122)				(193-242)				(315-330)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)
September-02	1,674	310	17.0	5.3	2,538	470	38.4	12.0		<3.7		<6.3		<3.7		<6.3		<370		<630
October-02	3,348	620		<8.8	5,940	1,100		<9.1	10.3	1.9		<2.2	5.9	1.1	1.6	0.5		<510		<860
November-02	5,940	1,100		<8.2	3,834	710		<8.4	16.7	3.1		<0.42	12.4	2.3		<0.85		<250		<420
December-02	3,942	730		<8.1	5,184	960		<8.3	13.0	2.4		<0.42	10.3	1.9		<0.43	37.8	7.0		
January-03	3,618	670		<21.0	4,536	840		<20.0	12.4	2.3		<0.42	13.5	2.5		<0.42	35.6	6.6		
February-03	5,238	970		<8.6	3,888	720		<9.0	11	2		<0.44	15.7	2.9		<0.42	28.6	5.3		
April-03	3,834	710		<9.1	5,940	1,100		<22.0	12.4	2.3		<0.42	17.3	3.2		<0.43	22.1	4.1		
July-03	4,536	840		<24.0	6,480	1,200		<8.2	14.0	2.6	3.2	1	11.9	2.2	2.4	0.76	41.0	7.6		
October-03	2,484	460		<2.2	1,134	210		<1.1	24.3	4.5		<0.45	8.1	1.5		<0.45	51.8	9.6	1,472	460
May-04	3,726	690	2.0	0.64	5,940	1,100		<21.0	16.7	3.1		<0.42	19.4	3.6		<0.43	38.3	7.1	1,472	460
August-04																				
October-04	4,914	910		<4.3	5,940	1,100		<4.3	23.8	4.4		<0.41	18.4	3.4		<0.40	46.4	8.6	1,408	440
April-05	4,104	760		<4.2	4,806	890		<4.1	20.5	3.8		<0.43	24.3	4.5		<0.42	35.6	6.6	2,016	630
September-05	1,998	370		<2.8	221	41.0		<0.61	21.1	3.9	1.63	0.51	14.0	2.6	2.0	0.63	25.4	4.7		<86.0
April-06	4,374	810	5.12	1.6	5,400	1,000	4.8	1.5	18.4	3.4	0.35	0.11	23.2	4.3	0.38	0.12	23.8	4.4		<92.0
October-06	4,968	920		<23.0	4,968	920		<19.0	33.5	6.2		<0.44	12.4	2.3	0.24	0.08	26.5	4.9	1,440	450
April-07																				
October-07	5,940	1,100		<19.0	6,480	1,200		<20.0											416	130
April-08																				
October-08	3,618	670		<12.0	2,592	480		<9.7										<1,100		<1,100
March-09																				
April-09																				
July-09	4,100	760	<5.6	<1.8	4,100	760	<6.5	<2.0												
October-09	4,000	740	<48.0		3,700	690	<46.0													
January-10	3,300	611	<39.0	<7.2	3,500	648	<38.0	<7.0												
April-10	2,700	500	<12.0	<2.2	3,300	611	<18.0	<3.3	13.0	2.4	<0.63	<0.12	7.6	1.4	15.0	4.7				
July-10	3,200	593	<19.0	<3.5	3,800	704	<20.0	<3.7												
October-10	3,600	667	<18.0	<3.3	3,900	722	<25.0	<4.6									<240	<48	<140	<25.9
February-11	3,000	570	<16.0	<4.9	4,000	740	<25.0	<7.8												
March-11	3,300	620	<19	<6.0	3,400	630	<17.0	<5.2												

Notes:
Blank cells indicate no sample collected on that date
< = Not detected above the stated detection limit
bgs = below ground surface
µg/m^3 = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	MW27												MW28											
Vapor Port	VP1				VP2				VP3				VP1				VP2				VP3			
Perforated Interval (feet bgs)	(64-79)				(169-183)				(340-345)				(79-90)				(172-179)				(294-299)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)
September-02																								
October-02																								
November-02																								
December-02																								
January-03																								
February-03																								
April-03																								
July-03																								
October-03																								
May-04																								
August-04																								
October-04	70,200	13,000		<85.0	7,560	1,400		<8.5	14,040	2,600		<14.0	1,890	350		<10.0	5,346	990		<10.0	2,484	460		<11.0
April-05	513,000	95,000		<41.0	12,960	2,400		<17.0	28,620	5,300		<17.0	3,726	690		<1.5	3,348	620		<3.5	1,620	300		<0.90
September-05	453,600	84,000		<290	6,480	1,200	15.0	4.7	4,806	890		<2.9	4,806	890		<3.0	3,672	680		<2.2	2,268	420		<1.5
April-06	648,000	120,000	1,376	430	12,420	2,300	10.6	3.3	5,940	1,100	4.2	1.3	7,020	1,300	2.9	0.9	8,640	1,600		<28.0	1,674	310	1.3	0.42
October-06	513,000	95,000		<1,800	11,880	2,200		<18.0	5,400	1,000		<18.0	4,644	860		<23.0	5,022	930		<18.0	2,322	430		<9.3
April-07	470,000	88,000			8,700	1,600			5,700	1,100														
October-07	702,000	130,000		<3,800	9,720	1,800		<45.0	6,480	1,200		<29.0	4,320	800		<17.0	3,834	710		<14.0	2,214	410		<7.9
April-08	270,000	50,000			6,800	1,300			7,600	1,400														
October-08	459,000	85,000		<1,500	10,260	1,900		<40.0	7,560	1,400		<18.0	4,158	770		<15.0	3,078	570		<9.7	1,728	320		<5.6
March-09																								
April-09	85,000	15,740	<880		12,000	2,222	<100		7,900	1,500	<54.0													
July-09	210,000	38,000	<260	<81	8,600	1,600	<13.0	<4.1	7,900	1,500	<12.0	<3.9												
October-09	85,000	16,000	<1,000		8,200	1,500	<120		7,000	1,300	<93.0		3,900	730	<46.0		3,000	550	<34.0		1,900	350	<18.0	
January-10	210,000	38,889	2,300	719	6,200	1,148	<78.0	<14.4	6,500	1,204	<77.0	<24.0												
April-10	30,000	5,556	<160	<30	7,000	1,296	<49.0	<9.0	9,300	1,722	<46.0	<8.5												
July-10	22,000	4,074	<140	<26	6,500	1,204	<34.0	<6.2	9,600	1,778	<52.0	<9.6												
October-10	22,000	4,074	<48.0	<8.9	6,400	1,185	<45.0	<8.3	11,000	2,037	<66.0	<12.0	3,400	630	<24.0	<4.4	2,700	500	<18.0	<3.3	1,700	315	<9.6	<1.8
February-11	27,000	5,100	<140	<27	5,800	1,100	<29	<5.4	10,000	1,900	<48	<15												
March-11	16,000	3,000	<92	<29	6,700	1,200	<33	<10	6,800	1,300	<13	<4.1												

Notes:
Blank cells indicate no sample collected on that date
< = Not detected above the stated detection limit
bgs = below ground surface
µg/m^3 = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	MW29												MW30											
Vapor Port	VP1				VP2				VP3				VP1				VP2				VP3			
Perforated Interval (feet bgs)	(111-118)				(175-187)				(355-362)				(139-158)				(233-247)				(345-354)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)
September-02																								
October-02																								
November-02																								
December-02																								
January-03																								
February-03																								
April-03																								
July-03																								
October-03																								
May-04													1,188	220		<0.43	103	19.0		<0.44	119	22.0		<12.0
August-04	4.6	0.85		<0.88	2.9	0.54	1.5	0.47	4.9	0.91	4.2	1.3												
October-04	7.0	1.3	1.7	0.53	2.9	0.53	1.3	0.40	10.8	2.0	1.8	0.55	1,620	300		<4.1	211	39.0		<0.41	91.8	17.0		<0.43
April-05	7.0	1.3		<0.44	2.6	0.48		<0.45	26.5	4.9		<0.46	1,242	230		<0.85	292	54.0		<0.43	140	26.0		<0.43
September-05	30.8	5.7		<0.43	2.0	0.37		<0.43	24.8	4.6	9.0	2.8	1,728	320		<1.1	421	78.0		<0.46	91.8	17.0		<0.44
April-06	10.3	1.9	0.35	0.11	2.9	0.54	0.22	0.07	30.8	5.7	0.58	0.18	1,836	340	1.6	0.51	594	110	2.72	0.85	146	27.0	0.29	0.09
October-06	5.9	1.1	0.61	0.19	2.1	0.38	0.35	0.11	22.1	4.1	0.70	0.22	1,620	300		<6.6	432	80.0		<2.2	70.2	13.0	0.35	0.11
April-07																								
October-07													1,458	270		<5.9	486	90.0	0.704	0.22	81.0	15.0	0.31	0.10
April-08																								
October-08													1,404	260	4.2	1.3	464	86.0	3.52	1.1	243	45.0	3.5	1.1
March-09																								
April-09																								
July-09																								
October-09													1,000	185	<13.0		740	140	<7.3		200	40.0	0.23	0.07
January-10																								
April-10	5.9	1.1	<3.3	<0.61	2.8	0.52	0.18	0.056	15.0	2.8	<1.6	<0.30												
July-10																								
October-10													1,100	204	<3.5	<0.6	580	107	<1.8	<0.33	620	115	0.31	0.10
February-11																								
March-11																								

Notes:
Blank cells indicate no sample collected on that date
< = Not detected above the stated detection limit
bgs = below ground surface
µg/m^3 = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	MW31												MW32											
Vapor Port	VP1				VP2				VP3				VP1				VP2				VP3			
Perforated Interval (feet bgs)	(121-160)				(235-245)				(357-365)				(70-80)				(235-250)				(318-327)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)
September-02																								
October-02																								
November-02																								
December-02																								
January-03																								
February-03																								
April-03																								
July-03																								
October-03																								
May-04	119	22.0		<2.0	27.0	5.0		<0.41	37.8	7.0	1.5	0.46												
August-04													162	30.0	3.2	1.0	648	120		<0.64	756	140	3.2	1.0
October-04	31.3	5.8		<0.41	40.0	7.4		<0.41		<0.25	2.9	0.92	346	64.0		<0.41	1,080	200		<0.83	918	170		<0.82
April-05	23.2	4.3		<0.44	35.6	6.6		<0.44	54.0	10	1.5	0.47	421	78.0		<0.44	648	120		<0.44	1,080	200		<0.44
September-05	25.9	4.8		<0.42	130	24.0		<0.41	22.1	4.1		<1.1	416	77.0		<0.44	756	140		<0.44	1,188	220	5.1	1.6
April-06	25.4	4.7	0.35	0.11	47.0	8.7	0.42	0.13	75.6	14	0.48	0.15	524	97.0	0.90	0.28	756	140	0.32	0.10	1,296	240	1.0	0.32
October-06	20.5	3.8	0.35	0.11	32.9	6.1	0.67	0.21	35.6	6.6	0.26	0.08	389	72.0	0.38	0.12	756	140		<2.9	1,134	210		<5.9
April-07																								
October-07													362	67.0	0.42	0.13	702	130		<3.5	1,026	190		<3.5
April-08																								
October-08													292	54.0		<0.98	535	99.0	1.2	0.37	972	180		<3.7
March-09																								
April-09																								
July-09																								
October-09													310	57.0	0.19	0.06	600	110	<1.4		910	170	0.38	0.12
January-10																								
April-10	18.0	3.3	0.14	0.04	26.0	4.8	0.14	0.04	0.78	0.14	0.31	0.10												
July-10																								
October-10													270	50.0	<0.67	<0.12	650	120	4.8	1.5	830	154	<0.67	<0.12
February-11																								
March-11																								

Notes:
Blank cells indicate no sample collected on that date
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bgs = below ground surface
µg/m^3 = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	MW33												MW34											
Vapor Port	VP1				VP2				VP3				VP1				VP2				VP3			
Perforated Interval (feet bgs)	(110-128)				(294-315)				(330-345)				(107-126)				(282-302)				(355-365)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)
September-02																								
October-02																								
November-02																								
December-02																								
January-03																								
February-03																								
April-03																								
July-03																								
October-03																								
May-04													35.6	6.6		<0.41	36.7	6.8		<0.41	21.1	3.9	1.4	0.45
August-04																								
October-04	11,340	2,100		<12.0	2,268	420		<11.0	1,620	300		<12.0	38.9	7.2		<0.41	44.8	8.3		<0.42	41.0	7.6		<0.42
April-05	7,560	1,400		<9.0	2,484	460		<1.9	1,728	320		<.92	38.3	7.1		<0.42	54.0	10.0		<0.43	59.4	11.0		<0.43
September-05	15,120	2,800		<44.0	2,430	450		<2.9	1,674	310		<2.9	31.9	5.9		<2.2	54.0	10.0		<2.2	42.7	7.9	9.9	3.1
April-06	10,260	1,900		<40.0	3,240	600	4.5	1.4	2,322	430	3.2	0.99	38.9	7.2	0.29	0.09	64.8	12.0	1.25	0.39	50.8	9.4	0.29	0.09
October-06	10,800	2,000		<48.0	2,970	550		<12.0	1,674	310		<8.8	32.9	6.1	1.44	0.45	52.9	9.8	0.67	0.21	37.8	7.0	2.11	0.66
April-07																								
October-07	8,640	1,600		<39.0	2,430	450		<8.1	1,782	330		<8.1												
April-08																								
October-08	5,292	980		<17.0	3,078	570		<11.0	4,158	770		<15.0												
March-09																								
April-09																								
July-09																								
October-09	9,300	1,700	<120		2,900	540	<26.0		3,600	670	<34.0													
January-10																								
April-10													29.0	5.4	0.43	0.13	48.0	8.9	0.37	0.12	38.0	7.0	<3.3	<0.61
July-10	4,700	870	<14.0	<2.6	2,700	500	<6.6	<1.2	3,600	667	1.1	0.34												
October-10	7,700	1,426	<40.0	<7.4	2,800	519	<13.0	<2.4	6,000	1,111	<34.0	<6.2												
February-11	3,600	670	1.2	0.38	3,400	640	<22	<1.7	5,500	1,000	<28	<8.8												
March-11	2,600	481	<16	<3.0	2,600	481	<19	<3.5	2,900	537	<19	<3.5												

Notes:
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µg/m^3 = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	MW35												MW36											
Vapor Port	VP1				VP2				VP3				VP1				VP2				VP3			
Perforated Interval (feet bgs)	(129-134)				(219-224)				(354-364)				(171-186)				(231-253)				(348-363)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)	(µg/m^3)	(ppbv)
September-02																								
October-02																								
November-02																								
December-02																								
January-03																								
February-03																								
April-03																								
July-03																								
October-03																								
May-04													362	67	89.6	28	437	81	2.0	0.63	145.8	27.0		<0.44
August-04	1,890	350		<4.5	5,400	1,000		<15.0	918	170		<2.3												
October-04	1,512	280		<2.0	5,940	1,100		<4.0	2,106	390		<1.4	864	160		<0.81	702	130		<0.81	361.8	67.0		<0.40
April-05	2,592	480		<1.5	5,940	1,100		<3.6	2,160	400		<0.88	1,080	200		<0.87	1,026	190		<0.88	529.2	98.0		<0.44
September-05	3,078	570		<1.8	5,940	1,100		<4.4	2,430	450		<1.4	1,134	210		<0.72	648	120		<0.43	221.4	41.0		<0.44
April-06	4,536	840	5.4	1.7	9,180	1,700	9.28	2.9	2,592	480	4.16	1.3	1,296	240	1.7	0.52	702	130	0.99	0.31	145.8	27.0	0.58	0.18
October-06	4,050	750		<18	6,480	1,200		<33.0	2,754	510		<8.6	97.2	18	0.26	0.08	648	120		<2.5	216	40.0	0.26	0.08
April-07																								
October-07	864	160	2.0	0.62	6,480	1,200		<23.0	648	120	1.09	0.34												
April-08																								
October-08	3,402	630		<11.0	7,560	1,400		<5.7	2,268	420		<7.4												
March-09																								
April-09																								
July-09	4,000	750	<5.3	<1.7	4,700	880	<2.7	<0.83	2,600	480	<2.3	<.72												
October-09	3,400	640	<38.0		5,200	960	<58.0		2,600	480	<33.0													
January-10	3,700	685	<38.0	<7.0	5,400	1,000	<80.0	<14.8	1,600	296	<16.0	<3.0												
April-10	3,900	722	2.5	0.78	5,100	944	<28.0	<5.2	2,400	444	<13.0	<2.4	830	154	<3.4	<0.63	500	93	<3.4	<0.63	240	44.4	0.29	0.09
July-10	3,300	611	<8.4	<1.6	4,600	852	<12.0	<2.2	1,800	333	1.1	0.34												
October-10	3,500	648	<15.0	<2.8	4,300	796	<29.0	<5.4	2,300	426	<9.6	<1.8												
February-11	4,400	810	<28	<8.8	5,700	1100	<35	<11	1,200	230	<4.9	<1.5												
March-11	3,800	720	<22	<7.0	5,600	1000	<33	<10	1,900	360	<11	<3.4												

Notes:
Blank cells indicate no sample collected on that date
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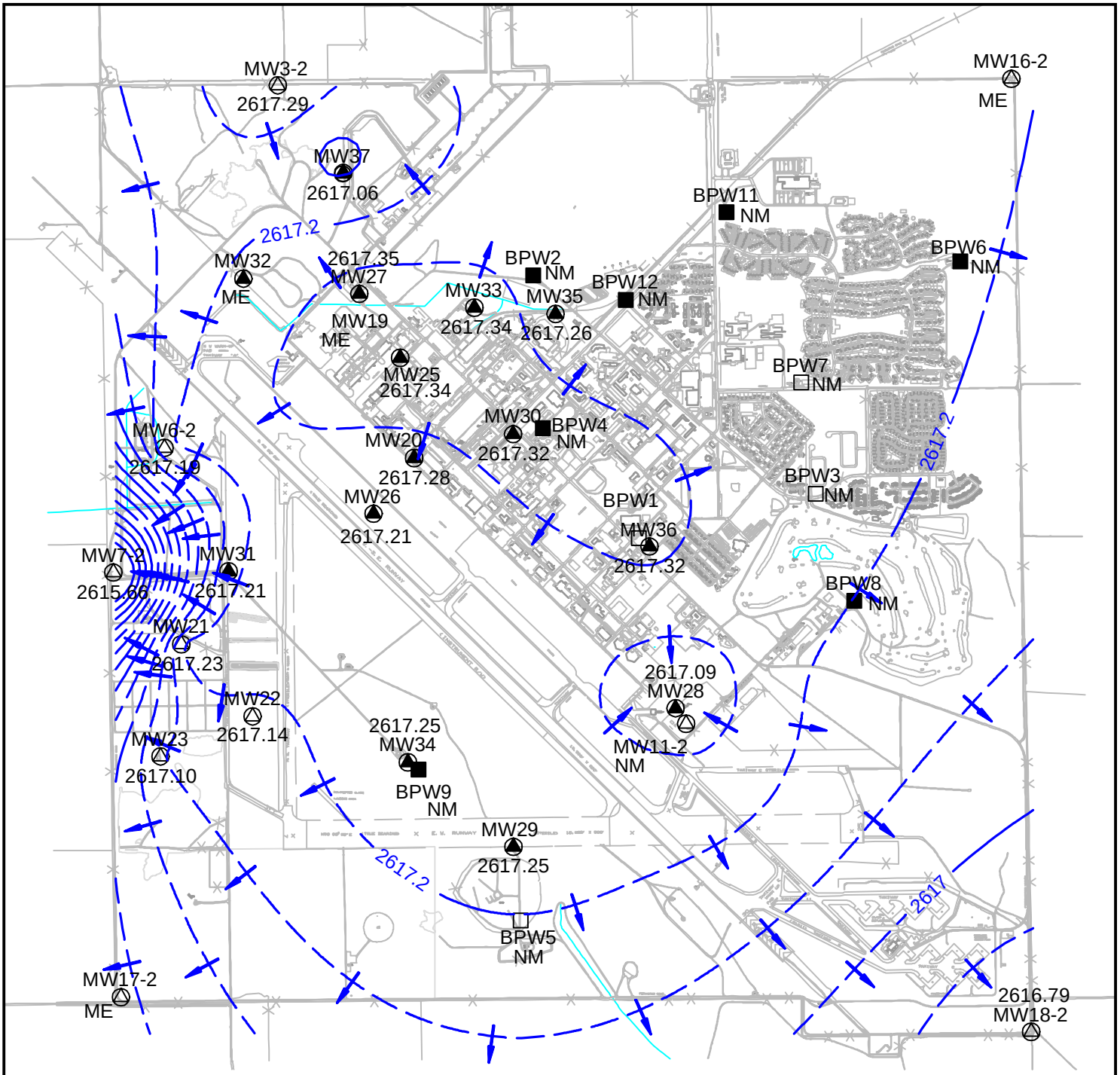
µg/m^3 = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well

TABLE 3-4
HISTORICAL COMPREHENSIVE BEDROCK VAPOR SAMPLE RESULTS FOR TCE AND BENZENE
MOUNTAIN HOME AFB, IDAHO

Well	MW37												MW39											
Vapor Port	VP1				VP2				VP3				VP1				VP2				VP3				VP4			
Perforated Interval (feet bgs)	(113.5-124.5)				(256.5-267.5)				(357.5-363.5)				(89-96)				(172-177)				(260-266)				(340-344)			
Compound	TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene		TCE		Benzene	
Date	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)	($\mu g/m^3$)	(ppbv)
September-02																												
October-02																												
November-02																												
December-02																												
January-03																												
February-03																												
April-03																												
July-03																												
October-03																												
May-04																												
August-04																												
October-04																												
April-05																												
September-05																												
April-06	3,510	650		<14.0	2,592	480	6.4	2.0	540	100	1.3	0.40																
October-06	2,700	500		<14.0	2,916	540		<14.0	64.8	12.0		<0.43																
April-07																												
October-07	2,754	510	4.8	1.5	2,970	550		<12.0	50.2	9.3	0.28	0.086																
April-08																												
October-08	2,322	430		<8.3	2,538	470		<8.6	54.0	10.0		<0.45																
March-09													1,500	270	4.6	1.4	2,700	510	2.9	0.91	1,400	260	<13.0		960	180	<13.0	
April-09													1,100	204	<17.0		1,900	352	<25.0		3,000	556	<34.0		870	161	1.5	0.47
July-09																												
October-09	2,100	390	<27.0		2,600	480	<27.0		68.0	12.6	<1.4		1,900	360	<23.0		3,100	580	<31.0		2,400	440	<23.0		1,600	290	<16.0	
January-10																												
April-10													1,200	222	<3.4	<0.63	2,400	444	<6.9	<1.28	2,100	389	<3.4	<0.63	1,200	222	0.84	0.26
July-10																												
October-10	2,100	389	<11.0	<2.0	2,400	444	<15.0	<2.8	73.0	13.5	<0.69	<0.13	1,800	333	<8.9	<1.6	2,300	426	<14.0	<2.6	2,300	426	<14	<2.6	1,500	278	<9.4	<1.7
February-11																												
March-11													2,700	500	<15	<4.6	2,700	500	<15	<4.7	2,400	440	<13	<4.1	880	160	<4.4	<1.4

Notes:
Blank cells indicate no sample collected on that date
< = Not detected above the stated detection limit
bgs = below ground surface
$\mu g/m^3$ = micrograms per cubic meter
MW = monitoring well
POL = petroleum, oil, and lubricants
ppbv = parts per billion by volume
TCE = trichloroethene
VP = vapor port
VW = vapor monitoring well



LEGEND

MW23 — REGIONAL GROUNDWATER MONITORING WELL

2622.28 — GROUNDWATER ELEVATION (FEET NAVD 1988)

MW34 — REGIONAL GROUNDWATER AND VAPOR MONITORING WELL

2621.88

BPW9 — ACTIVE BASE PRODUCTION WELL

BPW5 — INACTIVE BASE PRODUCTION WELL

NAVD NORTH AMERICAN VERTICAL DATUM

ME MEASUREMENT ERROR

NM NOT CORRECTED FOR DEVIATION AND NOT MEASURED

APPROXIMATE CONTOUR LOCATION
CONTOUR INTERVAL – 0.1 FOOT

GROUNDWATER FLOW DIRECTION

ONLY WELLS CORRECTED FOR DEVIATION ARE MAPPED

N

2500 1250 0 2500

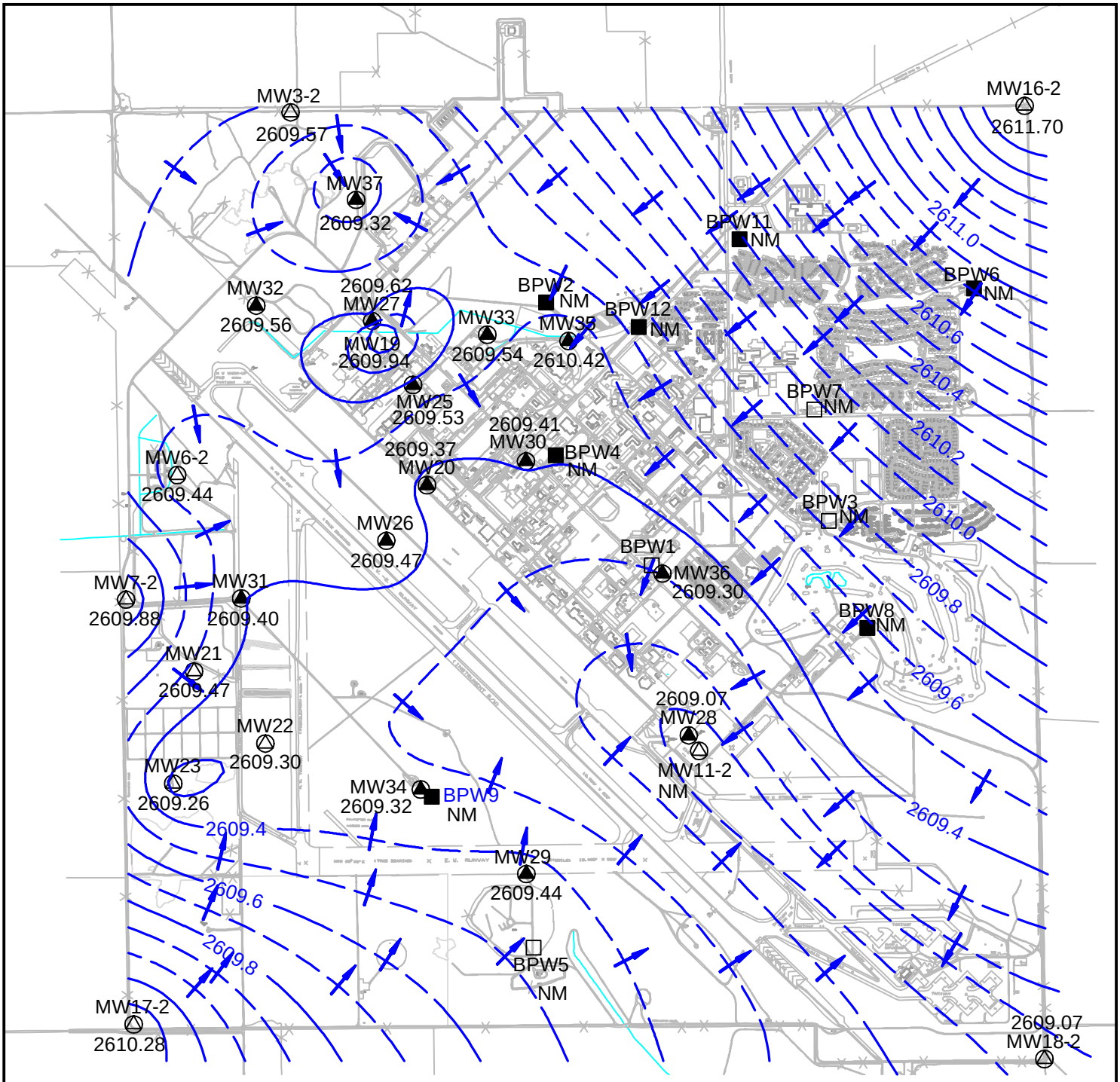
SCALE IN FEET

Figure is an interpretation for presentation purposes that assumes groundwater in this rock aquifer behaves as if in granular media.

REGIONAL GROUNDWATER ELEVATION MAP
APRIL 2010
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: TMS	DATE: 06/03/11	PROJECT NO. 16169962	FIG. NO. 3-1
CHK'D. BY: KAS	DATE: 06/03/11		

June 03, 2011 1:00:18 p.m.
Drawing: T:\mhafb\16169962.2\20000\11\3-1.dwg



LEGEND

MW23 — REGIONAL GROUNDWATER MONITORING WELL

2622.28 — GROUNDWATER ELEVATION (FEET NAVD 1988)

MW34 — REGIONAL GROUNDWATER AND VAPOR MONITORING WELL

2621.88

BPW9 — ACTIVE BASE PRODUCTION WELL

BPW5 — INACTIVE BASE PRODUCTION WELL

NAVD NORTH AMERICAN VERTICAL DATUM

NM NOT CORRECTED FOR DEVIATION AND NOT MEASURED

APPROXIMATE CONTOUR LOCATION

CONTOUR INTERVAL – 0.1 FOOT

GROUNDWATER FLOW DIRECTION

ONLY WELLS CORRECTED FOR DEVIATION ARE MAPPED

N

2500 1250 0 2500

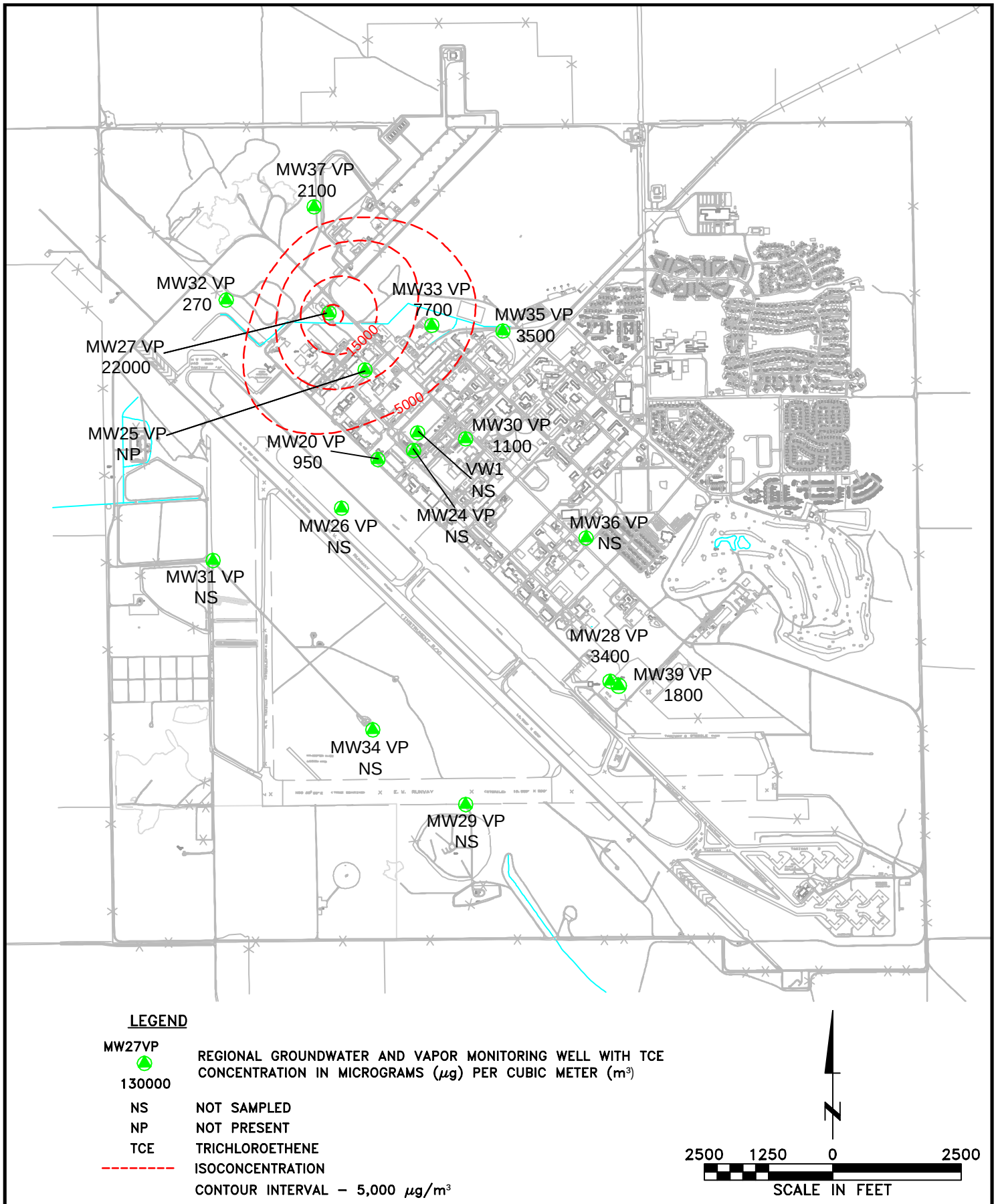
SCALE IN FEET

Figure is an interpretation for presentation purposes that assumes groundwater in this rock aquifer behaves as if in granular media.

REGIONAL GROUNDWATER ELEVATION MAP
OCTOBER 2010
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: TMS	DATE: 06/03/11	PROJECT NO. 16169962	FIG. NO. 3-2
CHK'D. BY: KAS	DATE: 06/03/11		

June 03, 2011 12:54:57 p.m.
Drawing: T:\mhafb\16169962.2\20000\11\3-2.dwg



LEGEND

MW27VP
130000 — REGIONAL GROUNDWATER AND VAPOR MONITORING WELL WITH TCE CONCENTRATION IN MICROGRAMS (μg) PER CUBIC METER (m^3)

NS — NOT SAMPLED

NP — NOT PRESENT

TCE — TRICHLOROETHENE

---------- — ISOCONCENTRATION CONTOUR INTERVAL – 5,000 $\mu g/m^3$

N

2500 1250 0 2500

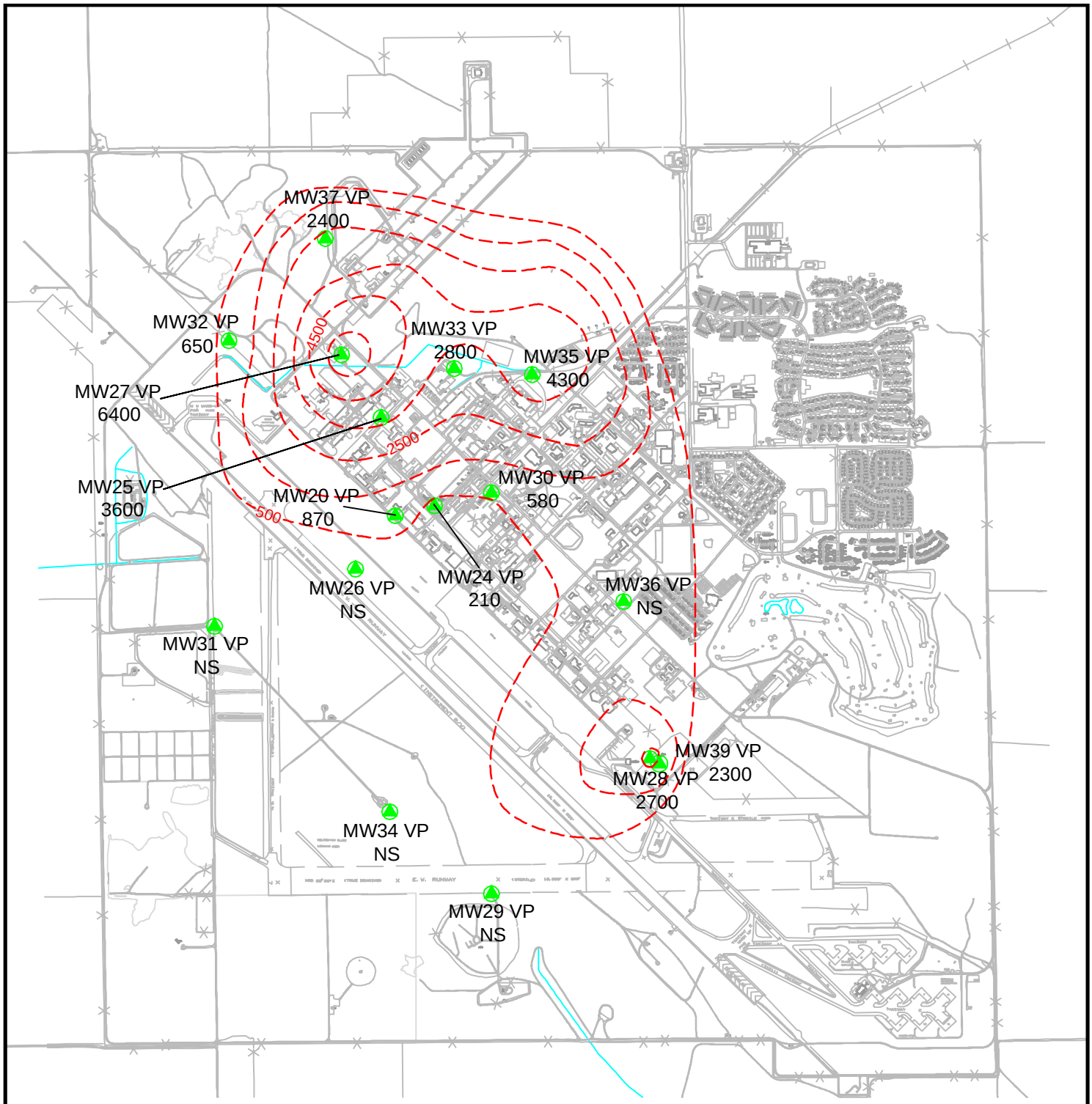
SCALE IN FEET

Note: Contouring of these data in fractured rock conditions has produced a simplified visualization of the data that may not be representative of actual contaminant distribution in the vadose zone.

March 28, 2011 8:27:30 a.m.
Drawing: T:\mhafb\16169962.2\20000\11\3-3.dwg

ISOCONCENTRATION MAP OF SHALLOW VAPOR PORT
TCE RESULTS – OCTOBER 2010
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRAWN BY: TMS	DATE: 03/24/11	PROJECT NO. 16169962	FIG. NO. 3-3
CHK'D BY: KAS	DATE: 03/24/11		



LEGEND

MW27VP 1800	REGIONAL GROUNDWATER AND VAPOR MONITORING WELL WITH TCE CONCENTRATION IN MICROGRAMS (μg) PER CUBIC METER (m^3)
NS	NOT SAMPLED
TCE	TRICHLOROETHENE
--------	ISOCONCENTRATION
	CONTOUR INTERVAL – 1,000 $\mu g/m^3$

N

2500 1250 0 2500

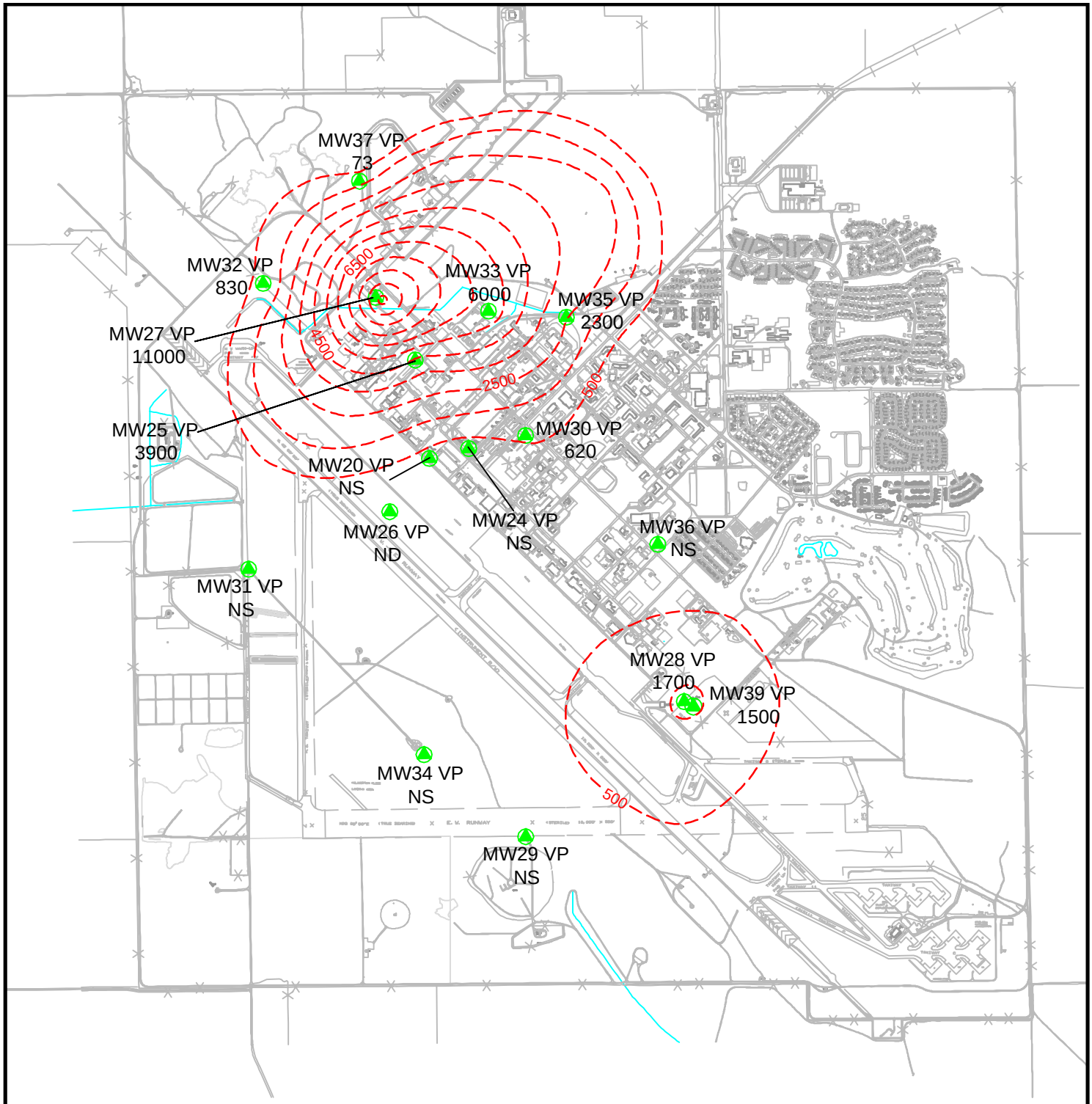
SCALE IN FEET

Note: Contouring of these data in fractured rock conditions has produced a simplified visualization of the data that may not be representative of actual contaminant distribution in the vadose zone.

March 28, 2011 8:28:40 a.m.
Drawing: T:\mhafb\16169962.2\20000\11\3-4.dwg

ISOCONCENTRATION MAP OF MIDDLE VAPOR PORT
TCE RESULTS – OCTOBER 2010
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRAWN BY: TMS	DATE: 03/24/11	PROJECT NO. 16169962	FIG. NO. 3-4
CHK'D BY: KAS	DATE: 03/24/11		



LEGEND

MW27VP 1200	REGIONAL GROUNDWATER AND VAPOR MONITORING WELL WITH TCE CONCENTRATION IN MICROGRAMS (μg) PER CUBIC METER (m^3)
ND	NOT DETECTED
NS	NOT SAMPLED
TCE	TRICHLOROETHENE
--------	ISOCONCENTRATION
	CONTOUR INTERVAL – 1,000 $\mu g/m^3$

N

2500 1250 0 2500

SCALE IN FEET

Note: Contouring of these data in fractured rock conditions has produced a simplified visualization of the data that may not be representative of actual contaminant distribution in the vadose zone.

March 28, 2011 8:29:33 a.m.
Drawing: T:\mhafb\16169962.2\20000\11\3-5.dwg

ISOCONCENTRATION MAP OF DEEP VAPOR PORT TCE RESULTS – OCTOBER 2010
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRAWN BY: TMS	DATE: 03/24/11	PROJECT NO. 16169962	FIG. NO. 3-5
CHK'D BY: KAS	DATE: 03/24/11		

Thirty-three Environmental Restoration Program (ERP) sites, which are grouped into Operable Units (OUs) 1 through 6, were reviewed during the initial Five-Year Remedy Review (FYR) completed in 2001. Figure 1-2 shows the locations of the ERP sites. While some sites were remediated pursuant to other Records of Decision (RODs), all 33 ERP sites, with the exception of Site ST-38, are addressed in the 1995 ROD. The 1995 ROD concluded that no further action (NFA) was necessary except institutional controls (ICs) at Site ST-11 and long-term monitoring (LTM) of regional groundwater.

Decision documents that are in-place and signed by representatives of Mountain Home Air Force Base (MHAFB), Idaho Department of Environmental Quality (DEQ), and U.S. Environmental Protection Agency (EPA) include the following:

- 1992 ROD for OU-4, which addresses soils at the Fire Training Area 8 (FT-08)
  - 2009 ROD Amendment for OU-4, which addresses soils at Site FT-08
- 1993 ROD for OU-2, which addresses the B-Street Landfill (LF-02)
  - 2006 Explanation of Significant Differences (ESD) for Site LF-02
- 1995 ROD for OUs 1, 3, 5, 6, the Lagoon Landfill, and the underground storage tank (UST) at the Fire Training Area 8 (FT-08)
  - 2004 ESD for Site ST-11
  - 2006 ESD for Site LF-01
  - 2007 Action Memoranda for Sites OT-16, LF-23, SD-27, and SS-29
  - 2010 ROD Amendment for OUs 1, 3, 5, 6, the Lagoon Landfill, and the UST at the Fire Training Area 8 (FT-08)
  - 2011 ESD for Site LF-23

This FYR summarizes the status of all 33 ERP sites, which include OU-3, but sites with a NFA recommendation in the 2006 FYR were not re-evaluated. Based on the approved decision documents, the following subsections present the selected and amended remedies, the remedial action objectives, the implementation of selected remedies, and the system operations and maintenance requirements for the selected remedies.

4.1 REMEDY SELECTION

The selected remedies specified in the 1992, 1993, and 1995 RODs for 31 of the ERP sites was No Remedial Action (NRA), which includes a minimum of annual LTM for regional groundwater at MHAFB to ensure protection of human health and the environment (chemicals of concern [COC] remain below the Federal Safe Drinking Water Act [SDWA] maximum contaminant level [MCLs]) and to verify uncertainties regarding the groundwater fate and transport model. Sites with a remedy other than NRA or that have undergone a change since the 1992, 1993, and 1995 RODs are described below.

4.1.1 Site LF-01 (Lagoon Landfill)

Site LF-01 was included in the ROD signed in 1995 (EPA 1995). NRA was the selected remedy for Site LF-01. The NRA alternative for this site included the requirement for LTM of the regional aquifer at MHAFB to ensure protection of human health and the environment and to verify uncertainties with the groundwater fate and transport model.

An ESD was issued on September 29, 2006 for the 1995 ROD and signed by the Air Force, EPA Region 10, and DEQ. The ESD, prepared in accordance with Section 117(c) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and 40 Code of Federal Regulations (CFR) 300.435(c)(2)(i), documents site-specific land use controls (LUCs) for Site LF-01 to ensure long-term protection of human health and the environment, ensure the integrity of the engineered containment (protective cover) for Site LF-01, and prevent inappropriate land use in the future. The LUC boundary for Site LF-01 is depicted on Figure 4-1.

The following LUC objectives supplement the remedy established for Site LF-01 by the October 20, 1995 ROD:

- Limit the future uses of LF-01 to the current use (an inactive landfill) or future uses that do not pose an unacceptable risk. Residential land use poses unacceptable risk and is therefore prohibited. Development for uses other than an inactive landfill would require an evaluation of risk and approval by the EPA and DEQ.
- Prevent activities and land uses that disturb the protective cover, except as approved by EPA and DEQ, to limit direct human and ecological contact with contaminated material below the cover and to minimize infiltration of surface water.
- Maintain the two-foot thickness and grade of the protective cover to minimize the potential for leachate production and movement.
- Restrict drilling in and consumptive use of perched groundwater below LF-01.

4.1.2 Site LF-02 (B-Street Landfill)

Site LF-02 was included in the ROD signed in 1993 (EPA 1993). NRA was the selected remedy for Site LF-02. It was stated in the ROD that due to uncertainties associated with the assumptions used in the groundwater model, an assessment of whether monitoring would be necessary at Site LF-02 would be addressed during the OU-3 basewide groundwater investigation. The ROD also noted that the NRA remedy may result in hazardous substances remaining on-site that do not allow for unlimited use/unrestricted exposure (UU/UE) due to uncertainties associated with the risk assessment at the Trench Area (the number of samples collected, the heterogeneous nature of the wastes, and the possibility of trench disposal in the Rubble Area).

Although it was determined during the OU-3 basewide groundwater Remedial Investigation (RI) that regional groundwater monitoring would not be necessary, monitoring well (MW)3- 2,

located due north of Site LF-02, was included in the LTM program as recommended in the 2001 five-year review (Foothill Engineering Consultants [FEC] 2001).

An ESD was issued on September 29, 2006 for the 1993 ROD and signed by the Air Force, EPA Region 10, and DEQ. The ESD, prepared in accordance with Section 117(c) of CERCLA and 40 CFR 300.435(c)(2)(i), documents site-specific LUCs for Site LF-02 to ensure long-term protection of human health and the environment and prevent inappropriate land use in the future. The LUC boundary for Site LF-02 is depicted on Figure 4-2.

The following LUC objectives supplement the remedy established for Site LF-02 by the June 15, 1993 ROD:

- Limit the future uses of LF-02 to the current use (an inactive landfill) or future uses that do not pose unacceptable risk. Residential land use poses unacceptable risk and is therefore prohibited. Development for uses other than an inactive landfill would require an evaluation of risk and approval by the EPA and DEQ.
- Prevent activities and land uses that disturb the existing ground surface, except as approved by the EPA and DEQ, to minimize contaminant dispersion and limit direct human and ecological contact with contaminated material.

4.1.3 Site FT-08 (OU-4) (Fire Training Area 8)

A ROD Amendment was issued on September 18, 2009 for the 1992 ROD and signed by the Air Force, EPA Region 10, and DEQ. Pursuant to CERCLA Section 117 (42 United States Code [USC] Section 9617) and the National Contingency Plan (NCP) at 40 CFR 300.435(c)(2)(ii), the ROD Amendment documents a fundamental change to the remedy selected in the 1992 ROD for Site FT-08, OU-4.

Previous investigations described in Section 3.4.4 identified a variety of petroleum-based and solvent-based chemical compounds in soil and soil gas at Site FT-08 at concentrations posing potential unacceptable human health risks. The response action selected in the 2009 ROD Amendment is considered necessary to protect public health and welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The remedial action objective (RAO) for Site FT-08 is to remediate chlorinated- and petroleum-related volatile organic compounds (VOCs) in soil and soil gas to meet the cleanup standards for UU/UE exposure listed in Table 2-3 of the 2009 ROD Amendment (URS 2009k).

The amended remedy for OU-4, Site FT-08, is soil vapor extraction (SVE). The major components of the amended remedy include:

- Apply a vacuum to vadose zone overburden soils to induce the controlled flow of air in the soil, and remove volatile contaminants from the soil until residual soil and soil gas contaminant concentrations are reduced to the UU/UE cleanup levels discussed in Section 2.8 of the ROD Amendment.

- Complete vapor effluent sampling and soil and soil gas sampling.
- Conduct operations and maintenance (O&M) activities until cleanup levels are met. Achievement of cleanup levels will be documented with sampling results and FFA team concurrence before the system is turned off or dismantled.
- Complete FYRs, as needed, and dismantle system.

The SVE system layout is depicted on Figure 4-3. Based on collective monitoring results, the site is no longer considered a potential threat to regional groundwater and should be removed from the list of sites that require groundwater LTM.

4.1.4 Site ST-11 (Flight Line Fuel Spill)

After conducting a Focused Feasibility Study (FFS) (FEC 2001) on remedial alternatives, the limited action alternative ICs was selected as the remedy for Site ST-11. This remedy includes the following:

- Notice of restriction: identifies the perched water zone and prohibits drilling through the zone or using the perched water as drinking water on the Base Comprehensive Plan (BCP). The BCP has been registered on land plat maps held by MHAFB. The land is held by lease by the Air Force and cannot return to the land holder (Bureau of Land Management) until contamination is below MCLs.
- Leak detection program: to detect future petroleum product leaks at the site. The program includes petroleum inventory and annual flight line leak detection monitoring. Additional discussion of MHAFB fuel inventory and leak detection program is included in Section 6.4.1.
- Sampling of the perched groundwater prior to removal of the land use restriction to ensure that perched water meets the standards of the SDWA.
- Monitoring of the perched groundwater for at least 5 years in accordance with the approved groundwater sampling plan.

The RAOs for Site ST-11 presented in the 1995 ROD were as follows:

- The protection of human health by preventing human exposure to the perched water.
- The protection of the environment by preventing an inadvertent release to the regional aquifer through either accidental penetration of the contaminated zone or extraction and release of contaminated groundwater to the environment.

An ESD was issued on March 23, 2004 for the 1995 ROD and signed by the Air Force, EPA Region 10, and DEQ. The ESD, prepared in accordance with Section 117(c) of CERCLA and 40 CFR 300.435(c)(2)(i), documents significant differences to the remedy selected in the ROD for Site ST-11. The ESD was prepared to address deficiencies in the ROD description of the ICs and modify the IC requirements for ST-11 in accordance with the "Air Force Policy and Guidance on Remedy Selection Documentation in Records of Decision" memorandum dated January 23, 2002, which specifies ROD requirements for ICs. ICs are summarized below with more detail provided in the ESD (MHAFB 2004):

- Use of Site ST-11 is restricted to industrial purposes.

- The Air Force will ensure paved areas of the flightline and parking apron that reduce surface water infiltration are not altered to decrease the area or thickness, except in the case of temporary changes due to construction or repair.

- MHAFB will provide EPA and DEQ 30 days notice of any changes to the MHAFB General Plan internal procedures for maintaining ICs which may affect Site ST-11.

- The Air Force will ensure that instructions, processes, and requirements will be complied with for all proposed construction or subsurface soil-disturbing activities at Site ST-11.

- The Air Force will visually inspect Site ST-11 on at least an annual basis; an annual report of the inspection will be developed by the Air Force and provided for information only to the EPA and DEQ.

- The Air Force shall provide prompt notice to the regulators if it discovers any activity that is inconsistent with the IC requirement, objectives or controls, or any action that may interfere with the effectiveness of the ICs.

- The Air Force shall seek prior concurrence from EPA and DEQ to terminate ICs or modify land use from industrial uses at Site ST-11; in addition, the Air Force shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the ICs or any action that may alter or negate the need for land use controls at Site ST-11.

- The Air Force will ensure that a notice of the IC will be placed in the BCP, as well as in the files of the MHAFB real estate manager's office.

- The Air Force will provide notice to EPA and DEQ at least 6 months prior to any transfer or sale of Site ST-11 so that EPA and DEQ can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective ICs.

These ICs will be maintained until it is demonstrated that perched groundwater at Site ST-11 is no longer a threat to human health and the environment, verified by 2 years of semiannual LTM sampling events where analytical results show COCs are below the MCL. The IC boundary for Site ST-11 is depicted on Figure 4-4.

Based on additional activities described in Section 3.4.5, active remediation was required at Site ST-11. A ROD Amendment was issued on September 23, 2010 for the 1995 ROD and signed by the Air Force, EPA Region 10, and DEQ in October 2010. Pursuant to CERCLA Section 117 (42 USC Section 9617) and the NCP at 40 CFR 300.435(c)(2)(ii), the ROD Amendment documents a fundamental change to the remedy selected in the 1995 ROD for Site ST-11. The ROD Amendment was prepared because Site ST-11 required active remediation in order to

protect public health and welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The RAOs for Site ST-11 presented in the 2010 ROD Amendment and the IC objectives in the 2004 ESD replace the RAOs established in the 1995 ROD. The revised RAOs for Site ST-11 are as follows:

- Recover free-phase jet propellant-4 (JP-4) in perched zone monitoring wells (PZMWs) that have a history of containing light non-aqueous phase liquid (LNAPL) to comply with Idaho Administrative Procedures Act (IDAPA) 58.01.02.852.04, which requires free-product removal to the maximum extent practicable as determined by the DEQ. Free product is defined as the presence of petroleum greater than 0.1 inch (DEQ 2008).
- Reduce concentrations of benzene in perched groundwater to the federal MCL of 5 micrograms per liter (µg/L) or below, which is the same value in the Idaho "Ground Water Quality Rule" (IDAPA 58.01.11).

The amended remedy for Site ST-11 documented in the 2010 ROD Amendment is vapor extraction (VE). The VE system layout is depicted on Figure 4-5. The major components of the amended remedy include:

- Continuation of ICs established by the 1995 ROD and 2004 ESD
- Engineering controls
- Passive LNAPL recovery
- *In situ* treatment consisting of the following:
  - Passive bioventing
  - *In situ* chemical oxidation for perched groundwater
- Perched groundwater monitoring to document whether or not biodegradation or other types of natural attenuation are occurring

4.1.5 Site OT-16 (Munitions Burial Site)

Site OT-16 was included in the ROD signed in 1995 (EPA 1995). NRA with LTM was the remedy selected for the site in the 1995 ROD.

To facilitate achievement of UU/UE, an Engineering Evaluations/Cost Analysis (EE/CA) was completed for Site OT-16 in 2006 (URS 2006d) in accordance with 40 CFR Section 300.415(b)(4). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants and the munitions scrap and debris. The EE/CA concluded that a non-time critical removal action (NTCRA) (excavation of selected soil, mechanical separation, and off-site disposal) was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the Site OT-16, which was signed on January 30, 2007 (URS 2007a).

The removal action objectives included in the EE/CA were as follows:

- Remove and dispose of debris (munitions destruction scrap) at appropriate on-Base or off-Base disposal facilities.
- Remove soils that are impacted with polynuclear aromatic hydrocarbons (PAHs) at concentrations above human health risk based concentrations for residential receptors as defined by EPA Region 9 preliminary remediation goals (PRGs).

4.1.6 Site LF-23 (Solid Waste Disposal Area)

Site LF-23 was included in the ROD signed in 1995 (EPA 1995). NRA with LTM was the remedy selected for the site.

To facilitate achievement of UU/UE, an EE/CA was completed for Site LF-23 in 2006 (URS 2006d) in accordance with 40 CFR Section 300.415(b)(4). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants and debris in Area LF-23A. The EE/CA concluded that a NTCRA was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the Site LF-23, which was signed on January 30, 2007 (URS 2007b).

An ESD was signed July 8, 2011for the 1995 ROD and signed by the Air Force, EPA Region 10, and DEQ. The ESD, prepared in accordance with Section 117(c) of CERCLA and 40 CFR 300.435(c)(2)(i), documents site-specific LUCs for Site LF-23 to ensure long-term protection of human health and the environment and prevent inappropriate land use in the future. The LUC boundary for Site LF-23 is depicted on Figure 4-6.

The following LUC objectives supplement the remedy established for Site LF-23 by the 1995 ROD:

- Limit the future uses of the LUC area at Site LF-23 to the current use (an inactive landfill) or future uses that do not pose unacceptable risk. Residential land use poses unacceptable risk and is therefore prohibited. Development for uses other than an inactive landfill would require an evaluation of risk and approval by the EPA and DEQ.
- Prevent activities and land uses that disturb the existing ground surface, except as approved by the EPA and DEQ, to minimize contaminant dispersion and limit direct human and ecological contact with contaminated material.

4.1.7 Site SD-24 (Old Liquid Oxygen Loading Plant and Auto Hobby Shop)

Site SD-24 was included in the ROD signed in 1995 (EPA 1995). NRA with LTM was the remedy selected for the site in the 1995 ROD.

For the purpose of achieving UU/UE, in November 2004, a removal and disposal action (RDA) was completed for impacted soils at the location of the removed effluent collection box at Site SD-24. The objective of the RDA was to remove soils impacted with site-related contaminants

that would prevent the site from having unrestricted future land use potential (URS 2005). In addition, injection of a chemical oxidizing agent (sodium permanganate) was completed on January 15 and 16, 2008. The purpose of this action was to treat the small amount of remaining trichloroethene (TCE)-impacted soil, at concentrations that exceeded a site cleanup goal of 0.53 milligrams per kilogram (mg/kg), located below an active water line adjacent to the previous RDA excavation limits (URS 2008c).

4.1.8 Site SD-27 (Equipment Wash Rack)

Site SD-27 was included in the ROD signed in 1995 (EPA 1995). NRA with LTM was the remedy selected for the site in the 1995 ROD.

To facilitate achievement of UU/UE, an EE/CA was completed for Site SD-27 in 2006 (URS 2006d) in accordance with 40 CFR Section 300.415(b)(4). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants. The EE/CA concluded that a NTCRA was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the site, which was signed on January 30, 2007 (URS 2007c).

The removal action objective included in the EE/CA was to remove soils that are impacted with PAHs at concentrations above human health risk based concentrations for residential receptors as defined by EPA Region 9 PRGs.

4.1.9 Site SS-29 (Drum Accumulation Pad)

Site SS-29 was included in the ROD signed in 1995 (EPA 1995). NRA with LTM was the remedy selected for the site in the 1995 ROD.

To facilitate achievement of UU/UE, an EE/CA was completed for Site SS-29 in 2006 (URS 2006d) in accordance with 40 CFR Section 300.415(b)(4). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants. The EE/CA concluded that a NTCRA was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the site, which was signed on January 30, 2007 (URS 2007d).

The removal action objective included in the EE/CA was to remove soils that are impacted with PAHs at concentrations above human health risk based concentrations for residential receptors as defined by EPA Region 9 PRGs.

4.1.10 OU-3 (Basewide Regional Groundwater)

OU-3 was included in the ROD signed in 1995 (EPA 1995). NRA with LTM was the remedy selected for the site in the 1995 ROD. The ROD requires at least annual monitoring of the regional groundwater. The purpose of the monitoring is to verify uncertainties with the groundwater fate and transport model. Monitoring of contaminants of concern will occur at least annually in accordance with the groundwater monitoring plan.

4.2 REMEDY IMPLEMENTATION

The following subsections present the implementation mechanism and specific requirements associated with each of the selected and amended remedies that have undergone a change since the 1992, 1993, and 1995 RODs.

4.2.1 Site LF-01 (Lagoon Landfill)

LTM and LUCs for Site LF-01 have been implemented in accordance with the 1995 ROD and 2006 ESD. Basewide groundwater monitoring required by the 1995 ROD has been implemented in accordance with LTM work plans reviewed and approved by the FFA team. The LUCs are implemented, monitored, and maintained by MHAFB in accordance with Final Closure and Post Closure Maintenance Plan (MACTEC Engineering and Consulting, Inc. [MACTEC] 2002) and through the facility-wide IC or LUC procedures established under the BCP and programs implemented under Air Force Instruction (AFI) 32-1021 and AFI 32-1001. The LUC boundary for Site LF-01 is shown on Figure 4-1. The following summary provides the LUC actions implemented for Site LF-01:

- Annual inspections of the protective cover at Site LF-01 and assess the effectiveness of the LUCs.
- Maintenance and repair the protective cover as necessary.
- Annual monitoring of the environmental use restrictions and controls. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to the EPA and DEQ. The annual reports will be used in preparation of a FYR to evaluate the effectiveness of the remedy. The annual report will evaluate the status of the LUCs and how any LUC deficiencies or inconsistent uses have been addressed. The annual report will address whether the use of restrictions and controls referenced above were communicated in the Real Estate Records, whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property (as applicable), and whether use of the property has conformed with such restrictions and controls.
- Submittal of the LUCs for recordation at the local recording office, which for fee-owned-deeded land, is both the Elmore County Courthouse and the MHAFB Civil Engineer Squadron (CES) Real Estate Office; include with the recordation a survey plot and description of the LUCs. Withdrawn public domain land is only recorded at the MHAFB CES Real Estate office.
- Update of the BCP to include the following: a map and details of the LUCs; a discussion of the purpose of the LUCs; regulatory requirements for the LUCs; and MHAFB entities responsible for implementing, monitoring, and enforcing the LUCs.

4.2.2 Site LF-02 (B-Street Landfill)

LTM and LUCs for Site LF-02 have been implemented in accordance with the 1995 ROD and the 2006 ESD. Basewide groundwater monitoring recommended in the 2001 FYR (FEC 2001) has been implemented in accordance with LTM work plans reviewed and approved by the FFA team. The LUCs are implemented, monitored, and maintained by MHAFB through the facility-wide IC or LUC procedures established under the BCP and programs implemented under AFI 32-1021 and AFI 32-1001. The LUC boundary for Site LF-02 is shown on Figure 4-2. The following summary provides the actions implemented for Site LF-02:

- Annual inspect the LF-02 area and assess the effectiveness of the LUCs.
- Annual monitoring of the environmental use restrictions and controls. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to the EPA and DEQ. The annual reports will be used in preparation of a FYR to evaluate the effectiveness of the remedy. The annual report will evaluate the status of the LUCs and how any LUC deficiencies or inconsistent uses have been addressed. The annual report will address whether the use of restrictions and controls referenced above were communicated in the Real Estate Records, whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property (as applicable), and whether use of the property has conformed with such restrictions and controls.
- Submittal of the recordation at the local recording office, which for withdrawn land, is the MHAFB CES Real Estate Office. Include with the recordation a survey plat and description of the LUCs.
- Update the BCP to include the following: a map and details of the LUCs; a discussion of the purpose of the LUCs; regulatory requirements for the LUCs; and MHAFB entities responsible for implementing, monitoring, and enforcing the LUCs.

4.2.3 Site FT-08 (OU-4) (Fire Training Area 8)

A pilot scale SVE system was in operation at Site FT-08 prior to implementation of the remedial action. A Remedial Action Work Plan (RAWP) was issued in February 2010 (URS 2010a) to describe the construction of the remedial action selected (SVE) in the OU-4 ROD Amendment for Site FT-08. Modifications to the existing pilot system were completed in February 2010 in accordance with the Site FT-08 RAWP to optimize sub-surface vapor flow and overall contaminant extraction rates. Modifications included adding two shallow soil extraction wells (SEWs), 12 air injection wells, and 10 vapor monitoring wells (VMWs).

The site achieved construction complete status when the Remedial Action Report was issued on December 3, 2010.

The EPA and DEQ have determined that all remedial action construction activities were performed according to the RAWP. The overall objective of the remedial action activities for Site FT-08 is to achieve regulatory SC with UU/UE. Based on performance monitoring, it is

expected that cleanup levels for all soil and soil gas contaminants will have been reached by October 2011. After soil and soil gas cleanup levels have been met, a Final Close Out Report will be issued.

4.2.4 Site ST-11 (Flight Line Fuel Spill)

A pilot study for VE was completed at Site ST-11 prior to selection of the remedial action. Modifications to the existing pilot study system were completed in September and October 2009. Modifications included:

- Removing a small section of concrete between vapor extraction well (VEW)-3 and VEW-6 and the existing 4-inch conduits to allow installation of piping from the VEWs to the existing conduits
- Installing conveyance piping
- Installing a new spring assisted vault lid assembly over the existing VEWs
- Setting up the system trailer with inlet piping, a moisture separator, a VE blower, a thermal/catalytic oxidizer, a control panel, and a condensate transfer pump

In a ROD amendment (dated September 2010), VE was selected for Site ST-11 and remediation is in progress.

The EPA and DEQ have determined that all remedial action construction activities were performed in an acceptable manner.

In order to augment the activities of the VE system, the remedy for Site ST-11 provided for injection of chemical oxidant at Site ST-11 if:

- All free product has been removed and not detected for 6 months or longer using a fuel/water interface probe and
- Benzene concentrations persist above the MCL of 5 µg/L after 1 year of operating the SVE system or the trend of benzene concentrations indicates MCLs will not be achieved within 1 year of system start-up.

In March 2011, both of these conditions were met, so injection of chemical oxidant at Site ST-11 into fractured bedrock contaminated with fuel-related compounds was initiated. Injection activities were completed at Site ST-11 in May 2011 in accordance with the ERP Site ST-11, Work Plan Addendum for Injection of Chemical Oxidant into Perched Groundwater (URS 2011a). Approximately 6,612 pounds of sodium persulfate, at a concentration of 4.3 grams per liter (g/L), were injected to treat the benzene, toluene, ethylbenzene and xylenes (BTEX) mass estimated to be present in perched groundwater. In addition, approximately 11,000 pounds of sodium hydroxide, at a concentration of 1.33 g/L, were added to the sodium persulfate at the time of injection to activate the persulfate.

The overall objective of the remedial action activities for Site ST-11 is to achieve regulatory SC with UU/UE. It is expected that cleanup levels for perched groundwater contaminants will be

reached by October 2011. After perched groundwater cleanup levels have been met, a Final Close Out Report will be issued.

4.2.5 Site OT-16 (Munitions Burial Site)

An NTCRA was completed at Site OT-16, as dictated by the EE/CA (URS 2006d) and associated Action Memorandum (URS 2007a); to address the residual munitions related scrap material and soil impacted with PAHs as a result of historical site use by MHAFB. The soil and debris removal, disposal, and backfill activities were completed for the site during the time period of August 5 through October 28, 2008. All NTCRA activities are documented in the Final Non-Time Critical Removal Action Completion Report for Site OT-16 (URS 2009b).

Based on the results of this NTCRA, Site OT-16 now meets UU/UE criteria from the unexploded ordnance and chemical exposure standpoints. This site status and conclusion were documented in the ROD Amendment for OUs 1, 3, 5, and 6, which was signed by the Air Force, EPA Region 10, and DEQ in October 2010.

4.2.6 Site LF-23 (Solid Waste Disposal Area)

Non-Time Critical Removal Action

An NTCRA was completed at Site LF-23 between March 12 and June 26, 2007 to address landfill debris and soils impacted with PAHs as a result of historical site use by the Air Force. The NTCRA involved excavation of approximately 350 cubic yards of native soil, 30 cubic yards of coal ash, and 156 cubic yards of construction debris with minor amounts of intermixed soils around the test pit. Based on sampling following the NTCRA excavation, some areas of Site LF-23 were still not suitable for UU/UE, which led to further characterization.

After the NTCRA, a single multi-increment (M-I) soil sample, plus one field duplicate sample, was collected at the Site LF-23 excavation after discussion and agreement among the FFA team members. Excavation sidewalls were not sampled due to the high percentage of unrepresentative material (e.g., concrete rubble, rubber tires and coal ash). By agreement with the FFA team, the floor of the excavation at Site LF-23 was sampled as a single decision unit using the M-I sampling approach. At the time of the NTCRA, sampling results were compared to the EPA Region 9 residential PRGs. Sampling results indicated the PRG was exceeded for benzo(a)pyrene in the investigative sample. In addition, PRGs were exceeded for multiple PAHs in the duplicate sample.

During the Site LF-23 excavation, approximately 2 feet of coal ash were encountered in the shallow subsurface of the excavation centered on LFI test pit LF23-10B, overlying a mix of native soil and solid waste (primarily construction debris). The coal ash appeared to have been deposited after the debris, which was excavated during the NTCRA at Site LF-23 (URS 2008a).

LUCs

The implementation of LTM and LUCs for Site LF-23 will be in accordance with the 1995 ROD and the July 2011 ESD. The LUC boundary for Site LF-23 is depicted on Figure 4-6. The LUCs will be implemented, monitored, and maintained by MHAFB through the facility-wide IC or LUC procedures established under the BCP and programs implemented under AFI 32-1021 and AFI 32-1001. The following summary provides the actions implemented for Site LF-23:

- The United States Air Force (USAF) shall install and maintain signs that provide notification of the restricted land use within 60 days of final signature of the ESD. The signs shall read as follows: "By Order of Commander – Authorized personnel only. Excavating & Dumping not allowed."
- Site LF-23 lies on land withdrawn from the public domain. The USAF shall submit for recordation at the local recording office, which is the Base CES 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 MHAFB entities responsible for implementing, monitoring, and enforcing the LUCs.
- The USAF shall notify EPA and DEQ 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 DEQ.
- The USAF shall review of planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23. MHAFB 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.
- MHAFB will perform annual inspections (site visit) of the LUC area designated at Site LF-23 and assessment of the effectiveness of the LUCs.
- MHAFB shall perform annual monitoring of the environmental use restrictions and controls, including a review of the recordation at the MHAFB CES Real Estate Office and dig permit/land use personnel interviews. The monitoring results will be reported and provided to the EPA and DEQ. The annual reports will be used in preparation of the FYR to evaluate the effectiveness of the remedy. The annual report will evaluate the status of the LUCs and how any LUC deficiencies or inconsistent uses 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.
- USAF shall notify to EPA and DEQ as soon as practicable but no later than 10 business days after discovering any unauthorized activity, either ongoing or completed, that is inconsistent with the objectives, 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 DEQ 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 DEQ of corrective actions MHAFB will implement to address the activity at issue.
- The USAF shall provide documentation of approved actions or corrective actions to EPA and DEQ as soon as practicable but not later than the subsequent annual report.
- The USAF shall notify EPA and DEQ 45 days in advance of any proposed land use changes that are inconsistent with LUC objectives or the selected remedy.
- The USAF shall seek prior approval from EPA 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 DEQ, at least 6 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 DEQ 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 DEQ at least 6 months prior to any transfer or sale, then the USAF shall notify EPA and DEQ 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 DEQ with similar notice, within the same time frames, as to federal-to-federal transfer of property.
- MHAFB shall provide a copy of executed deed or transfer assembly to EPA and DEQ.

4.2.7 Site SD-24 [Old Liquid Oxygen (LOX) Loading Plant and Auto Hobby Shop]

An RDA was completed in 2004 for impacted soils at the location of the removed effluent collection box at Site SD-24. The results of the RDA are documented in the Final SD-24/SD-25 RDA Report (URS 2005). Impacted soils were excavated to the bedrock surface over an area of approximately 25 by 40 feet at the site. Soils were excavated until field and fixed-base laboratory analytical results were below the risk-based screening action levels for the site (EPA Region 9 PRGs at the 10^{-6} risk level for all VOCs except TCE, and at the 10^{-5} risk level for TCE [0.53 mg/kg]) through agreement with the DEQ and EPA Region 10. A small volume of soil with TCE concentrations (1.4 and 12 mg/kg) that exceeded the action level could not be excavated due to an active water line; the remaining TCE-impacted soil was later treated in place by chemical oxidation as described below. The excavation was backfilled with compacted clean fill soil. Approximately 460 cubic yards of impacted soil were removed and disposed at off-base disposal facilities.

Chemical oxidation was completed to treat the soil that could not be excavated. Results indicate an adequate radius of influence and depth for the dispersion of the oxidant was obtained, and the subject impacted soil zone was adequately treated. Although confirmation soil sampling of the soils directly underneath the water line was precluded by the presence of the water line, the quantity and concentration of the sodium permanganate injected was more than adequate to effectively treat the subject soils, so the resultant TCE concentrations are well below the target TCE concentration (URS 2008c). Based on the results of the injection activities, the soil at Site SD-24 now meets UU/UE criteria.

4.2.8 Site SD-27 (Equipment Wash Rack)

An NTCRA was completed at Site SD-27, as dictated by the EE/CA (URS 2006d) and associated Action Memorandum (URS 2007c), to address soils and sediments impacted with PAHs as a result of historical site use by the Air Force. NTCRA activities were completed between March 12 and June 26, 2007. All NTCRA activities are documented in the Final Non-Time Critical Removal Action Completion Report for Sites LF-23, SD-27, and SS-29 (URS 2008a).

Based on the results of this NTCRA, Site SD-27 now meets UU/UE criteria. This site status and conclusion were documented in the ROD Amendment for OUs 1, 3, 5, and 6, which was signed by the Air Force, EPA Region 10, and DEQ in October 2010.

4.2.9 Site SS-29 (Drum Accumulation Pad)

An NTCRA was completed at Site SS-29, as dictated by the EE/CA (URS 2006d) and associated Action Memorandum (URS 2007d), to address soils impacted with PAHs as a result of historical site use by the Air Force. NTCRA activities were completed between March 12 and June 26, 2007. All NTCRA activities are documented in the Final Non-Time Critical Removal Action Completion Report for Sites LF-23, SD-27, and SS-29 (URS 2008a).

Based on the results of this NTCRA, Site SS-29 now meets UU/UE criteria. This site status and conclusion were documented in the ROD Amendment for OUs 1, 3, 5, and 6, which was signed by the Air Force, EPA Region 10, and DEQ in October 2010.

4.2.10 OU-3 (Basewide Regional Groundwater)

The LTM program was initiated in May 1996 in accordance with the Final Post-ROD Groundwater Monitoring Plan for OU-3 (Woodward-Clyde Consultants [WCC] 1996). LTM of the regional groundwater, perched groundwater, and bedrock vapor are currently conducted on a semiannual basis (quarterly basis for MW25, MW27, MW33, and MW35) in accordance with the 2007 through 2011 LTM Work Plan Addendum (URS 2007e), the Site SD-24 Remedy Optimization Work Plan Addendum (URS 2009h), and the installation of new well MW39. A summary of samples collected as part of the LTM program since 1996 is shown on Table 4-1.

Changes have been made to the LTM program since 1996 based on deficiencies identified in the 2001 FYR and in subsequent annual LTM reports. The most significant change to the LTM

program since the 2006 FYR includes the installation of one regional groundwater monitoring well with vapor ports (MW39) in January 2009.

Based on collective monitoring results, Site ST-11 is a potential threat to the regional groundwater.

4.3 SYSTEM OPERATION/OPERATION AND MAINTENANCE

4.3.1 Site LF-01 (Lagoon Landfill)

The primary O&M activities associated with Site LF-01 include LTM for site-related monitoring wells to monitor groundwater quality and ensure post-closure activities are being completed according to the post-closure plan (MACTEC 2002). The LTM program is summarized in Section 4.3.11.

In accordance with the specific ICs for Site LF-01 as described in the ESD for the ROD, signed October 13, 2006, for four OUs (OU-1, OU-3, OU-5, and OU-6) of MHAFB, an annual on-site inspection is completed for Site LF-01. During each inspection, the overall cap integrity including erosion, presence of burrowing animals, condition of drainage ditches, site drainage, and public access is reviewed for any compliance issues. Each inspection verifies compliance with the IC requirements, objectives, and controls in the ROD and ESD. A report discussing conditions and any recommendations required for maintenance and repairs is completed after each inspection for ICs. The most recent inspection report is included in Appendix A. Required follow-up actions on the 2-foot thick monofill cap are accomplished under the MHAFB environmental compliance program. Environmental restoration oversight on the monofill cap is of interest due to the fact that ERP Site LF-01 (four disposal trenches) resides under the cap.

4.3.2 Site LF-02 (B-Street Landfill)

The primary O&M activities associated with Site LF-02 include LTM for site-related monitoring wells to monitor groundwater quality and ensure annual landfill inspections of the LUCs are being completed in accordance with the ESD. The LTM program is summarized in Section 4.3.11.

In accordance with the specific ICs for Site LF-02 as described in the ESD for the 1993 ROD, signed October 13, 2006, an annual on-site inspection is completed for Site LF-02. During each inspection the general landfill condition is observed with particular attention paid to the fenced area surrounding the asbestos disposal trenches and whether any unauthorized activities (e.g., digging or dumping) are being done on the other areas (trench area, ash disposal area, and drum disposal area) under the LUCs. Each inspection verifies compliance with the IC requirements, objectives, and controls in the ROD and ESD. A report discussing conditions and any recommendations required for maintenance and repairs is completed after each inspection for ICs. The most recent inspection report is included in Appendix A.

4.3.3 Site FT-08 (OU-4) (Fire Training Area 8)

The Air Force is conducting performance monitoring and system operations according to the RAWP dated February 26, 2010 and approved by the EPA and DEQ. The primary activities associated with the performance monitoring include the following:

- Effluent monitoring - The combined effluent vapor from the exhaust stack are sampled bi-monthly and analyzed for COCs by EPA Method TO-15.
- Soil extraction well sampling - Vapor samples are collected from the SEWs to monitor COCs by EPA Method TO-15.
- Vapor monitoring well sampling - Vapor samples are collected from the VMWs to monitor COCs by EPA Method TO-15.
- Soil sampling - Direct push soil samples are collected at eight locations at Site FT-08. Six of the locations are next to the new vapor monitoring well locations to assess contamination site wide; one location is near SEW-9 to assess the TCE plume core; and one location is near bedrock extraction well (BEW)-1 to assess the area between the BTEX and TCE plumes. All direct push samples are analyzed for the COCs.

In addition, the primary activities associated with system operations include the following:

- SVE system – The system utilizes a trailer-mounted portable SVE system to apply a vacuum to soil through 10 shallow extraction wells (SEW-1 through SEW-10) installed in the soil at Site FT-08. Relative humidity and absolute humidity data are from the MHAFB Weather Station and onsite instruments at various times and are evaluated to determine if differences in humidity have an effect on the flow rates of the system. Vacuum responses are monitored in all available locations including vacuum monitoring clusters (soil and bedrock), unused SVE wells, and bedrock vapor monitoring ports in nearby monitoring well MW39.
- Air injection system - Operation of the air injection system includes inspection of the system and collection of field data twice per week. Periodic inspections include visual inspection of the blower unit and associated piping for defects, and verifying the discharge temperature is within operating range. Field data include temperature, pipe pressure, barometric pressure, and differential pressure. Air flow rates are computed from the field data.

Performance monitoring and system operations activities are presented and summarized in quarterly Remedial Action/Operation (RA/O) Technical Memoranda (URS 2009j, URS 2010d, URS 2010h, URS 2010k, and URS 2011c)

O&M costs include sampling and monitoring efforts, system maintenance, and data management and reporting. Estimated annual O&M costs over the operational life of the system are $103,700.

4.3.4 Site ST-11 (Flight Line Fuel Spill)

In accordance with the specific ICs for Site ST-11, as described in the ESD signed March 23, 2004 for the 1995 ROD, four operable units (OU-1, OU-3, OU-5, and OU-6) at MHAFB, a visual inspection is completed at least annually. The visual inspection is completed to verify compliance with the IC requirements, objectives, and controls in the ROD and the ESD; to determine violations of these controls; and to look for indications of tampering, incompatible use, and trespass. A report of the inspections is included in the LTM Annual Report each year including a statement as to whether all requirements, objectives, and controls in the ROD and ESD have been complied with and whether MHAFB's administrative procedures are effective.

The Air Force is completing performance monitoring and system operations according to the Final Remedial Action Report dated December 29, 2010 and approved by the EPA and DEQ. The primary activities associated with the performance monitoring include the following:

- Vapor monitoring well sampling - Vapor samples are collected from the MW20 and MW26 to monitor COCs by EPA Methods TO-14 and TO-15.
- Perched groundwater sampling – Perched groundwater samples will be collected over the operation life of the system, with one additional year of perched groundwater monitoring under the Basewide LTM program to monitor system effectiveness. The LTM program is summarized in Section 4.3.11. Semiannual groundwater sampling is completed at nine PZMWs located at Site ST-11 in accordance with the LTM program. The sampled wells sampled include: PZMW7, PZMW8, PZMW11, PZMW12, PZMW13, PZMW14, PZMW15, PZMW16, and PZMW17. The wells are sampled for BTEX (by EPA Method 8260b) and field parameters.
- Regional groundwater sampling – Performance monitoring will begin approximately 6 weeks after completion of *in situ* chemical oxidation injection activities. Bimonthly sampling of the PZMWs will continue after the three rounds of bimonthly performance monitoring are completed if RAOs have not been met and/or active remediation is still necessary. Once RAOs have been met and active remediation is no longer necessary, quarterly sampling will be performed as part of the Basewide LTM program to monitor site conditions. The data from the post-remedy monitoring will be evaluated by the FFA team to determine when and whether active monitoring of the perched groundwater can be concluded. Samples will be analyzed for VOCs by EPA Method 8260b. Sampling of groundwater and bedrock vadose zone vapors from nearby regional monitoring wells, MW20 and MW26, will also be completed.

In addition, the primary activities associated with system operations include active removal of contaminated subsurface vapors are completed by using a semi-permanent trailer-mounted blower-based VE system. In addition to subsurface vapors, the VE system is also targeted at removing residual phase non-aqueous phase liquid floating on the perched groundwater and residing in the fractured bedrock vadose zone. The system is connected to VEW-3 and VEW-6 through abandoned electrical conduits that enter into a vault at manhole number 1. Although these two VEWs are located adjacent to each other, they are screened at different vertical

intervals and together are expected to exert an influence over the entire vertical and lateral extent of site contamination.

Performance monitoring and system operations activities are presented and summarized in quarterly RA/O Technical Memoranda (URS 2010e URS 2010i, URS 2010l, and URS 2011d).

O&M costs include sampling and monitoring efforts, system maintenance, and data management and reporting. Estimated annual O&M costs over the operational life of the system are $183,300.

4.3.5 Site OT-16 (Munitions Burial Site)

No O&M activities are required for Site OT-16 due to the following:

- The site now meets UU/UE criteria and requires no further action.
- The site is no longer considered a potential threat to regional groundwater and should be removed from the list of sites that require groundwater LTM.

Barring any new information that indicates the contrary, the site does not require subsequent evaluation in future FYRs.

4.3.6 Site LF-23 (Solid Waste Disposal Area)

The primary O&M activities associated with Site LF-23 will include LTM for site-related monitoring wells to monitor groundwater quality and ensure annual inspections of the LUCs are completed in accordance with the ESD. The LTM program is summarized in Section 4.3.11.

An annual on-site inspection will be completed for Site LF-23 in accordance with the specific LUCs for Site LF-23 as described in the July 2011 ESD for the 1995 ROD. During each inspection, the general landfill condition will be observed with particular attention paid to the area with signage surrounding the coal ash and debris area and whether any unauthorized activities (e.g., digging or dumping) are being done under the LUCs and the warning signs will be inspected to ensure they are properly in place. Each inspection will verify compliance with the LUC requirements, objectives, and controls in the ROD and ESD. A report discussing conditions and any recommendations required for maintenance and repairs will be completed after inspection for LUCs.

4.3.7 Site SD-24 (Old Liquid Oxygen Loading Plant and Auto Hobby Shop)

No O&M activities are required for Site SD-24 due to the following:

- The site now meets UU/UE criteria and requires no further action.
- The site is no longer considered a potential threat to regional groundwater and should be removed from the list of sites that require groundwater LTM.

Barring any new information that indicates the contrary, the site does not require subsequent evaluation in future 5-year remedy reviews.

To support protection of the regional groundwater, bedrock vapor contamination will be addressed under OU-3, Basewide Regional Groundwater. The LTM program is summarized in Section 4.3.11.

4.3.8 Site SD-27 (Equipment Wash Rack)

No O&M activities are required for Site SD-27 due to the following:

- The site now meets UU/UE criteria and requires no further action.
- The site is no longer considered a potential threat to regional groundwater and should be removed from the list of sites that require groundwater LTM.

Barring any new information that indicates the contrary, the site does not require subsequent evaluation in future 5-year remedy reviews.

4.3.9 Site SS-29 (Drum Accumulation Pad)

No O&M activities are required for Site SS-29 due to the following:

- The site now meets UU/UE criteria and requires no further action.
- The site is no longer considered a potential threat to regional groundwater and should be removed from the list of sites that require groundwater LTM.

Barring any new information that indicates the contrary, the site does not require subsequent evaluation in future 5-year remedy reviews.

4.3.10 OU-3 (Basewide Regional Groundwater)

The primary O&M activities associated with the implemented remedial action (NRA with LTM) include LTM of regional groundwater, perched groundwater, and bedrock vadose zone vapors for OU-3. The LTM program was initiated in May 1996 in accordance with the Final Post-ROD Groundwater Monitoring Plan for OU-3 (WCC 1996). Changes have been made to the LTM program since 1996 based on deficiencies identified in the 2001 FYR and in subsequent annual LTM reports. The most significant change to the LTM program since the 2006 FYR includes the installation of one regional groundwater monitoring well with vapor ports (MW39) in January 2009.

Regional groundwater, perched groundwater, and bedrock vadose zone vapors are currently sampled in accordance with the 2007 through 2011 LTM Work Plan Addendum (URS 2007e), the Site SD-24 Remedy Optimization Work Plan Addendum (URS 2009h), and the installation of new well MW39. Groundwater is currently sampled from four regional groundwater monitoring wells on a quarterly basis, four regional groundwater monitoring wells on a semiannual basis, and seven wells on an annual basis. Sixteen wells have vapor monitoring ports

installed at multiple depths for a total of 49 sampling ports. Semiannual groundwater sampling is completed at nine perched zone monitoring wells located at Site ST-11. A summary of samples collected as part of the LTM program since 1996 is shown on Table 4-1. Historical perched groundwater, regional groundwater, and bedrock vapor analytical results are included in Tables 3-2 through 3-4.

In addition, six MHAFB production wells are sampled on a quarterly basis to meet requirements of the Safe Drinking Water Act. Recent results and the MCL for each analyte are included in Table 4-2. MCLs were obtained from the May 2011 Regional Screening Level Summary Table, which is included in Appendix B. VOCs, including TCE, have not been detected above MCLs in any of the MHAFB drinking water supply wells or perimeter wells.

Estimated annual O&M cost over the review period (2006 through 2011) are presented in Table 4-3 for LTM activities.

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TABLE 4-1
SUMMARY OF HISTORICAL SAMPLING SCHEDULE FOR GROUNDWATER AND VAPOR
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Well	May-96	Aug-96	Oct-96	Dec-96	Apr-97	Apr-98	Oct-98	Jan-99	Apr-99	Jul-99	Apr-00	May-01	Oct-01	Jun-02	Aug-02	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Apr-03	Jun-03
BPW1	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X	X	X	X	X	✓	X
BPW2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW4	✓	X	X	X	✓	X	X	X	✓	✓	✓	X	X	X	X	X	X	X	X	X	X	X	X
BPW5	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X	X	X	X	X	X	X
BPW8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW9	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X	X	X	X	X	✓	X
BPW11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW12	X	X	X	X	X	✓	✓	✓	✓	✓	X	X	X	X	X	X	X	X	X	X	X	X	X
MW3-2	X	X	X	X	X	X	X	X	X	X	X	✓	✓	✓	X	✓	X	X	X	X	X	*	X
MW7/MW7-2	✓	X	X	X	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	X	X	X	X	X	X	X	✓	X
MW11/MW11-2	✓	X	X	X	✓	✓	X	X	X	X	✓	✓	✓	✓	X	✓	X	X	X	X	X	✓	X
MW16/MW16-2	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	X	X	X	X	X	X	✓	X
MW17/MW17-2	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X	X	X	X	X	✓	X
MW18-2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW19	X	X	X	X	X	X	X	X	X	X	X	✓	✓	✓	X	✓	X	X	X	X	X	✓	X
MW20[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	✓	VP	VP	VP	VP	VP	✓	GW
MW24[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓
MW25[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	VP	VP	VP	VP	VP	✓	GW
MW26[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	VP	VP	VP	VP	VP	VP	✓	X
MW27[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW28[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW29[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW30[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW31[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW32[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW33[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW34[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW35[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW36[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW37[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW39[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PZMW7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X	X	X	X	X	✓	X
PZMW8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X
PZMW11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X
PZMW12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X
PZMW13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X
PZMW14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X
PZMW15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	D	D	X	X	X	X	X	✓	X
PZMW16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X
PZMW17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	D	D	X	X	X	X	X	D	X
VW1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	VP	VP	VP	VP	✓	✓	✓	X

✓ = Sample collected
[a] = Well includes vapor ports
— = Not installed at the time
D = Dry
BPW = base production well
FP = No sample, free product
GW = Groundwater sampled only
MW = monitoring well
PZ = perched zone
VP = Vapor port sampling only
VW = vapor well
X = not sampled
*A sample could not be collected in October from MW28 because the dedicated pump was inoperable. A sample was collected from MW28 on January 13, 2011.

TABLE 4-1
SUMMARY OF HISTORICAL SAMPLING SCHEDULE FOR GROUNDWATER AND VAPOR
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Well	Jul-03	Aug-03	Oct-03	May-04	Aug-04	Sep-04	Oct-04	Apr-05	Sep-05	Apr-06	Oct-06	Apr-07	Oct-07	Jan-08	Apr-08	Oct-08	Jan-09	Apr-09	Jul-09	Oct-09	Jan-10	Apr-10	Jul-10
BPW1	X	X	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW2	X	X	X	X	X	X	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW4	X	X	✓	✓	X	X	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW9	X	X	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BPW12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW3-2	X	X	✓	✓	X	X	✓	X	✓	X	✓	X	X	X	X	X	X	GW	X	X	X	X	X
MW7/MW7-2	X	X	✓	✓	X	X	✓	X	✓	X	X	GW	X	X	X	X	X	GW	X	X	X	X	X
MW11/MW11-2	X	X	✓	✓	X	X	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW16/MW16-2	X	X	✓	✓	X	X	✓	X	✓	X	X	X	X	X	X	X	X	GW	X	X	X	X	X
MW17/MW17-2	X	X	✓	✓	X	X	✓	X	✓	X	X	X	X	X	X	X	X	GW	X	X	X	X	X
MW18-2	X	X	✓	✓	X	X	✓	X	✓	X	X	X	X	X	X	X	X	GW	X	X	X	X	X
MW19	X	X	✓	✓	X	X	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW20[a]	✓	GW	✓	✓	X	X	✓	✓	✓	✓	✓	GW	✓	X	GW	✓	X	GW	X	✓	X	GW	X
MW24[a]	✓	✓	✓	✓	X	X	✓	✓	VP	✓	FP	GW	FP	✓	GW	FP	✓	GW	X	✓	X	✓	X
MW25[a]	✓	GW	✓	✓	X	✓	✓	✓	✓	✓	✓	GW	✓	X	GW	✓	X	GW	✓	✓	✓	✓	✓
MW26[a]	VP	X	✓	✓	X	X	✓	✓	✓	✓	✓	GW	✓	X	GW	✓	X	GW	X	✓	X	✓	X
MW27[a]	—	—	—	—	—	—	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	X	✓	✓	✓	✓	✓	✓
MW28[a]	—	—	—	—	—	—	✓	✓	✓	X	✓	X	✓	X	X	✓	X	X	X	✓	X	X	X
MW29[a]	—	—	—	—	✓	X	✓	✓	✓	✓	✓	X	GW	X	X	GW	X	X	X	GW	X	VP	X
MW30[a]	—	—	—	✓	X	X	✓	✓	✓	✓	✓	X	✓	X	X	✓	X	X	X	✓	X	X	X
MW31[a]	—	—	—	✓	X	X	✓	✓	✓	✓	X	X	X	X	GW	X	X	X	X	X	X	GW	X
MW32[a]	—	—	—	—	✓	X	✓	✓	✓	X	✓	X	✓	X	X	✓	X	X	X	✓	X	X	X
MW33[a]	—	—	—	—	—	—	✓	✓	✓	✓	✓	X	✓	X	X	✓	X	X	X	✓	GW	✓	✓
MW34[a]	—	—	—	✓	X	X	✓	✓	✓	X	✓	X	GW	X	X	GW	X	X	X	GW	X	VP	X
MW35[a]	—	—	—	—	✓	✓	✓	✓	✓	✓	✓	GW	✓	X	GW	✓	GW	GW	X	✓	✓	✓	✓
MW36[a]	—	—	—	✓	X	X	✓	✓	✓	✓	✓	X	GW	X	X	GW	X	X	X	X	X	VP	X
MW37[a]	—	—	—	—	—	—	—	—	—	✓	✓	X	✓	X	X	✓	X	X	X	✓	X	X	X
MW39[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	✓	X	✓	X
PZMW7	X	X	✓	✓	X	X	✓	✓	FP	FP	FP	FP	FP	X	✓	✓	X	✓	X	✓	X	✓	✓
PZMW8	X	X	✓	✓	X	X	FP	FP	✓	FP	FP	✓	FP	X	✓	✓	X	✓	X	✓	X	✓	✓
PZMW11	X	X	✓	✓	X	X	✓	✓	✓	✓	✓	✓	D	X	✓	D	X	✓	X	D	X	✓	✓
PZMW12	X	X	✓	✓	X	X	✓	X	X	FP	FP	FP	✓	X	✓	✓	X	✓	X	FP	X	✓	✓
PZMW13	X	X	✓	✓	X	X	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	X	✓	X	✓	X	✓	✓
PZMW14	X	X	✓	✓	X	X	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	X	✓	X	✓	X	✓	✓
PZMW15	X	X	✓	✓	X	X	FP	FP	FP	FP	FP	FP	FP	X	FP	FP	X	FP	X	FP	X	FP	✓
PZMW16	X	X	✓	✓	X	X	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	X	✓	X	✓	X	✓	✓
PZMW17	X	X	D	✓	X	X	✓	✓	✓	✓	✓	✓	D	X	D	D	X	D	X	D	X	✓	D
VW1	✓	X	✓	✓	X	X	✓	✓	✓	✓	✓	X	X	X	X	X	X	X	X	X	X	✓	X

✓ = Sample collected
[a] = Well includes vapor ports
— = Not installed at the time
D = Dry
BPW = base production well
FP = No sample, free product
GW = Groundwater sampled only
MW = monitoring well
PZ = perched zone
VP = Vapor port sampling only
VW = vapor well
X = not sampled
*A sample could not be collected in October from MW28 because the dedicated pump was inoperable. A sample was collected from MW28 on January 13, 2011.

TABLE 4-1
SUMMARY OF HISTORICAL SAMPLING SCHEDULE FOR GROUNDWATER AND VAPOR
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Well	Oct-10	Feb-11	Mar-11
BPW1	X	X	X
BPW2	X	X	X
BPW4	X	X	X
BPW5	X	X	X
BPW8	X	X	X
BPW9	X	X	X
BPW11	X	X	X
BPW12	X	X	X
MW3-2	X	X	X
MW7/MW7-2	X	X	GW
MW11/MW11-2	X	X	X
MW16/MW16-2	X	X	X
MW17/MW17-2	X	X	X
MW18-2	X	X	X
MW19	X	X	X
MW20[a]	✓	X	GW
MW24[a]	✓	X	GW
MW25[a]	✓	✓	✓
MW26[a]	✓	X	GW
MW27[a]	✓	✓	✓
MW28[a]	✓*	X	X
MW29[a]	GW	X	X
MW30[a]	✓	X	X
MW31[a]	X	X	X
MW32[a]	✓	X	X
MW33[a]	✓	✓	✓
MW34[a]	GW	X	X
MW35[a]	✓	✓	✓
MW36[a]	GW	X	X
MW37[a]	✓	X	X
MW39[a]	✓	X	✓
PZMW7	✓	X	✓
PZMW8	✓	X	✓
PZMW11	✓	X	✓
PZMW12	✓	X	✓
PZMW13	✓	X	✓
PZMW14	✓	X	✓
PZMW15	✓	X	✓
PZMW16	✓	X	✓
PZMW17	✓	X	✓
VW1	X	X	X

✓ = Sample collected
[a] = Well includes vapor ports
— = Not installed at the time
D = Dry
BPW = base production well
FP = No sample, free product
GW = Groundwater sampled only
MW = monitoring well
PZ = perched zone
VP = Vapor port sampling only
VW = vapor well
X = not sampled
*A sample could not be collected in October from MW28 because the dedicated pump was inoperable. A sample was collected from MW28 on January 13, 2011.

TABLE 4-2
SUMMARY OF BASE PRODUCTION WELL GROUNDWATER ANALYTICAL RESULTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Well Date Collected		Well 9 February 9, 2010		Well 12 February 9, 2010		Wells 2 & 4 (Manifold) February 16, 2010		Well 13 April 23, 2010		Well 13 August 3, 2010		Well 13 October 19, 2010		Well 11 December 7, 2010		Well 9 April 12, 2011	
	MCL	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Result	MDL	Result	MDL
Volatile Organic Compounds (µg/L)																	
1,1,1-Trichloroethane	200	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
1,1,2-Trichloroethane	5.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
1,1-Dichloroethene	7.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
1,2-Dichloroethane	5.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
1,2-Dichloropropane	5.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
1,2,4-Trichlorobenzene	70	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Benzene	5.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Bromodichloromethane	80	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Bromoform	80	ND	0.5	ND	0.5	1.3	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	1.5	0.5
Carbon Tetrachloride	5.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
cis-1,2-Dichloroethene	70	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Dibromochloromethane	80	ND	0.5	ND	0.5	1.0	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
p-Dichlorobenzene	75	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
o-Dichlorobenzene	600	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Ethylbenzene	700	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Monochlorobenzene	100	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Styrene	100	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Tetrachloroethene	5.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Toluene	1,000	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Total trihalomethanes	NA	ND	2	ND	2	2.3	2	ND	2	ND	2	ND	2	ND	2	ND	2
Trans-1,2-Dichloroethene	100	ND	0.5	ND	0.5	ND	1	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Trichloroethene	5.0	0.8	0.5	1.5	0.5	0.8	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	0.7	0.5
Vinyl chloride	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Xylenes - Total	10,000	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5

Notes:

-- = Sample was not analyzed for this constituent

MCL = maximum contaminant level

MDL = method detection limit

µg/L = microgram per liter

NA = not applicable

ND = not detected

TABLE 4-2
SUMMARY OF BASE PRODUCTION WELL GROUNDWATER ANALYTICAL RESULTS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Well Date Collected		Wells 2 & 4 (Manifold) April 19, 2011		Well 11 April 19, 2011		Well 12 April 19, 2011		Well 13 April 19, 2011	
	MCL	Result	MDL	Result	MDL	Result	MDL	Result	MDL
Volatile Organic Compounds (µg/L)									
1,1,1-Trichloroethane	200	ND	0.5	--		ND	0.5	--	
1,1,2-Trichloroethane	5.0	ND	0.5	--		ND	0.5	--	
1,1-Dichloroethene	7.0	ND	0.5	--		ND	0.5	--	
1,2-Dichloroethane	5.0	ND	0.5	--		ND	0.5	--	
1,2-Dichloropropane	5.0	ND	0.5	--		ND	0.5	--	
1,2,4-Trichlorobenzene	70	ND	0.5	--		ND	0.5	--	
Benzene	5.0	ND	0.5	--		ND	0.5	--	
Bromodichloromethane	80	ND	0.5	--		ND	0.5	--	
Bromoform	80	1.9	0.5	--		0.7	0.5	--	
Carbon Tetrachloride	5.0	ND	0.5	--		ND	0.5	--	
cis-1,2-Dichloroethene	70	ND	0.5	--		ND	0.5	--	
Dibromochloromethane	80	0.7	0.5	--		ND	0.5	--	
p-Dichlorobenzene	75	ND	0.5	--		ND	0.5	--	
o-Dichlorobenzene	600	ND	0.5	--		ND	0.5	--	
Ethylbenzene	700	ND	0.5	--		ND	0.5	--	
Monochlorobenzene	100	ND	0.5	--		ND	0.5	--	
Styrene	100	ND	0.5	--		ND	0.5	--	
Tetrachloroethene	5.0	ND	0.5	--		ND	0.5	--	
Toluene	1,000	ND	0.5	--		ND	0.5	--	
Total trihalomethanes	NA	2.6	2	--		ND	2	--	
Trans-1,2-Dichloroethene	100	ND	0.5	--		ND	0.5	--	
Trichloroethene	5.0	0.6	0.5	ND	0.5	1.6	0.5	ND	0.5
Vinyl chloride	2.0	ND	0.5	--		ND	0.5	--	
Xylenes - Total	10,000	ND	0.5	--		ND	0.5	--	

Notes:

-- = Sample was not analyzed for this constituent

MCL = maximum contaminant level

MDL = method detection limit

µg/L = microgram per liter

NA = not applicable

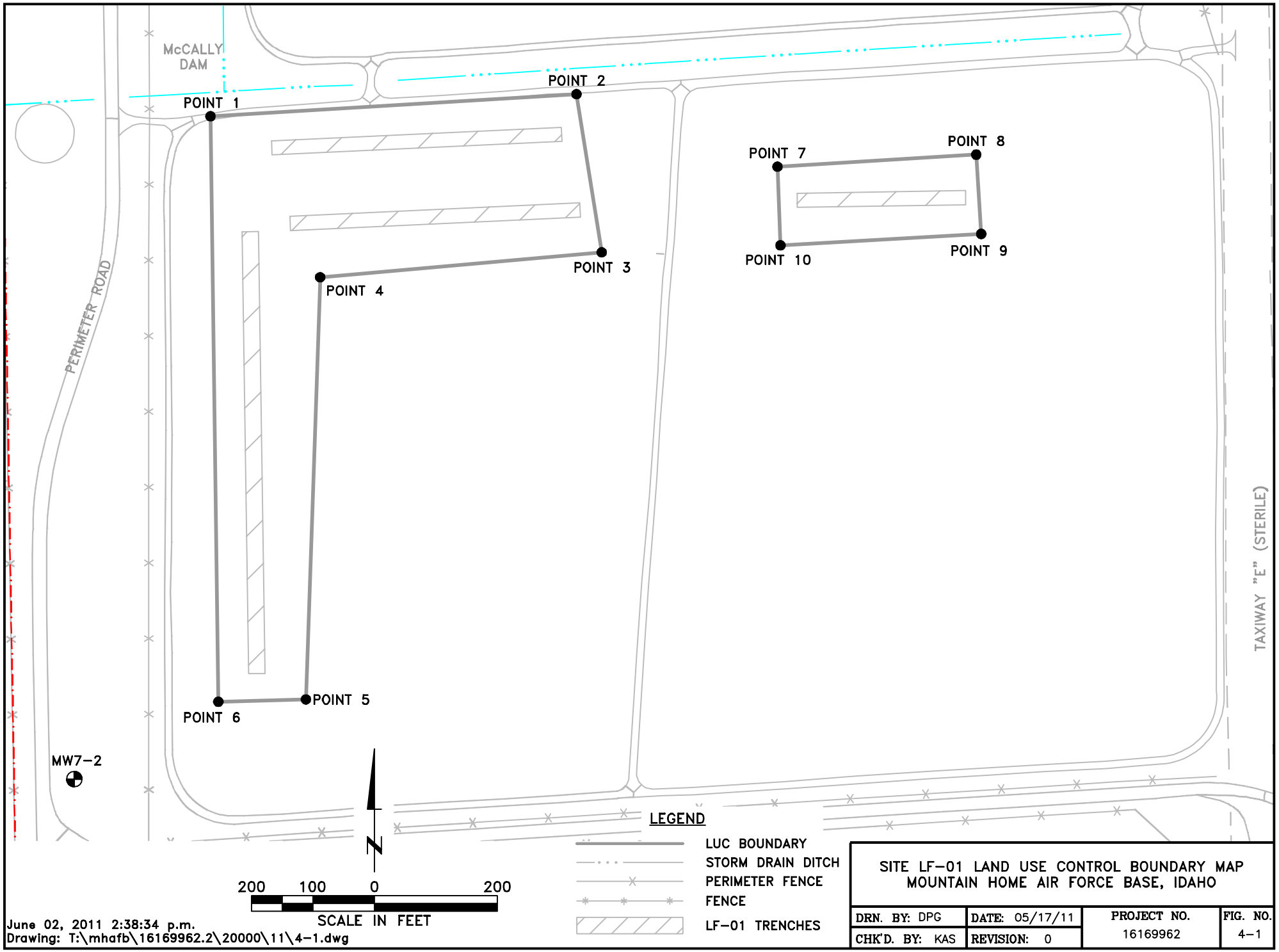
ND = not detected

TABLE 4-3
SUMMARY OF LTM AND O&M COST
CALENDAR YEARS 2006 THROUGH 2010
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Calendar Year	Regional Groundwater and Vapor LTM	Perched Groundwater LTM	Reporting	Total
2006	$89,101	$9,044	$14,777	$112,922
2007	$63,702	$4,818	$18,370	$86,890
2008	$67,875	$4,500	$19,573	$91,948
2009	$72,321	$5,000	$20,855	$98,176
2010	$76,984	$5,823	$22,200	$105,007
Total	$369,983	$29,185	$95,775	$494,944

Notes:
Perched groundwater LTM costs for 2008 and 2009 are estimated.
Costs do not include installation of MW39.

LTM = long-term monitoring
MW = monitoring well
O&M = operations and maintenance



SITE LF-01 LAND USE CONTROL BOUNDARY MAP
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 05/17/11	PROJECT NO. 16169962	FIG. NO. 4-1
CHK'D. BY: KAS	REVISION: 0		

June 02, 2011 2:38:34 p.m.
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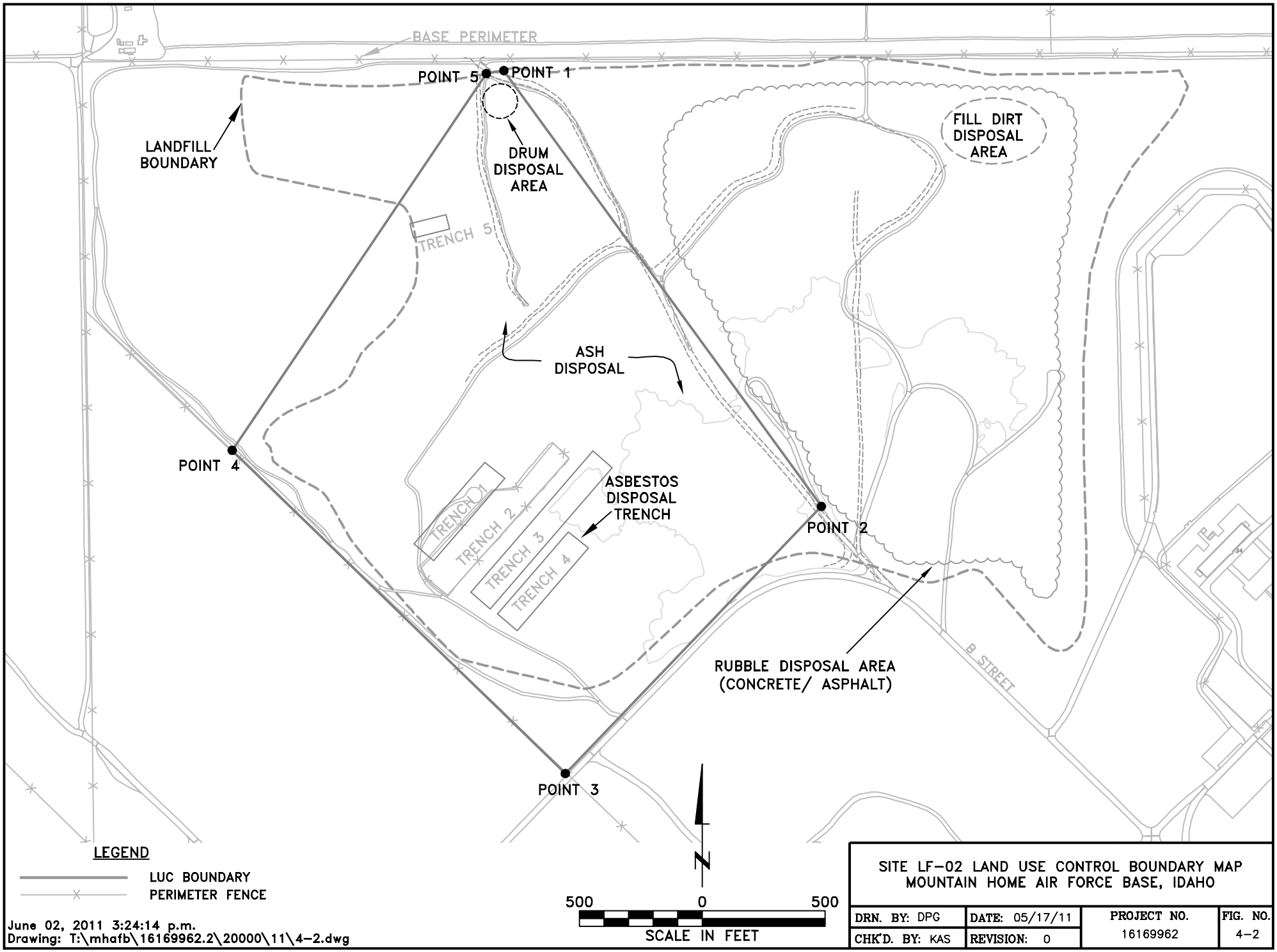
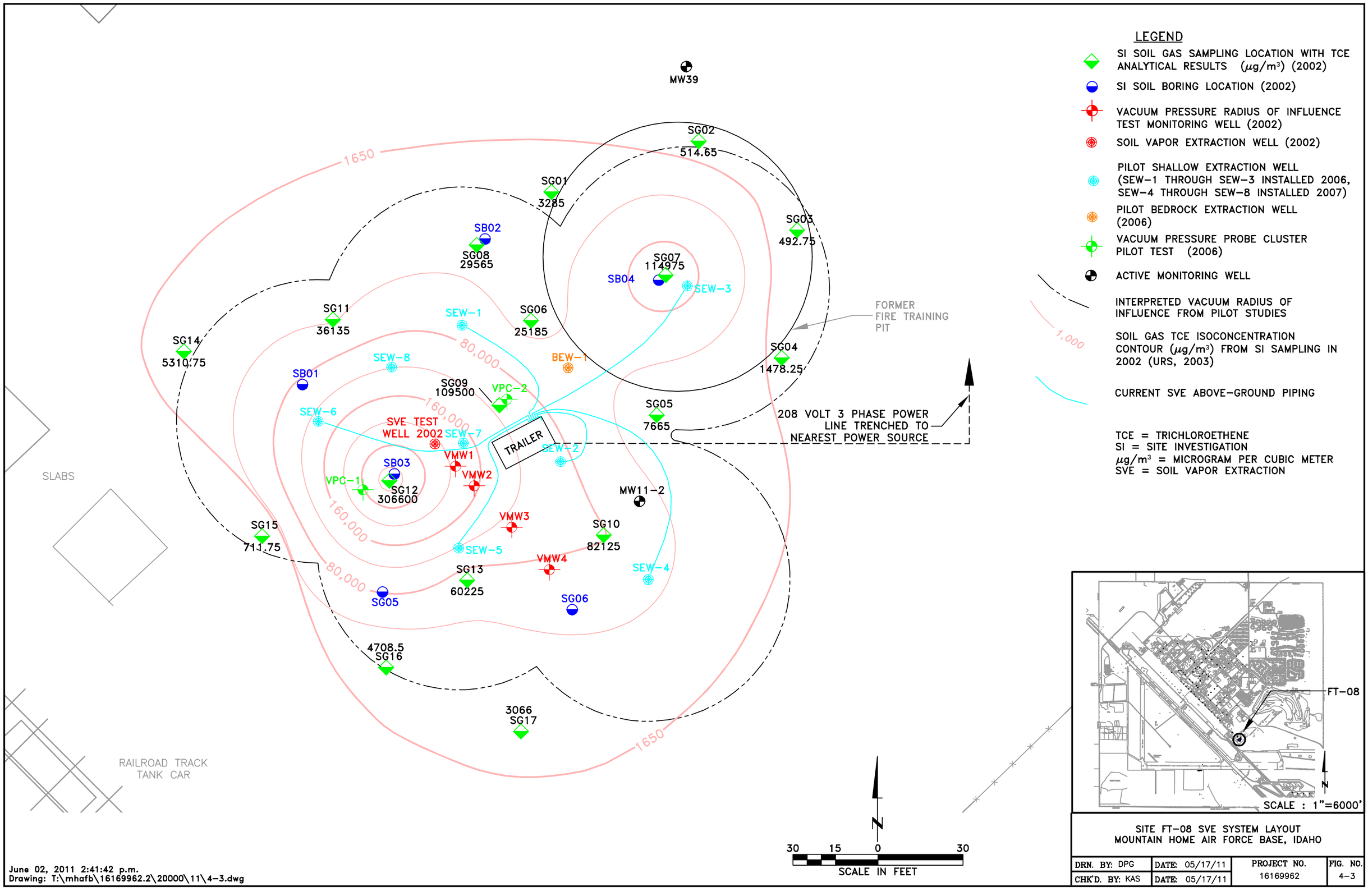


SITE LF-02 LAND USE CONTROL BOUNDARY MAP
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 05/17/11	PROJECT NO. 16169962	FIG. NO. 4-2
CHK'D. BY: KAS	REVISION: 0		



SITE FT-08 SVE SYSTEM LAYOUT
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 05/17/11	PROJECT NO. 16169962	FIG. NO. 4-3
CHK'D. BY: KAS	DATE: 05/17/11		

June 02, 2011 2:41:42 p.m.
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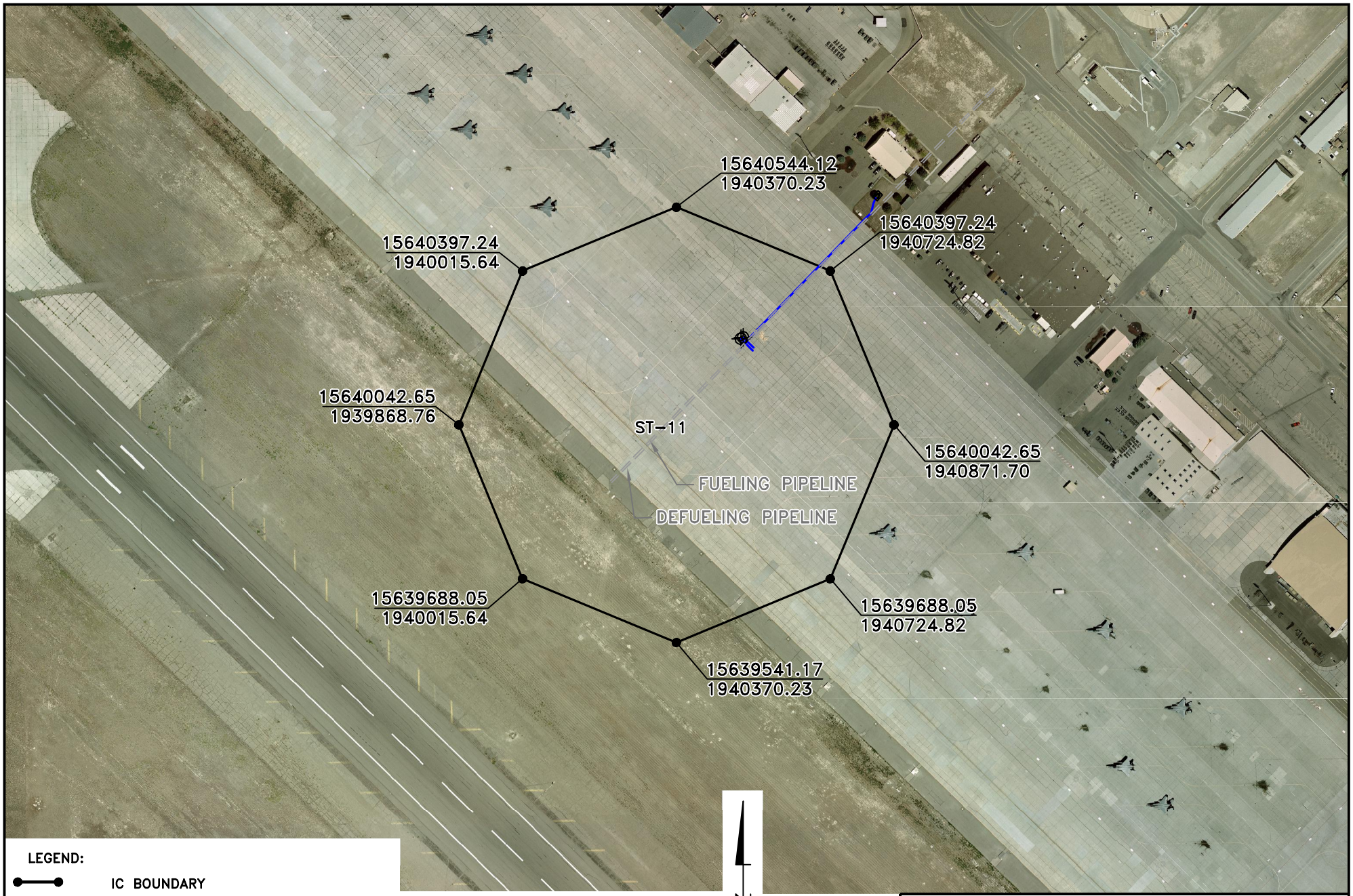


LEGEND:

IC BOUNDARY

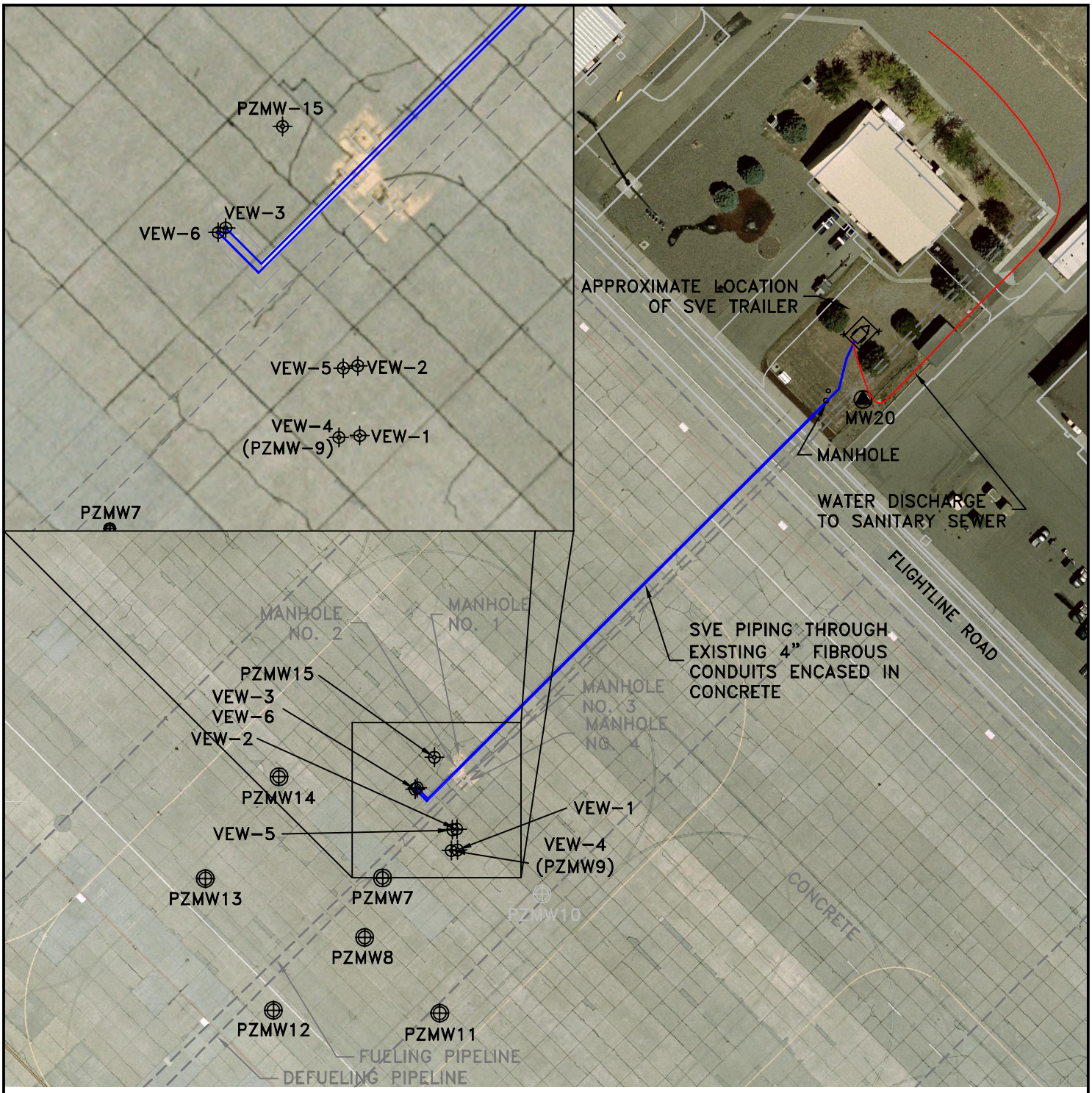
509901.47
470858.69 NORTHING AND EASTING COORDINATES (NAD83\HARN95)

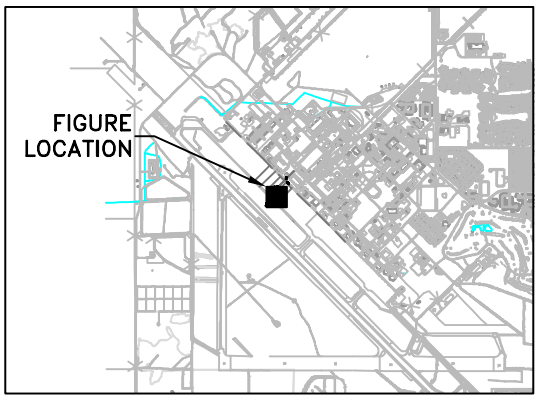
SOURCE: MHAFB GIS IMAGE FILES

June 02, 2011 3:25:16 p.m.
Drawing: T:\mhafb\16169962.2\20000\11\4-4.dwg

SITE ST-11 INSTITUTIONAL CONTROL BOUNDARY MAP MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 05/17/11	PROJECT NO. 16169962	FIG. NO. 4-4
CHK'D. BY: KAS	REVISION: 0		





LEGEND

PZMW8 — PERCHED ZONE MONITORING WELL

REGIONAL GROUNDWATER MONITORING WELL

VEW-1 — VAPOR EXTRACTION WELLS

FUELING/DEFUELING LINES

NOTE: GRAY SHADING INDICATES BORING /WELL IS PLUGGED AND ABANDONED

N

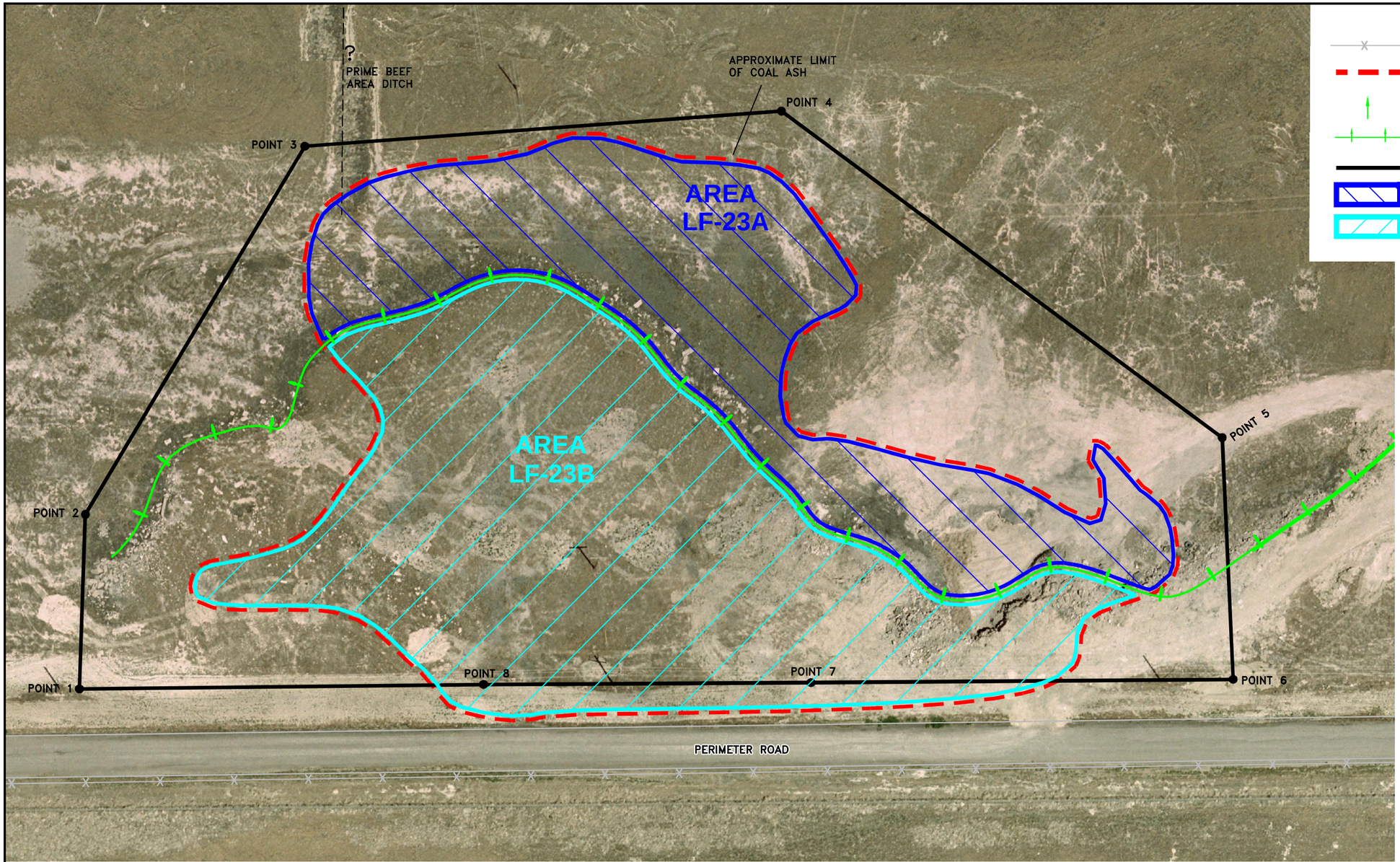
100 50 0 100

SCALE IN FEET

SITE ST-11 VE SYSTEM LAYOUT
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 05/17/11	PROJECT NO. 16169962	FIG. NO. 4-5
CHK'D. BY: KAS	DATE: 05/17/11		

June 02, 2011 3:28:39 p.m.
Drawing: T:\mhafb\16169962.2\20000\11\4-5.dwg

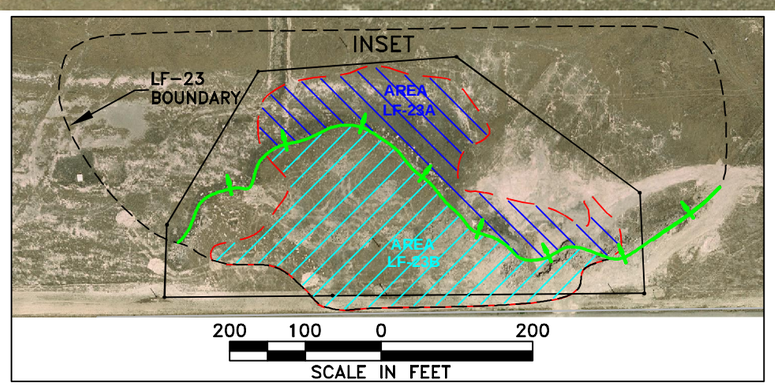


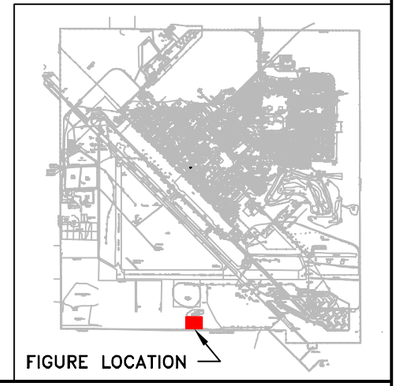
LEGEND:

- 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.





N

60 30 0 60
SCALE IN FEET

SITE LF–23
LAND USE CONTROL BOUNDARY MAP
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 05/17/11	PROJECT NO. 16169962	FIG. NO. 4–6
CHK'D. BY: KAS	REVISION: 0		

June 02, 2011 3:32:10 p.m.
Drawing: T:\mhafb\16169962.2\20000\11\4–6.dwg

The last Five-Year Review (FYR) of the 33 Environmental Restoration Program (ERP) sites was completed in 2006. Since 2006, recommendations for meeting protectiveness goals have been implemented for sites in which the selected remedy was determined inadequate (not protective), with the exceptions noted in Table 5-1.

As referenced in Tables ES-1, 5-1, and 9-1 of this report, Sites FT-04, FT-05, FT-06, FT-07, DP-09, OT-10, SD-12, ST-13, RW-14, OT-15, OT-16, DP-18, ST-22, SD-24 SD-25, SS-26, SD-27, SS-28, SS-29, SS-30, ST-31, ST-32, ST-34, ST-35, and ST-39 currently meet unlimited use/unrestricted exposure (UU/UE) criteria. Sites FT-08 and ST-11 are undergoing remedial actions. OU-3 is being proposed for further evaluation and remedial action. ST-38 was transferred from the OU-3 Fuel Sites in November 1994 and is being managed by State authorities. DEQ issued a letter dated July 21, 2011 stating no additional remediation or monitoring of petroleum hydrocarbon contamination related to the delineated area of the Tank 1A release in the POL yard is required at this time.

Table 5-1 summarizes the progress since the last review for each site, including status of previous recommendations, subsequent actions, and results of implemented actions.

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TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions	COC Concentrations Allowing UU/UE
LF-01 (OU-2)	• Although potential threats to human health and the environment have been minimized through the burial of lagoon sediment under a monofill and protective cover, the selected remedy at Site LF-01 (NRA with LTM) is not currently protective because the calculated risks for sediment exceed the protectiveness goal for both current occupational use (a carcinogenic risk not to exceed 1 x 10^{-4}) and UU/UE (a carcinogenic risk not to exceed 1 x 10^{-6}). In order for the remedy to be protective for UU/UE, the ROD must be amended to include institutional controls to prevent exposure to potentially contaminated site sediment. • Although federal MCLs are exceeded by modeled groundwater concentrations of compounds (aroclor-1254 and heptachlor epoxide) detected in sediment, neither PCBs nor pesticides have ever been detected in groundwater sampled from MW7-2 or MW31. At this time, Site LF-01 does not appear to pose a threat to the regional aquifer.	• As per recommendations provided for Site LF-01 during the previous review, an ESD was issued on September 29, 2006 for the 1995 ROD, which documents site-specific ICs for Site LF-01. The ICs ensure long-term protection of human health and the environment, ensure the integrity of the engineered containment (protective cover) for Site LF-01, and prevent inappropriate land use in the future. • MW7-2 continues to be sampled as part of the basewide groundwater LTM program.	• The current status of the site recommendations is complete. • The ESD limits the future uses of Site LF-01 to the current use (an inactive landfill) or future uses that do not pose unacceptable risk; prevents activities and land uses that disturb the protective cover; maintains the two-foot thickness and grade of the protective cover; and restricts drilling in and consumptive use of perched groundwater below Site LF-01. • Annual on-site inspections are completed at Site LF-01 as part of the LTM Program. During each inspection, the overall cap integrity, including erosion, presence of burrowing animals, condition of drainage ditches, site drainage, and public access are reviewed for any compliance issues. Inspections completed from 2006 through 2010 verified compliance with the IC requirements, objectives, and controls in the ROD and ESD. Results of annual inspections are included as part of the annual LTM reports. • Neither PCBs nor pesticides have ever been detected in groundwater sampled from MW7-2 or MW31. In addition, there have been no exceedances of Federal MCLs in groundwater sampled from MW7-2.	Not Applicable; Site soils do not meet UU/UE criteria
LF-02 (OU-2)	• The selected remedy at Site LF-02 (NRA with LTM) is not considered protective because the standard default RME HI exceeded 1.0 at the Ash Disposal Area, indicating a potential non-carcinogenic hazard. In order for the remedy to be protective in the long term for UU/UE, the ROD must be amended to include institutional controls to prevent exposure to potentially contaminated site soil.	• As per recommendations provided for Site LF-02 during the previous review, an ESD was issued on September 29, 2006 for the 1993 ROD, which documents site-specific LUCs for Site LF-02. The LUCs, which were implemented, ensure long-term protection of human health and the environment and prevent inappropriate land use in the future.	• The current status of the site recommendations is complete. • The ESD limits the future uses of Site LF-02 to the current use (an inactive landfill) or future uses that do not pose unacceptable risk and prevents activities and land uses that disturb the existing ground surface. • Annual on-site inspections are completed at Site LF-02 as part of the LTM Program. During each inspection the general landfill condition are observed with particular attention being paid to the fenced area surrounding the asbestos disposal trenches, and whether any unauthorized activities (e.g., digging or dumping) are being done on the other areas (trench area, ash disposal area, and drum disposal area) under the LUCs. Inspections completed from 2006 through 2010 verified compliance with the LUC requirements, objectives, and controls in the ROD and ESD. Results of annual inspections are included as part of the annual LTM reports.	Not Applicable; Site soils do not meet UU/UE criteria
FT-04 (OU-1)	• The selected remedy at Site FT-04 (NRA with LTM) is currently protective of human health and the environment because the site lies on vacant land and the current and near-term planned site use does not involve exposure to site soil. However, the remedy is not protective in the long-term for UU/UE since arsenic was detected in site soils at concentrations exceeding DEQ's background concentration. The remedy will not be considered protective until a non-time-critical removal action is completed, as recommended, for soils that contain arsenic above the DEQ background concentration.	• Additional fieldwork was completed at Site FT-04 in June 2006 in order to address regulatory concerns regarding potentially elevated concentrations of arsenic in site soils at two distinct areas of the site. A limited assessment was completed at two "hot spots" for arsenic in soils with arsenic above the DEQ established background concentration. Findings from the additional investigation indicated the higher arsenic concentrations were associated with deeper soils near basalt bedrock and were not due to site-related activities (URS 2006c). • The Summary of Soil Sampling and Arsenic Analysis, Site FT-04 Technical Memorandum (URS 2006c) recommended no further investigation, since the site does not present any unacceptable site-related human health risks.	• The current status of the site recommendations is complete. • Site FT-04 meets the criteria for UU/UE. The EPA concurred with this conclusion at the September 6, 2006 FFA Team meeting.	Arsenic in soils: 33 mg/kg (The arsenic concentration is consistent with background arsenic values near Site FT-04.)

TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions	COC Concentrations Allowing UU/UE
FT-08 (OU-4)	• The selected remedy at Site FT-08 (NRA with LTM) is not protective because the calculated RME excess cancer risk for the hypothetical on-site adult resident (3.9×10^{-5}) exceeds the UU/UE protectiveness goal (a carcinogenic risk not to exceed 1×10^{-6}). The remedy will not be considered protective at Site FT-08 until a full-scale remedial system is implemented, as planned, and results in closure of the site.	• As per recommendations provided for Site FT-08 during the previous review, a ROD Amendment was issued on September 18, 2009 for the 1992 ROD to amend the remedy of NRA with LTM with a full-scale remedial system. The amended remedy for OU-4, Site FT-08, is SVE (URS 2009j). • A pilot scale SVE system was in operation at Site FT-08 prior to implementation of the remedial action. A RAWP was issued in February 2010 (URS 2010a) to describe the construction of the remedial action selected (SVE). Modifications to the existing pilot system were completed in February 2010 in accordance with the Site FT-08 RAWP to optimize sub-surface vapor flow and overall contaminant extraction rates. Modifications included adding two shallow SEWs, 12 air injection wells, and 10 VMWs.	• The current status of the site recommendations is complete. • The site achieved construction complete status when the Final Remedial Action Report was issued on December 3, 2010. EPA and DEQ have determined that all remedial action construction activities were performed according to the RAWP. • Operation and monitoring of the full scale SVE system began on February 26, 2010. • The overall objective of the remedial action activities for Site FT-08 is to achieve regulatory SC with UU/UE. Based on performance monitoring, it is expected that cleanup levels for all soil and soil gas contaminants will be reached by October 2011.	Not Applicable; Site soils do not meet UU/UE criteria
ST-11 (OU-3)	• The selected remedy at ST-11 (Limited Action) is protective currently and in the near-term since institutional controls have been implemented pursuant to the ROD, as modified by the ESD. The Limited Action alternative is not protective in the long term with respect to potential releases of contamination from the perched aquifer to the regional aquifer. Passive oil recovery canisters are currently installed in PZMWs where LNAPL is present for the removal of product from the wells, and the completion of an OU-3 RI/BRA amendment and FFS has been recommended to consider active remediation of the site and a focused evaluation of an air-based VE system and sparge system to remediate subsurface soils, perched groundwater, and shallow bedrock. Institutional controls already implemented at ST-11 will ensure long-term protectiveness with respect to human exposure to the perched groundwater at ST-11.	• VE pilot studies (URS 2007g and 2009a) indicated VE technology is effective for VOC recovery in both shallow soils and deeper bedrock. • An FS and Proposed Plan were completed to evaluate remedial alternatives for fuel constituents in perched zone groundwater. The FS identified VE as the Preferred Alternative (URS 2009l). The Air Force issued a Proposed Plan for Site ST-11 in March 2010 (URS 2010b). • A ROD Amendment was issued on September 23, 2010 for the 1995 ROD to amend the remedy of Limited Action with a full-scale remedial system. The amended remedy for Site ST-11 is VE (URS 2010h). • A pilot study for VE was completed at Site ST-11 prior to implementation of the remedial action. Modifications to the existing pilot study system were completed in September and October 2009.	• The current status of the site recommendations is complete. • The ESD is reviewed and a visual inspection of Site ST-11 is completed twice a year as part of the LTM Program. The inspection is used to verify compliance with the IC requirements, objectives, and controls in the ROD and the ESD, to determine violations of these controls, and to look for indications of tampering, incompatible use, and trespass. The Air Force has met all requirements, objectives, and controls in the ROD and the ESD for Site ST-11 from 2006 through 2010. Results of annual inspections are included as part of the annual LTM reports. • EPA and DEQ have determined that all remedial action construction activities were performed in an acceptable manner. Operation and monitoring of the full scale VE system began in March 2010. • As part of the remedial action, chemical oxidant injection activities were completed at SiteST-11 in May 2011. Approximately 6,612 pounds of sodium persulfate and 11,000 pounds of sodium hydroxide were injected into PZMW7, PZMW8, PZMW12, and PZMW15 to treat the BTEX mass estimated to be present in perched groundwater. • The overall objective of the remedial action activities for Site ST-11 is to achieve regulatory SC with UU/UE. It is expected that cleanup levels for perched groundwater contaminants will be reached by October 2011.	Not Applicable; Site soils do not meet UU/UE criteria

TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions	COC Concentrations Allowing UU/UE
ST-13 (OU-3)	• The selected remedy (NRA with LTM) is no longer protective due to the presence of LNAPL on regional groundwater in MW24. As a result, a product recovery system was installed at MW24.	• Operation and maintenance activities are currently performed for the product recovery system at MW24 on a quarterly basis (URS 2007e). Measurable product is ephemerally present in the well for brief periods in the late fall. • Operation of the product recovery system at MW24 since December 2004 produced over 100,000 gallons of water with recovery of about 1 gallon of LNAPL. • Regional groundwater samples from MW24 historically showed elevated concentrations of JP-4 constituents. Maximum benzene concentrations were reported at 360 µg/L in April 2003. Benzene concentrations have steadily declined, with benzene detected below the MCL for the first time during the April 2007 sampling event at a concentration of 2 µg/L (URS 2009d). Benzene has been below the MCL since then. LNAPL was not observed in MW24 in 2009 or 2010. • An evaluation of the subsurface physical conditions at Site ST-13 (URS 2007f) has suggested the past presence of free product in MW24 was due to inadvertent introduction of product through the borehole drilled for MW24 as opposed to leakage from former Site ST-13 USTs.	• The current status of the site recommendations is complete. • Based on results of operating the product recovery system, that active remediation is no longer warranted for this site and the site meets UU/UE criteria. • Results of vapor sampling from MW24 indicate elevated concentrations of JP-4 fuel constituents, including benzene, are present in the deep vapor port (URS 2009d). • Continued LTM for regional groundwater and occurrence of LNAPL (including continued use, as necessary, of a passive fuel absorbent sock) at MW24 are the only actions needed at this time. Continued LTM will be addressed under OU-3.	Benzene in groundwater: <1 µg/L
OT-16 (OU-1, OU-6, OU-3 [LTM])	• The excess cancer risks calculated for future occupational receptors and future residential receptors exceed the protectiveness goal for UU/UE (a carcinogenic risk not to exceed 1 x 10^{-6}) and benzo(a)pyrene was detected at concentrations that exceed the EPA Region 9 residential PRG. Since the munitions debris/scrap and underlying soils contain PAHs at concentrations that prevent UU/UE, the selected remedy at Site OT-16 (NRA with LTM) is not considered protective. To ensure long-term protectiveness, a NTCRA should be completed, as recommended, for the munitions debris/scrap and site soils that contain PAHs at concentrations that prevent UU/UE, or that might pose a potential threat to groundwater.	• An EE/CA was completed for Site OT-16 in 2006 (URS 2006d). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants and the munitions scrap and debris. The EE/CA concluded that a NTCRA (excavation of selected soil, mechanical separation, and off-site disposal) was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the site (URS 2007a). • An NTCRA was completed at Site OT-16 to address the residual munitions related scrap material and soil impacted with PAHs as a result of historical site use by the Air Force. The soil and debris removal, disposal, and backfill activities were completed between August 5 and October 28, 2008 (URS 2009b).	• The current status of the site recommendations is complete. • Based on the results of this NTCRA, Site OT-16 now meets UU/UE criteria from the unexploded ordnance and chemical exposure standpoints.	Concentrations in soil: Benzo(a)anthracene: 0.31 mg/kg Benzo(a)pyrene: 0.34 mg/kg Benzo(b)flouranthene: 0.57 mg/kg Dibenz(a,h)anthracene: 0.13 mg/kg Indeno(1,2,3-c,d)pyrene: 0.2 mg/kg

TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions	COC Concentrations Allowing UU/UE
LF-23 (OU-1 OU3 [LTM])	• Because no risk assessment was conducted, there is uncertainty regarding whether PAH concentrations detected in soil above the EPA Region 9 residential PRGs pose an unacceptable risk to human health and the environment. Since institutional controls were not established in the ROD for Site LF-23, the selected remedy (NRA with LTM) may not be protective for UU/UE. To ensure long-term protectiveness, a NTCRA should be completed, as recommended, for the site debris and underlying soils that contain PAHs at concentrations that prevent UU/UE or that might pose a potential threat to groundwater. The selected remedy for Site LF-23 is currently protective of human health because the site is located on vacant land, and current and near-term use does not involve exposure to soil.	• An EE/CA was completed for Site LF-23 in 2006 (URS 2006d). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants and debris in Area LF-23. The EE/CA concluded that a NTCRA was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the site (URS 2007b). • A NTCRA was completed at Site LF-23 between March 12 and June 26, 2007 to address landfill debris and soils impacted with PAHs. Based on sampling following the NTCRA excavation, some areas of Site LF-23 were still not suitable for UU/UE and further characterization was required (URS 2008a). • An extensive deposit of coal ash was discovered during the initiation of the NTCRA, which was documented in a technical memorandum (URS 2007l). • A work plan addendum to address the coal ash at Site LF-23 and the vicinity was completed (URS 2009i). • Additional work was completed in September 2009 to define the nature and extent of contamination of the coal ash and complete a site-specific risk assessment to estimate the potential risks to human health posed by constituents of the coal ash deposit south of and overlapping the historical ERP site boundary for Site LF-23 (URS 2010f). • An ESD was signed on July 8, 2011 for the 1995 ROD, which documents site-specific LUCs for Site LF-23. The ICs ensure long-term protection of human health and the environment and prevent inappropriate land use in the future.	• The current status of the site recommendations is complete. • The ESD limits 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. The ESD also prevents activities and land uses that disturb the existing ground surface.	Not Applicable; Site soils do not meet UU/UE criteria

TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions	COC Concentrations Allowing UU/UE
SD-24 (OU-1, OU-6, OU-3 [LTM])	• Approximately three cubic feet of TCE-contaminated soil is present along the east wall of the previous Site SD-24 excavation near the hydrant thrust block at concentrations above the EPA Region 9 residential PRG. Therefore, the selected remedy for Site SD-24 (NRA with LTM) is not protective currently or in the long-term for UU/UE. Current plans call for the removal or remediation of the remaining contaminated soil at Site SD-24. In addition, uncertainties associated with potential exposure pathways for the inhalation of vapors via indoor air and/or ambient air exist due to bedrock vadose zone vapors. A protectiveness determination with respect to potential exposure to contaminated vapors cannot be made at this time. A vapor intrusion sampling evaluation is currently underway to determine whether a risk to human health and the environment exists as a result of the contaminated bedrock vapors impacting indoor and or ambient air.	• Bedrock vadose zone vapor samples collected from MW27 exhibited the highest vapor concentrations on MHAFB for TCE and other VOCs (maximum concentration of 130,000 µg/m^3 TCE). A bedrock vapor to indoor air intrusion sampling and risk evaluation concludes there are no unacceptable human health risks from this pathway (URS 2007k). • The Final OU-3 RI Report Amendment (URS 2008b) identified Site SD-24 as an ERP site still considered a potential or likely threat to regional groundwater quality that warrants remedial action. The rationale regarding the need for remedial action was based on data signifying the site is the ultimate source of the vapor-phase chlorinated VOCs in the fractured basalt vadose zone. • Injection of a chemical oxidizing agent (sodium permanganate) was completed on January 15 and 16, 2008 to treat the small amount of remaining TCE-impacted soil present below an active water line at the source area. (URS 2008c). • VE pilot studies and Pilot Remedy Optimization Testing (URS 2008d) indicated VE is an effective remedial candidate for the shallow bedrock to depths of 50-feet at the source area, with initial indications that high mass removal rates can be achieved. • Site SD-24 is considered the most likely source for bedrock vadose zone VOC vapors and TCE contamination to regional groundwater. • The ROD Amendment for OUs 1, 3, 5, and 6 (URS 2010h) concluded the impacted soil source is now removed from the site and soil meets UU/UE criteria. The ROD Amendment also indicated the need for further active remediation of the fractured bedrock at Site SD-24 as a full-scale remedial action was not known until the additional data obtained from the pilot study VE testing could be fully evaluated. • An SD-24 Remedy Optimization Work Plan Addendum (URS 2009h) was prepared to address additional Site SD-24 activities associated with the continued operation of the VE system and collection of more frequent LTM data. • The VE system operated until August 2010 with comprehensive results provided in the Final SD-24 Data Report (URS 2011f). • During a meeting on January 26, 2011, the FFA team agreed to close Site SD-24 because site soils meet UU/UE criteria. The FFA team also agreed to continue VE activities under OU-3 to address residual contamination in bedrock vadose zone vapors. • To support protection of the regional groundwater, bedrock vapor contamination will be addressed and concluded under OU-3, Basewide Regional Groundwater.	• The current status of the site recommendations is complete. • Based on the results of the injection activities, the EPA and DEQ concurred with this conclusion at the January 26, 2011 FFA Team meeting that the soil at Site SD-24 now meets UU/UE criteria. • Contamination in bedrock vadose zone vapors will be addressed and concluded under OU-3, Basewide Regional Groundwater.	TCE in soil: < 0.53 mg/kg
SD-27 (OU-1, OU-6, OU-3 [LTM])	• The selected remedy at SD-27 (NRA and LTM) is not considered protective because the excess cancer risk calculated for hypothetical residential exposures to site soils (3 x 10^{-4}) exceeds the protectiveness goal for UU/UE (a carcinogenic risk not to exceed 1 x 10^{-6}). Furthermore, site soils contain PAH concentrations above EPA Region 9 residential PRGs. In order for the remedy to be protective in the long-term, a NTCRA should be completed, as recommended, for site soils that contain PAHs at concentrations that prevent UU/UE, or that might pose a potential threat to groundwater.	• An EE/CA was completed for Site SD-27 in 2006 (URS 2006d). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants and the munitions scrap and debris. The EE/CA concluded that a NTCRA was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the site (URS 2007c). • An NTCRA was completed at Site SD-27 between March 12 and June 26, 2007 to address soils and sediments impacted with PAHs as a result of historical site use by the Air Force.	• The current status of the site recommendations is complete. • Based on the results of this NTCRA, Site SD-27 now meets UU/UE criteria.	Concentrations in soil: Benzo(a)anthracene: 84 mg/kg Benzo(a)pyrene: 12 mg/kg Benzo(b)flouranthene: 20 mg/kg J Dibenz(a,h)anthracene: 18 mg/kg Indeno(1,2,3-c,d)pyrene: 81 mg/kg

TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions	COC Concentrations Allowing UU/UE
SS-29 (OU-1, OU-6, OU-3 [LTM])	• The selected remedy at SS-29 (NRA and LTM) is not considered protective because the excess cancer risk calculated for hypothetical residential exposures to site soils (2×10^{-4}) exceeds the protectiveness goal for UU/UE (a carcinogenic risk not to exceed 1×10^{-6}). Furthermore, site soils contain PAH concentrations above EPA Region 9 residential PRGs. In order for the remedy to be protective in the long-term, a non-time-critical removal action should be completed, as recommended, for site soils that contain PAHs at concentrations that prevent UU/UE, or that might pose a potential threat to groundwater.	• An EE/CA was completed for Site SS-29 in 2006 (URS 2006d). The purpose of the EE/CA was to evaluate potential remedial alternatives that could address the site contaminants and the munitions scrap and debris. The EE/CA concluded that a NTCRA was the most appropriate remedy for the site. This decision was documented in the Action Memorandum for the site (URS 2007d). • An NTCRA was completed at Site SS-29 between March 12 and June 26, 2007 to address soils impacted with PAHs as a result of historical site use by the Air Force.	• The current status of the site recommendations is complete. • Based on the results of this NTCRA, Site SS-29 now meets UU/UE criteria.	Concentrations in soil: Benzo(a)pyrene: 0.37 mg/kg Benzo(b)flouranthene: 0.63 mg/kg Dibenz(a,h)anthracene: 0.10 mg/kg
ST-38 (OU-3 Fuel Sites)	• Due to the presence of LNAPL in perched water as a result of a JP-8 release from Tank 1, Site ST-38 is not considered currently protective of human health and the environment. Completion of the on-going investigation and remediation of the POL release at Tank 1A is necessary to assess the long-term protectiveness.	• Tank 1A was removed at Site ST-38 between July 30, 2007 and September 18, 2007. Impacted soil was removed and confirmation sampling was completed. Soil analytical results showed no BTEX detections and two locations with PAHs above the reporting limit (URS and Weston Solutions, Inc. 2008). • No measurable LNAPL was present in any well during the 2nd Quarter 2010 sampling round. Low levels of PAHs and BTEX have been detected in perched groundwater during quarterly groundwater monitoring events (URS and Weston Solutions, Inc. 2010). • Quarterly groundwater sampling and LNAPL removal was completed from October 2003 to October 2010 as recommended by the Corrective Action Plan (Washington Group, Inc. et al. 2003). • A RBCA evaluation was completed in 2011 to evaluate site conditions. According to the evaluation, and with DEQ concurrence in a letter dated July 21, 2011, no further remediation or monitoring is required (URS 2011g).	• The current status of the site recommendations is complete. • Based on results of the RBCA evaluation, further monitoring and remediation is not required, as agreed to by DEQ in a letter dated July 21, 2011.	Not Applicable; UU/UE criteria do not apply to this site since it was managed under RCRA.
OU-3	• The remedy for OU-3 basewide groundwater (NRA and LTM) is no longer considered protective because TCE concentrations detected in monitoring wells MW25 and MW35 exceed the federal MCL and LNAPL has been encountered in MW24. However, an exposure pathway that could result in unacceptable risks associated with the exposure to or the ingestion of contaminated groundwater does not currently exist since regional groundwater samples from base production wells have not reported COCs above applicable federal MCLs. Another factor which could also compromise the protectiveness of the selected remedy for OU-3 is the presence of significant vadose zone VOC vapors (of primary concern TCE) which suggest a possible link to gas phase transport of VOC constituents from soil sources to regional groundwater. Poorly understood mechanisms could allow contaminant dissolution into groundwater to occur and to be acting as a continuing source for low-level contaminant migration from historical soil sources to regional groundwater. • The long-term protectiveness of the remedy for OU-3 will be verified during the continued monitoring of the regional groundwater, which is currently scheduled for the next six years.	• Additional wells with vapor ports were installed for monitoring. MW37, installed in 2006 includes three discrete vapor monitoring ports and MW39, installed in 2009 includes four (URS 2009d). • Continued monitoring of the regional groundwater is being completed through the LTM program. Groundwater is currently sampled from four regional groundwater monitoring wells on a quarterly basis, four regional groundwater monitoring wells on a semiannual basis, and seven wells on an annual basis. Sixteen wells have vapor monitoring ports installed for a total of 49 sampling ports. Semiannual groundwater sampling is completed at nine perched zone monitoring wells located at Site ST-11. • Residual contamination is present in bedrock vadose zone vapors in the northwest portion of MHAFB. To support protection of the regional groundwater, action is recommended under OU-3 to expand the current vapor extraction system in the northwest portion of MHAFB to provide additional source control in the bedrock vapor. • Implementation of ICs and LUCs in order to protect human health due to potential TCE presence in groundwater from residual TCE vapor in bedrock.	• The current status of the site recommendations is continued in the next FYR. • Since the 1995 ROD, LTM of the regional groundwater has routinely detected TCE above its MCL (5.0 µg/L) in three monitoring wells. Consistent with past results, widespread low-level TCE has been detected at eight other regional groundwater well locations during the LTM sampling events. In addition, VOCs, including TCE, have not been detected above MCLs in any of the MHAFB drinking water supply wells or perimeter wells during any sampling event. Historical regional groundwater TCE analytical results are provided in Section 3.4.13. • TCE concentrations in bedrock vapors have been monitored since September 2002. Vapor ports in monitoring wells MW25, MW27, MW33, and MW35 have detected the highest TCE concentrations at MHAFB. All these wells are in the northwest portion of MHAFB, near Site SD-24. Historical TCE concentrations in bedrock vapors are provided in Section 3.4.13.	Not Applicable; Site groundwater does not meet UU/UE criteria

Notes:

This table includes only those sites from the 2006 Five-Year Remedy Review that included a recommendation for further action or evaluation as part of the protectiveness statement.

TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Notes:

BRA = Baseline Risk Assessment
COC = chemical of concern
DEQ = Idaho Department of Environmental Quality
EE/CA = Engineering Evaluation/Cost Analysis
EPA = Environmental Protection Agency
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
FFA = Federal Facility Agreement
FS = Feasibility Study
FFS = Focused Feasibility Study
HI = hazard index
IC = institutional control
JP-4 = Jet Propulsion Fuel Type 4
LTM = long-term monitoring
LNAPL = light non-aqueous phase liquid
LUC = land use control
MCL = maximum contaminant level
mg/kg = milligram per kilogram
µg/L = microgram per liter
µg/m^3 = microgram per cubic meter
MHAFB = Mountain Home Air Force Base
MW = monitoring well
NRA = no remedial action
NTCRA = non-time critical removal action
OU = Operable Unit
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyls
POL = petroleum, oil and lubricants
PRG = preliminary remediation goal
PZMW = perched zone monitoring well
RAWP = Remedial Action Work Plan
RCRA = Resource Conservation and Recovery Act
RI = Remedial Investigation
RME = reasonable maximum exposure
ROD = Record of Decision
SC = site closure
SEW = soil extraction well
SVE = soil vapor extraction
TCA = trichloroethane
TCE = trichloroethene
URS = URS Group, Inc.
UST = underground storage tank
UU/UE = unlimited use/unlimited unrestricted
VE = vapor extraction
VOC = volatile organic compound
VMW = vapor monitoring well

6.1 ADMINISTRATIVE COMPONENTS

The third Five-Year Review (FYR) began with the Federal Facility Agreement (FFA) team members' monthly status call in September 2010. The FFA team members agreed the general table of contents and format of the document should follow that used for the 2006 Five-Year Review. The preparation of the FYR document began with data gathering and information assessment in September 2010.

The review team is comprised of environmental managers from the 366th Environmental Flight, Headquarters Air Combat Command (ACC), Idaho Department of Environmental Quality (DEQ), U.S. Environmental Protection Agency (EPA) Region 10, and Air Force Center for Engineering and the Environment (AFCEE) and their contractors.

6.2 COMMUNITY INVOLVEMENT

The Air Force will notify the community of completion of the FYR through a notice published in the Mountain Home Air Force Base (MHAFB) newspaper, the Mountain Home News, and the Idaho Statesman and via a letter sent to the Restoration Advisory Board (RAB) members.

Results of the FYR will be made available to the public through the following:

- Report presentation to the MHAFB RAB
- Placement in the administrative record repository at the 366th Environmental Flight, Mountain Home Air Force Base, Idaho

The RAB, initially named the Technical Review Committee, was formed in March 1992, adopting a charter to require quarterly meetings. In addition to Air Force, EPA, and Idaho regulators, the RAB includes the Mountain Home City Manager, an Elmore County Commissioner, and a representative of the Governor of Idaho.

A notice will be sent to a local newspaper that the FYR has been completed and that there will be a public meeting.

6.3 DOCUMENT REVIEW

This FYR consisted of a review of relevant documents including the following:

- EPA's Comprehensive FYR Guidance Document (Office of Solid Waste and Emergency Response [OSWER] Directive 9355.7-03B-P [EPA 2001])
- Explanation of Significant Differences (ESD) for LF-01 (MHAFB 2006a)
- ESD for LF-02 (MHAFB 2006b)
- Technical Memorandum, Summary of Soil Sampling and Arsenic Analysis – Site FT-04 (URS 2006c)

- Final Non-Time Critical Removal Action (NTCRA) Engineering Evaluation/Cost Analysis (EE/CA) (URS 2006d)
- Action Memorandum for the Site OT-16 NTCRA EE/CA (URS 2007a)
- Action Memorandum for the Site LF-23 NTCRA EE/CA (URS 2007b)
- Action Memorandum for the Site SD-27 NTCRA EE/CA (URS 2007c)
- Action Memorandum for the Site SS-29 NTCRA EE/CA (URS 2007d)
- Technical Memorandum ST-13 Rock Evaluation (URS 2007f)
- Final Vapor Extraction Pilot Study Technical Report for Flightline Hydrant System Leak/Fuel Spill (ST-11) (URS 2007g)
- Final Vapor Extraction Pilot Study Technical Report for Fire Training Area 8 (URS 2007i)
- Final 2006 Long-Term Monitoring (LTM) Annual Report (URS 2007j)
- Final Vapor Intrusion to Indoor Air Sampling/Evaluation Report (URS 2007k)
- Technical Memorandum, LF-23 Site Status and Coal Ash (URS 2007l)
- Final NTCRA – Environmental Restoration Program (ERP) Sites LF-23, SD-27, and SS-29 (URS 2008a)
- 4th Quarter 2007 Report for the Corrective Action Related to Tank 1A (URS and Weston Solutions, Inc. 2008)
- Final OU-3 Remedial Investigation (RI) Report Amendment (URS 2008b)
- Technical Memorandum for Injection of Chemical Oxidant into Site Soils for ERP Site SD-24 (URS 2008c)
- Technical Memorandum Report – VEW-3 & VEW-6 SVE Pilot Test Results, Site ST-11. (URS 2009a)
- Final Non-Time Critical Removal Action Report for ERP Site OT-16 (URS 2009b)
- Final 2008 LTM Annual Report (URS 2009d)
- Final FT-08 Feasibility Study (FS)(URS 2009e)
- Proposed Plan, Site FT-08 (URS 2009f)
- Record of Decision (ROD) Amendment for Operable Unit 4, ERP Site Fire Training Area 8 (FT-08) Soil (URS 2009k)
- Final ST-11 FS (URS 2009l)
- Proposed Plan, Operable Units 1, 3, 5, and 6, Lagoon Landfill, and Underground Storage Tank (UST) at Fire Training Area 8 (URS 2010b)

- ROD Amendment, Operable Units 1, 3, 5, and 6 with a Proposed Remedy for Site ST-11 (Operable Units 1, 3, 5, and 6, Lagoon Landfill, and UST at Fire Training Area 8) (URS 2010g)
- Final LF-23 Coal Ash Characterization and Risk Assessment Report (URS 2010d)
- ESD for LF-23 (URS 2011f)

6.4 DATA REVIEW

Data presented in the documents listed in Section 6.3 were reviewed during this FYR. Findings from pre-ROD activities and actions implemented since the 2006 FYR are summarized by site in Section 3.4 (Basis for Taking Action/Selected Remedy) and Table 5-1 in Section 5.0 (Progress Since Last FYR), respectively. Data reviewed for the remaining sites have been summarized in previous sections of this report, with more detail included below for those topics which are broader in nature.

Fuel Management Program

There have been no significant changes to the MHAFB's fuel management program since it was presented in the Final 2001 FYR Report (Foothill Engineering Consultants [FEC] 2001), which discusses fuel operations including leak detection systems, inventory controls, secondary containment, and cathodic protection. The fuel inventory system for MHAFB includes procedures, requirements, and information contained in the following documents:

- Air Force Manual 23-110 Volume 1, Part 3
- Department of Defense (DoD) Manual 4140.25-M (general guidelines for inventory control procedures and accountability for fuel stored on MHAFB are outlined in the DoD 4140 25-M, Volume II, Chapter 10 on bulk fuel inventory accounting for all products owned by Defense Logistics Agency [DLA]).
- Memorandum on Fuel Inventory Control Information for August 1999 to the Present by the Mountain Home AFB Fuels Management Flight (366 LRS/LGRF 2005).

Fuel releases identified since the previous FYR and changes to the fuel management program are presented in the following discussion.

MHAFB continues to operate the leak detection program initiated in 1995, which includes a tracer tightness test. The Tracer Tightness Leak Test is performed for the Petroleum, Oil, and Lubricants Hydrant Piping System and USTs. In addition, tracer tests are performed on the primary fuel lines, which includes the Holly Corporation Pipe Line (jet propellant 8 [JP-8]) that runs to the Bulk Storage Area and the fuel line that runs along A-Street to refueling hydrants 1 through 12 located along the taxiway. The pipeline is tested quarterly, and the five USTs are tested annually. Findings of the Tracer Tightness Leak Tests are provided in reports (quarterly for the pipeline and annually for the tanks) prepared by Tracer Researcher Corporation.

During 2nd quarter 2006 integrity testing of 23,280 feet of JP-8 hydrant pipeline and 1,640 feet of motor gasoline/diesel pipeline using a Tracer Tight leak detection test, a leaking camlock on the low point drain next to Probe 1271 (northwest end of Building 1317) was discovered on the JP-8 pipeline. This leak was repaired. Approximately one cup of JP-8 was estimated to have been released as a result of the defective camlock. A new camlock was installed in July 2006. Leaks were not detected in the JP-8 pipeline during the 3rd quarter test. More stringent inspection procedures for low point drains were instituted as a result of the leak (URS 2007j).

Tank 1A was removed at Site ST-38 between July 30, 2007 and September 18, 2007. Impacted soil was removed and confirmation sampling was completed. Soil analytical results showed no benzene, toluene, ethylbenzene, and xylenes (BTEX) detections and two locations with polynuclear aromatic hydrocarbons (PAHs) above the reporting limit (URS and Weston Solutions, Inc. 2008).

In January and February 2008, a Mass Technology Continuous Precision Tightness Monitoring (CPTM) System was installed in Tanks 2 and 3. The CPTM system included valve replacement to provide automatic isolation of the tanks to provide monthly monitoring, reported on a quarterly basis. The results of the CPTM testing indicated both Tank 2 and Tank 3 received a passing/tight result (URS 2009d).

Since the time of the CPTM system installation at Tank 2, the system was performing individual low threshold test whenever the tank was static. On June 19, 2009 an individual monitoring test of Tank 2 had a result above the minimum detectable leak rate. The tank was shut down to allow for additional testing to be performed. The additional testing began on June 19, 2009 and was completed on June 25, 2009, with results indicating a loss of 0.75 gallons per hour. At that time, all the isolation points associated to the tank were inspected to determine if they were possible sources for product leaking. The double block and bleed valve cavities were drained and left accessible for frequent inspection, and two ¾-inch pipes (pressure relief lines) were disconnected and plugged (URS 2010c). Tank 2 was taken out of service, emptied, cleaned out and an American Petroleum Institute (API) 653 inspection was performed. The API inspectors were unable to locate a hole in the tank but stated the floor coating was rippled and in very poor shape, which left several areas that could not be inspected. Hydrostatic testing was also completed on the pipe lines that go to and from the tank to determine if they were are the source of the leak. On 26 June 2009 testing resumed and stopped on 30 June 2009 with confirming results of 0.95 gallon per hour leak rate (URS 2009d).

Integrity testing using the Tracer Tight method was performed on Tank 3 from January 19, 2010 through May 14, 2010. The Tracer Tight method was selected as the best alternative test method to the CPTM system, which could not be used due to the operational demand on the tank resulting from taking Tank 2 out of service. On June 10, 2010 the CPTM system was re-installed and re-commissioned. From June 30 to July 8, 2010, Tank 3 was isolated and tested over a 186 hour period with failing results. The testing indicated a leak rate of 1.47 gallons per hour. Tank 3 was taken out of service following confirmation testing (URS 2011b).

Tank 2 was returned to service on June 30, 2010 and passed a Mass Technology integrity test to a 0.1 gallon per hour minimum leak rate. Tracer Tight integrity tests were performed on Tank 2 in August, September, and November 2010, with a failing result in September. A follow-up Tracer Tight integrity test was completed on Tank 2 in September 2010, which also failed. An integrity test using the CPTM system was performed from October 8 through October 11, 2010. This 72-hour test certified Tank 2 to a minimum detectable leak rate of 0.3 gallon per hour. The CPTM system test indicated there was no product loss over a 72-hour test period greater than 0.3 gallons per hour, resulting in a passing test result (URS 2011b).

Tank 1A was evaluated under the Risk-Based Corrective Action. The evaluation had to be completed under a Tier 1 due to the presence of LNAPL and groundwater contamination. A Tier 1 Assessment with Corrective Action remediation and Trend Monitoring/Compliance Monitoring were completed in July 2011. The recommendations of the Tier 1 included that further remediation of the Tank 1A was unnecessary due to the absence of LNAPL and the steady and declining COCs in groundwater. The DEQ issued a letter of concurrence that no additional remediation or monitoring is required.

Consent Order Sites

Two sites at MHAFB that include potential asbestos contamination from transite pipe removal and chlordane in soils in the family housing area are managed by the Base Compliance Program. Actions at these sites are enforceable by the DEQ under Consent Order Idaho Code §§ 39-108 and 4413. . Under the Consent Order, MHAFB will sample and assess the extent of inadvertent chlordane pesticide and transite asbestos concrete pipe fragmentation in military family housing and evaluate health risk to family housing occupants.

The problem arose with contract work in the demolition phase of military family housing. The potential contamination threat from the past use of chlordane as a termiticide under and around building foundations was not recognized early on in the project. In addition, a potential contamination threat existed due to the cutting and crushing of asbestos concrete water lines being abandoned as part of the project. An impact to the water line occurred during the trenching operations for new sewer and water lines and scattered asbestos pipe fragments over the site.

Compliance with assessment, disposition, and cleanup of these site conditions in military family housing is being strictly enforced and followed under the DEQ Consent Order. It is not anticipated this will become a CERCLA compliance issue.

6.5 SITE INSPECTION

Findings from the initial inspections completed in 2001 are presented in the Final FYR Report (FEC 2001). Since URS Group Inc. (URS) is currently performing the basewide groundwater and vapor LTM activities and is knowledgeable of current site conditions, formal inspections of all site addressed in this FYR were not warranted.

In accordance with the specific land use controls for Sites LF-01 and LF-02, an inspection of Site LF-01 was completed on May 25, 2011, and an inspection for Site LF-02 was completed on November 1, 2010. Inspection results are included in Appendix A.

In addition, in accordance with specific institutional controls (ICs) for Site ST-11 a visual inspection of Site ST-11 was completed in October 2010. The inspection was used to verify compliance with the IC requirements, objectives, and controls in the ROD and the ESD; to determine violations of these controls; and to look for indications of tampering, incompatible use, and trespass. The inspection verified the Air Force has met all requirements, objectives, and controls in the ROD and the ESD for Site ST-11. Additionally, inspection results verified MHAFB has effective administrative procedures in place to comply with all aspects and requirements of the ICs described in the ROD and ESD. This inspection is documented in the Draft 2010 LTM Annual Report (URS 2011b).

There have been no changes in the physical conditions of the sites or in the use of the sites since the last review that would reduce the protectiveness of the remedy or render the initial risk analysis invalid. The current land use for all sites is industrial except Sites DP-18 and ST-31. Site DP-18 is located in an open field adjacent to MHAFB residential housing and is managed as residential. Site ST-31 includes a Fitness Annex with an indoor running track and is managed as commercial. Current uses are not anticipated to change within the next five years.

6.6 INTERVIEWS

Since documentation concerning the status and history of all sites was available, and URS is currently performing the basewide support activities and is knowledgeable of current site conditions, formal interviews of all sites addressed in this FYR were not necessary.

A technical assessment of the remedies in place at Mountain Home Air Force Base (MHAFB) was completed for this five-year review. The following three questions were evaluated in the technical assessment:

- Question A – Is the remedy functioning as intended by the decision documents?
- Question B – Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?
- Question C – Has any other information come to light that could call into question the protectiveness of the remedy?

The following discussions present the answers to each of these questions and the information used for the basis of each answer, which in turn was used for the protectiveness determination(s) presented in Section 10.

Question A: Is the remedy functioning as intended by the decision documents?

Yes, the remedies are functioning as intended by the decision documents. The following criteria were examined to evaluate whether the selected remedies are functioning as intended: remedial action performance, system operations/operations and maintenance (O&M), opportunities for optimizations, potential issues or problems that could place protectiveness at risk, and the implementation of institutional controls and other measures to ensure immediate threats have been addressed. Remedies have been selected at five ERP sites (Sites LF-01, LF-02, FT-08, ST-11, and LF-23) since the last Five-Year Remedy Review (FYR) in 2006, which are still operating or that require ongoing effort.

Sites with Land Use Controls

Site LF-01

The remedy for Site LF-01 is functioning as intended by the Record of Decision (ROD), as modified by the Explanation of Significant Differences (ESD). Land use controls (LUCs) have been implemented to limit the future uses of Site LF-01 to the current use (an inactive landfill) or future uses that do not pose an unacceptable risk; prevent activities and land uses that disturb the protective cover; maintain the two-foot thickness and grade of the protective cover; and restrict drilling in and consumptive use of perched groundwater below Site LF-01. The LUC boundary is shown on Figure 4-1. Annual inspections have verified compliance with the institutional control (IC) requirements, objectives, and controls in the ROD and ESD. The most recent inspection report is included in Appendix A.

Site LF-02

The remedy for Site LF-02 is functioning as intended by the ROD, as modified by the ESD. LUCs have been implemented to limit the future uses of Site LF-02 to the current use (inactive landfill) or future uses that do not pose an unacceptable risk and prevent activities and land uses that disturb the existing ground surface. The LUC boundary is shown on Figure 4-2. Annual

inspections have verified compliance with IC requirements, objectives, and controls in the ROD and ESD. The most recent inspection report is included in Appendix A.

Site LF-23

The remedy for Site LF-23 is expected to function as intended by the ROD, as modified by the ESD. LUCs will be implemented to 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 and prevent activities and land uses that disturb the existing ground surface. The LUC boundary is shown on Figure 4-6. Annual inspections will be completed to verify compliance with IC requirements, objectives, and controls in the ROD and ESD.

Sites with Operating Remedial Actions

Site FT-08

The remedy for Site FT-08 is performing as intended by the ROD amendment. Performance monitoring results indicate the soil vapor extraction (SVE) system is effectively removing volatile organic compounds (VOCs) from the soil. The air injection system was modified (valves on seven wells were closed) on December 9, 2010 to increase air injection flow rates around two specific soil extraction wells to optimize the system and to expedite removal of contaminant mass (URS 2010k). Since full-scale implementation of the SVE system in March 2010, approximately 7 pounds of trichloroethene (TCE), 3 pounds of 1,3,5-trimethylbenzene (TMB), and 16 pounds of total VOCs (including TCE and 1,3,5-TMB) have been removed. In February 2011, soil vapor sample results indicated all contaminants were below their RAOs (URS 2011c). Soil sampling was completed in April 2011 to determine if contaminant concentrations in the soil are below their RAOs. Results indicated soil in the vicinity of the source area has contaminant concentrations in soil above their RAOs. The SVE system is expected to be optimized further to focus remedial activities on this source area. No large variance in O&M costs is anticipated, and the remedy is likely to meet RAOs by October 2011.

Site ST-11

The remedy for Site ST-11 is performing as intended by the ROD, as modified by the ESD and the ROD amendment. ICs have been implemented to minimize the potential for completing the contact and inhalation exposure pathways; limit future uses of Site ST-11 to industrial use; prevent residential or commercial future uses; minimize the potential for completing the ingestion exposure pathway for perched groundwater; prevent future uses of perched groundwater; minimize the potential for completing the ingestion exposure pathway for regional groundwater; and prevent drilling of wells or any other activity at Site ST-11 that would penetrate or otherwise disturb the perched aquifer or provide a pathway to the regional aquifer. The IC area is shown on Figure 4-4. Annual inspections have verified compliance with the IC requirements, objectives, and controls in the ROD and the ESD.

Performance monitoring results indicate the vapor extraction (VE) system is effectively removing VOCs from the perched groundwater. Since March 2010, approximately 150 pounds

of VOCs have been removed via vapor effluent at Site ST-11 (URS 2011d). Chemical oxidant injection activities were completed in May 2011 at Site ST-11. Injection was completed into fractured bedrock contaminated with fuel-related compounds. Performance monitoring is planned to determine the effectiveness of the chemical oxidant injection. Results of performance monitoring will be used to determine if opportunities to optimize the VE system exist. No large variance in O&M costs is anticipated, and the remedy is likely to meet RAOs by October 2011.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection still valid?

Changes in Standards and To Be Considered

Applicable or relevant and appropriate requirements (ARARs) cited in the RODs, as modified by ROD Amendments, were reviewed to evaluate changes in the ARARs since the last FYR. There have been no changes in the ARARs, any new standards, or To Be Considereds affecting the protectiveness of the remedies.

Changes in Exposure Pathways

There have been no changes in the physical conditions of the sites or in the use of the sites that would reduce the protectiveness of the remedy or render the initial risk analyses invalid. The exposure assumptions identified in the Final ERP Remedial Investigation (RI)/Baseline Risk Assessment (BRA) for Operable Unit (OU)-2 (Woodward-Clyde Consultants [WCC] 1992) and OU-3 (WCC 1995b), and Final FT-08 RI/BRA Addendum (URS 2009c) have not changed since the RODs as modified by ROD Amendments and ESDs were signed. An indoor air vapor intrusion evaluation was completed during the late spring/early summer of 2006 since it was identified as a potential exposure pathway during the 2006 FYR. The results of the evaluation demonstrated there were no unacceptable human health risks or adverse health effects due to vapor intrusion to indoor air pathways for any use scenario (industrial or residential) (URS 2007k). A summary of this evaluation is included in Section 3.4.13.

Changes in Toxicity and Other Contaminant Characteristics

Several toxicity values have been updated since completion of the BRA including the inhalation slope factor, oral slope factor, inhalation reference dose, and oral reference dose. These changes were accounted for in reassessment of the risk for OU-4 (Site FT-08 soil) as part of the FT-08 RI/BRA Addendum (URS 2009c). In addition, the FT-08 RI/BRA Addendum (URS 2009c) did not utilize reference concentrations and unit risks for evaluating inhalation exposures, as provided in Risk Assessment Guidance for Superfund (RAGS) Part F (finalized in January 2009), because the addendum was under development using an agreed upon approach and was finalized shortly thereafter. Additionally, during finalization of the FT-08 RI/BRA Addendum (URS 2009c), U.S. Environmental Protection Agency's (EPA's) RAGS Part F changed the way inhalation exposures are evaluated for human health, including use of Regional Screening Levels (RSLs) in place of EPA Region 6 Medium Specific Screening Levels (MSSLs). RSLs for ethylbenzene and naphthalene became available for these chemicals to be evaluated as

carcinogens, unlike the EPA Region 6 MSSLs. As such, while naphthalene was not originally retained as a chemical of potential concern (COPC), the current screening level (3,900 micrograms per kilogram [µg/kg]) resulted in it being considered a COPC. Therefore, naphthalene was added as a COPC in soil, and risk-based cleanup levels were established for naphthalene in soil and soil gas for Site FT-08. Furthermore, the risk-based cleanup levels account for the change to evaluate ethylbenzene as a carcinogen. The current remedy for OU-4 has accounted for these changes in toxicity factors, so the remedy is considered protective.

In August 2001, EPA released the draft *Trichloroethylene Health Risk Assessment: Synthesis and Characterization* (the "draft TCE assessment") for external review and proposed a new inhalation and oral slope factor for TCE. . For the FT-08 BRA addendum, the toxicity value hierarchy recommended by EPA's Office of Solid Waste and Emergency Response (OSWER) Directive 9285.7-53 discussed below was used (EPA 2003). Under that hierarchy, sources of toxicity values are generally recommended in this order: Tier 1 sources, Tier 2 sources, and Tier 3 sources. Tier 1 and Tier 2 toxicity values are not currently available for TCE.

The toxicity value hierarchy currently recommended by the EPA's OSWER Directive 9285.7-53 for risk assessment (EPA 2003) is described below.

- Tier 1 – EPA's Integrated Risk Information System (EPA 2007b)
- Tier 2 – EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center develops PPRTVs on a chemical specific basis when requested by EPA's Superfund program.
- Tier 3 - Other Toxicity Values – Tier 3 includes additional EPA and non-EPA sources of toxicity information. Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer reviewed. These sources include California Environmental Protection Agency (CalEPA) toxicity values, Agency for Toxic Substances and Disease Registry Minimal Risk Levels, and EPA Health Effects Assessment Summary Tables (HEAST) toxicity values. With respect to the "Other Toxicity Values" that comprise Tier 3, the EPA Directive states that "in general, draft toxicity assessments are not appropriate for use until they have been through peer review, the peer review comments have been addressed in a revised draft, and the revised draft is publicly available."

In addition, the CalEPA toxicity values have been peer reviewed and conform to the EPA directive. Current Air Force policy mandates use of the CalEPA toxicity value until a new value is formalized.

Since the issuance of the EPA draft TCE assessment in 2001, there have been other memoranda published concerning this matter. In September and October 2008 the EPA Region 10 issued letters/memoranda concerning this issue (EPA 2008a and 2008b). In these memoranda EPA recommends, as a compromise, using a safety factor of 10 times the CalEPA TCE slope factor due to apparent toxicity differences between mice (the toxicity study subjects) and humans for certain TCE metabolites. In October 2009, EPA released a new external review draft health

assessment of TCE titled "Toxicological Review of TCE In Support of Summary Information on the Integrated Risk Information System." The draft document includes new inhalation and oral toxicity values for cancer and noncancer health effects. It also suggests that there is sufficient weight of evidence to conclude that TCE operates through a mutagenic mode of action for kidney tumors and recommends application of the default age-dependent adjustment factors for early life susceptibility for the evaluation of cancer risk. EPA has re-evaluated the toxicity and cancer potency of TCE and expects to post and update to the IRIS database in August 2011. However, as these are not peer reviewed and universally accepted values in the scientific community, the Air Force will also not use these values for making remedial decisions. The Air Force follows the EPA toxicity hierarchy and Air Force policy, which do not include using draft toxicity values. Furthermore, groundwater is the only medium that currently requires action to address TCE and is not subject to toxicity values but rather the maximum contaminant level (MCL).

Expected Progress Towards Meeting Remedial Action Objectives

The RAOs from the RODs, as modified by ROD Amendments and ESDs, are valid for all remedies.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No ecological receptors were identified during the BRAs or BRA addendum for OU-4 and none were identified during the FYR.

Since the 1995 ROD, long-term monitoring (LTM) of the regional groundwater has routinely detected TCE above its MCL in three monitoring wells (MW25, MW33, and MW35). Historical regional groundwater TCE analytical results are included in Table 3-3. Volatile organic compounds, including TCE, have not been detected above MCLs in any of the MHAFB drinking water supply wells or perimeter wells. Recent groundwater analytical results for the MHAFB production wells are included in Table 4-2. Furthermore, LTM of the bedrock vapor has been completed since September 2002, with historical results included in Table 3-4.

The OU-3 remedy of No Remedial Action (NRA) with LTM is protective of human health and the environment in the short term, but vapor concentrations in unsaturated bedrock are a potential source of TCE to groundwater, and groundwater use is not restricted in the long term. While some TCE mass has been removed from soil and shallow bedrock at Sites FT-08 and SD-24, further action to remove TCE mass is recommended to protect regional groundwater.

All other information obtained post-ROD that may compromise the protectiveness of a selected remedy has been previously discussed under Questions A and B.

Technical Assessment Summary

According to the data reviewed, the LUCs for Sites LF-01 and LF-02 and ICs for Site ST-11 are functioning as intended by the RODs, as modified by the ESDs. In addition, the LUCs for Site

LF-23 are expected to function as intended by the ROD, as modified by the ESD. Furthermore, the remedies for Sites FT-08 and ST-11 are functioning as intended by the RODs and ROD amendments. There have been no changes in the physical conditions of the sites or other information that calls into question the protectiveness of the remedies.

However, information concerning the remedy for OU-3 calls into question the future protectiveness of the remedy. Concentrations in unsaturated bedrock are a potential source of TCE to groundwater and future groundwater use is not restricted. As such, implementation of ICs and further action to remove TCE mass is recommended to protect human health and regional groundwater, respectively.

Issues identified during this five-year remedy review (FYR) are associated with maximum contaminant level (MCL) exceedances and the potential for future exceedances due to residual trichloroethene (TCE) mass in the vadose zone vapor for Operable Unit (OU)-3 as follows:

Since the 1995 Record of Decision, TCE concentrations detected in monitoring wells MW25, MW33, and MW35 have routinely exceeded the Federal MCL of 5.0 micrograms per liter (µg/L). However, an exposure pathway that could result in unacceptable risks associated with the exposure to or the ingestion of contaminated groundwater does not currently exist because regional groundwater samples from Mountain Home Air Force Base (MHAFB) production wells have not reported TCE above the Federal MCL. Six MHAFB production wells are sampled on a quarterly basis to meet requirements of the Safe Drinking Water Act (SDWA). Recent results are included in Table 4-2.

Table 8-1 summarizes issues identified for OU-3 and LF-23 and whether the protectiveness of the selected remedy is affected. No issues have been identified for any other ERP site at MHAFB. Table 8-1 summarizes the Tier 1 issues. Tier 1 recommendations address actions that affect protectiveness, and Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness.

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TABLE 8-1
ISSUES
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Issues	Affects Protectiveness?	
		Current	Future
TIER 1			
LF-23	An ESD was prepared for this site which includes following requirements that are to be completed in order for the site to achieve long-term protectiveness: • Submit a deed notice for recordation at the Base Real Estate Office. • Update the BCP and provide copies of the updated BCP to the EPA and DEQ. • Review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area. • Do 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 approval of EPA and DEQ.	N	Y
OU-3	Since the 1995 ROD, LTM of the regional groundwater has routinely detected TCE above its MCL in three monitoring wells (MW25, MW33, and MW35). Historical regional groundwater TCE concentrations are included in Section 3.4.13. Consistent with past results, widespread low-level TCE has been detected at eight other regional groundwater well locations during the LTM sampling events. However, an exposure pathway that could result in unacceptable risks associated with the exposure or ingestion of contaminated groundwater does not currently exist since regional groundwater samples from base productions wells have not reported COCs above applicable federal MCLs. TCE concentrations in bedrock vapors have been monitored since September 2002. Vapor ports in monitoring wells MW25, MW27, MW33, and MW35 have detected the highest TCE concentrations at MHAFB. TCE concentrations in bedrock vapors are discussed in Section 3.4.13. Further action, including implementation of ICs and removal of TCE mass is, recommended.	N N	Y Y

Notes:

All other ERP sites at Mountain Home Air Force Base have no issues and are not included in this table.

BCP = Base Comprehensive Plan
COC = chemical of concern
DEQ = Idaho Department of Environmental Quality
EPA = United States Environmental Protection Agency
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
IC = institutional control
LTM = long-term monitoring
LUC = land use control
MCL = maximum contaminant level
MW = monitoring well
MHAFB = Mountain Home Air Force Base
N = no
TCE = trichloroethene

The initial 2001 Five-Year Remedy Review (FYR) identified the need for additional characterization of potential trichloroethene (TCE) sources and changes to the long-term monitoring (LTM) plan, including replacement of monitoring wells to adequately maintain the monitoring program, and for compliance with the Records of Decision (RODs). Based on these recommendations, subsequent site characterization and LTM activities were performed and revealed that source removal of contamination, implementation of a remedial system, and/or the implementation of institutional controls are warranted at several sites to ensure the protectiveness of selected-remedies. The 2006 FYR identified the need for implementation of land use controls (LUCs) and remediation actions.

This section discusses recommendations and presents a schedule for implementing follow-up actions for sites evaluated during this FYR. Specific Tier 1 and Tier 2 recommendations are provided in Tables 9-1 and 9-2. Tier 1 recommendations address actions that affect protectiveness, and Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness.

- A deed notice for recordation, an updated Base Comprehensive Plan (BCP), and procedures to restrict future activities are required for Site LF-23.
- A pilot study, Feasibility Study (FS), Proposed Plan, and ROD amendment are recommended for Operable Unit (OU)-3.

9.1 SITE LF-01 (LAGOON LANDFILL)

The Tier 2 recommendations for Site LF-01 include the following actions. Monitoring of the regional groundwater at MW7-2 should be continued as part of the basewide LTM program. Monitoring should be completed ensure levels of chemicals of concern (COCs) (specifically TCE) in groundwater do not increase with time and remain below the maximum contaminant level (MCL). In addition, annual landfill inspections and assessment of the effectiveness of the LUCs should be continued in accordance with the Explanation of Significant Differences (ESD).

9.2 SITE LF-02 (B-STREET LANDFILL)

The Tier 2 recommendations for Site LF-02 include the following actions. Monitoring of the regional groundwater at MW3-2 should be continued, as part of the basewide LTM program to ensure that COCs associated with Site LF-02 are not migrating outside of installation boundaries. In addition, annual landfill inspections and assessment of the effectiveness of the LUCs should be continued in accordance with the ESD.

9.3 SITE FT-04 (FIRE TRAINING AREA 4)

Findings from the additional investigation completed at Site FT-04 indicated the higher arsenic concentrations were associated with deeper soils near basalt bedrock and were not due to site-related activities. Therefore, NFA is recommended for Site FT-04. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs.

9.4 SITE FT-08 (FIRE TRAINING AREA 8)

The Tier 2 recommendations for Site FT-08 include the following actions. Soil vapor extraction (SVE) system operations and maintenance (O&M) activities should continue until cleanup levels are met. Achievement of cleanup levels will be documented with sampling results and Federal Facility Team (FFA) team concurrence before the system is turned off or dismantled.

9.5 SITE ST-11 (FLIGHT LINE FUEL SPILL)

The Tier 2 recommendations for Site ST-11 include the following actions. Vapor extraction (VE) system O&M activities should continue until the following is achieved:

- Free product jet propellant 4 (JP-4) in is recovered in perched zone monitoring wells (PZMWs) that have a history of containing light non-aqueous phase liquid (LNAPL) to comply with Idaho Administrative Procedures Act (IDAPA) 58.01.02.852.04, which requires free-product removal to the maximum extent practicable as determined by the Idaho Department of Environmental Quality (DEQ). Free product is defined as the presence of petroleum greater than 0.1 inch (DEQ 2008).
- Benzene concentrations in perched groundwater are reduced to the Federal MCL of 5 micrograms per liter (µg/L) or below.

9.6 SITE ST-13 (POL YARD UST SITE)

The site meets unlimited use/unrestricted exposure (UU/UE) and remediation is no longer warranted for this site. As a result, the selected remedy is now considered protective for UU/UE and NFA is recommended for this site. Continued monitoring of the regional groundwater and occurrence of LNAPL (including continued use, as necessary, of a passive fuel absorbent sock) is recommended at MW24 under OU-3 as part of the LTM program. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs.

9.7 SITE OT-16 (MUNITIONS BURIAL SITE)

Concentrations of site-related chemicals remaining in excavation soils meet the criteria for UU/UE based on U.S. Environmental Protection Agency (EPA) Region 6 Medium-Specific Screening Levels. Therefore, NFA is recommended for Site OT-16. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs.

9.8 SITE LF-23 (SOLID WASTE DISPOSAL AREA)

Tier 1 recommendations for Site LF-23 include annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD. In addition, the following implementation actions should be completed and documented:

- Submit a deed notice for recordation at the Base (CES) Real Estate Office

- Update the BCP and provide copies of the updated BCP to the EPA and DEQ
- Review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23
- Do 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 DEQ.

9.9 SITE SD-24 (LIQUID OXYGEN LOADING PLANT AND AUTO HOBBY SHOP)

Contaminated soil was treated with a chemical oxidizing agent (sodium permanganate) in January 2008 to treat the small amount of remaining TCE-impacted soil present below an active water line at the source area. Based on discussions during a FFA team meeting on January 26, 2011, the FFA team agreed Site SD-24 now meets UU/UE for soils and soils are not a source of contamination to groundwater. As a result, the selected remedy is now considered protective for UU/UE, and NFA is recommended for this site. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs.

9.10 SITE SD-27 (EQUIPMENT WASH RACK)

Concentrations of site-related chemicals remaining in excavation soils meet the criteria for UU/UE based on EPA Region 9 Residential Preliminary Remediation Goals (PRGs). Therefore, NFA is recommended for Site SD-27. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs.

9.11 SITE SS-29 (DRUM ACCUMULATION PAD)

Concentrations of site-related chemicals remaining in excavation soils meet the criteria for UU/UE based on EPA Region 9 Residential PRGs. Therefore, NFA is recommended for Site SS-29. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs.

9.12 SITE ST-38 (POL STORAGE AREA, RCRA SOLID WASTE MANAGEMENT UNIT)

Tracking the actions being completed under another program by Defense Logistics Agency/Defense Energy Support Center (DLA/DESC) is no longer necessary. According to the Tier 1 Risk-Based Corrective Action (RBCA) evaluation, no further remediation or monitoring is required because no measurable LNAPL was detected for a year and COC concentrations in perched groundwater have been stable and declining in recent years (URS 2011g). DEQ issued a letter dated July 21, 2011 stating no additional remediation or monitoring of petroleum hydrocarbon contamination related to the delineated area of the Tank 1A release in the POL yard

is required at this time. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs.

9.13 OU-3 (BASEWIDE REGIONAL GROUNDWATER)

Tier 1 recommendations for OU-3 basewide regional groundwater and bedrock vadose zone vapors includes continued monitoring to ensure selected remedies remain protective of human health and the environment. The LTM program should be continued for as long as contaminants remain at concentrations that prevent UU/UE, with modifications and additions made per the FYR.

To support protection of the regional groundwater, MHAFB plans to select a remedy to remove TCE mass from the bedrock vadose zone and implement ICs. Vapor extraction has been successful at Sites FT-08, SD-24, and ST-11. A pilot study is recommended to evaluate vapor extraction in bedrock areas with high TCE vapor concentrations. An FS and Proposed Plan should be completed to consider active remediation of the site to address TCE contaminant levels in bedrock. A ROD amendment is required to select and implement a remedial technology for the site.

TABLE 9-1
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Responsible Party	Oversight Agency	Schedule
TIER 1					
LF-23	An ESD was issued in July 2011 for the 1995 ROD, which documents site-specific LUCs for Site LF-23. The LUCs ensure long-term protection of human health and the environment and prevent inappropriate land use in the future.	• Complete annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD. • Submit a deed notice for recordation at the Base Civil Engineer Squadron Real Estate Office • Update the BCP and provide copies of the updated BCP to the EPA and DEQ • Review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23; and not authorize projects or any other actions which are inconsistent with the LUC objectives or use restrictions which may interfere with the effectiveness of the LUCs, without prior approval of EPA and DEQ.	Air Force	EPA and DEQ	July 2012 June 2011 August 2011 As needed, in accordance with ESD

TABLE 9-1
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Responsible Party	Oversight Agency	Schedule
OU-3	Since the 1995 ROD, LTM of the regional groundwater has routinely detected TCE above its MCL in three monitoring wells (MW25, MW33, and MW35). Historical regional groundwater TCE concentrations are included in Section 3.4.13. In addition, TCE concentrations in bedrock vapors have been monitored since September 2002. Vapor ports in monitoring wells MW25, MW27, MW33, and MW35 have detected the highest TCE concentrations at MHAFB. In addition, TCE concentrations in bedrock vapors are as high as 16,000 µg/m^3 in the shallow zone at MW27; range from 3,400 µg/m^3 to 6,700 µg/m^3 in the mid-level zone at MW25 and MW27, respectively; and range from 1,900 µg/m^3 to 6,800 µg/m^3 in the deep zone at MW35 and MW27, respectively. All these wells are in the vicinity of Site SD-24. In order to provide additional source control, expansion of the vapor extraction system is recommended in the northwest portion of the MHAFB.	• Continue water level measurements on all available wells in the spring and fall each year. • Continue vapor sampling at the existing vadose zone vapor ports and monitoring regional and perched groundwater in accordance with the approved work plan. **• Complete a pilot study, FS, PP, and ROD amendment for OU-3 to address VOC mass removal from unsaturated bedrock and implement ICs.**	Air Force	EPA and DEQ	August 2011 In accordance with Work Plan **Complete Pilot Study – August 2011** **Final FS/PP – October 2011** **Final OU-3 ROD Amendment – June 2012**

Notes:
Recommendations and follow-up actions that affect the protectiveness of the selected remedies are in **bolded blue text**.
Tier 1 recommendations address actions that affect protectiveness.

BCP = Base Comprehensive Plan
DEQ = Idaho Department of Environmental Quality
EPA = Environmental Protection Agency
ESD = Explanation of Significant Differences
FS = Feasibility Study
IC = institutional control
LTM = long-term monitoring
LUC = land use control
MCL = maximum contaminant level
µg/m^3 = microgram per cubic meter
MHAFB = Mountain Home Air Force Base
MW = monitoring well
PP = Proposed Plan
ROD = Record of Decision
TCE = trichloroethene

TABLE 9-2
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
THAT DO NOT AFFECT PROTECTIVENESS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Responsible Party	Oversight Agency	Schedule
TIER 2					
LF-01	The ESD limits the future uses of Site LF-01 to the current use (an inactive landfill) or future uses that do not pose unacceptable risk; prevents activities and land uses that disturb the protective cover; maintains the two-foot thickness and grade of the protective cover; and restricts drilling in and consumptive use of perched groundwater below Site LF-01.	• LTM at MW7-2 is planned under OU-3 in accordance with the approved work plan. • Continue annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD.	Air Force	EPA and DEQ	In accordance with approved Work Plan May 2012
LF-02	The ESD limits the future uses of LF-02 to the current use (an inactive landfill) or future uses that do not pose unacceptable risk; prevents activities and land uses that disturb the existing ground surface prohibits residential land use; and requires an evaluation of risk and approval by the EPA and DEQ to develop for uses other than an inactive landfill.	• LTM at MW3-2 is planned under OU-3 in accordance with the approved work plan. • Continue annual landfill inspections and assessment of the effectiveness of the LUCs in accordance with the ESD.	Air Force	EPA and DEQ	In accordance with approved Work Plan November 2011
FT-08	The OU-4 ROD Amendment for Site FT-08 soil was issued and signed in September 2009 (EPA 2009b) with SVE selected as the amended remedy.	• Continue operation of the selected amended remedy (SVE). • Complete removal action at former burn pit area of Site FT-08.	Air Force	EPA and DEQ	In accordance with approved Work Plan August 2011
ST-11	An ESD was completed in 2004 to clarify and enhance the ICs for the site. The ROD Amendment for OUs 1, 3, 5, and 6, which included an amended remedy for Site ST-11, was issued in September 2010 and signed in October 2010 (URS 2010h) with VE selected as the amended remedy.	• Continue annual inspections and assessment of the effectiveness of the ICs in accordance with the ESD until and unless it is demonstrated that perched groundwater at Site ST-11 is no longer a threat to human health and the environment. • Continue operation of the selected amended remedy (VE).	Air Force	EPA and DEQ	August 2011 In accordance with approved Work Plan

TABLE 9-2
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
THAT DO NOT AFFECT PROTECTIVENESS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Responsible Party	Oversight Agency	Schedule
Fuel Management Program	The 1995 ROD specified a requirement for a leak detection program as part of the Limited Action remedy for Site ST-11. The purpose of the leak detection program is to ensure early detection of any future petroleum leaks at the site. The program includes petroleum inventory and annual flight line leak detection programs.	Track the following actions to be taken by DLA/DESC: • Continue the leak detection program for the POL Hydrant Piping System and USTs. • Continue the leak detection program for Tanks 2 and 3.	Air Force	EPA and DEQ	In accordance with approved Work Plan
NO RECOMMENDATIONS					
FT-04	The Air Force completed a limited assessment at two "hot spots" for arsenic in soils with arsenic above the DEQ established background concentration (URS 2006c). Additional soil sampling for arsenic analysis was completed. The evaluation indicated the higher arsenic concentrations were associated with deeper soils near basalt bedrock and were not due to site-related activities.	• NFA • Site FT-04 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	Air Force	EPA and DEQ	Not Applicable
ST-13	Benzene concentrations have been below the MCL since the April 2007 sampling event at a concentration of 2 µg/L (URS 2009c). Light non-aqueous phase liquid was not observed in MW24 in 2009 or 2010 (URS 2010c and 2011b).	• NRA • Site ST-13 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews. • As part of OU-3 activities, continue LTM for regional groundwater and occurrence of LNAPL at MW24.	Air Force	EPA and DEQ	Not Applicable
OT-16	An NTCRA was completed at Site OT-16 to address the residual munitions related scrap material and soil impacted with PAHs. The soil and debris removal, disposal, and backfill activities were completed between August 5 and October 28, 2008. The site meets UU/UE criteria based on the results of the NTCRA (URS 2009b).	• NFA • Site OT-16 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	Air Force	EPA and DEQ	Not Applicable

TABLE 9-2
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
THAT DO NOT AFFECT PROTECTIVENESS
MOUNTAIN HOME AIR FORCE BASE, IDAHO

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Responsible Party	Oversight Agency	Schedule
SD-24	Injection of a chemical oxidizing agent (sodium permanganate) was completed on January 15 and 16, 2008 to treat the small amount of remaining TCE-impacted soil present below an active water line at the source area. (URS 2008d).	• NFA • Site SD-24 soil meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews. • Bedrock vapor contamination in the vicinity of Site SD-24 will be addressed and concluded under OU-3, Basewide Regional Groundwater.	Air Force	EPA and DEQ	Not Applicable
SD-27	The Air Force initiated a NTCRA at Site SD-27 between March 12 and June 26, 2007. An NTCRA and disposal report was produced to document that the site now meets UU/UE criteria (URS 2008a).	• NFA • Site SD-27 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	Air Force	EPA and DEQ	Not Applicable
SS-29	The Air Force initiated a NTCRA at Site SS-29 between March 12 and June 26, 2007. An NTCRA and disposal report was produced to document that the site now meets UU/UE criteria (URS 2008a).	• NFA • Site SS-29 meets the criteria for UU/UE; therefore the site does not require re-evaluation during future five-year reviews.	Air Force	EPA and DEQ	Not Applicable

Notes:
Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness.

BCP = Base Comprehensive Plan
BTEX = benzene, toluene, ethylbenzene, and xylenes
DEQ = Idaho Department of Environmental Quality
DESC = Defense Energy Support Center
DLA = Defense Logistics Agency
EPA = Environmental Protection Agency
ESD = Explanation of Significant Differences
FS = Feasibility Study
IC = institutional control
LNAPL = light non-aqueous phase liquid
LTM = long-term monitoring
LUC = land use control
MCL = maximum contaminant level
µg/L = microgram per liter
$\mu g/m^3$ = microgram per cubic meter
N = no
NFA = No Further Action
NRA = No Remedial Action
NTCRA = non-time critical removal action
PAH = polynuclear aromatic hydrocarbon
PP = Proposed Plan
RBCA = Risk-Based Corrective Action
ROD = Record of Decision
SVE = soil vapor extraction
TCE = trichloroethene
URS = URS Group, Inc.
UU/UE = unlimited use/unrestricted exposure
VE = vapor extraction
Y = yes

10.1 SITE LF-01 (LAGOON LANDFILL)

The selected remedy at Site LF-01 (No Remedial Action [NRA] with long-term monitoring [LTM]) is protective currently and in the long term since institutional controls have been implemented pursuant to the Record of Decision (ROD), as modified by the Explanation of Significant Differences (ESD) dated October 2006.

10.2 SITE LF-02 (B-STREET LANDFILL)

The selected remedy at Site LF-02 (NRA with LTM) is protective currently and in the long term since institutional controls have been implemented pursuant to the ROD, as modified by the ESD dated October 2006.

10.3 SITE FT-04 (FIRE TRAINING AREA 4)

A limited assessment was completed at Site FT-04 in June 2006 for arsenic in soils with arsenic above the Idaho Department of Environmental Quality (DEQ) established background concentration. Findings from the additional investigation indicated the higher arsenic concentrations were associated with deeper soils near basalt bedrock and were not due to site-related activities (URS 2006c). Based on this investigation and as agreed upon by Federal Facility Agreement (FFA) team members during meeting on September 6, 2006, the selected remedy (NRA with LTM) at Site FT-04 is now considered protective currently and in the long term for unlimited use/unrestricted exposure (UU/UE).

10.4 SITE FT-08 (FIRE TRAINING AREA 8)

The selected remedy at Site FT-08 (NRA with LTM) was amended as part of the OU-4 ROD Amendment, which was issued and signed in September 2009 (URS 2009k). Soil vapor extraction (SVE) was selected as the amended remedy. Construction of the SVE system was completed in February 2010, is currently operating as designed, and is expected to achieve cleanup levels. As a result, the selected amended remedy is protective.

10.5 SITE ST-11 (FLIGHT LINE FUEL SPILL)

The selected remedy at Site ST-11 (Limited Action) was amended as part of the ROD Amendment for OUs 1, 3, 5, and 6, which was issued in September 2010 and signed in October 2010 (URS 2010g). Vapor extraction (VE) was selected as the amended remedy. Construction of the VE system was completed in October 2009 as part of a pilot study, is currently operating as designed, and is expected to achieve remedial action objectives (RAOs). As a result, the selected amended remedy is protective.

10.6 SITE ST-13 (POL YARD UST SITE)

The selected remedy at Site ST-13 (NRA with LTM) is protective for UU/UE currently and in the long term. Based on current site conditions, the FFA team agrees the site now meets UU/UE criteria.

10.7 SITE OT-16 (MUNITIONS BURIAL SITE)

A non-time critical removal action (NTCRA) was completed at Site OT-16 between August 5 and October 28, 2008 to address the residual munitions related scrap material and soil impacted with polynuclear aromatic hydrocarbons (PAHs). Based on the results of this NTCRA, the selected remedy (NRA with LTM) at Site OT-16 is now considered protective currently and in the long term for UU/UE from the unexploded ordnance and chemical exposure standpoints.

10.8 SITE LF-23 (SOLID WASTE DISPOSAL AREA)

The selected remedy at Site LF-23 (NRA with LTM) will be protective in the long term since land use controls (LUCs) will be implemented pursuant to the ROD, as modified by the ESD signed July 8, 2011.

10.9 SITE SD-24 (OLD LIQUID OXYGEN LOADING PLANT AND AUTO HOBBY SHOP)

Injection of a chemical oxidizing agent (sodium permanganate) was completed on January 15 and 16, 2008 under a pilot study. The purpose of the injection was to treat the small amount of remaining trichloroethene (TCE)-impacted soil present below an active water line at the source area. Based on the results of the injection activities, the selected remedy (NRA with LTM) for Site SD-24 is now considered protective for soils in the long term for UU/UE. Soils, but not groundwater, at Site SD-24 allow for UU/UE and are not a source of TCE to groundwater.

10.10 SITE SD-27 (EQUIPMENT WASH RACK)

A NTCRA was completed at Site SD-27 between March 12 and June 26, 2007 to address soils and sediments impacted with PAHs. Based on the results of this NTCRA, the selected remedy (NRA with LTM) at Site SD-27 is now considered protective currently and in the long term for UU/UE.

10.11 SITE SS-29 (DRUM ACCUMULATION PAD)

A NTCRA was completed at Site SS-29 between March 12 and June 26, 2007 to address soils impacted with PAHs. Based on the results of this NTCRA, the selected remedy (NRA with LTM) at Site SS-29 is now considered protective currently and in the long term for UU/UE.

10.12 SITE ST-38 (POL STORAGE AREA, RCRA SOLID WASTE MANAGEMENT UNIT)

A Risk-Based Corrective Action evaluation was completed in 2011 for the jet propellant 8 release from Tank 1A. Based on the results of this evaluation, no further remediation was considered necessary (URS 2011g). DEQ issued a letter dated July 21, 2011 stating no additional remediation or monitoring of petroleum hydrocarbon contamination related to the delineated area of the Tank 1A release in the POL yard is required at this time. As a result, sampling the perched groundwater, monitoring for the occurrence of LNAPL, and removal of LNAPL is no longer necessary at Site ST-38.

10.13 OU-3 (BASEWIDE REGIONAL GROUNDWATER)

Since the 1995 ROD, LTM of the regional groundwater has routinely detected TCE above its maximum contaminant level (MCL) in three monitoring wells (MW25, MW33, and MW35). Historical regional groundwater TCE analytical results are included in Table 3-3. Volatile organic compounds, including TCE, have not been detected above MCLs in any of the MHAFB drinking water supply wells or perimeter wells. Recent groundwater analytical results for the MHAFB production wells are included in Table 4-2. Furthermore, LTM of the bedrock vapor has been completed, with historical results included in Table 3-4.

The OU-3 remedy of NRA with LTM is currently protective of human health and the environment. However, vapor concentrations in unsaturated bedrock are a potential source of TCE to groundwater, and future groundwater use is not restricted. In order for the remedy to be protective in the long term, follow up actions need to be taken.

10.14 MHAFB SITEWIDE

The remedies at MHAFB will be protective of human health and the environment upon implementation of LUCs at Site LF-23 and completion of ongoing remedial actions at Sites FT-08 and ST-11. The remedy for OU-3 is protective in the short term, but in order for the remedy to be protective in the long term, follow-up actions need to be taken. Recommended follow-up actions include implementation of contaminant source removal from the vadose zone and ICs to assure long-term protectiveness. Exposure pathways that could result in unacceptable risks are being controlled in the interim. Barring unanticipated issues, remedial action and implementation of LUCs and ICs will likely allow a determination that the remedies are protective sitewide within the next five years.

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Additional five year remedy reviews (FYRs) are required since contamination remains above levels that allow unlimited use/unrestricted exposure at some Environmental Restoration Program sites located at Mountain Home Air Force Base (MHAFB). The next FYR will be due no later than June 2016.

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LAGOON MONOFILL POST-CLOSURE INSPECTION FORM

Facility Coordinator: Richard Roller Phone: 208-828-6667
Inspector: John Rupp Date: 5-25-2011

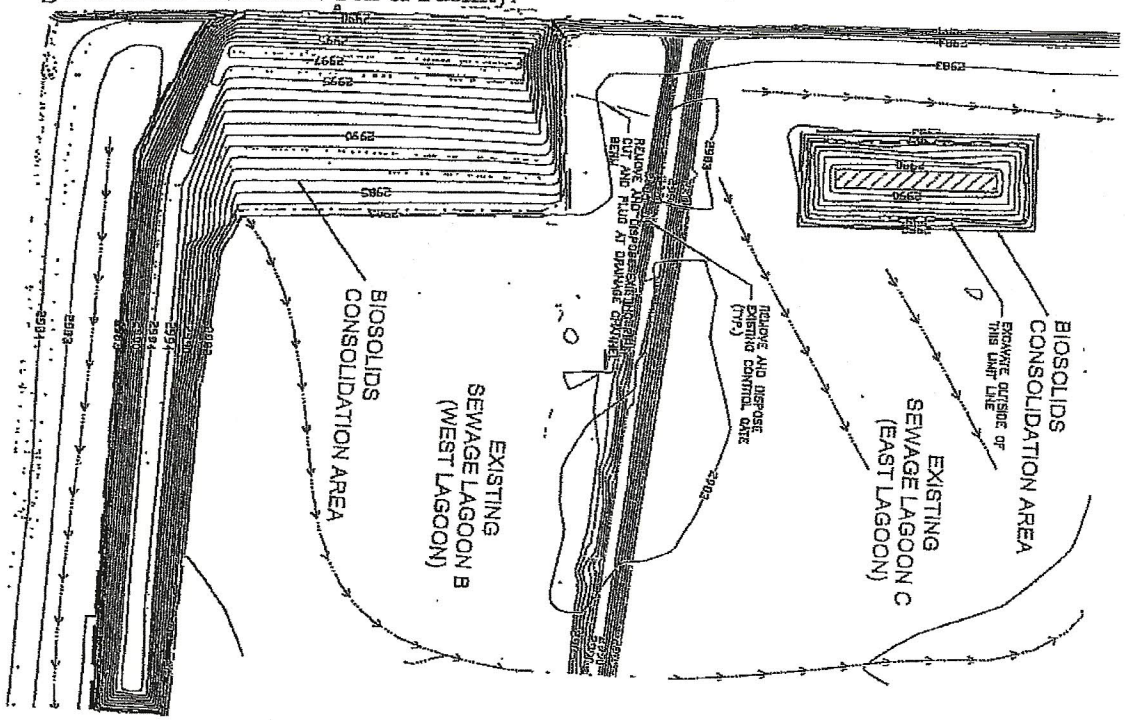
Weather conditions: partly cloudy, wind 10-20 mph, dry

Landfill Cell Status: Active ___ Closed X Photographs: Yes ___ No X Attached ___

Location or Cell #: LF-01 Sewage Lagoons

Drawing/Schematic of Landfill Cell or Facility:

Drawing/Schematic of Landfill Cell or Facility:



GENERAL OBSERVATIONS/RECOMMENDED COURSE OF ACTION:

The 2011 annual inspection of the existing closed lagoons B and C, west and east respectively was completed on May 25, 2011. The weather was mostly cloudy, with SE winds at 10-20 mph and a temp. of 58°F. The LF-01 area was undisturbed since the previous inspection (2010). An attempt was made to ~~cover~~ travel the perimeter of the area by vehicle or on foot.

OVERALL CAP INTEGRITY:

Complete the following checklist. If the answer is yes to any of the items, please provide an explanation, photograph and identify item location on the drawing/schematic of landfill cell.

A. Erosion (gullies or washouts) on the cap: YES____ NO X Depth/Length_____

B. Sloughing of embankments: YES____ NO X Est. of Area _____

C. Sparsely vegetated areas or stressed vegetation: YES____ NO X Est. of Area _____

D. Subsidence, depressions or settlement of soil: YES____ NO X Est. of Area _____

E. Cracks in cover cap: YES____ NO X Depth/Length_____

F. Damage to cap due to wildlife: YES____ NO X Type_____

G. Growth of woody vegetation on cap: YES____ NO X Type_____

H. Non-landfill related use of the cap: YES____ NO X Type_____

EXPLANATION/COMMENTS:

_____

_____

_____

_____

GROUNDWATER MONITORING:

Any evidence of potential groundwater contamination? YES____NO X If yes, explain.

_____

_____

Monitoring Testing Results completed: YES ____NO X Attached:_____

_____

_____

LANDFILL GAS MONITORING:

Evidence of methane odors at/or around this landfill cell or facility? YES____NO X If yes, explain.

_____

_____

_____

_____

Concentration Level:_____Location of Source _____

LEACHATE MANAGEMENT:

Are there any leachate breakouts on the side slopes or at the toe of the landfill, noticeable seeps, ponded or discolored water, or any areas of concern? YES_____ NO_X_ If yes, explain.

_____

_____

_____

STORM WATER MANAGEMENT:

Are swales, culverts and catch basins free of leaves and debris? YES_X_ NO____

Do swales and culverts have positive slope? YES_X_ NO____

Is there erosion within swales? YES____ NO_X_

Are there areas of ponding on the landfill or at the toe? YES____ NO_X_

Has there been any storm water damage at the facility? YES____ NO_X_

Provide explanation of all observed problems? YES____ NO____

_____

_____

_____

_____

OTHER:

Is the public access control adequate? YES_X_ NO____

Any vandalism noted, what type, location? YES____ NO_X_

Are there any holes or damaged fence? YES____ NO_X_

Is maintenance access in good condition? YES____ NO____

Has the cap vegetation been mowed? YES____ NO____
Date (if known) was last mowed (mo./yr.): _____/_____

Provide explanation of all observed problems:

_____

_____

_____

_____

To: **Richard Roller – 366 CES/CEVR - Mountain Home Air Force Base, Idaho**

From: **URS – Omaha**

Date: **November 1, 2010**

Subject: **Fifth Annual Landfill Inspection – B-Street Landfill (LF-02)**

Contract: **FA8903-04-D-8679, Delivery Order No. 0053**

1.0 INTRODUCTION

This Technical Memorandum is the second annual inspection report by URS Group Inc. (URS) for the B-Street Landfill (LF-02) at Mountain Home Air Force Base (the Base), Idaho. URS completed this inspection as part of the Air Force Performance Based Restoration (PBR) initiative for the Environmental Restoration Program (ERP) at the Base. The work has been authorized by the Air Combat Command (ACC) PBR initiative through the Air Force Center for Environmental Excellence (AFCEE) contract FA8903-04-D-8679, delivery order No. 0053.

The B-Street Landfill is a 130-acre area located in the industrial northwest corner of the Base about one-half mile north of the northwest end of the runway (Figure 1). It served as the main Base sanitary landfill between 1956 and 1969. Materials disposed at LF-02 included household garbage, yard waste, construction debris, and industrial waste. Some areas of LF-02 are now being covered for aesthetic purposes with excess clean soils derived from construction sites on the Base.

The B-Street Landfill is inactive. Certain areas within the landfill do not meet the criteria for unlimited future land use potential. Therefore, the U.S. Environmental Protection Agency (EPA) requires annual inspections as an Institutional Control (IC) to evaluate whether conditions at the subject area of the B-Street Landfill change over time. These inspections are required by the Explanation of Significant Differences (ESD) signed on September 28, 2006 and October 13, 2006 by the Federal Facility Agreement (FFA) team members. The ESD documented significant changes to the Record of Decision (ROD) for the B-Street Landfill signed on June 15, 1993 by the FFA team members. The 1993 ROD selected the No Action remedy as protective. Annual inspections will ensure long-term protectiveness by establishing a process to assess and assure the integrity of areas of concern within the B-Street Landfill, and to prevent future inappropriate land use. The Air Force will be responsible for maintaining the integrity of the following areas of concern: the Trench Area, the Coal Ash Disposal Area, and the Drum Disposal Area (Figure 1).

Historically the Trench Area served as the main Base sanitary landfill (Figure 1). It contains five trenches, four of which are approximately 50 feet wide by 400 feet long, and the fourth one that is 40 feet wide by 100 feet long. Trench 3 received asbestos waste, regulated by the Toxic Substance Control Act (TSCA); it is fenced and has posted warning signs. The other four trenches in the Trench Area were 2 to 14 feet deep, depending on the amount of available soil cover that overlies the basalt bedrock. Materials believed to have been disposed in these trenches are general household refuse; empty cans and drums (including empty pesticide drums); and industrial wastes (waste oils, solvents, waste jet fuel, and tank cleaning sludge). Wastes were reportedly burned and then covered with native soil on a weekly basis.

The Coal Ash Disposal Area is approximately 1,000 feet by 460 feet in size (Figure 1). It contains coal combustion ash from the former coal-fired central heating plant. Much of the Coal Ash Disposal Area has been covered with construction debris such as concrete rubble and asphalt rubble from the runway renovations completed in the last 10 years.

The Drum Disposal Area is roughly circular, with a diameter of about 80 feet (Figure 1). This area was used to store empty drums, drums that may have contained industrial wastes, and possibly up to 20 drums of dichlorodiphenyltrichloroethane (DDT). However, the DDT was not verified by historical records, interviews, or field investigation. No burial of drums occurred. Almost all of the Drum Disposal Area has been covered with construction debris such as concrete rubble from the runway renovations and asphalt rubble.

2.0 LANDFILL INSPECTION ACTIVITIES

URS completed the subject annual landfill inspection on November 1, 2010. The landfill inspection activities included the following:

1. Field locating each of the six polygon-defining corners that are marked by warning placards that were installed during the annual inspection in 2007. Warning placards consisted of high visibility signs prohibiting excavation and/or disposal, and a contact phone number.

   Note: URS personnel visited the site on June 15, 2007 with a Base Geographic Information System (GIS) technician to relocate the corner monuments based on Global Positioning System (GPS) coordinates. The monuments were moved slightly at that time based on the GPS coordinates and are currently in the positions noted in the ESD.

2. Photographing the landfill area in three different directions from each of the six polygon-defining corners.

3. Walking traverses across the landfill, observing the general conditions along the traverses, and recording any remarkable observations in the field logbook.

3.0 OBSERVATIONS

URS personnel visited each polygon marker corner during November 2010. From each corner, the B-Street Landfill area was visually surveyed using binoculars. Three compass-oriented photographs were taken from each corner, using the top of the corner post as a rest for the camera (Figure 1). Attachment 1 contains the 18 photographs taken from the polygon marker posts. It includes captions describing each photograph, along with pertinent observations. URS personnel performed a walking survey from Point 1 to the south through the Drum Disposal Area to the approximate center of the landfill to the Coal Ash Disposal Area, then southwest to the Trench Area and ending at Point 4. The following observations were made during the site visit.

Trench Area –The fence around the asbestos pit remains in excellent condition and the gate was observed to be locked. Warning signs are posted along all sides of the fence. The soil cover on all trenches appeared to be intact. There were no obvious signs of disturbance, except for rare

animal burrows into some of the soil cover over the trenches. There were no visual signs that vehicles had accessed the trench area.

Coal Ash Disposal Area – Much of this area has been covered with concrete rubble, asphalt rubble, and lesser amounts soil. The rubble severely limits access to this area. In many places the rubble piles coalesce together. In rare areas between individual rubble and soil piles, fine sand-size black ash is visible. Some of the piles and areas between piles support non-native grasses and weeds.

Drum Disposal Area – Much of this area has been covered with concrete rubble and asphalt rubble. The rubble eliminates vehicle access to this area. A few empty, rusted, and crushed steel drums (appear to be either 55 or 30-gallon drums) have been observed between ruble piles.

4.0 LANDFILL INSPECTION SCHEDULE

Landfill inspections are scheduled to occur on roughly yearly intervals throughout the period of performance of the PBC for the Base. The following inspection schedule is provided as a tentative schedule for the inspections.

Inspection No.	Date
2	December 2007
3	December 2008
4	December 2009
5	December 2010
6	December 2011

5.0 REFERENCES

URS Corporation (URS). 2008. *Technical Memorandum, B-Street Landfill (LF-02) Annual Inspection.* Prepared for the Air Force Center for Engineering and the Environment (AFCEE), Brooks City Base, Texas. Contract No. FA8903-04-D-8679, Delivery Order 0053. March 16, 2007.

ATTACHMENT NO. 1

Photographic Log

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No.	Date:
1	1-Nov-10

Description:
Point number 1 - View S30W from marker post #1. The photo shows many piles of construction debris consisting of concrete rubble and asphalt rubble. The rubble piles cover most of the drum disposal area that is located in the center and left side of the photo.

Photo No.	Date:
2	1-Nov-10

Description:
Point number 1 – View due south from marker post #1. The photo shows many piles of construction debris consisting of concrete rubble and asphalt rubble. The drum disposal area is located along the right of the photo.

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No. 3	Date: 1-Nov-10

Description:
Point number 1 – View S30E from marker post #1 looking toward Point Number 2. The photo shows many piles of construction debris consisting of concrete rubble and asphalt rubble. Vegetation mostly consists of non-native cheat grass (*Bromus tectorum*).

Photo No. 4	Date: 1-Nov-10

Description:
Point number 2 – View S45W from marker post #2 looking toward Point number 3. In the foreground are piles of construction debris consisting of concrete rubble and asphalt rubble. In the middle distance are the covered disposal trenches #3 and #4.

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No.	Date:
5	1-Nov-10

Description:
Point number 2 – View due west from marker post #2 showing piles of construction debris consisting of concrete rubble, asphalt rubble, and soil.

Photo No.	Date:
6	1-Nov-10

Description:
Point number 2 – View N30W from marker post #2 toward Point number 1. In the middle of the photo are piles of construction debris and clean fill from various construction sites on the Base. At the left horizon are the canopies of the Grand View Gate.

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No.	Date:
7	1-Nov-10

Description:
Point number 3 – View N40W from marker post #3 looking across the southwest end of the trench area. The fence visible on the right encircles Trench #3, the asbestos waste trench.

Photo No.	Date:
8	1-Nov-10

Description:
Point number 3 – View due north from marker post #3 looking across the trench area. The fence visible on the left and center encircles Trench #3, the asbestos waste trench.

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No.	Date:
9	1-Nov-10

Description:
Point number 3 – View N45E from marker post #3 toward Point number 2.

Photo No.	Date:
10	1-Nov-10

Description:
Point number 4 - View due north from marker post #4 toward Point number 5. On the horizon are debris piles consisting of soil and construction debris. Vegetation mostly consists of non-native cheat grass (*Bromus tectorum*).

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No. 11	Date: 1-Nov-10

Description:
Point number 4 – View N55E from marker post #4. In the background are debris piles consisting of soil and concrete rubble. On the far right is the edge of the trench area.

Photo No. 12	Date: 1-Nov-10

Description:
Point number 4 - View due east from marker post #4 showing the trench areas. The fence encircles Trench #3, the asbestos disposal trench.

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No. 13	Date: 1-Nov-10

Description:
Point number 5 - View N35E from marker post #5. In the distance are piles of construction debris and the drum disposal area. Vegetation mostly consists of non-native cheat grass (*Bromus tectorum*).

Photo No. 14	Date: 1-Nov-10

Description:
Point number 5 - View due east from marker post #5. In the distance are piles of construction debris consisting of concrete rubble and asphalt rubble. Vegetation mostly consists of non-native cheat grass (*Bromus tectorum*).

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No.	Date:
15	1-Nov-10

Description:
Point number 5 – View S50E from marker post #5. Vegetation mostly consists of non-native cheat grass (*Bromus tectorum*).

Photo No.	Date:
16	1-Nov-10

Description:
Point number 6 - View S30W from marker post #6 toward Point number 5. The photo shows many piles of construction debris consisting of concrete rubble and asphalt rubble.

PHOTOGRAPHIC LOG – LF-02

Client Name:	Site Location:	Project No.
AFCEE – 4-Base PBC; Contract FA8903-04-D-8679 D.O. 0053	Mountain Home AFB	16169962

Photo No.	Date:
17	1-Nov-10

Description:
Point number 6 - View due south from marker post #6. The photo shows many piles of construction debris consisting of concrete rubble and asphalt rubble. The left-center of the photo shows the drum disposal area that is covered by rubble piles.

Photo No.	Date:
18	1-Nov-10

Description:
Point number 6 - View S30E from marker post #6. The photo shows many piles of construction debris consisting of concrete rubble and asphalt rubble. The rubble piles cover most of the drum disposal area that is located in the center of the photo.

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Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information												Contaminant		Screening Levels										Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
1.8E-02	C	5.1E-06	C	1.5E-01	I					1	0.1		ALAR	1596-84-5	2.7E+01	c	9.6E+01	c	4.8E-01	c	2.4E+00	c	3.7E+00	c		8.2E-04	
8.7E-03	I			4.0E-03	I					1	0.1		Acephate	30560-19-1	5.6E+01	c**	2.0E+02	c*					7.7E+00	c*		1.7E-03	
		2.2E-06	I			9.0E-03	I	V		1		1.1E+05	Acetaldehyde	75-07-0	1.0E+01	c**	5.2E+01	c**	1.1E+00	c**	5.6E+00	c**	2.2E+00	c**		4.5E-04	
				2.0E-02	I					1	0.1		Acetochlor	34256-82-1	1.2E+03	n	1.2E+04	n					7.3E+02	n		5.8E-01	
				9.0E-01	I	3.1E+01	A	V		1		1.1E+05	Acetone	67-64-1	6.1E+04	n	6.3E+05	nms	3.2E+04	n	1.4E+05	n	2.2E+04	n		4.5E+00	
				3.0E-03	P	6.0E-02	P	V		1		1.1E+05	Acetone Cyanohydrin	75-86-5	2.0E+02	n	2.1E+03	n	6.3E+01	n	2.6E+02	n	5.8E+01	n		1.2E-02	
						6.0E-02	I	V		1		1.3E+05	Acetonitrile	75-05-8	8.7E+02	n	3.7E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n		2.6E-02	
				1.0E-01	I			V		1		2.5E+03	Acetophenone	98-86-2	7.8E+03	ns	1.0E+05	nms					3.7E+03	n		1.1E+00	
3.8E+00	C	1.3E-03	C							1	0.1		Acetylaminofluorene, 2-	53-96-3	1.3E-01	c	4.5E-01	c	1.9E-03	c	9.4E-03	c	1.8E-02	c		8.2E-05	
				5.0E-04	I	2.0E-05	I	V		1		2.3E+04	Acrolein	107-02-8	1.5E-01	n	6.5E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n		8.4E-06	
5.0E-01	I	1.0E-04	I	2.0E-03	I	6.0E-03	I		M	1	0.1		Acrylamide	79-06-1	2.3E-01	c	3.4E+00	c	9.6E-03	c	1.2E-01	c	4.3E-02	c		1.5E-02	
				5.0E-01	I	1.0E-03	I			1	0.1		Acrylic Acid	79-10-7	3.0E+04	n	2.9E+05	nm	1.0E+00	n	4.4E+00	n	1.8E+04	n		3.7E+00	
5.4E-01	I	6.8E-05	I	4.0E-02	A	2.0E-03	I	V		1		1.1E+04	Acrylonitrile	107-13-1	2.4E-01	c*	1.2E+00	c*	3.6E-02	c*	1.8E-01	c*	4.5E-02	c*		9.9E-06	
						6.0E-03	P			1	0.1		Adiponitrile	111-69-3	8.5E+06	nm	3.6E+07	nm	6.3E+00	n	2.6E+01	n					
5.6E-02	C			1.0E-02	I					1	0.1		Alachlor	15972-60-8	8.7E+00	c*	3.1E+01	c					1.2E+00	c	2.0E+00	9.9E-04	1.6E-03
				1.0E-03	I					1	0.1		Aldicarb	116-06-3	6.1E+01	n	6.2E+02	n					3.7E+01	n		9.1E-03	
				1.0E-03	I					1	0.1		Aldicarb Sulfone	1646-88-4	6.1E+01	n	6.2E+02	n					3.7E+01	n		8.0E-03	
1.7E+01	I	4.9E-03	I	3.0E-05	I					1	0.1		Aldrin	309-00-2	2.9E-02	c*	1.0E-01	c	5.0E-04	c	2.5E-03	c	4.0E-03	c		6.5E-04	
				2.5E-01	I					1	0.1		Ally	74223-64-6	1.5E+04	n	1.5E+05	nm					9.1E+03	n		3.5E+00	
				5.0E-03	I	1.0E-04	X			1	0.1		Allyl Alcohol	107-18-6	3.0E+02	n	3.1E+03	n	1.0E-01	n	4.4E-01	n	1.8E+02	n		3.7E-02	
2.1E-02	C	6.0E-06	C			1.0E-03	I	V		1		1.4E+03	Allyl Chloride	107-05-1	6.8E-01	c**	3.4E+00	c**	4.1E-01	c**	2.0E+00	c**	6.5E-01	c**		2.1E-04	
				1.0E+00	P	5.0E-03	P			1			Aluminum	7429-90-5	7.7E+04	n	9.9E+05	nm	5.2E+00	n	2.2E+01	n	3.7E+04	n		5.5E+04	
				4.0E-04	I					1			Aluminum Phosphide	20859-73-8	3.1E+01	n	4.1E+02	n					1.5E+01	n			
				3.0E-04	I					1	0.1		Amdro	67485-29-4	1.8E+01	n	1.8E+02	n					1.1E+01	n		3.9E+03	
				9.0E-03	I					1	0.1		Ametryn	834-12-8	5.5E+02	n	5.5E+03	n					3.3E+02	n		3.5E-01	
2.1E+01	C	6.0E-03	C							1	0.1		Aminobiphenyl, 4-	92-67-1	2.3E-02	c	8.2E-02	c	4.1E-04	c	2.0E-03	c	3.2E-03	c		1.6E-05	
				8.0E-02	P					1	0.1		Aminophenol, m-	591-27-5	4.9E+03	n	4.9E+04	n					2.9E+03	n		1.1E+00	
				2.0E-02	P					1	0.1		Aminophenol, p-	123-30-8	1.2E+03	n	1.2E+04	n					7.3E+02	n		2.8E-01	
				2.5E-03	I					1	0.1		Amitraz	33089-61-1	1.5E+02	n	1.5E+03	n					9.1E+01	n		4.7E+01	
						1.0E-01	I			1			Ammonia	7664-41-7					1.0E+02	n	4.4E+02	n					
				2.0E-01	I					1			Ammonium Sulfamate	7773-06-0	1.6E+04	n	2.0E+05	nm					7.3E+03	n			
5.7E-03	I	1.6E-06	C	7.0E-03	P	1.0E-03	I			1	0.1		Aniline	62-53-3	8.5E+01	c**	3.0E+02	c*	1.0E+00	n	4.4E+00	n	1.2E+01	c*		4.0E-03	
4.0E-02	P			2.0E-03	X				M				Anthraquinone, 9,10-	84-65-1	1.6E+01	c**	7.2E+01	c*					1.7E+00	c*			
				4.0E-04	I					0.15			Antimony (metallic)	7440-36-0	3.1E+01	n	4.1E+02	n					1.5E+01	n	6.0E+00	6.6E-01	2.7E-01
				5.0E-04	H					0.15			Antimony Pentoxide	1314-60-9	3.9E+01	n	5.1E+02	n					1.8E+01	n			
				9.0E-04	H					0.15			Antimony Potassium Tartrate	11071-15-1	7.0E+01	n	9.2E+02	n					3.3E+01	n			
				4.0E-04	H					0.15			Antimony Tetroxide	1332-81-6	3.1E+01	n	4.1E+02	n					1.5E+01	n			
						2.0E-04	I			0.15			Antimony Trioxide	1309-64-4	2.8E+05	nm	1.2E+06	nm	2.1E-01	n	8.8E-01	n					
				1.3E-02	I					1	0.1		Apollo	74115-24-5	7.9E+02	n	8.0E+03	n					4.7E+02	n		2.9E+01	
2.5E-02	I	7.1E-06	I	5.0E-02	H					1	0.1		Aramite	140-57-8	1.9E+01	c	6.9E+01	c	3.4E-01	c	1.7E+00	c	2.7E+00	c		3.0E-02	
1.5E+00	I	4.3E-03	I	3.0E-04	I	1.5E-05	C			1	0.03		Arsenic, Inorganic	7440-38-2	3.9E-01	c*	1.6E+00	c	5.7E-04	c*	2.9E-03	c*	4.5E-02	c	1.0E+01	1.3E-03	2.9E-01
				3.5E-06	C	5.0E-05	I			1			Arsine	7784-42-1	2.7E-01	n	3.6E+00	n	5.2E-02	n	2.2E-01	n	1.3E-01	n			
				9.0E-03	I					1	0.1		Assure	76578-14-8	5.5E+02	n	5.5E+03	n					3.3E+02	n		5.1E+00	
				5.0E-02	I					1	0.1		Asulam	3337-71-1	3.1E+03	n	3.1E+04	n					1.8E+03	n		4.7E-01	
2.3E-01	C			3.5E-02	I					1	0.1		Atrazine	1912-24-9	2.1E+00	c	7.5E+00	c					2.9E-01	c	3.0E+00	1.9E-04	1.9E-03
8.8E-01	C	2.5E-04	C							1	0.1		Auramine	492-80-8	5.5E-01	c	2.0E+00	c	9.7E-03	c	4.9E-02	c	7.6E-02	c		7.0E-04	
				4.0E-04	I					1	0.1		Avermectin B1	65195-55-3	2.4E+01	n	2.5E+02	n					1.5E+01	n		2.6E+01	
1.1E-01	I	3.1E-05	I					V		1			Azobenzene	103-33-3	5.1E+00	c	2.3E+01	c	7.8E-02	c	4.0E-01	c	1.2E-01	c		9.6E-04	
				2.0E-01	I	5.0E-04	H			0.07			Barium	7440-39-3	1.5E+04	n	1.9E+05	nm	5.2E-01	n	2.2E+00	n	7.3E+03	n	2.0E+03	3.0E+02	8.2E+01
				4.0E-03	I					1	0.1		Baygon	114-26-1	2.4E+02	n	2.5E+03	n					1.5E+02	n		4.7E-02	
				3.0E-02	I					1	0.1		Bayleton	43121-43-3	1.8E+03	n	1.8E+04	n					1.1E+03	n		8.7E-01	
				2.5E-02	I					1	0.1		Baythroid	68359-37-5	1.5E+03	n	1.5E+04	n					9.1E+02	n		2.4E+02	
				3.0E-01	I					1	0.1		Benefin	1861-40-1	1.8E+04	n	1.8E+05	nm					1.1E+04	n		3.6E+02	
				5.0E-02	I					1	0.1		Benomyl	17804-35-2	3.1E+03	n	3.1E+04	n					1.8E+03	n		1.6E+00	
				3.0E-02	I					1	0.1		Bentazon	25057-89-0	1.8E+03	n	1.8E+04	n					1.1E+03	n		2.4E-01	
				1.0E-01	I			V		1		1.2E+03	Benzaldehyde	100-52-7	7.8E+03	ns	1.0E+05	nms					3.7E+03	n		8.1E-01	
5.5E-02	I	7.8E-06	I	4.0E-03	I	3.0E-02	I	V		1		1.8E+03	Benzene	71-43-2	1.1E+00	c*	5.4E+00	c*	3.1E-01	c	1.6E+00	c*	4.1E-01	c	5.0E+00	2.1E-04	2.6E-03
				2.0E-04	X				M				Benzenediamine-2-methyl sulfate, 1,4-	6369-59-1	1.6E+01	n	2.0E+02	n					7.3E+00	n			
				1.0E-03	P			V		1		1.3E+03	Benzenethiol	108-98-5	7.8E+01	n	1.0E+03	n					3.7E+01	n		2.4E-02	
2.3E+02	I	6.7E-02	I	3.0E-03	I				M	1	0.1		Benzidine	92-87-5	5.0E-04	c	7.5E-03	c	1.4E-05	c	1.8E-04	c	9.4E-05	c		2.8E-01	
				4.0E+00	I					1	0.1		Benzoic Acid	65-85-0	2.4E+05	nm	2.5E+06	nm					1.5E+05	n		3.4E+01	
1.3E+01	I							V		1		3.2E+02	Benzotrichloride	98-07-7	4.9E-02	c	2.2E-01	c					5.2E-03	c		1.1E-05	
				1.0E-01	P					1	0.1		Benzyl Alcohol	100-51-6	6.1E+03	n	6.2E+04	n					3.7E+03	n		8.9E-01	
1.7E-01	I	4.9E-05	C	2.0E-03	P	1.0E-03	P	V		1		1.5E+03	Benzyl Chloride	100-44-7	1.0E+00	c*	4.9E+00	c*	5.0E-02	c*	2.5E-01	c*	7.9E-02	c*		8.7E-05	
		2.4E-03	I	2.0E-03	I	2.0E-05	I			0.007			Beryllium and compounds	7440-41-7	1.6E+02	n	2.0E+03	n	1.0E-03	c*	5.1E-03	c*	7.3E+01	n	4.0E+00	5.8E+01	3.2E+00

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Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				1.0E-04	I					1	0.1		Bidrin	141-66-2	6.1E+00	n	6.2E+01	n					3.7E+00	n		8.5E-04	
				9.0E-03	P					1	0.1		Bifenox	42576-02-3	5.5E+02	n	5.5E+03	n					3.3E+02	n		2.5E+00	
				1.5E-02	I					1	0.1		Biphenthrin	82657-04-3	9.2E+02	n	9.2E+03	n					5.5E+02	n		2.5E+03	
8.0E-03	X			5.0E-02	I	4.0E-04	X	V		1		2.1E+02	Biphenyl, 1,1'-	92-52-4	5.1E+01	n	2.1E+02	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		8.7E-03	
7.0E-02	H	1.0E-05	H	4.0E-02	I			V		1		1.0E+03	Bis(2-chloro-1-methylethyl) ether	108-60-1	4.6E+00	c	2.2E+01	c	2.4E-01	c	1.2E+00	c	3.2E-01	c		1.2E-04	
				3.0E-03	P					1	0.1		Bis(2-chloroethoxy)methane	111-91-1	1.8E+02	n	1.8E+03	n					1.1E+02	n		2.5E-02	
1.1E+00	I	3.3E-04	I					V		1		5.1E+03	Bis(2-chloroethyl)ether	111-44-4	2.1E-01	c	1.0E+00	c	7.4E-03	c	3.7E-02	c	1.2E-02	c		3.1E-06	
1.4E-02	I	2.4E-06	C	2.0E-02	I					1	0.1		Bis(2-ethylhexyl)phthalate	117-81-7	3.5E+01	c*	1.2E+02	c	1.0E+00	c	5.1E+00	c	4.8E+00	c	6.0E+00	1.1E+00	1.4E+00
2.2E+02	I	6.2E-02	I					V		1		4.2E+03	Bis(chloromethyl)ether	542-88-1	7.7E-05	c	3.9E-04	c	3.9E-05	c	2.0E-04	c	6.2E-05	c		1.5E-08	
				5.0E-02	I					1	0.1		Bisphenol A	80-05-7	3.1E+03	n	3.1E+04	n					1.8E+03	n		1.4E+02	
				2.0E-01	I	2.0E-02	H			1			Boron And Borates Only	7440-42-8	1.6E+04	n	2.0E+05	nm	2.1E+01	n	8.8E+01	n	7.3E+03	n		2.3E+01	
				4.0E-02	C	1.3E-02	C			1			Boron Trifluoride	7637-07-2	3.1E+03	n	4.1E+04	n	1.4E+01	n	5.7E+01	n	1.5E+03	n			
7.0E-01	I			4.0E-03	I					1			Bromate	15541-45-4	9.1E-01	c	4.1E+00	c					9.6E-02	c	1.0E+01	7.4E-04	7.7E-02
2.0E+00	X	6.0E-04	X					V		1		2.4E+03	Bromo-2-chloroethane, 1-	107-04-0	2.4E-02	c	1.2E-01	c	4.1E-03	c	2.0E-02	c	6.5E-03	c		1.8E-06	
				8.0E-03	I	6.0E-02	I	V		1		6.8E+02	Bromobenzene	108-86-1	3.0E+02	n	1.8E+03	ns	6.3E+01	n	2.6E+02	n	8.8E+01	n		5.9E-02	
						4.0E-02	X	V		1		4.0E+03	Bromochloromethane	74-97-5	1.6E+02	n	6.8E+02	n	4.2E+01	n	1.8E+02	n	8.3E+01	n		2.1E-02	
6.2E-02	I	3.7E-05	C	2.0E-02	I			V		1		9.3E+02	Bromodichloromethane	75-27-4	2.7E-01	c	1.4E+00	c	6.6E-02	c	3.3E-01	c	1.2E-01	c	8.0E+01(F)	3.2E-05	2.2E-02
7.9E-03	I	1.1E-06	I	2.0E-02	I					1	0.1		Bromoform	75-25-2	6.2E+01	c*	2.2E+02	c*	2.2E+00	c	1.1E+01	c	8.5E+00	c*	8.0E+01(F)	2.3E-03	2.1E-02
				1.4E-03	I	5.0E-03	I	V		1		3.6E+03	Bromomethane	74-83-9	7.3E+00	n	3.2E+01	n	5.2E+00	n	2.2E+01	n	8.7E+00	n		2.2E-03	
				5.0E-03	H					1	0.1		Bromophos	2104-96-3	3.1E+02	n	3.1E+03	n					1.8E+02	n		7.7E-01	
				2.0E-02	I					1	0.1		Bromoxynil	1689-84-5	1.2E+03	n	1.2E+04	n					7.3E+02	n		6.3E-01	
				2.0E-02	I					1	0.1		Bromoxynil Octanoate	1689-99-2	1.2E+03	n	1.2E+04	n					7.3E+02	n		6.4E+00	
3.4E+00	C	3.0E-05	I			2.0E-03	I	V		1		6.7E+02	Butadiene, 1,3-	106-99-0	5.4E-02	c*	2.6E-01	c*	8.1E-02	c*	4.1E-01	c*	1.8E-02	c		9.7E-06	
				1.0E-01	I					1	0.1		Butanol, N-	71-36-3	6.1E+03	n	6.2E+04	n					3.7E+03	n		7.6E-01	
1.9E-03	P			2.0E-01	I					1	0.1		Butyl Benzyl Phthlate	85-68-7	2.6E+02	c*	9.1E+02	c					3.5E+01	c		5.1E-01	
				2.0E+00	P	3.0E+01	P			1	0.1		Butyl alcohol, sec-	78-92-2	1.2E+05	nm	1.2E+06	nm	3.1E+04	n	1.3E+05	n	7.3E+04	n		1.5E+01	
				5.0E-02	I					1	0.1		Butylate	2008-41-5	3.1E+03	n	3.1E+04	n					1.8E+03	n		1.8E+00	
2.0E-04	C	5.7E-08	C							1	0.1		Butylated hydroxyanisole	25013-16-5	2.4E+03	c	8.6E+03	c	4.3E+01	c	2.2E+02	c	3.4E+02	c		6.3E-01	
				5.0E-02	P			V		1		1.1E+02	Butylbenzene, n-	104-51-8	3.9E+03	ns	5.1E+04	ns					1.8E+03	n		5.9E+00	
				1.0E+00	I					1	0.1		Butylphthalyl Butylglycolate	85-70-1	6.1E+04	n	6.2E+05	nm					3.7E+04	n		8.3E+02	
				2.0E-02	A					1	0.1		Cacodylic Acid	75-60-5	1.2E+03	n	1.2E+04	n					7.3E+02	n			
		1.8E-03	I	1.0E-03	I	2.0E-05	C			0.025	0.001		Cadmium (Diet)	7440-43-9	7.0E+01	n	8.0E+02	n									
		1.8E-03	I	5.0E-04	I	2.0E-05	C			0.05	0.001		Cadmium (Water)	7440-43-9					1.4E-03	c*	6.8E-03	c*	1.8E+01	n	5.0E+00	1.4E+00	3.8E-01
				5.0E-01	I					1	0.1		Caprolactam	105-60-2	3.1E+04	n	3.1E+05	nm					1.8E+04	n		4.5E+00	
1.5E-01	C	4.3E-05	C	2.0E-03	I					1	0.1		Captafol	2425-06-1	3.2E+00	c*	1.1E+01	c	5.7E-02	c	2.9E-01	c	4.5E-01	c		7.9E-04	
2.3E-03	C	6.6E-07	C	1.3E-01	I					1	0.1		Captan	133-06-2	2.1E+02	c*	7.5E+02	c	3.7E+00	c	1.9E+01	c	2.9E+01	c		2.1E-02	
				1.0E-01	I					1	0.1		Carbaryl	63-25-2	6.1E+03	n	6.2E+04	n					3.7E+03	n		3.3E+00	
				5.0E-03	I					1	0.1		Carbofuran	1563-66-2	3.1E+02	n	3.1E+03	n					1.8E+02	n	4.0E+01	7.1E-02	1.6E-02
				1.0E-01	I	7.0E-01	I	V		1		7.4E+02	Carbon Disulfide	75-15-0	8.2E+02	ns	3.7E+03	ns	7.3E+02	n	3.1E+03	n	1.0E+03	n		3.1E-01	
7.0E-02	I	6.0E-06	I	4.0E-03	I	1.0E-01	I	V		1		4.6E+02	Carbon Tetrachloride	56-23-5	6.1E-01	c	3.0E+00	c	4.1E-01	c	2.0E+00	c	4.4E-01	c	5.0E+00	1.7E-04	1.9E-03
				1.0E-02	I					1	0.1		Carbosulfan	55285-14-8	6.1E+02	n	6.2E+03	n					3.7E+02	n		8.8E+00	
				1.0E-01	I					1	0.1		Carboxin	5234-68-4	6.1E+03	n	6.2E+04	n					3.7E+03	n		2.0E+00	
						9.0E-04	I			1			Ceric oxide	1306-38-3	1.3E+06	nm	5.4E+06	nm	9.4E-01	n	3.9E+00	n					
				1.0E-01	I					1	0.1		Chloral Hydrate	302-17-0	6.1E+03	n	6.2E+04	n					3.7E+03	n		7.4E-01	
				1.5E-02	I					1	0.1		Chloramben	133-90-4	9.2E+02	n	9.2E+03	n					5.5E+02	n		1.3E-01	
4.0E-01	H									1	0.1		Chloranil	118-75-2	1.2E+00	c	4.3E+00	c					1.7E-01	c		1.4E-04	
3.5E-01	I	1.0E-04	I	5.0E-04	I	7.0E-04	I			1	0.04		Chlordane	12789-03-6	1.6E+00	c*	6.5E+00	c*	2.4E-02	c*	1.2E-01	c*	1.9E-01	c*	2.0E+00	1.3E-02	1.4E-01
1.0E+01	I	4.6E-03	C	3.0E-04	I					1	0.1		Chlordecone (Kepone)	143-50-0	4.9E-02	c	1.7E-01	c	5.3E-04	c	2.7E-03	c	6.7E-03	c		2.4E-04	
				7.0E-04	A					1	0.1		Chlorfenvinphos	470-90-6	4.3E+01	n	4.3E+02	n					2.6E+01	n		7.0E-02	
				2.0E-02	I					1	0.1		Chlorimuron, Ethyl-	90982-32-4	1.2E+03	n	1.2E+04	n					7.3E+02	n		2.5E-01	
				1.0E-01	I	1.5E-04	A			1			Chlorine	7782-50-5	7.5E+03	n	9.1E+04	n	1.5E-01	n	6.4E-01	n	3.7E+03	n		1.6E+00	
				3.0E-02	I	2.0E-04	I			1			Chlorine Dioxide	10049-04-4	2.3E+03	n	3.0E+04	n	2.1E-01	n	8.8E-01	n	1.1E+03	n			
				3.0E-02	I					1			Chlorite (Sodium Salt)	7758-19-2	2.3E+03	n	3.1E+04	n					1.1E+03	n	1.0E+03		
						5.0E+01	I	V		1		1.2E+03	Chloro-1,1-difluoroethane, 1-	75-68-3	5.8E+04	ns	2.4E+05	nms	5.2E+04	n	2.2E+05	n	1.0E+05	n		5.2E+01	
		3.0E-04	I	2.0E-02	H	2.0E-02	I	V		1		7.5E+02	Chloro-1,3-butadiene, 2-	126-99-8	9.4E-03	c	4.7E-02	c	8.1E-03	c	4.1E-02	c	1.6E-02	c		8.5E-06	
4.6E-01	H									1	0.1		Chloro-2-methylaniline HCl, 4-	3165-93-3	1.1E+00	c	3.7E+00	c					1.5E-01	c		8.3E-05	
1.0E-01	P	7.7E-05	C	3.0E-03	X					1	0.1		Chloro-2-methylaniline, 4-	95-69-2	4.9E+00	c*	1.7E+01	c	3.2E-02	c	1.6E-01	c	6.7E-01	c		3.8E-04	
2.7E-01	X									1	0.1		Chloroacetaldehyde, 2-	107-20-0	1.8E+00	c	6.4E+00	c					2.5E-01	c		5.0E-05	
				2.0E-03	H					1	0.1		Chloroacetic Acid	79-11-8	1.2E+02	n	1.2E+03	n					7.3E+01	n	6.0E+01	1.5E-02	1.2E-02
						3.0E-05	I			1	0.1		Chloroacetophenone, 2-	532-27-4	4.3E+04	n	1.8E+05	nm	3.1E-02	n	1.3E-01	n					
2.0E-01	P			4.0E-03	I					1	0.1		Chloroaniline, p-	106-47-8	2.4E+00	c	8.6E+00	c					3.4E-01	c		1.4E-04	
				2.0E-02	I	5.0E-02	P	V		1		7.6E+02	Chlorobenzene	108-90-7	2.9E+02	n	1.4E+03	ns	5.2E+01	n	2.2E+02	n	9.1E+01	n	1.0E+02	6.2E-02	6.8E-02
1.1E-01	C	3.1E-05	C	2.0E-02	I					1	0.1		Chlorobenzilate	510-15-6	4.4E+00	c	1.6E+01	c	7.8E-02	c	4.0E-01	c	6.1E-01	c		2.0E-03	
				3.0E-02	X					1	0.1		Chlorobenzoic Acid, p-	74-11-3	1.8E+03	n	1.8E+04	n					1.1E+03	n		2.8E-01	
				3.0E-03	P	3.0E-01	P	V		1		1.2E+02	Chlorobenzotrifluoride, 4-	98-56-6	2.1E+02	ns	2.3E+03	ns	3.1E+02	n	1.3E+03	n	9.3E+01	n		3.3E-01	

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Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				4.0E-02	P			V		1		7.3E+02	Chlorobutane, 1-	109-69-3	3.1E+03	ns	4.1E+04	ns					1.5E+03	n		5.9E-01	
						5.0E+01	I	V		1		1.7E+03	Chlorodifluoromethane	75-45-6	5.3E+04	ns	2.2E+05	nms	5.2E+04	n	2.2E+05	n	1.0E+05	n		4.3E+01	
3.1E-02	C	2.3E-05	I	1.0E-02	I	9.8E-02	A	V		1		2.5E+03	Chloroform	67-66-3	2.9E-01	c	1.5E+00	c	1.1E-01	c	5.3E-01	c	1.9E-01	c	8.0E+01(F)	5.3E-05	2.2E-02
						9.0E-02	I	V		1		1.3E+03	Chloromethane	74-87-3	1.2E+02	n	5.0E+02	n	9.4E+01	n	3.9E+02	n	1.9E+02	n		4.9E-02	
2.4E+00	C	6.9E-04	C					V		1		2.6E+04	Chloromethyl Methyl Ether	107-30-2	1.9E-02	c	9.4E-02	c	3.5E-03	c	1.8E-02	c	5.6E-03	c		1.2E-06	
				8.0E-02	I			V		1		1.8E+02	Chloronaphthalene, Beta-	91-58-7	6.3E+03	ns	8.2E+04	ns					2.9E+03	n		1.5E+01	
3.0E-01	P			3.0E-03	P	1.0E-05	X			1	0.1		Chloronitrobenzene, o-	88-73-3	1.6E+00	c	5.7E+00	c	1.0E-02	n	4.4E-02	n	2.2E-01	c		2.1E-04	
6.3E-03	P			1.0E-03	P	6.0E-04	P			1	0.1		Chloronitrobenzene, p-	100-00-5	6.1E+01	n	2.7E+02	c**	6.3E-01	n	2.6E+00	n	1.1E+01	c**		9.9E-03	
				5.0E-03	I			V		1		2.2E+04	Chlorophenol, 2-	95-57-8	3.9E+02	n	5.1E+03	n					1.8E+02	n		1.5E-01	
						4.0E-04	C	V		1		6.2E+02	Chloropicrin	76-06-2	2.1E+00	n	8.8E+00	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		2.5E-04	
3.1E-03	C	8.9E-07	C	1.5E-02	I					1	0.1		Chlorothalonil	1897-45-6	1.6E+02	c**	5.6E+02	c*	2.7E+00	c	1.4E+01	c	2.2E+01	c*		4.9E-02	
				2.0E-02	I			V		1		9.1E+02	Chlorotoluene, o-	95-49-8	1.6E+03	ns	2.0E+04	ns					7.3E+02	n		7.1E-01	
				2.0E-02	X			V		1		2.5E+02	Chlorotoluene, p-	106-43-4	1.6E+03	ns	2.0E+04	ns					7.3E+02	n		7.1E-01	
2.4E+02	C	6.9E-02	C							1	0.1		Chlorozotocin	54749-90-5	2.0E-03	c	7.2E-03	c	3.5E-05	c	1.8E-04	c	2.8E-04	c		6.2E-08	
				2.0E-01	I					1	0.1		Chlorpropham	101-21-3	1.2E+04	n	1.2E+05	nm					7.3E+03	n		6.6E+00	
				3.0E-03	I					1	0.1		Chlorpyrifos	2921-88-2	1.8E+02	n	1.8E+03	n					1.1E+02	n		1.6E+00	
				1.0E-02	H					1	0.1		Chlorpyrifos Methyl	5598-13-0	6.1E+02	n	6.2E+03	n					3.7E+02	n		1.7E+00	
				5.0E-02	I					1	0.1		Chlorsulfuron	64902-72-3	3.1E+03	n	3.1E+04	n					1.8E+03	n		1.5E+00	
				8.0E-04	H					1	0.1		Chlorthiophos	60238-56-4	4.9E+01	n	4.9E+02	n					2.9E+01	n		7.5E-01	
				1.5E+00	I					0.013			Chromium(III), Insoluble Salts	16065-83-1	1.2E+05	nm	1.5E+06	nm					5.5E+04	n		9.9E+07	
5.0E-01	J	8.4E-02	S	3.0E-03	I	1.0E-04	I		M	0.025			Chromium(VI)	18540-29-9	2.9E-01	c	5.6E+00	c	1.1E-05	c	1.5E-04	c	4.3E-02	c		2.1E+00	
										0.013			Chromium, Total	7440-47-3											1.0E+02		1.8E+05
		9.0E-03	P	3.0E-04	P	6.0E-06	P			1			Cobalt	7440-48-4	2.3E+01	n	3.0E+02	n	2.7E-04	c*	1.4E-03	c*	1.1E+01	n		4.9E-01	
		6.2E-04	I						M	1	0.1		Coke Oven Emissions	8007-45-2					1.5E-03	c	2.0E-02	c					
				4.0E-02	H					1			Copper	7440-50-8	3.1E+03	n	4.1E+04	n					1.5E+03	n	1.3E+03	5.1E+01	4.6E+01
				5.0E-02	I	6.0E-01	C			1	0.1		Cresol, m-	108-39-4	3.1E+03	n	3.1E+04	n	6.3E+02	n	2.6E+03	n	1.8E+03	n		1.5E+00	
				5.0E-02	I	6.0E-01	C			1	0.1		Cresol, o-	95-48-7	3.1E+03	n	3.1E+04	n	6.3E+02	n	2.6E+03	n	1.8E+03	n		1.5E+00	
				5.0E-03	H	6.0E-01	C			1	0.1		Cresol, p-	106-44-5	3.1E+02	n	3.1E+03	n	6.3E+02	n	2.6E+03	n	1.8E+02	n		1.5E-01	
				1.0E-01	X					1	0.1		Cresol, p-chloro-m-	59-50-7	6.1E+03	n	6.2E+04	n					3.7E+03	n		4.3E+00	
				1.0E-01	A	6.0E-01	C	V		1		5.0E+04	Cresols	1319-77-3	7.5E+03	n	9.1E+04	ns	6.3E+02	n	2.6E+03	n	9.3E+02	n		7.6E-01	
1.9E+00	H			1.0E-03	P			V		1		1.7E+04	Crotonaldehyde, trans-	123-73-9	3.4E-01	c	1.5E+00	c					3.5E-02	c		7.2E-06	
				1.0E-01	I	4.0E-01	I	V		1		2.7E+02	Cumene	98-82-8	2.1E+03	ns	1.1E+04	ns	4.2E+02	n	1.8E+03	n	6.8E+02	n		1.1E+00	
2.2E-01	C	6.3E-05	C							1	0.1		Cupferron	135-20-6	2.2E+00	c	7.8E+00	c	3.9E-02	c	1.9E-01	c	3.1E-01	c		5.3E-04	
8.4E-01	H			2.0E-03	H					1	0.1		Cyanazine	21725-46-2	5.8E-01	c	2.1E+00	c					8.0E-02	c		3.7E-05	
													Cyanides														
				4.0E-02	I					1			~Calcium Cyanide	592-01-8	3.1E+03	n	4.1E+04	n					1.5E+03	n			
				5.0E-03	I					1			~Copper Cyanide	544-92-3	3.9E+02	n	5.1E+03	n					1.8E+02	n			
				2.0E-02	I			V		1		1.0E+07	~Cyanide (CN-)	57-12-5	1.6E+03	n	2.0E+04	n					7.3E+02	n	2.0E+02	7.4E+00	2.0E+00
				4.0E-02	I			V		1			~Cyanogen	460-19-5	3.1E+03	n	4.1E+04	n					1.5E+03	n			
				9.0E-02	I			V		1			~Cyanogen Bromide	506-68-3	7.0E+03	n	9.2E+04	n					3.3E+03	n			
				5.0E-02	I			V		1			~Cyanogen Chloride	506-77-4	3.9E+03	n	5.1E+04	n					1.8E+03	n			
				6.0E-04	I	8.0E-04	I	V		1			~Hydrogen Cyanide	74-90-8	4.7E+01	n	6.1E+02	n	8.3E-01	n	3.5E+00	n	1.6E+00	n			
				5.0E-02	I					1			~Potassium Cyanide	151-50-8	3.9E+03	n	5.1E+04	n					1.8E+03	n			
				2.0E-01	I					0.04			~Potassium Silver Cyanide	506-61-6	1.6E+04	n	2.0E+05	nm					7.3E+03	n			
				1.0E-01	I					0.04			~Silver Cyanide	506-64-9	7.8E+03	n	1.0E+05	nm					3.7E+03	n			
				4.0E-02	I					1			~Sodium Cyanide	143-33-9	3.1E+03	n	4.1E+04	n					1.5E+03	n	2.0E+02		
				2.0E-04	P			V		1		4.6E+03	~Thiocyanate	463-56-9	1.6E+01	n	2.0E+02	n					7.3E+00	n		1.5E-03	
				5.0E-02	I					1			~Zinc Cyanide	557-21-1	3.9E+03	n	5.1E+04	n					1.8E+03	n			
						6.0E+00	I	V		1		1.2E+02	Cyclohexane	110-82-7	7.0E+03	ns	2.9E+04	ns	6.3E+03	n	2.6E+04	n	1.3E+04	n		1.3E+01	
2.3E-02	H									1	0.1		Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	2.1E+01	c	7.5E+01	c					2.9E+00	c		1.7E-02	
				5.0E+00	I	7.0E-01	P			1	0.1		Cyclohexanone	108-94-1	3.1E+05	nm	3.1E+06	nm	7.3E+02	n	3.1E+03	n	1.8E+05	n		4.3E+01	
				2.0E-01	I					1	0.1		Cyclohexylamine	108-91-8	1.2E+04	n	1.2E+05	nm					7.3E+03	n		1.9E+00	
				5.0E-03	I					1	0.1		Cyhalothrin/karate	68085-85-8	3.1E+02	n	3.1E+03	n					1.8E+02	n		1.2E+02	
				1.0E-02	I					1	0.1		Cypermethrin	52315-07-8	6.1E+02	n	6.2E+03	n					3.7E+02	n		5.8E+01	
				7.5E-03	I					1	0.1		Cyromazine	66215-27-8	4.6E+02	n	4.6E+03	n					2.7E+02	n		7.0E-02	
2.4E-01	I	6.9E-05	C							1	0.1		DDD	72-54-8	2.0E+00	c	7.2E+00	c	3.5E-02	c	1.8E-01	c	2.8E-01	c		6.6E-02	
3.4E-01	I	9.7E-05	C							1	0.1		DDE, p,p'-	72-55-9	1.4E+00	c	5.1E+00	c	2.5E-02	c	1.3E-01	c	2.0E-01	c		4.6E-02	
3.4E-01	I	9.7E-05	I	5.0E-04	I					1	0.03		DDT	50-29-3	1.7E+00	c*	7.0E+00	c*	2.5E-02	c	1.3E-01	c	2.0E-01	c*		6.7E-02	
				1.0E-02	I					1	0.1		Dacthal	1861-32-1	6.1E+02	n	6.2E+03	n					3.7E+02	n		4.5E-01	
				3.0E-02	I					1	0.1		Dalapon	75-99-0	1.8E+03	n	1.8E+04	n					1.1E+03	n	2.0E+02	2.3E-01	4.1E-02
7.0E-04	I			7.0E-03	I					1	0.1		Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'- (BDE-209)	1163-19-5	4.3E+02	n	2.5E+03	c**					9.6E+01	c**		5.3E+01	
				4.0E-05	I					1	0.1		Demeton	8065-48-3	2.4E+00	n	2.5E+01	n					1.5E+00	n			
1.2E-03	I			6.0E-01	I					1	0.1		Di(2-ethylhexyl)adipate	103-23-1	4.1E+02	c*	1.4E+03	c					5.6E+01	c	4.0E+02	4.0E+00	2.9E+01
6.1E-02	H									1	0.1		Diallate	2303-16-4	8.0E+00	c	2.8E+01	c					1.1E+00	c		1.6E-03	
				7.0E-04	A					1	0.1		Diazinon	333-41-5	4.3E+01	n	4.3E+02	n					2.6E+01	n		1.6E-01	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vo c	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
8.0E-01	P	6.0E-03	P	2.0E-04	P	2.0E-04	I	V	M	1		9.8E+02	Dibromo-3-chloropropane, 1,2-	96-12-8	5.4E-03	c	6.9E-02	c	1.6E-04	c	2.0E-03	c	3.2E-04	c	2.0E-01	1.4E-07	8.6E-05
				1.0E-02	I					1	0.1		Dibromobenzene, 1,4-	106-37-6	6.1E+02	n	6.2E+03	n					3.7E+02	n		3.5E-01	
8.4E-02	I	2.7E-05	C	2.0E-02	I			V		1	0.1	8.0E+02	Dibromochloromethane	124-48-1	6.8E-01	c	3.3E+00	c	9.0E-02	c	4.5E-01	c	1.5E-01	c	8.0E+01(F)	3.9E-05	2.1E-02
2.0E+00	I	6.0E-04	I	9.0E-03	I	9.0E-03	I	V		1		1.3E+03	Dibromoethane, 1,2-	106-93-4	3.4E-02	c	1.7E-01	c	4.1E-03	c	2.0E-02	c	6.5E-03	c	5.0E-02	1.8E-06	1.4E-05
				1.0E-02	H	4.0E-03	X	V		1		2.8E+03	Dibromomethane (Methylene Bromide)	74-95-3	2.5E+01	n	1.1E+02	n	4.2E+00	n	1.8E+01	n	8.2E+00	n		2.0E-03	
				1.0E-01	I					1	0.1		Dibutyl Phthalate	84-74-2	6.1E+03	n	6.2E+04	n					3.7E+03	n		9.2E+00	
				3.0E-04	P					1	0.1		Dibutyltin Compounds	NA	1.8E+01	n	1.8E+02	n					1.1E+01	n			
				3.0E-02	I					1	0.1		Dicamba	1918-00-9	1.8E+03	n	1.8E+04	n					1.1E+03	n		2.8E-01	
		4.2E-03	P					V		1		5.2E+02	Dichloro-2-butene, 1,4-	764-41-0	6.9E-03	c	3.5E-02	c	5.8E-04	c	2.9E-03	c	1.2E-03	c		5.4E-07	
		4.2E-03	P					V		1	0.1	5.2E+02	Dichloro-2-butene, cis-1,4-	1476-11-5	6.9E-03	c	3.5E-02	c	5.8E-04	c	2.9E-03	c	1.2E-03	c		5.4E-07	
		4.2E-03	P					V		1	0.1	7.6E+02	Dichloro-2-butene, trans-1,4-	110-57-6	6.9E-03	c	3.5E-02	c	5.8E-04	c	2.9E-03	c	1.2E-03	c		5.4E-07	
5.0E-02	I			4.0E-03	I					1	0.1		Dichloroacetic Acid	79-43-6	9.7E+00	c*	3.4E+01	c*					1.3E+00	c	6.0E+01	2.7E-04	1.2E-02
				9.0E-02	I	2.0E-01	H	V		1		3.8E+02	Dichlorobenzene, 1,2-	95-50-1	1.9E+03	ns	9.8E+03	ns	2.1E+02	n	8.8E+02	n	3.7E+02	n	6.0E+02	3.6E-01	5.8E-01
5.4E-03	C	1.1E-05	C	7.0E-02	A	8.0E-01	I	V		1			Dichlorobenzene, 1,4-	106-46-7	2.4E+00	c	1.2E+01	c	2.2E-01	c	1.1E+00	c	4.3E-01	c	7.5E+01	4.1E-04	7.2E-02
4.5E-01	I	3.4E-04	C							1	0.1		Dichlorobenzidine, 3,3'-	91-94-1	1.1E+00	c	3.8E+00	c	7.2E-03	c	3.6E-02	c	1.5E-01	c		9.8E-04	
				9.0E-03	X					1	0.1		Dichlorobenzophenone, 4,4'-	90-98-2	5.5E+02	n	5.5E+03	n					3.3E+02	n		2.0E+00	
				2.0E-01	I	1.0E-01	X	V		1		8.5E+02	Dichlorodifluoromethane	75-71-8	9.4E+01	n	4.0E+02	n	1.0E+02	n	4.4E+02	n	2.0E+02	n		3.1E-01	
5.7E-03	C	1.6E-06	C	2.0E-01	P			V		1		1.7E+03	Dichloroethane, 1,1-	75-34-3	3.3E+00	c	1.7E+01	c	1.5E+00	c	7.7E+00	c	2.4E+00	c		6.9E-04	
9.1E-02	I	2.6E-05	I	6.0E-03	X	7.0E-03	P	V		1		3.0E+03	Dichloroethane, 1,2-	107-06-2	4.3E-01	c*	2.2E+00	c*	9.4E-02	c*	4.7E-01	c*	1.5E-01	c*	5.0E+00	4.2E-05	1.4E-03
				5.0E-02	I	2.0E-01	I	V		1		1.2E+03	Dichloroethylene, 1,1-	75-35-4	2.4E+02	n	1.1E+03	n	2.1E+02	n	8.8E+02	n	3.4E+02	n	7.0E+00	1.2E-01	2.5E-03
				9.0E-03	H			V		1		1.3E+03	Dichloroethylene, 1,2- (Mixed Isomers)	540-59-0	7.0E+02	n	9.2E+03	ns					3.3E+02	n		9.7E-02	
				2.0E-03	I			V		1		2.4E+03	Dichloroethylene, 1,2-cis-	156-59-2	1.6E+02	n	2.0E+03	n					7.3E+01	n	7.0E+01	2.1E-02	2.1E-02
				2.0E-02	I	6.0E-02	P	V		1		1.7E+03	Dichloroethylene, 1,2-trans-	156-60-5	1.5E+02	n	6.9E+02	n	6.3E+01	n	2.6E+02	n	1.1E+02	n	1.0E+02	3.1E-02	2.9E-02
				3.0E-03	I					1	0.1		Dichlorophenol, 2,4-	120-83-2	1.8E+02	n	1.8E+03	n					1.1E+02	n		1.3E-01	
				1.0E-02	I					1	0.05		Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	6.9E+02	n	7.7E+03	n					3.7E+02	n	7.0E+01	9.5E-02	1.8E-02
				8.0E-03	I					1	0.1		Dichlorophenoxy)butyric Acid, 4-(2,4-	94-82-6	4.9E+02	n	4.9E+03	n					2.9E+02	n		1.2E-01	
3.6E-02	C	1.0E-05	C	9.0E-02	A	4.0E-03	I	V		1		1.4E+03	Dichloropropane, 1,2-	78-87-5	9.4E-01	c*	4.7E+00	c*	2.4E-01	c*	1.2E+00	c*	3.9E-01	c*	5.0E+00	1.3E-04	1.7E-03
				2.0E-02	P			V		1		1.5E+03	Dichloropropane, 1,3-	142-28-9	1.6E+03	ns	2.0E+04	ns					7.3E+02	n		2.5E-01	
				3.0E-03	I					1	0.1		Dichloropropanol, 2,3-	616-23-9	1.8E+02	n	1.8E+03	n					1.1E+02	n		2.3E-02	
1.0E-01	I	4.0E-06	I	3.0E-02	I	2.0E-02	I	V		1		1.6E+03	Dichloropropene, 1,3-	542-75-6	1.7E+00	c*	8.3E+00	c*	6.1E-01	c*	3.1E+00	c*	4.3E-01	c*		1.5E-04	
2.9E-01	I	8.3E-05	C	5.0E-04	I	5.0E-04	I			1	0.1		Dichlorvos	62-73-7	1.7E+00	c*	5.9E+00	c*	2.9E-02	c*	1.5E-01	c*	2.3E-01	c*		7.1E-05	
				8.0E-03	P	7.0E-03	P	V		1		1.3E+02	Dicyclopentadiene	77-73-6	3.1E+01	n	1.3E+02	ns	7.3E+00	n	3.1E+01	n	1.4E+01	n		4.8E-02	
1.6E+01	I	4.6E-03	I	5.0E-05	I					1	0.1		Dieldrin	60-57-1	3.0E-02	c	1.1E-01	c	5.3E-04	c	2.7E-03	c	4.2E-03	c		1.7E-04	
		3.0E-04	C			5.0E-03	I			1	0.1		Diesel Engine Exhaust	NA					8.1E-03	c	4.1E-02	c					
						3.0E-03	C			1	0.1		Diethanolamine	111-42-2	4.3E+06	nm	1.8E+07	nm	3.1E+00	n	1.3E+01	n					
				8.0E-01	I					1	0.1		Diethyl Phthalate	84-66-2	4.9E+04	n	4.9E+05	nm					2.9E+04	n		1.2E+01	
				3.0E-02	P	1.0E-04	P			1	0.1		Diethylene Glycol Monobutyl Ether	112-34-5	1.8E+03	n	1.8E+04	n	1.0E-01	n	4.4E-01	n	1.1E+03	n		2.4E-01	
				6.0E-02	P	3.0E-04	P			1	0.1		Diethylene Glycol Monoethyl Ether	111-90-0	3.6E+03	n	3.6E+04	n	3.1E-01	n	1.3E+00	n	2.2E+03	n		4.4E-01	
				1.0E-03	P					1	0.1		Diethylformamide	617-84-5	6.1E+01	n	6.2E+02	n					3.7E+01	n		7.5E-03	
3.5E+02	C	1.0E-01	C							1	0.1		Diethylstilbestrol	56-53-1	1.4E-03	c	4.9E-03	c	2.4E-05	c	1.2E-04	c	1.9E-04	c		1.1E-04	
				8.0E-02	I					1	0.1		Difenzoquat	43222-48-6	4.9E+03	n	4.9E+04	n					2.9E+03	n			
				2.0E-02	I					1	0.1		Diflubenzuron	35367-38-5	1.2E+03	n	1.2E+04	n					7.3E+02	n		8.2E-01	
						4.0E+01	I	V		1		1.4E+03	Difluoroethane, 1,1-	75-37-6	5.2E+04	ns	2.2E+05	nms	4.2E+04	n	1.8E+05	n	8.3E+04	n		2.8E+01	
4.4E-02	C	1.3E-05	C							1	0.1		Dihydrosafrole	94-58-6	1.1E+01	c	3.9E+01	c	1.9E-01	c	9.4E-01	c	1.5E+00	c		1.9E-03	
						7.0E-01	P	V		1		2.3E+03	Diisopropyl Ether	108-20-3	2.4E+03	ns	1.0E+04	ns	7.3E+02	n	3.1E+03	n	1.5E+03	n		3.7E-01	
				8.0E-02	I			V		1		5.3E+02	Diisopropyl Methylphosphonate	1445-75-6	6.3E+03	ns	8.2E+04	ns					2.9E+03	n		8.3E-01	
				2.0E-02	I					1	0.1		Dimethipin	55290-64-7	1.2E+03	n	1.2E+04	n					7.3E+02	n		1.6E-01	
				2.0E-04	I					1	0.1		Dimethoate	60-51-5	1.2E+01	n	1.2E+02	n					7.3E+00	n		1.6E-03	
1.4E-02	H									1	0.1		Dimethoxybenzidine, 3,3'-	119-90-4	3.5E+01	c	1.2E+02	c					4.8E+00	c		5.8E-03	
1.7E-03	P			6.0E-02	P					1	0.1		Dimethyl methylphosphonate	756-79-6	2.9E+02	c*	1.0E+03	c*					4.0E+01	c*		8.3E-03	
4.6E+00	C	1.3E-03	C							1	0.1		Dimethylamino azobenzene [p-]	60-11-7	1.1E-01	c	3.7E-01	c	1.9E-03	c	9.4E-03	c	1.5E-02	c		6.2E-05	
5.8E-01	H									1	0.1		Dimethylaniline HCl, 2,4-	21436-96-4	8.4E-01	c	3.0E+00	c					1.2E-01	c		6.6E-05	
2.0E-01	P			2.0E-03	X					1	0.1		Dimethylaniline, 2,4-	95-68-1	2.4E+00	c*	8.6E+00	c					3.4E-01	c		1.9E-04	
				2.0E-03	I			V		1		8.3E+02	Dimethylaniline, N,N-	121-69-7	1.6E+02	n	2.0E+03	ns					7.3E+01	n		2.6E-02	
1.1E+01	P									1	0.1		Dimethylbenzidine, 3,3'-	119-93-7	4.4E-02	c	1.6E-01	c					6.1E-03	c		4.0E-05	
				1.0E-01	P	3.0E-02	I			1	0.1		Dimethylformamide	68-12-2	6.1E+03	n	6.2E+04	n	3.1E+01	n	1.3E+02	n	3.7E+03	n		7.4E-01	
				1.0E-04	X	2.0E-06	X			1	0.1		Dimethylhydrazine, 1,1-	57-14-7	6.1E+00	n	6.1E+01	n	2.1E-03	n	8.8E-03	n	3.7E+00	n		8.2E-04	
5.5E+02	C	1.6E-01	C							1	0.1		Dimethylhydrazine, 1,2-	540-73-8	8.8E-04	c	3.1E-03	c	1.5E-05	c	7.7E-05	c	1.2E-04	c		2.8E-08	
				2.0E-02	I					1	0.1		Dimethylphenol, 2,4-	105-67-9	1.2E+03	n	1.2E+04	n					7.3E+02	n		8.6E-01	
				6.0E-04	I					1	0.1		Dimethylphenol, 2,6-	576-26-1	3.7E+01	n	3.7E+02	n					2.2E+01	n		2.6E-02	
				1.0E-03	I					1	0.1		Dimethylphenol, 3,4-	95-65-8	6.1E+01	n	6.2E+02	n					3.7E+01	n		4.3E-02	
				1.0E-01	I			V		1		5.5E+00	Dimethylterephthalate	120-61-6	7.8E+03	ns	1.0E+05	nms					3.7E+03	n		9.6E-01	
4.5E-02	C	1.3E-05	C							1	0.1		Dimethylvinylchloride	513-37-1	1.1E+01	c	3.8E+01	c	1.9E-01	c	9.4E-01	c	1.5E+00	c		9.2E-04	
				8.0E-05	X					1	0.1		Dinitro-o-cresol, 4,6-	534-52-1	4.9E+00	n	4.9E+01	n					2.9E+00	n		5.0E-03	
				2.0E-03	I					1	0.1		Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5	1.2E+02	n	1.2E+03	n					7.3E+01	n		2.4E+00	

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Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				1.0E-04	P					1	0.1		Dinitrobenzene, 1,2-	528-29-0	6.1E+00	n	6.2E+01	n					3.7E+00	n		3.3E-03	
				1.0E-04	I					1	0.1		Dinitrobenzene, 1,3-	99-65-0	6.1E+00	n	6.2E+01	n					3.7E+00	n		3.3E-03	
				1.0E-04	P					1	0.1		Dinitrobenzene, 1,4-	100-25-4	6.1E+00	n	6.2E+01	n					3.7E+00	n		3.3E-03	
				2.0E-03	I					1	0.1		Dinitrophenol, 2,4-	51-28-5	1.2E+02	n	1.2E+03	n					7.3E+01	n		8.2E-02	
6.8E-01	I									1	0.1		Dinitrotoluene Mixture, 2,4/2,6-	25321-14-6	7.2E-01	c	2.5E+00	c					9.9E-02	c		1.4E-04	
3.1E-01	C	8.9E-05	C	2.0E-03	I					1	0.102		Dinitrotoluene, 2,4-	121-14-2	1.6E+00	c*	5.5E+00	c	2.7E-02	c	1.4E-01	c	2.2E-01	c		2.9E-04	
				1.0E-03	P					1	0.099		Dinitrotoluene, 2,6-	606-20-2	6.1E+01	n	6.2E+02	n					3.7E+01	n		5.0E-02	
				2.0E-03	S					1	0.006		Dinitrotoluene, 2-Amino-4,6-	35572-78-2	1.5E+02	n	2.0E+03	n					7.3E+01	n		5.6E-02	
				2.0E-03	S					1	0.009		Dinitrotoluene, 4-Amino-2,6-	19406-51-0	1.5E+02	n	1.9E+03	n					7.3E+01	n		5.6E-02	
				1.0E-03	I					1	0.1		Dinoseb	88-85-7	6.1E+01	n	6.2E+02	n					3.7E+01	n	7.0E+00	3.2E-01	6.2E-02
1.0E-01	I	7.7E-06	C	3.0E-02	I	3.0E+00	C			1	0.1		Dioxane, 1,4-	123-91-1	4.9E+00	c	1.7E+01	c	3.2E-01	c	1.6E+00	c	6.7E-01	c		1.4E-04	
													Dioxins															
6.2E+03	I	1.3E+00	I							1	0.03		~Hexachlorodibenzo-p-dioxin, Mixture	NA	9.4E-05	c	3.9E-04	c	1.9E-06	c	9.4E-06	c	1.1E-05	c		1.5E-05	
1.3E+05	C	3.8E+01	C	1.0E-09	A	4.0E-08	C			1	0.03		~TCDD, 2,3,7,8-	1746-01-6	4.5E-06	c*	1.8E-05	c*	6.4E-08	c	3.2E-07	c	5.2E-07	c*	3.0E-05	2.6E-07	1.5E-05
				3.0E-02	I					1	0.1		Diphenamid	957-51-7	1.8E+03	n	1.8E+04	n					1.1E+03	n		1.1E+01	
				8.0E-04	X					1	0.1		Diphenyl Sulfone	127-63-9	4.9E+01	n	4.9E+02	n					2.9E+01	n		7.1E-02	
				2.5E-02	I					1	0.1		Diphenylamine	122-39-4	1.5E+03	n	1.5E+04	n					9.1E+02	n		1.7E+00	
8.0E-01	I	2.2E-04	I							1	0.1		Diphenylhydrazine, 1,2-	122-66-7	6.1E-01	c	2.2E+00	c	1.1E-02	c	5.6E-02	c	8.4E-02	c		2.7E-04	
				2.2E-03	I					1	0.1		Diquat	85-00-7	1.3E+02	n	1.4E+03	n					8.0E+01	n	2.0E+01	1.5E+00	3.7E-01
7.4E+00	C	2.1E-03	C							1	0.1		Direct Black 38	1937-37-7	6.6E-02	c	2.3E-01	c	1.2E-03	c	5.8E-03	c	9.1E-03	c		4.4E+00	
7.4E+00	C	2.1E-03	C							1	0.1		Direct Blue 6	2602-46-2	6.6E-02	c	2.3E-01	c	1.2E-03	c	5.8E-03	c	9.1E-03	c		1.4E+01	
6.7E+00	C	1.9E-03	C							1	0.1		Direct Brown 95	16071-86-6	7.3E-02	c	2.6E-01	c	1.3E-03	c	6.5E-03	c	1.0E-02	c			
				4.0E-05	I					1	0.1		Disulfoton	298-04-4	2.4E+00	n	2.5E+01	n					1.5E+00	n		2.7E-03	
				1.0E-02	I					1	0.1		Dithiane, 1,4-	505-29-3	6.1E+02	n	6.2E+03	n					3.7E+02	n		1.8E-01	
				2.0E-03	I					1	0.1		Diuron	330-54-1	1.2E+02	n	1.2E+03	n					7.3E+01	n		3.1E-02	
				4.0E-03	I					1	0.1		Dodine	2439-10-3	2.4E+02	n	2.5E+03	n					1.5E+02	n		7.5E-01	
				2.5E-02	I			V		1		4.1E+02	EPTC	759-94-4	2.0E+03	ns	2.6E+04	ns					9.1E+02	n		4.8E-01	
				6.0E-03	I					1	0.1		Endosulfan	115-29-7	3.7E+02	n	3.7E+03	n					2.2E+02	n		3.0E+00	
				2.0E-02	I					1	0.1		Endothall	145-73-3	1.2E+03	n	1.2E+04	n					7.3E+02	n	1.0E+02	1.7E-01	2.4E-02
				3.0E-04	I					1	0.1		Endrin	72-20-8	1.8E+01	n	1.8E+02	n					1.1E+01	n	2.0E+00	4.4E-01	8.1E-02
9.9E-03	I	1.2E-06	I	6.0E-03	P	1.0E-03	I	V		1		1.1E+04	Epichlorohydrin	106-89-8	2.0E+01	n	8.8E+01	n	1.0E+00	n	4.4E+00	n	2.1E+00	n		4.5E-04	
						2.0E-02	I	V		1		1.5E+04	Epoxybutane, 1,2-	106-88-7	1.7E+02	n	7.2E+02	n	2.1E+01	n	8.8E+01	n	4.2E+01	n		9.2E-03	
				5.0E-03	I					1	0.1		Ethephon	16672-87-0	3.1E+02	n	3.1E+03	n					1.8E+02	n		3.8E-02	
				5.0E-04	I					1	0.1		Ethion	563-12-2	3.1E+01	n	3.1E+02	n					1.8E+01	n		3.6E-02	
				1.0E-01	P	6.0E-02	P			1	0.1		Ethoxyethanol Acetate, 2-	111-15-9	6.1E+03	n	6.2E+04	n	6.3E+01	n	2.6E+02	n	3.7E+03	n		7.6E-01	
				4.0E-01	H	2.0E-01	I			1	0.1		Ethoxyethanol, 2-	110-80-5	2.4E+04	n	2.5E+05	nm	2.1E+02	n	8.8E+02	n	1.5E+04	n		2.9E+00	
				9.0E-01	I			V		1		1.1E+04	Ethyl Acetate	141-78-6	7.0E+04	ns	9.2E+05	nms					3.3E+04	n		7.0E+00	
4.8E-02	H							V		1		2.5E+03	Ethyl Acrylate	140-88-5	1.3E+01	c	6.0E+01	c					1.4E+00	c		3.1E-04	
						1.0E+01	I	V		1		2.1E+03	Ethyl Chloride	75-00-3	1.5E+04	ns	6.1E+04	ns	1.0E+04	n	4.4E+04	n	2.1E+04	n		5.9E+00	
				2.0E-01	I			V		1		1.0E+04	Ethyl Ether	60-29-7	1.6E+04	ns	2.0E+05	nms					7.3E+03	n		1.6E+00	
				9.0E-02	H	3.0E-01	P	V		1		1.1E+03	Ethyl Methacrylate	97-63-2	1.5E+03	ns	7.5E+03	ns	3.1E+02	n	1.3E+03	n	5.3E+02	n		1.2E-01	
				1.0E-05	I					1	0.1		Ethyl-p-nitrophenyl Phosphonate	2104-64-5	6.1E-01	n	6.2E+00	n					3.7E-01	n		1.1E-02	
1.1E-02	C	2.5E-06	C	1.0E-01	I	1.0E+00	I	V		1		4.8E+02	Ethylbenzene	100-41-4	5.4E+00	c	2.7E+01	c	9.7E-01	c	4.9E+00	c	1.5E+00	c	7.0E+02	1.7E-03	7.8E-01
				3.0E-02	P					1	0.1		Ethylene Cyanohydrin	109-78-4	1.8E+03	n	1.8E+04	n					1.1E+03	n		2.2E-01	
				9.0E-02	P					1	0.1		Ethylene Diamine	107-15-3	5.5E+03	n	5.5E+04	n					3.3E+03	n		7.5E-01	
				2.0E+00	I	4.0E-01	C			1	0.1		Ethylene Glycol	107-21-1	1.2E+05	nm	1.2E+06	nm	4.2E+02	n	1.8E+03	n	7.3E+04	n		1.5E+01	
				1.0E-01	I	1.6E+00	I			1	0.1		Ethylene Glycol Monobutyl Ether	111-76-2	6.1E+03	n	6.2E+04	n	1.7E+03	n	7.0E+03	n	3.7E+03	n		7.5E-01	
3.1E-01	C	8.8E-05	C			3.0E-02	C	V		1		1.2E+05	Ethylene Oxide	75-21-8	1.7E-01	c	8.3E-01	c	2.8E-02	c	1.4E-01	c	4.4E-02	c		9.1E-06	
4.5E-02	C	1.3E-05	C	8.0E-05	I					1	0.1		Ethylene Thiourea	96-45-7	4.9E+00	n	3.8E+01	c**	1.9E-01	c	9.4E-01	c	1.5E+00	c**		3.4E-04	
6.5E+01	C	1.9E-02	C							1	0.1		Ethyleneimine	151-56-4	7.5E-03	c	2.7E-02	c	1.3E-04	c	6.5E-04	c	1.0E-03	c		2.3E-07	
				3.0E+00	I					1	0.1		Ethylphthalyl Ethyl Glycolate	84-72-0	1.8E+05	nm	1.8E+06	nm					1.1E+05	n		2.5E+02	
				8.0E-03	I					1	0.1		Express	101200-48-0	4.9E+02	n	4.9E+03	n					2.9E+02	n		1.1E-01	
				2.5E-04	I					1	0.1		Fenamiphos	22224-92-6	1.5E+01	n	1.5E+02	n					9.1E+00	n		9.1E-03	
				2.5E-02	I					1	0.1		Fenpropathrin	39515-41-8	1.5E+03	n	1.5E+04	n					9.1E+02	n		4.1E+01	
				1.3E-02	I					1	0.1		Fluometuron	2164-17-2	7.9E+02	n	8.0E+03	n					4.7E+02	n		3.7E-01	
				4.0E-02	C	1.3E-02	C			1			Fluoride	16984-48-8	3.1E+03	n	4.1E+04	n	1.4E+01	n	5.7E+01	n	1.5E+03	n		2.2E+02	
				6.0E-02	I	1.3E-02	C			1			Fluorine (Soluble Fluoride)	7782-41-4	4.7E+03	n	6.1E+04	n	1.4E+01	n	5.7E+01	n	2.2E+03	n	4.0E+03	3.3E+02	6.0E+02
				8.0E-02	I					1	0.1		Fluridone	59756-60-4	4.9E+03	n	4.9E+04	n					2.9E+03	n		3.3E+02	
				2.0E-02	I					1	0.1		Flurprimidol	56425-91-3	1.2E+03	n	1.2E+04	n					7.3E+02	n		3.3E+00	
				6.0E-02	I					1	0.1		Flutolanil	66332-96-5	3.7E+03	n	3.7E+04	n					2.2E+03	n		1.2E+01	
				1.0E-02	I					1	0.1		Fluvalinate	69409-94-5	6.1E+02	n	6.2E+03	n					3.7E+02	n		5.3E+02	
3.5E-03	I			1.0E-01	I					1	0.1		Folpet	133-07-3	1.4E+02	c*	4.9E+02	c					1.9E+01	c		4.5E-03	
1.9E-01	I									1	0.1		Fomesafen	72178-02-0	2.6E+00	c	9.1E+00	c					3.5E-01	c		1.2E-03	
				2.0E-03	I					1	0.1		Fonofos	944-22-9	1.2E+02	n	1.2E+03	n					7.3E+01	n		1.4E-01	
		1.3E-05	I	2.0E-01	I	9.8E-03	A			1	0.1		Formaldehyde	50-00-0	1.2E+04	n	1.2E+05	nm	1.9E-01	c*	9.4E-01	c*	7.3E+03	n		1.5E+00	

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Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				9.0E-01	P	3.0E-04	X			1	0.1		Formic Acid	64-18-6	4.9E+04	n	4.2E+05	nm	3.1E-01	n	1.3E+00	n	3.3E+04	n		6.6E+00	
				3.0E+00	I					1	0.1		Fosetyl-AL	39148-24-8	1.8E+05	nm	1.8E+06	nm					1.1E+05	n			
													Furans														
				1.0E-03	X			V		1		1.7E+02	~Dibenzofuran	132-64-9	7.8E+01	n	1.0E+03	ns					3.7E+01	n		6.8E-01	
				1.0E-03	I			V		1		6.2E+03	~Furan	110-00-9	7.8E+01	n	1.0E+03	n					3.7E+01	n		1.4E-02	
3.8E+00	H									1	0.1		Furazolidone	67-45-8	1.3E-01	c	4.5E-01	c					1.8E-02	c		3.4E-05	
				3.0E-03	I	5.0E-02	H			1	0.1		Furfural	98-01-1	1.8E+02	n	1.8E+03	n	5.2E+01	n	2.2E+02	n	1.1E+02	n		2.3E-02	
1.5E+00	C	4.3E-04	C							1	0.1		Furium	531-82-8	3.2E-01	c	1.1E+00	c	5.7E-03	c	2.9E-02	c	4.5E-02	c		6.1E-05	
3.0E-02	I	8.6E-06	C							1	0.1		Furmecyclox	60568-05-0	1.6E+01	c	5.7E+01	c	2.8E-01	c	1.4E+00	c	2.2E+00	c		2.4E-03	
				4.0E-04	I					1	0.1		Glufosinate, Ammonium	77182-82-2	2.4E+01	n	2.5E+02	n					1.5E+01	n		3.2E-03	
						8.0E-05	C			1	0.1		Glutaraldehyde	111-30-8	1.1E+05	nm	4.8E+05	nm	8.3E-02	n	3.5E-01	n					
				4.0E-04	I	1.0E-03	H			1	0.1		Glycidyl	765-34-4	2.4E+01	n	2.5E+02	n	1.0E+00	n	4.4E+00	n	1.5E+01	n		2.9E-03	
				1.0E-01	I					1	0.1		Glyphosate	1071-83-6	6.1E+03	n	6.2E+04	n					3.7E+03	n	7.0E+02	7.4E-01	1.4E-01
				3.0E-03	I					1	0.1		Goal	42874-03-3	1.8E+02	n	1.8E+03	n					1.1E+02	n		8.8E+00	
				3.0E-03	A	1.0E-02	A			1	0.1		Guthion	86-50-0	1.8E+02	n	1.8E+03	n	1.0E+01	n	4.4E+01	n	1.1E+02	n		3.3E-02	
				5.0E-05	I					1	0.1		Haloxyfop, Methyl	69806-40-2	3.1E+00	n	3.1E+01	n					1.8E+00	n		2.0E-02	
				1.3E-02	I					1	0.1		Harmony	79277-27-3	7.9E+02	n	8.0E+03	n					4.7E+02	n		1.4E-01	
4.5E+00	I	1.3E-03	I	5.0E-04	I					1	0.1		Heptachlor	76-44-8	1.1E-01	c	3.8E-01	c	1.9E-03	c	9.4E-03	c	1.5E-02	c	4.0E-01	1.2E-03	3.3E-02
9.1E+00	I	2.6E-03	I	1.3E-05	I					1	0.1		Heptachlor Epoxide	1024-57-3	5.3E-02	c*	1.9E-01	c*	9.4E-04	c	4.7E-03	c	7.4E-03	c*	2.0E-01	1.5E-04	4.1E-03
				2.0E-03	I					1	0.1		Hexabromobenzene	87-82-1	1.2E+02	n	1.2E+03	n					7.3E+01	n		4.2E-01	
				2.0E-04	I					1	0.1		Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2	1.2E+01	n	1.2E+02	n					7.3E+00	n			
1.6E+00	I	4.6E-04	I	8.0E-04	I					1	0.1		Hexachlorobenzene	118-74-1	3.0E-01	c	1.1E+00	c	5.3E-03	c	2.7E-02	c	4.2E-02	c	1.0E+00	5.3E-04	1.3E-02
7.8E-02	I	2.2E-05	I	1.0E-03	P					1	0.1		Hexachlorobutadiene	87-68-3	6.2E+00	c**	2.2E+01	c*	1.1E-01	c	5.6E-01	c	8.6E-01	c*		1.7E-03	
6.3E+00	I	1.8E-03	I	8.0E-03	A					1	0.1		Hexachlorocyclohexane, Alpha-	319-84-6	7.7E-02	c	2.7E-01	c	1.4E-03	c	6.8E-03	c	1.1E-02	c		6.2E-05	
1.8E+00	I	5.3E-04	I							1	0.1		Hexachlorocyclohexane, Beta-	319-85-7	2.7E-01	c	9.6E-01	c	4.6E-03	c	2.3E-02	c	3.7E-02	c		2.2E-04	
1.1E+00	C	3.1E-04	C	3.0E-04	I					1	0.04		Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	5.2E-01	c*	2.1E+00	c	7.8E-03	c	4.0E-02	c	6.1E-02	c	2.0E-01	3.6E-04	1.2E-03
1.8E+00	I	5.1E-04	I							1	0.1		Hexachlorocyclohexane, Technical	608-73-1	2.7E-01	c	9.6E-01	c	4.8E-03	c	2.4E-02	c	3.7E-02	c		2.2E-04	
				6.0E-03	I	2.0E-04	I			1	0.1		Hexachlorocyclopentadiene	77-47-4	3.7E+02	n	3.7E+03	n	2.1E-01	n	8.8E-01	n	2.2E+02	n	5.0E+01	6.8E-01	1.6E-01
1.4E-02	I	4.0E-06	I	1.0E-03	I					1	0.1		Hexachloroethane	67-72-1	3.5E+01	c**	1.2E+02	c**	6.1E-01	c	3.1E+00	c	4.8E+00	c**		2.9E-03	
				3.0E-04	I					1	0.1		Hexachlorophene	70-30-4	1.8E+01	n	1.8E+02	n					1.1E+01	n		1.5E+01	
1.1E-01	I			3.0E-03	I					1	0.015		Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	5.6E+00	c*	2.4E+01	c					6.1E-01	c		2.3E-04	
						1.0E-05	I	V		1		5.2E+03	Hexamethylene Diisocyanate, 1,6-	822-06-0	3.4E+00	n	1.4E+01	n	1.0E-02	n	4.4E-02	n	2.1E-02	n		2.1E-04	
				6.0E-02	H	7.0E-01	I	V		1		1.4E+02	Hexane, N-	110-54-3	5.7E+02	ns	2.6E+03	ns	7.3E+02	n	3.1E+03	n	8.8E+02	n		6.2E+00	
				2.0E+00	P					1	0.1		Hexanedioic Acid	124-04-9	1.2E+05	nm	1.2E+06	nm					7.3E+04	n		1.8E+01	
				5.0E-03	I	3.0E-02	I	V		1		3.3E+03	Hexanone, 2-	591-78-6	2.1E+02	n	1.4E+03	n	3.1E+01	n	1.3E+02	n	4.7E+01	n		1.1E-02	
				3.3E-02	I					1	0.1		Hexazinone	51235-04-2	2.0E+03	n	2.0E+04	n					1.2E+03	n		5.5E-01	
3.0E+00	I	4.9E-03	I			3.0E-05	P			1			Hydrazine	302-01-2	2.1E-01	c	9.5E-01	c	5.0E-04	c*	2.5E-03	c*	2.2E-02	c			
3.0E+00	I	4.9E-03	I							1			Hydrazine Sulfate	10034-93-2	2.1E-01	c	9.5E-01	c	5.0E-04	c	2.5E-03	c	2.2E-02	c			
						2.0E-02	I			1			Hydrogen Chloride	7647-01-0	2.8E+07	nm	1.2E+08	nm	2.1E+01	n	8.8E+01	n					
				4.0E-02	C	1.4E-02	C			1			Hydrogen Fluoride	7664-39-3	3.1E+03	n	4.1E+04	n	1.5E+01	n	6.1E+01	n	1.5E+03	n			
						2.0E-03	I			1			Hydrogen Sulfide	7783-06-4	2.8E+06	nm	1.2E+07	nm	2.1E+00	n	8.8E+00	n					
6.0E-02	P			4.0E-02	P					1	0.1		Hydroquinone	123-31-9	8.1E+00	c	2.9E+01	c					1.1E+00	c		7.6E-04	
				1.3E-02	I					1	0.1		Imazalil	35554-44-0	7.9E+02	n	8.0E+03	n					4.7E+02	n		8.2E+00	
				2.5E-01	I					1	0.1		Imazaquin	81335-37-7	1.5E+04	n	1.5E+05	nm					9.1E+03	n		4.5E+01	
				1.0E-02	A					1			Iodine	7553-56-2	7.8E+02	n	1.0E+04	n					3.7E+02	n		2.2E+01	
				4.0E-02	I					1	0.1		Iprodione	36734-19-7	2.4E+03	n	2.5E+04	n					1.5E+03	n		4.5E-01	
				7.0E-01	P					1			Iron	7439-89-6	5.5E+04	n	7.2E+05	nm					2.6E+04	n		6.4E+02	
				3.0E-01	I			V		1		1.0E+04	Isobutyl Alcohol	78-83-1	2.3E+04	ns	3.1E+05	nms					1.1E+04	n		2.3E+00	
9.5E-04	I			2.0E-01	I	2.0E+00	C			1	0.1		Isophorone	78-59-1	5.1E+02	c*	1.8E+03	c*	2.1E+03	n	8.8E+03	n	7.1E+01	c		2.3E-02	
				1.5E-02	I					1	0.1		Isopropalin	33820-53-0	9.2E+02	n	9.2E+03	n					5.5E+02	n		1.3E+01	
						7.0E+00	C			1	0.1		Isopropanol	67-63-0	9.9E+09	nm	4.2E+10	nm	7.3E+03	n	3.1E+04	n					
				1.0E-01	I					1	0.1		Isopropyl Methyl Phosphonic Acid	1832-54-8	6.1E+03	n	6.2E+04	n					3.7E+03	n		7.9E-01	
				5.0E-02	I					1	0.1		Isoxaben	82558-50-7	3.1E+03	n	3.1E+04	n					1.8E+03	n		5.0E+00	
						3.0E-01	A	V		1			JP-7	NA	4.3E+08	nm	1.8E+09	nm	3.1E+02	n	1.3E+03	n	6.3E+02	n			
				7.5E-02	I					1	0.1		Kerb	23950-58-5	4.6E+03	n	4.6E+04	n					2.7E+03	n		2.8E+00	
				2.0E-03	I					1	0.1		Lactofen	77501-63-4	1.2E+02	n	1.2E+03	n					7.3E+01	n		3.4E+00	
													Lead Compounds														
2.8E-01	C	8.0E-05	C							1	0.1		~Lead acetate	301-04-2	1.7E+00	c	6.2E+00	c	3.0E-02	c	1.5E-01	c	2.4E-01	c			
		1.2E-05								1			~Lead and Compounds	7439-92-1	4.0E+02	n	8.0E+02	n	2.0E-01	c	1.0E+00	c			1.5E+01		1.4E+01
3.8E-02	C	1.1E-05	C							1	0.1		~Lead subacetate	1335-32-6	1.3E+01	c	4.5E+01	c	2.2E-01	c	1.1E+00	c	1.8E+00	c			
				1.0E-07	I					1	0.1		~Tetraethyl Lead	78-00-2	6.1E-03	n	6.2E-02	n					3.7E-03	n		1.3E-05	
				2.0E-03	I					1	0.1		Linuron	330-55-2	1.2E+02	n	1.2E+03	n					7.3E+01	n		6.4E-02	
				2.0E-03	P					1			Lithium	7439-93-2	1.6E+02	n	2.0E+03	n					7.3E+01	n		2.2E+01	
				2.0E-01	I					1	0.1		Londax	83055-99-6	1.2E+04	n	1.2E+05	nm					7.3E+03	n		1.9E+00	
				5.0E-04	I					1	0.1		MCPA	94-74-6	3.1E+01	n	3.1E+02	n					1.8E+01	n		4.7E-03	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information												Contaminant		Screening Levels														Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				1.0E-02	I					1	0.1		MCPB	94-81-5	6.1E+02	n	6.2E+03	n					3.7E+02	n		1.4E-01	
				1.0E-03	I					1	0.1		MCPP	93-65-2	6.1E+01	n	6.2E+02	n					3.7E+01	n		1.1E-02	
				2.0E-02	I					1	0.1		Malathion	121-75-5	1.2E+03	n	1.2E+04	n					7.3E+02	n		1.9E-01	
				1.0E-01	I	7.0E-04	C			1	0.1		Maleic Anhydride	108-31-6	6.1E+03	n	6.1E+04	n	7.3E-01	n	3.1E+00	n	3.7E+03	n		7.4E-01	
				5.0E-01	I					1	0.1		Maleic Hydrazide	123-33-1	3.1E+04	n	3.1E+05	nm					1.8E+04	n		3.8E+00	
				1.0E-04	P					1	0.1		Malononitrile	109-77-3	6.1E+00	n	6.2E+01	n					3.7E+00	n		7.5E-04	
				3.0E-02	H					1	0.1		Mancozeb	8018-01-7	1.8E+03	n	1.8E+04	n					1.1E+03	n		1.5E+00	
				5.0E-03	I					1	0.1		Maneb	12427-38-2	3.1E+02	n	3.1E+03	n					1.8E+02	n		2.6E-01	
				1.4E-01	I	5.0E-05	I			1			Manganese (Diet)	7439-96-5													
				2.4E-02	S	5.0E-05	I			0.04			Manganese (Non-diet)	7439-96-5	1.8E+03	n	2.3E+04	n	5.2E-02	n	2.2E-01	n	8.8E+02	n		5.7E+01	
				9.0E-05	H					1	0.1		Mephosfolan	950-10-7	5.5E+00	n	5.5E+01	n					3.3E+00	n		4.8E-03	
				3.0E-02	I					1	0.1		Mepiquat Chloride	24307-26-4	1.8E+03	n	1.8E+04	n					1.1E+03	n		3.6E-01	
													Mercury Compounds															
				3.0E-04	I	3.0E-05	C			0.07			~Mercuric Chloride (and other Mercury salts)	7487-94-7	2.3E+01	n	3.1E+02	n	3.1E-02	n	1.3E-01	n	1.1E+01	n	2.0E+00		
						3.0E-04	I	V		1		3.1E+00	~Mercury (elemental)	7439-97-6	1.0E+01	ns	4.3E+01	ns	3.1E-01	n	1.3E+00	n	6.3E-01	n	2.0E+00	3.3E-02	1.0E-01
				1.0E-04	I					1			~Methyl Mercury	22967-92-6	7.8E+00	n	1.0E+02	n					3.7E+00	n			
				8.0E-05	I					1	0.1		~Phenylmercuric Acetate	62-38-4	4.9E+00	n	4.9E+01	n					2.9E+00	n		9.1E-04	
				3.0E-05	I					1	0.1		Merphos	150-50-5	1.8E+00	n	1.8E+01	n					1.1E+00	n		1.1E-01	
				3.0E-05	I					1	0.1		Merphos Oxide	78-48-8	1.8E+00	n	1.8E+01	n					1.1E+00	n		5.4E-03	
				6.0E-02	I					1	0.1		Metalaxyl	57837-19-1	3.7E+03	n	3.7E+04	n					2.2E+03	n		6.1E-01	
				1.0E-04	I	7.0E-04	H	V		1		4.6E+03	Methacrylonitrile	126-98-7	3.2E+00	n	1.8E+01	n	7.3E-01	n	3.1E+00	n	1.0E+00	n		2.4E-04	
				5.0E-05	I					1	0.1		Methamidophos	10265-92-6	3.1E+00	n	3.1E+01	n					1.8E+00	n		3.8E-04	
				5.0E-01	I	4.0E+00	C			1	0.1		Methanol	67-56-1	3.1E+04	n	3.1E+05	nm	4.2E+03	n	1.8E+04	n	1.8E+04	n		3.7E+00	
				1.0E-03	I					1	0.1		Methidathion	950-37-8	6.1E+01	n	6.2E+02	n					3.7E+01	n		8.9E-03	
				2.5E-02	I					1	0.1		Methomyl	16752-77-5	1.5E+03	n	1.5E+04	n					9.1E+02	n		2.0E-01	
4.9E-02	C	1.4E-05	C							1	0.1		Methoxy-5-nitroaniline, 2-	99-59-2	9.9E+00	c	3.5E+01	c	1.7E-01	c	8.8E-01	c	1.4E+00	c		4.7E-04	
				5.0E-03	I					1	0.1		Methoxychlor	72-43-5	3.1E+02	n	3.1E+03	n					1.8E+02	n	4.0E+01	9.9E+00	2.2E+00
				8.0E-03	P	1.0E-03	P			1	0.1		Methoxyethanol Acetate, 2-	110-49-6	4.9E+02	n	4.9E+03	n	1.0E+00	n	4.4E+00	n	2.9E+02	n		6.0E-02	
				5.0E-03	P	2.0E-02	I			1	0.1		Methoxyethanol, 2-	109-86-4	3.1E+02	n	3.1E+03	n	2.1E+01	n	8.8E+01	n	1.8E+02	n		3.7E-02	
				1.0E+00	X			V		1		2.9E+04	Methyl Acetate	79-20-9	7.8E+04	ns	1.0E+06	nms					3.7E+04	n		7.5E+00	
				3.0E-02	H			V		1		6.8E+03	Methyl Acrylate	96-33-3	2.3E+03	n	3.1E+04	ns					1.1E+03	n		2.3E-01	
				6.0E-01	I	5.0E+00	I	V		1		2.8E+04	Methyl Ethyl Ketone (2-Butanone)	78-93-3	2.8E+04	n	2.0E+05	nms	5.2E+03	n	2.2E+04	n	7.1E+03	n		1.5E+00	
		1.0E-03	X	1.0E-03	P	2.0E-05	X			1	0.1		Methyl Hydrazine	60-34-4	6.1E+01	n	6.1E+02	n	2.4E-03	c**	1.2E-02	c**	3.7E+01	n		8.3E-03	
				8.0E-02	H	3.0E+00	I	V		1		3.4E+03	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	5.3E+03	ns	5.3E+04	ns	3.1E+03	n	1.3E+04	n	2.0E+03	n		4.5E-01	
						1.0E-03	C			1	0.1		Methyl Isocyanate	624-83-9	1.4E+06	nm	6.0E+06	nm	1.0E+00	n	4.4E+00	n					
				1.4E+00	I	7.0E-01	I	V		1		2.4E+03	Methyl Methacrylate	80-62-6	4.8E+03	ns	2.1E+04	ns	7.3E+02	n	3.1E+03	n	1.4E+03	n		3.1E-01	
				2.5E-04	I					1	0.1		Methyl Parathion	298-00-0	1.5E+01	n	1.5E+02	n					9.1E+00	n		1.5E-02	
				6.0E-02	X					1	0.1		Methyl Phosphonic Acid	993-13-5	3.7E+03	n	3.7E+04	n					2.2E+03	n		4.4E-01	
				6.0E-03	H	4.0E-02	H	V		1		3.8E+02	Methyl Styrene (Mixed Isomers)	25013-15-4	2.5E+02	n	1.6E+03	ns	4.2E+01	n	1.8E+02	n	6.0E+01	n		9.7E-02	
9.9E-02	C	2.8E-05	C							1	0.1		Methyl methanesulfonate	66-27-3	4.9E+00	c	1.7E+01	c	8.7E-02	c	4.4E-01	c	6.8E-01	c		1.4E-04	
1.8E-03	C	2.6E-07	C			3.0E+00	I	V		1		8.9E+03	Methyl tert-Butyl Ether (MTBE)	1634-04-4	4.3E+01	c	2.2E+02	c	9.4E+00	c	4.7E+01	c	1.2E+01	c		2.8E-03	
				2.0E-04	X				M				Methyl-1,4-benzenediamine dihydrochloride, 2-	615-45-2	1.6E+01	n	2.0E+02	n					7.3E+00	n			
9.0E-03	P			2.0E-02	X					1	0.1		Methyl-5-Nitroaniline, 2-	99-55-8	5.4E+01	c*	1.9E+02	c*					7.5E+00	c*		4.2E-03	
8.3E+00	C	2.4E-03	C							1	0.1		Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	5.9E-02	c	2.1E-01	c	1.0E-03	c	5.1E-03	c	8.1E-03	c		2.8E-06	
1.3E-01	C	3.7E-05	C							1	0.1		Methylaniline Hydrochloride, 2-	636-21-5	3.7E+00	c	1.3E+01	c	6.6E-02	c	3.3E-01	c	5.2E-01	c		2.2E-04	
				1.0E-02	A					1	0.1		Methylarsonic acid	124-58-3	6.1E+02	n	6.2E+03	n					3.7E+02	n			
				2.0E-04	X				M				Methylbenzene,1-4-diamine monohydrochloride, 2-	74612-12-7	1.6E+01	n	2.0E+02	n					7.3E+00	n			
				2.0E-04	X				M				Methylbenzene-1,4-diamine sulfate, 2-	615-50-9	1.6E+01	n	2.0E+02	n					7.3E+00	n			
2.2E+01	C	6.3E-03	C							1	0.1		Methylcholanthrene, 3-	56-49-5	2.2E-02	c	7.8E-02	c	3.9E-04	c	1.9E-03	c	3.1E-03	c		5.9E-03	
7.5E-03	I	4.7E-07	I	6.0E-02	I	1.0E+00	A	V		1		3.3E+03	Methylene Chloride	75-09-2	1.1E+01	c	5.3E+01	c	5.2E+00	c	2.6E+01	c	4.8E+00	c	5.0E+00	1.2E-03	1.3E-03
1.0E-01	P	4.3E-04	C	2.0E-03	P				M	1	0.1		Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.2E+00	c	1.7E+01	c*	2.2E-03	c	2.9E-02	c	2.2E-01	c		8.5E-01	
4.6E-02	I	1.3E-05	C							1	0.1		Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	1.1E+01	c	3.7E+01	c	1.9E-01	c	9.4E-01	c	1.5E+00	c		8.1E-03	
1.6E+00	C	4.6E-04	C			2.0E-02	C			1	0.1		Methylenebisbenzenamine, 4,4'-	101-77-9	3.0E-01	c	1.1E+00	c	5.3E-03	c	2.7E-02	c	4.2E-02	c		1.9E-04	
						6.0E-04	I			1	0.1		Methylenediphenyl Diisocyanate	101-68-8	8.5E+05	nm	3.6E+06	nm	6.3E-01	n	2.6E+00	n					
				7.0E-02	H			V		1		5.0E+02	Methylstyrene, Alpha-	98-83-9	5.5E+03	ns	7.2E+04	ns					2.6E+03	n		4.1E+00	
				1.5E-01	I					1	0.1		Metolachlor	51218-45-2	9.2E+03	n	9.2E+04	n					5.5E+03	n		6.4E+00	
				2.5E-02	I					1	0.1		Metribuzin	21087-64-9	1.5E+03	n	1.5E+04	n					9.1E+02	n		2.8E-01	
				3.0E+00	P					1	0.1		Mineral oils	8012-95-1	1.8E+05	nm	1.8E+06	nm					1.1E+05	n		4.3E+03	
1.8E+01	C	5.1E-03	C	2.0E-04	I					1	0.1		Mirex	2385-85-5	2.7E-02	c	9.6E-02	c	4.8E-04	c	2.4E-03	c	3.7E-03	c		2.7E-03	
				2.0E-03	I					1	0.1		Molinate	2212-67-1	1.2E+02	n	1.2E+03	n					7.3E+01	n		4.1E-02	
				5.0E-03	I					1			Molybdenum	7439-98-7	3.9E+02	n	5.1E+03	n					1.8E+02	n		3.7E+00	
				1.0E-01	I					1			Monochloramine	10599-90-3	7.8E+03	n	1.0E+05	nm					3.7E+03	n			
				2.0E-03	P					1	0.1		Monomethylaniline	100-61-8	1.2E+02	n	1.2E+03	n					7.3E+01	n		2.7E-02	
				3.0E-04	X					1	0.1		N,N'-Diphenyl-1,4-benzenediamine	74-31-7	1.8E+01	n	1.8E+02	n					1.1E+01	n		1.1E+00	
				2.0E-03	I					1	0.1		Naled	300-76-5	1.2E+02	n	1.2E+03	n					7.3E+01	n		3.3E-02	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				3.0E-02	X	1.0E-01	P	V		1			Naphtha, High Flash Aromatic (HFAN)	64724-95-6	2.3E+03	n	3.1E+04	n	1.0E+02	n	4.4E+02	n	1.8E+02	n			
1.8E+00	C	0.0E+00	C							1	0.1		Naphthylamine, 2-	91-59-8	2.7E-01	c	9.6E-01	c					3.7E-02	c		1.9E-04	
				1.0E-01	I					1	0.1		Napropamide	15299-99-7	6.1E+03	n	6.2E+04	n					3.7E+03	n		2.4E+01	
				5.0E-02	C	5.0E-05	C			0.04			Nickel Carbonyl	13463-39-3	3.7E+03	n	4.4E+04	n	5.2E-02	n	2.2E-01	n	1.8E+03	n			
				5.0E-02	C	1.0E-04	C			1			Nickel Oxide	1313-99-1	3.8E+03	n	4.7E+04	n	1.0E-01	n	4.4E-01	n	1.8E+03	n			
		2.4E-04	I	5.0E-02	C	5.0E-05	C			0.04			Nickel Refinery Dust	NA	3.7E+03	n	4.4E+04	n	1.0E-02	c**	5.1E-02	c**	1.8E+03	n		2.7E+02	
		2.6E-04	C	2.0E-02	I	9.0E-05	A			0.04			Nickel Soluble Salts	7440-02-0	1.5E+03	n	2.0E+04	n	9.4E-03	c*	4.7E-02	c**	7.3E+02	n		4.8E+01	
1.7E+00	C	4.8E-04	I	5.0E-02	C	5.0E-05	C			0.04			Nickel Subsulfide	12035-72-2	3.8E-01	c	1.7E+00	c	5.1E-03	c*	2.6E-02	c**	4.0E-02	c			
				1.6E+00	I					1			Nitrate	14797-55-8	1.3E+05	nm	1.6E+06	nm					5.8E+04	n	1.0E+04		
				1.0E-01	I					1			Nitrite	14797-65-0	7.8E+03	n	1.0E+05	nm					3.7E+03	n	1.0E+03		
				1.0E-02	X	5.0E-05	X			1	0.1		Nitroaniline, 2-	88-74-4	6.1E+02	n	6.0E+03	n	5.2E-02	n	2.2E-01	n	3.7E+02	n		1.5E-01	
2.0E-02	P			4.0E-03	P	6.0E-03	P			1	0.1		Nitroaniline, 4-	100-01-6	2.4E+01	c*	8.6E+01	c*	6.3E+00	n	2.6E+01	n	3.4E+00	c*		1.4E-03	
		4.0E-05	I	2.0E-03	I	9.0E-03	I	V		1		3.1E+03	Nitrobenzene	98-95-3	4.8E+00	c*	2.4E+01	c*	6.1E-02	c	3.1E-01	c	1.2E-01	c		7.9E-05	
				3.0E+03	P					1	0.1		Nitrocellulose	9004-70-0	1.8E+08	nm	1.8E+09	nm					1.1E+08	n		2.4E+04	
				7.0E-02	H					1	0.1		Nitrofurantoin	67-20-9	4.3E+03	n	4.3E+04	n					2.6E+03	n		1.1E+00	
1.3E+00	C	3.7E-04	C							1	0.1		Nitrofurazone	59-87-0	3.7E-01	c	1.3E+00	c	6.6E-03	c	3.3E-02	c	5.2E-02	c		4.7E-05	
1.7E-02	P			1.0E-04	P					1	0.1		Nitroglycerin	55-63-0	6.1E+00	n	6.2E+01	n					3.7E+00	n		1.6E-03	
				1.0E-01	I					1	0.1		Nitroguanidine	556-88-7	6.1E+03	n	6.2E+04	n					3.7E+03	n		8.8E-01	
		9.0E-06	P			2.0E-02	P	V		1		1.8E+04	Nitromethane	75-52-5	4.9E+00	c*	2.5E+01	c*	2.7E-01	c*	1.4E+00	c*	5.4E-01	c*		1.2E-04	
		2.7E-03	H			2.0E-02	I	V		1		4.9E+03	Nitropropane, 2-	79-46-9	1.3E-02	c	6.4E-02	c	9.0E-04	c	4.5E-03	c	1.8E-03	c		4.7E-07	
2.7E+01	C	7.7E-03	C							1	0.1		Nitroso-N-ethylurea, N-	759-73-9	1.8E-02	c	6.4E-02	c	3.2E-04	c	1.6E-03	c	2.5E-03	c		6.0E-07	
1.2E+02	C	3.4E-02	C							1	0.1		Nitroso-N-methylurea, N-	684-93-5	4.1E-03	c	1.4E-02	c	7.2E-05	c	3.6E-04	c	5.6E-04	c		1.2E-07	
5.4E+00	I	1.6E-03	I					V		1		7.1E+03	Nitroso-di-N-butylamine, N-	924-16-3	8.7E-02	c	4.0E-01	c	1.5E-03	c	7.7E-03	c	2.4E-03	c		5.0E-06	
7.0E+00	I	2.0E-03	C							1	0.1		Nitroso-di-N-propylamine, N-	621-64-7	6.9E-02	c	2.5E-01	c	1.2E-03	c	6.1E-03	c	9.6E-03	c		7.2E-06	
2.8E+00	I	8.0E-04	C							1	0.1		Nitrosodiethanolamine, N-	1116-54-7	1.7E-01	c	6.2E-01	c	3.0E-03	c	1.5E-02	c	2.4E-02	c		4.8E-06	
1.5E+02	I	4.3E-02	I						M	1	0.1		Nitrosodiethylamine, N-	55-18-5	7.7E-04	c	1.1E-02	c	2.2E-05	c	2.9E-04	c	1.4E-04	c			
5.1E+01	I	1.4E-02	I	8.0E-06	P	4.0E-05	X		M	1	0.1		Nitrosodimethylamine, N-	62-75-9	2.3E-03	c	3.4E-02	c	6.9E-05	c	8.8E-04	c	4.2E-04	c		7.2E-05	
4.9E-03	I	2.6E-06	C							1	0.1		Nitrosodiphenylamine, N-	86-30-6	9.9E+01	c	3.5E+02	c	9.4E-01	c	4.7E+00	c	1.4E+01	c		7.5E-02	
2.2E+01	I	6.3E-03	C							1	0.1		Nitrosomethylethylamine, N-	10595-95-6	2.2E-02	c	7.8E-02	c	3.9E-04	c	1.9E-03	c	3.1E-03	c		8.8E-07	
6.7E+00	C	1.9E-03	C							1	0.1		Nitrosomorpholine [N-]	59-89-2	7.3E-02	c	2.6E-01	c	1.3E-03	c	6.5E-03	c	1.0E-02	c		2.5E-06	
9.4E+00	C	2.7E-03	C							1	0.1		Nitrosopiperidine [N-]	100-75-4	5.2E-02	c	1.8E-01	c	9.0E-04	c	4.5E-03	c	7.2E-03	c		3.8E-06	
2.1E+00	I	6.1E-04	I							1	0.1		Nitrosopyrrolidine, N-	930-55-2	2.3E-01	c	8.2E-01	c	4.0E-03	c	2.0E-02	c	3.2E-02	c		1.2E-05	
				1.0E-04	X					1	0.1		Nitrotoluene, m-	99-08-1	6.1E+00	n	6.2E+01	n					3.7E+00	n		3.4E-03	
2.2E-01	P			9.0E-04	P			V		1		1.5E+03	Nitrotoluene, o-	88-72-2	2.9E+00	c*	1.3E+01	c*					3.1E-01	c		2.9E-04	
1.6E-02	P			4.0E-03	P					1	0.1		Nitrotoluene, p-	99-99-0	3.0E+01	c**	1.1E+02	c*					4.2E+00	c*		3.9E-03	
				3.0E-04	X	2.0E-01	P	V		1		6.9E+00	Nonane, n-	111-84-2	2.1E+01	ns	2.3E+02	ns	2.1E+02	n	8.8E+02	n	1.1E+01	n		1.5E-01	
				4.0E-02	I					1	0.1		Norflurazon	27314-13-2	2.4E+03	n	2.5E+04	n					1.5E+03	n		9.4E+00	
				7.0E-04	I					1	0.1		Nustar	85509-19-9	4.3E+01	n	4.3E+02	n					2.6E+01	n		4.1E+00	
				3.0E-03	I					1	0.1		Octabromodiphenyl Ether	32536-52-0	1.8E+02	n	1.8E+03	n					1.1E+02	n		2.2E+01	
				5.0E-02	I					1	0.006		Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0	3.8E+03	n	4.9E+04	n					1.8E+03	n		2.3E+00	
				2.0E-03	H					1	0.1		Octamethylpyrophosphoramide	152-16-9	1.2E+02	n	1.2E+03	n					7.3E+01	n		1.8E-02	
				5.0E-02	I					1	0.1		Oryzalin	19044-88-3	3.1E+03	n	3.1E+04	n					1.8E+03	n		3.4E+00	
				5.0E-03	I					1	0.1		Oxadiazon	19666-30-9	3.1E+02	n	3.1E+03	n					1.8E+02	n		1.9E+00	
				2.5E-02	I					1	0.1		Oxamyl	23135-22-0	1.5E+03	n	1.5E+04	n					9.1E+02	n	2.0E+02	2.0E-01	4.4E-02
				1.3E-02	I					1	0.1		Paclobutrazol	76738-62-0	7.9E+02	n	8.0E+03	n					4.7E+02	n		9.7E-01	
				4.5E-03	I					1	0.1		Paraquat Dichloride	1910-42-5	2.7E+02	n	2.8E+03	n					1.6E+02	n		2.3E+00	
				6.0E-03	H					1	0.1		Parathion	56-38-2	3.7E+02	n	3.7E+03	n					2.2E+02	n		1.1E+00	
				5.0E-02	H					1	0.1		Pebulate	1114-71-2	3.1E+03	n	3.1E+04	n					1.8E+03	n		1.5E+00	
				4.0E-02	I					1	0.1		Pendimethalin	40487-42-1	2.4E+03	n	2.5E+04	n					1.5E+03	n		1.7E+01	
				2.0E-03	I					1	0.1		Pentabromodiphenyl Ether	32534-81-9	1.2E+02	n	1.2E+03	n					7.3E+01	n		3.2E+00	
				1.0E-04	I					1	0.1		Pentabromodiphenyl ether, 2,2',4,4',5- (BDE-99)	60348-60-9	6.1E+00	n	6.2E+01	n					3.7E+00	n		1.6E-01	
				8.0E-04	I					1	0.1		Pentachlorobenzene	608-93-5	4.9E+01	n	4.9E+02	n					2.9E+01	n		2.2E-01	
9.0E-02	P									1	0.1		Pentachloroethane	76-01-7	5.4E+00	c	1.9E+01	c					7.5E-01	c		3.6E-04	
2.6E-01	H			3.0E-03	I					1	0.1		Pentachloronitrobenzene	82-68-8	1.9E+00	c*	6.6E+00	c					2.6E-01	c		3.2E-03	
4.0E-01	I	5.1E-06	C	5.0E-03	I					1	0.25		Pentachlorophenol	87-86-5	8.9E-01	c	2.7E+00	c	4.8E-01	c	2.4E+00	c	1.7E-01	c	1.0E+00	1.7E-03	1.0E-02
4.0E-03	X			2.0E-03	P					1	0.1		Pentaerythritol tetranitrate (PETN)	78-11-5	1.2E+02	c**	4.3E+02	c**					1.7E+01	c**		2.5E-02	
						1.0E+00	P	V		1		3.9E+02	Pentane, n-	109-66-0	8.7E+02	ns	3.7E+03	ns	1.0E+03	n	4.4E+03	n	2.1E+03	n		1.0E+01	
													Perchlorates												(F)		
				7.0E-04	I					1			~Ammonium Perchlorate	7790-98-9	5.5E+01	n	7.2E+02	n					2.6E+01	n			
				7.0E-04	I					1			~Lithium Perchlorate	7791-03-9	5.5E+01	n	7.2E+02	n					2.6E+01	n			
				7.0E-04	I					1			~Perchlorate and Perchlorate Salts	14797-73-0	5.5E+01	n	7.2E+02	n					2.6E+01	n	1.5E+01		
				7.0E-04	I					1			~Potassium Perchlorate	7778-74-7	5.5E+01	n	7.2E+02	n					2.6E+01	n			
				7.0E-04	I					1			~Sodium Perchlorate	7601-89-0	5.5E+01	n	7.2E+02	n					2.6E+01	n			
				5.0E-02	I					1	0.1		Permethrin	52645-53-1	3.1E+03	n	3.1E+04	n					1.8E+03	n		4.3E+02	
2.2E-03	C	6.3E-07	C							1	0.1		Phenacetin	62-44-2	2.2E+02	c	7.8E+02	c	3.9E+00	c	1.9E+01	c	3.1E+01	c		8.6E-03	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO ($(mg/kg-day)^{-1}$)	key	IUR ($(ug/m^3)^{-1}$)	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				2.5E-01	I					1	0.1		Phenmedipham	13684-63-4	1.5E+04	n	1.5E+05	nm					9.1E+03	n		4.9E+01	
				3.0E-01	I	2.0E-01	C			1	0.1		Phenol	108-95-2	1.8E+04	n	1.8E+05	nm	2.1E+02	n	8.8E+02	n	1.1E+04	n		6.3E+00	
				5.0E-04	X				M				Phenothiazine	92-84-2	3.9E+01	n	5.1E+02	n					1.8E+01	n			
				6.0E-03	I					1	0.1		Phenylenediamine, m-	108-45-2	3.7E+02	n	3.7E+03	n					2.2E+02	n		5.9E-02	
4.7E-02	H									1	0.1		Phenylenediamine, o-	95-54-5	1.0E+01	c	3.7E+01	c					1.4E+00	c		3.8E-04	
				1.9E-01	H					1	0.1		Phenylenediamine, p-	106-50-3	1.2E+04	n	1.2E+05	nm					6.9E+03	n		1.9E+00	
1.9E-03	H									1	0.1		Phenylphenol, 2-	90-43-7	2.5E+02	c	8.9E+02	c					3.5E+01	c		4.7E-01	
				2.0E-04	H					1	0.1		Phorate	298-02-2	1.2E+01	n	1.2E+02	n					7.3E+00	n		8.2E-03	
						3.0E-04	I	V		1		1.6E+03	Phosgene	75-44-5	3.3E-01	n	1.4E+00	n	3.1E-01	n	1.3E+00	n					
				2.0E-02	I					1	0.1		Phosmet	732-11-6	1.2E+03	n	1.2E+04	n					7.3E+02	n		1.6E-01	
													Phosphates, Inorganic															
				4.9E+01	P								~Aluminum metaphosphate	13776-88-0	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Ammonium polyphosphate	68333-79-9	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Calcium pyrophosphate	7790-76-3	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Diammonium phosphate	7783-28-0	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Dicalcium phosphate	7757-93-9	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Dimagnesium phosphate	7782-75-4	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Dipotassium phosphate	7758-11-4	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Disodium phosphate	7558-79-4	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Monoaluminum phosphate	13530-50-2	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Monoammonium phosphate	7722-76-1	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Monocalcium phosphate	7758-23-8	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Monomagnesium phosphate	7757-86-0	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Monopotassium phosphate	7778-77-0	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Monosodium phosphate	7558-80-7	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Polyphosphoric acid	8017-16-1	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Potassium tripolyphosphate	13845-36-8	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium acid pyrophosphate	7758-16-9	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium aluminum phosphate (acidic)	7785-88-8	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium aluminum phosphate (anhydrous)	10279-59-1	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium aluminum phosphate (tetrahydrate)	10305-76-7	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium hexametaphosphate	10124-56-8	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium polyphosphate	68915-31-1	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium trimetaphosphate	7785-84-4	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Sodium tripolyphosphate	7758-29-4	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Tetrapotassium phosphate	7320-34-5	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Tetrasodium pyrophosphate	7722-88-5	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Trialuminum sodium tetra decahydrogenoctaorthophosphate (dihydrate)	15136-87-5	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Tricalcium phosphate	7758-87-4	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Trimagnesium phosphate	7757-87-1	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Tripotassium phosphate	7778-53-2	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				4.9E+01	P								~Trisodium phosphate	7601-54-9	3.8E+06	nm	5.0E+07	nm					1.8E+06	n			
				3.0E-04	I	3.0E-04	I			1			Phosphine	7803-51-2	2.3E+01	n	3.1E+02	n	3.1E-01	n	1.3E+00	n	1.1E+01	n			
				4.9E+01	P	1.0E-02	I			1			Phosphoric Acid	7664-38-2	3.0E+06	nm	2.7E+07	nm	1.0E+01	n	4.4E+01	n	1.8E+06	n			
				2.0E-05	I					1			Phosphorus, White	7723-14-0	1.6E+00	n	2.0E+01	n					7.3E-01	n		2.7E-03	
				1.0E+00	H					1	0.1		Phthalic Acid, P-	100-21-0	6.1E+04	n	6.2E+05	nm					3.7E+04	n		1.3E+01	
				2.0E+00	I	2.0E-02	C			1	0.1		Phthalic Anhydride	85-44-9	1.2E+05	nm	1.2E+06	nm	2.1E+01	n	8.8E+01	n	7.3E+04	n		1.6E+01	
				7.0E-02	I					1	0.1		Picloram	1918-02-1	4.3E+03	n	4.3E+04	n					2.6E+03	n	5.0E+02	7.1E-01	1.4E-01
				1.0E-04	X					1	0.1		Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3	6.1E+00	n	6.2E+01	n					3.7E+00	n		2.4E-03	
				1.0E-02	I					1	0.1		Pirimiphos, Methyl	29232-93-7	6.1E+02	n	6.2E+03	n					3.7E+02	n		3.5E-01	
3.0E+01	C	8.6E-03	C	7.0E-06	H					1	0.1		Polybrominated Biphenyls	59536-65-1	1.6E-02	c*	5.7E-02	c*	2.8E-04	c	1.4E-03	c	2.2E-03	c			
													Polychlorinated Biphenyls (PCBs)															
7.0E-02	S	2.0E-05	S	7.0E-05	I					1	0.14		~Aroclor 1016	12674-11-2	3.9E+00	n	2.1E+01	c**	1.2E-01	c	6.1E-01	c	9.6E-01	c**		9.2E-02	
2.0E+00	S	5.7E-04	S					V		1	0.14	7.6E+02	~Aroclor 1221	11104-28-2	1.4E-01	c	5.4E-01	c	4.3E-03	c	2.1E-02	c	6.8E-03	c		1.2E-04	
2.0E+00	S	5.7E-04	S					V		1	0.14	7.3E+01	~Aroclor 1232	11141-16-5	1.4E-01	c	5.4E-01	c	4.3E-03	c	2.1E-02	c	6.8E-03	c		1.2E-04	
2.0E+00	S	5.7E-04	S							1	0.14		~Aroclor 1242	53469-21-9	2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c	3.4E-02	c		5.3E-03	
2.0E+00	S	5.7E-04	S							1	0.14		~Aroclor 1248	12672-29-6	2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c	3.4E-02	c		5.2E-03	
2.0E+00	S	5.7E-04	S	2.0E-05	I					1	0.14		~Aroclor 1254	11097-69-1	2.2E-01	c**	7.4E-01	c*	4.3E-03	c	2.1E-02	c	3.4E-02	c*		8.8E-03	
2.0E+00	S	5.7E-04	S							1	0.14		~Aroclor 1260	11096-82-5	2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c	3.4E-02	c		2.4E-02	
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		1.2E-02	
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		7.2E-03	
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		7.4E-03	
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		7.4E-03	
3.9E+03	E	1.1E+00	E	3.3E-08	E	1.3E-06	E			1	0.14		~Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	1.1E-04	c*	3.8E-04	c*	2.1E-06	c	1.1E-05	c	1.7E-05	c*		7.2E-06	
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.5E-03	

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Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.4E-03	
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.5E-03	
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14		~Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.5E-03	
1.3E+04	E	3.8E+00	E	1.0E-08	E	4.0E-07	E			1	0.14		~Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	3.4E-05	c*	1.1E-04	c*	6.4E-07	c	3.2E-06	c	5.2E-06	c*		1.3E-06	
2.0E+00	I	5.7E-04	I							1	0.14		~Polychlorinated Biphenyls (high risk)	1336-36-3	2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c					
4.0E-01	I	1.0E-04	I							1	0.14		~Polychlorinated Biphenyls (low risk)	1336-36-3					2.4E-02	c	1.2E-01	c	1.7E-01	c	5.0E-01	2.6E-02	7.8E-02
7.0E-02	I	2.0E-05	I							1	0.14		~Polychlorinated Biphenyls (lowest risk)	1336-36-3					1.2E-01	c	6.1E-01	c					
1.3E+01	E	3.8E-03	E	1.0E-05	E	4.0E-04	E			1	0.14		~Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	3.4E-02	c*	1.1E-01	c*	6.4E-04	c	3.2E-03	c	5.2E-03	c*		8.1E-04	
3.9E+01	E	1.1E-02	E	3.3E-06	E	1.3E-04	E			1	0.14		~Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	1.1E-02	c*	3.8E-02	c*	2.1E-04	c	1.1E-03	c	1.7E-03	c*		2.7E-04	
						6.0E-04	I			1	0.1		Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	8.5E+05	nm	3.6E+06	nm	6.3E-01	n	2.6E+00	n					
													Polynuclear Aromatic Hydrocarbons (PAHs)														
				6.0E-02	I			V		1	0.13		~Acenaphthene	83-32-9	3.4E+03	n	3.3E+04	n					2.2E+03	n		2.2E+01	
				3.0E-01	I			V		1	0.13		~Anthracene	120-12-7	1.7E+04	n	1.7E+05	nm					1.1E+04	n		3.6E+02	
7.3E-01	E	1.1E-04	C						M	1	0.13		~Benz[a]anthracene	56-55-3	1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c			
1.2E+00	C	1.1E-04	C							1	0.13		~Benzo(j)fluoranthene	205-82-3	3.8E-01	c	1.3E+00	c	2.2E-02	c	1.1E-01	c	5.6E-02	c		6.7E-02	
7.3E+00	I	1.1E-03	C						M	1	0.13		~Benzo[a]pyrene	50-32-8	1.5E-02	c	2.1E-01	c	8.7E-04	c	1.1E-02	c	2.9E-03	c	2.0E-01		2.4E-01
7.3E-01	E	1.1E-04	C						M	1	0.13		~Benzo[b]fluoranthene	205-99-2	1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c			
7.3E-02	E	1.1E-04	C						M	1	0.13		~Benzo[k]fluoranthene	207-08-9	1.5E+00	c	2.1E+01	c	8.7E-03	c	1.1E-01	c	2.9E-01	c			
7.3E-03	E	1.1E-05	C						M	1	0.13		~Chrysene	218-01-9	1.5E+01	c	2.1E+02	c	8.7E-02	c	1.1E+00	c	2.9E+00	c			
7.3E+00	E	1.2E-03	C						M	1	0.13		~Dibenz[a,h]anthracene	53-70-3	1.5E-02	c	2.1E-01	c	8.0E-04	c	1.0E-02	c	2.9E-03	c			
1.2E+01	C	1.1E-03	C							1	0.13		~Dibenzo(a,e)pyrene	192-65-4	3.8E-02	c	1.3E-01	c	2.2E-03	c	1.1E-02	c	5.6E-03	c		7.3E-02	
2.5E+02	C	7.1E-02	C							1	0.13		~Dimethylbenz(a)anthracene, 7,12-	57-97-6	1.8E-03	c	6.2E-03	c	3.4E-05	c	1.7E-04	c	2.7E-04	c		2.7E-04	
				4.0E-02	I					1	0.13		~Fluoranthene	206-44-0	2.3E+03	n	2.2E+04	n					1.5E+03	n		1.6E+02	
				4.0E-02	I			V		1	0.13		~Fluorene	86-73-7	2.3E+03	n	2.2E+04	n					1.5E+03	n		2.7E+01	
7.3E-01	E	1.1E-04	C						M	1	0.13		~Indeno[1,2,3-cd]pyrene	193-39-5	1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c			
2.9E-02	P			7.0E-02	A			V		1		3.9E+02	~Methylnaphthalene, 1-	90-12-0	2.2E+01	c	9.9E+01	c					2.3E+00	c		1.2E-02	
				4.0E-03	I			V		1		3.7E+02	~Methylnaphthalene, 2-	91-57-6	3.1E+02	n	4.1E+03	ns					1.5E+02	n		7.5E-01	
		3.4E-05	C	2.0E-02	I	3.0E-03	I	V		1	0.13		~Naphthalene	91-20-3	3.6E+00	c*	1.8E+01	c*	7.2E-02	c*	3.6E-01	c*	1.4E-01	c*		4.7E-04	
1.2E+00	C	1.1E-04	C							1	0.13		~Nitropyrene, 4-	57835-92-4	3.8E-01	c	1.3E+00	c	2.2E-02	c	1.1E-01	c	5.6E-02	c		9.7E-03	
				3.0E-02	I			V		1	0.13		~Pyrene	129-00-0	1.7E+03	n	1.7E+04	n					1.1E+03	n		1.2E+02	
1.5E-01	I			9.0E-03	I					1	0.1		Prochloraz	67747-09-5	3.2E+00	c	1.1E+01	c					4.5E-01	c		2.3E-03	
				6.0E-03	H					1	0.1		Profluralin	26399-36-0	3.7E+02	n	3.7E+03	n					2.2E+02	n		1.3E+01	
				1.5E-02	I					1	0.1		Prometon	1610-18-0	9.2E+02	n	9.2E+03	n					5.5E+02	n		2.6E-01	
				4.0E-03	I					1	0.1		Prometryn	7287-19-6	2.4E+02	n	2.5E+03	n					1.5E+02	n		2.2E-01	
				1.3E-02	I					1	0.1		Propachlor	1918-16-7	7.9E+02	n	8.0E+03	n					4.7E+02	n		2.9E-01	
				5.0E-03	I					1	0.1		Propanil	709-98-8	3.1E+02	n	3.1E+03	n					1.8E+02	n		1.0E-01	
				2.0E-02	I					1	0.1		Propargite	2312-35-8	1.2E+03	n	1.2E+04	n					7.3E+02	n		5.4E+01	
				2.0E-03	I					1	0.1		Propargyl Alcohol	107-19-7	1.2E+02	n	1.2E+03	n					7.3E+01	n		1.5E-02	
				2.0E-02	I					1	0.1		Propazine	139-40-2	1.2E+03	n	1.2E+04	n					7.3E+02	n		6.5E-01	
				2.0E-02	I					1	0.1		Propham	122-42-9	1.2E+03	n	1.2E+04	n					7.3E+02	n		4.7E-01	
				1.3E-02	I					1	0.1		Propiconazole	60207-90-1	7.9E+02	n	8.0E+03	n					4.7E+02	n		1.6E+00	
						8.0E-03	I	V		1		3.3E+04	Propionaldehyde	123-38-6	8.0E+01	n	3.4E+02	n	8.3E+00	n	3.5E+01	n	1.7E+01	n		3.4E-03	
				1.0E-01	X	1.0E+00	X	V		1	0.1	2.6E+02	Propyl benzene	103-65-1	3.4E+03	ns	2.1E+04	ns	1.0E+03	n	4.4E+03	n	1.3E+03	n		2.5E+00	
						3.0E+00	C			1	0.1		Propylene	115-07-1	4.3E+09	nm	1.8E+10	nm	3.1E+03	n	1.3E+04	n					
				2.0E+01	P					1	0.1		Propylene Glycol	57-55-6	1.2E+06	nm	1.2E+07	nm					7.3E+05	n		1.5E+02	
						2.7E-04	A	V		1		1.5E+03	Propylene Glycol Dinitrate	6423-43-4	5.7E+01	n	2.4E+02	n	2.8E-01	n	1.2E+00	n	5.7E-01	n		1.8E-04	
				7.0E-01	H					1	0.1		Propylene Glycol Monoethyl Ether	1569-02-4	4.3E+04	n	4.3E+05	nm					2.6E+04	n		5.2E+00	
				7.0E-01	H	2.0E+00	I			1	0.1		Propylene Glycol Monomethyl Ether	107-98-2	4.3E+04	n	4.3E+05	nm	2.1E+03	n	8.8E+03	n	2.6E+04	n		5.2E+00	
2.4E-01	I	3.7E-06	I			3.0E-02	I	V		1		7.8E+04	Propylene Oxide	75-56-9	2.0E+00	c	9.0E+00	c	6.6E-01	c*	3.3E+00	c*	2.3E-01	c		4.9E-05	
				2.5E-01	I					1	0.1		Pursuit	81335-77-5	1.5E+04	n	1.5E+05	nm					9.1E+03	n		8.0E+00	
				2.5E-02	I					1	0.1		Pydrin	51630-58-1	1.5E+03	n	1.5E+04	n					9.1E+02	n		5.8E+02	
				1.0E-03	I			V		1		5.3E+05	Pyridine	110-86-1	7.8E+01	n	1.0E+03	n					3.7E+01	n		1.3E-02	
				5.0E-04	I					1	0.1		Quinalphos	13593-03-8	3.1E+01	n	3.1E+02	n					1.8E+01	n		1.6E-01	
3.0E+00	I									1	0.1		Quinoline	91-22-5	1.6E-01	c	5.7E-01	c					2.2E-02	c		7.4E-05	
						3.0E-02	A			1			Refractory Ceramic Fibers	NA	4.3E+07	nm	1.8E+08	nm	3.1E+01	n	1.3E+02	n					
				3.0E-02	I					1	0.1		Resmethrin	10453-86-8	1.8E+03	n	1.8E+04	n					1.1E+03	n		6.8E+02	
				5.0E-02	H					1	0.1		Ronnel	299-84-3	3.1E+03	n	3.1E+04	n					1.8E+03	n		1.7E+01	
				4.0E-03	I					1	0.1		Rotenone	83-79-4	2.4E+02	n	2.5E+03	n					1.5E+02	n		7.6E+01	
2.2E-01	C	6.3E-05	C							1	0.1		Safrole	94-59-7	2.2E+00	c	7.8E+00	c	3.9E-02	c	1.9E-01	c	3.1E-01	c		1.9E-04	
				2.5E-02	I					1	0.1		Savey	78587-05-0	1.5E+03	n	1.5E+04	n					9.1E+02	n		4.1E+00	
				5.0E-03	I					1			Selenious Acid	7783-00-8	3.9E+02	n	5.1E+03	n					1.8E+02	n			
				5.0E-03	I	2.0E-02	C			1			Selenium	7782-49-2	3.9E+02	n	5.1E+03	n	2.1E+01	n	8.8E+01	n	1.8E+02	n	5.0E+01	9.5E-01	2.6E-01
				5.0E-03	C	2.0E-02	C			1			Selenium Sulfide	7446-34-6	3.9E+02	n	5.1E+03	n	2.1E+01	n	8.8E+01	n	1.8E+02	n			
				9.0E-02	I					1	0.1		Sethoxydim	74051-80-2	5.5E+03	n	5.5E+04	n					3.3E+03	n		2.9E+01	
						3.0E-03	C			1			Silica (crystalline, respirable)	7631-86-9	4.3E+06	nm	1.8E+07	nm	3.1E+00	n	1.3E+01	n					

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				5.0E-03	I						0.04		Silver	7440-22-4	3.9E+02	n	5.1E+03	n					1.8E+02	n		1.6E+00	
1.2E-01	H			5.0E-03	I					1	0.1		Simazine	122-34-9	4.1E+00	c*	1.4E+01	c					5.6E-01	c	4.0E+00	2.8E-04	2.0E-03
				1.3E-02	I					1	0.1		Sodium Acifluorfen	62476-59-9	7.9E+02	n	8.0E+03	n					4.7E+02	n		3.8E+00	
				4.0E-03	I					1			Sodium Azide	26628-22-8	3.1E+02	n	4.1E+03	n					1.5E+02	n			
2.7E-01	H			3.0E-02	I					1	0.1		Sodium Diethyldithiocarbamate	148-18-5	1.8E+00	c	6.4E+00	c					2.5E-01	c			
				5.0E-02	A	1.3E-02	C			1			Sodium Fluoride	7681-49-4	3.9E+03	n	5.1E+04	n	1.4E+01	n	5.7E+01	n	1.8E+03	n			
				2.0E-05	I					1	0.1		Sodium Fluoroacetate	62-74-8	1.2E+00	n	1.2E+01	n					7.3E-01	n		1.5E-04	
				1.0E-03	H					1			Sodium Metavanadate	13718-26-8	7.8E+01	n	1.0E+03	n					3.7E+01	n			
2.4E-02	H			3.0E-02	I					1	0.1		Stirofos (Tetrachlorovinphos)	961-11-5	2.0E+01	c*	7.2E+01	c					2.8E+00	c		8.3E-03	
				6.0E-01	I					1			Strontium, Stable	7440-24-6	4.7E+04	n	6.1E+05	nm					2.2E+04	n		7.7E+02	
				3.0E-04	I					1	0.1		Strychnine	57-24-9	1.8E+01	n	1.8E+02	n					1.1E+01	n		1.2E-01	
				2.0E-01	I	1.0E+00	I	V		1		8.7E+02	Styrene	100-42-5	6.3E+03	ns	3.6E+04	ns	1.0E+03	n	4.4E+03	n	1.6E+03	n	1.0E+02	1.8E+00	1.1E-01
				8.0E-04	P					1	0.1		Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9	4.9E+01	n	4.9E+02	n					2.9E+01	n		1.7E-01	
						1.0E-03	C			1			Sulfuric Acid	7664-93-9	1.4E+06	nm	6.0E+06	nm	1.0E+00	n	4.4E+00	n					
				2.5E-02	I					1	0.1		Systhane	88671-89-0	1.5E+03	n	1.5E+04	n					9.1E+02	n		1.1E+01	
				3.0E-02	H					1	0.1		TCMTB	21564-17-0	1.8E+03	n	1.8E+04	n					1.1E+03	n		7.6E+00	
				7.0E-02	I					1	0.1		Tebuthiuron	34014-18-1	4.3E+03	n	4.3E+04	n					2.6E+03	n		7.3E-01	
				2.0E-02	H					1	0.1		Temephos	3383-96-8	1.2E+03	n	1.2E+04	n					7.3E+02	n		1.4E+02	
				1.3E-02	I					1	0.1		Terbacil	5902-51-2	7.9E+02	n	8.0E+03	n					4.7E+02	n		1.4E-01	
				2.5E-05	H					1	0.1		Terbufos	13071-79-9	1.5E+00	n	1.5E+01	n					9.1E-01	n		2.0E-03	
				1.0E-03	I					1	0.1		Terbutryn	886-50-0	6.1E+01	n	6.2E+02	n					3.7E+01	n		5.2E-02	
				1.0E-04	I					1	0.1		Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1	6.1E+00	n	6.2E+01	n					3.7E+00	n		9.7E-02	
				3.0E-04	I					1	0.1		Tetrachlorobenzene, 1,2,4,5-	95-94-3	1.8E+01	n	1.8E+02	n					1.1E+01	n		5.1E-02	
2.6E-02	I	7.4E-06	I	3.0E-02	I			V		1		6.8E+02	Tetrachloroethane, 1,1,1,2-	630-20-6	1.9E+00	c	9.3E+00	c	3.3E-01	c	1.7E+00	c	5.2E-01	c		2.0E-04	
2.0E-01	I	5.8E-05	C	2.0E-02	I			V		1		1.9E+03	Tetrachloroethane, 1,1,2,2-	79-34-5	5.6E-01	c	2.8E+00	c	4.2E-02	c	2.1E-01	c	6.7E-02	c		2.6E-05	
5.4E-01	C	5.9E-06	C	1.0E-02	I	2.7E-01	A	V		1		1.7E+02	Tetrachloroethylene	127-18-4	5.5E-01	c	2.6E+00	c	4.1E-01	c	2.1E+00	c	1.1E-01	c	5.0E+00	4.9E-05	2.3E-03
				3.0E-02	I					1	0.1		Tetrachlorophenol, 2,3,4,6-	58-90-2	1.8E+03	n	1.8E+04	n					1.1E+03	n		6.7E+00	
2.0E+01	H									1	0.1		Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	2.4E-02	c	8.6E-02	c					3.4E-03	c		1.1E-05	
				5.0E-04	I					1	0.1		Tetraethyl Dithiopyrophosphate	3689-24-5	3.1E+01	n	3.1E+02	n					1.8E+01	n		1.3E-02	
						8.0E-01	I	V		1		1.1E+03	Tetrafluoroethane, 1,1,1,2-	811-97-2	1.1E+05	nms	4.6E+05	nms	8.3E+04	n	3.5E+05	n	1.7E+05	n		9.3E+01	
				4.0E-03	P					1	0.1		Tetryl (Trinitrophenylmethylnitramine)	479-45-8	2.4E+02	n	2.5E+03	n					1.5E+02	n		1.4E+00	
				1.0E-05	X					1			Thallium (Soluble Salts)	7440-28-0	7.8E-01	n	1.0E+01	n					3.7E-01	n	2.0E+00	2.6E-02	1.4E-01
				1.0E-02	I					1	0.1		Thiobencarb	28249-77-6	6.1E+02	n	6.2E+03	n					3.7E+02	n		1.3E+00	
				7.0E-02	X					1	0.008		Thiodiglycol	111-48-8	5.4E+03	n	6.8E+04	n					2.6E+03	n		5.2E-01	
				3.0E-04	H					1	0.1		Thiofanox	39196-18-4	1.8E+01	n	1.8E+02	n					1.1E+01	n		3.8E-03	
				8.0E-02	I					1	0.1		Thiophanate, Methyl	23564-05-8	4.9E+03	n	4.9E+04	n					2.9E+03	n		2.5E+00	
				5.0E-03	I					1	0.1		Thiram	137-26-8	3.1E+02	n	3.1E+03	n					1.8E+02	n		2.6E-01	
				6.0E-01	H					1			Tin	7440-31-5	4.7E+04	n	6.1E+05	nm					2.2E+04	n		5.5E+03	
						1.0E-04	A			1			Titanium Tetrachloride	7550-45-0	1.4E+05	nm	6.0E+05	nm	1.0E-01	n	4.4E-01	n					
				8.0E-02	I	5.0E+00	I	V		1		8.2E+02	Toluene	108-88-3	5.0E+03	ns	4.5E+04	ns	5.2E+03	n	2.2E+04	n	2.3E+03	n	1.0E+03	1.6E+00	6.9E-01
1.8E-01	X			1.0E-04	X					1	0.1		Toluene-2,5-diamine	95-70-5	2.7E+00	c**	9.6E+00	c**					3.7E-01	c**		1.2E-04	
1.9E-01	H									1	0.1		Toluidine, p-	106-49-0	2.6E+00	c	9.1E+00	c					3.5E-01	c		1.5E-04	
1.1E+00	I	3.2E-04	I							1	0.1		Toxaphene	8001-35-2	4.4E-01	c	1.6E+00	c	7.6E-03	c	3.8E-02	c	6.1E-02	c	3.0E+00	9.4E-03	4.6E-01
				7.5E-03	I					1	0.1		Tralomethrin	66841-25-6	4.6E+02	n	4.6E+03	n					2.7E+02	n		1.0E+02	
				3.0E-04	A					1	0.1		Tri-n-butyltin	688-73-3	1.8E+01	n	1.8E+02	n					1.1E+01	n		2.4E-01	
				1.3E-02	I					1	0.1		Triallate	2303-17-5	7.9E+02	n	8.0E+03	n					4.7E+02	n		1.1E+00	
				1.0E-02	I					1	0.1		Triasulfuron	82097-50-5	6.1E+02	n	6.2E+03	n					3.7E+02	n		3.8E-01	
				5.0E-03	I					1	0.1		Tribromobenzene, 1,2,4-	615-54-3	3.1E+02	n	3.1E+03	n					1.8E+02	n		2.6E-01	
9.0E-03	P			1.0E-02	P					1	0.1		Tributyl Phosphate	126-73-8	5.4E+01	c*	1.9E+02	c*					7.5E+00	c*		3.7E-02	
				3.0E-04	P					1	0.1		Tributyltin Compounds	NA	1.8E+01	n	1.8E+02	n					1.1E+01	n			
				3.0E-04	I					1	0.1		Tributyltin Oxide	56-35-9	1.8E+01	n	1.8E+02	n					1.1E+01	n		5.7E+02	
				3.0E+01	I	3.0E+01	H	V		1		9.1E+02	Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	4.3E+04	ns	1.8E+05	nms	3.1E+04	n	1.3E+05	n	5.9E+04	n		1.5E+02	
										1	0.1		Trichloroacetic Acid	76-03-9											6.0E+01		1.2E-02
2.9E-02	H									1	0.1		Trichloroaniline HCl, 2,4,6-	33663-50-2	1.7E+01	c	5.9E+01	c					2.3E+00	c		6.4E-03	
7.0E-03	X			3.0E-05	X					1	0.1		Trichloroaniline, 2,4,6-	634-93-5	1.8E+00	n	1.8E+01	n					1.1E+00	n		9.9E-03	
				8.0E-04	X			V		1	0.1	1.5E+02	Trichlorobenzene, 1,2,3-	87-61-6	4.9E+01	n	4.9E+02	ns					2.9E+01	n		8.7E-02	
2.9E-02	P			1.0E-02	I	2.0E-03	P	V		1		4.0E+02	Trichlorobenzene, 1,2,4-	120-82-1	2.2E+01	c**	9.9E+01	c**	2.1E+00	n	8.8E+00	n	2.3E+00	c**	7.0E+01	6.8E-03	2.0E-01
				2.0E+00	I	5.0E+00	I	V		1		6.4E+02	Trichloroethane, 1,1,1-	71-55-6	8.7E+03	ns	3.8E+04	ns	5.2E+03	n	2.2E+04	n	9.1E+03	n	2.0E+02	3.2E+00	7.0E-02
5.7E-02	I	1.6E-05	I	4.0E-03	I	2.0E-04	X	V		1		2.2E+03	Trichloroethane, 1,1,2-	79-00-5	1.1E+00	c**	5.3E+00	c**	1.5E-01	c**	7.7E-01	c**	2.4E-01	c**	5.0E+00	7.8E-05	1.6E-03
5.9E-03	C	2.0E-06	C			1.0E-02	Y	V		1		6.9E+02	Trichloroethylene	79-01-6	2.8E+00	c**	1.4E+01	c**	1.2E+00	c**	6.1E+00	c**	2.0E+00	c*	5.0E+00	7.2E-04	1.8E-03
				3.0E-01	I	7.0E-01	H	V		1		1.2E+03	Trichlorofluoromethane	75-69-4	7.9E+02	n	3.4E+03	ns	7.3E+02	n	3.1E+03	n	1.3E+03	n		8.3E-01	
				1.0E-01	I					1	0.1		Trichlorophenol, 2,4,5-	95-95-4	6.1E+03	n	6.2E+04	n					3.7E+03	n		1.4E+01	
1.1E-02	I	3.1E-06	I	1.0E-03	P					1	0.1		Trichlorophenol, 2,4,6-	88-06-2	4.4E+01	c**	1.6E+02	c**	7.8E-01	c	4.0E+00	c	6.1E+00	c**		2.3E-02	
				1.0E-02	I					1	0.1		Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	6.1E+02	n	6.2E+03	n					3.7E+02	n		1.5E-01	
				8.0E-03	I					1	0.1		Trichlorophenoxypropionic acid, -2,4,5	93-72-1	4.9E+02	n	4.9E+03	n					2.9E+02	n	5.0E+01	1.6E-01	2.8E-02

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; X = PPRTV Appendix; H = HEAST; J = New Jersey; Y = New York; O = EPA Office of Water; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	voc	muta-gen	GIABS	ABS	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
				5.0E-03	I			V		1		1.3E+03	Trichloropropane, 1,1,2-	598-77-6	3.9E+02	n	5.1E+03	ns					1.8E+02	n		7.1E-02	
3.0E+01	I			4.0E-03	I	3.0E-04	I	V	M	1		1.4E+03	Trichloropropane, 1,2,3-	96-18-4	5.0E-03	c	9.5E-02	c	3.1E-01	n	1.3E+00	n	7.2E-04	c		2.7E-04	
				3.0E-03	X	3.0E-04	P	V		1		4.5E+02	Trichloropropene, 1,2,3-	96-19-5	7.8E-01	n	3.3E+00	n	3.1E-01	n	1.3E+00	n	6.2E-01	n		3.1E-04	
				3.0E-03	I					1	0.1		Tridiphane	58138-08-2	1.8E+02	n	1.8E+03	n					1.1E+02	n		7.8E-01	
						7.0E-03	I	V		1		2.8E+04	Triethylamine	121-44-8	1.2E+02	n	5.2E+02	n	7.3E+00	n	3.1E+01	n	1.5E+01	n		4.4E-03	
7.7E-03	I			7.5E-03	I					1	0.1		Trifluralin	1582-09-8	6.3E+01	c**	2.2E+02	c*					8.7E+00	c*		2.9E-01	
2.0E-02	P			1.0E-02	P					1	0.1		Trimethyl Phosphate	512-56-1	2.4E+01	c*	8.6E+01	c*					3.4E+00	c		7.4E-04	
						5.0E-03	P	V	M				Trimethylbenzene, 1,2,3-	526-73-8	7.1E+06	nm	3.0E+07	nm	5.2E+00	n	2.2E+01	n	1.0E+01	n			
						7.0E-03	P	V		1		2.2E+02	Trimethylbenzene, 1,2,4-	95-63-6	6.2E+01	n	2.6E+02	ns	7.3E+00	n	3.1E+01	n	1.5E+01	n		2.1E-02	
				1.0E-02	X			V		1		1.8E+02	Trimethylbenzene, 1,3,5-	108-67-8	7.8E+02	ns	1.0E+04	ns					3.7E+02	n		5.2E-01	
				3.0E-02	I					1	0.019		Trinitrobenzene, 1,3,5-	99-35-4	2.2E+03	n	2.7E+04	n					1.1E+03	n		3.9E+00	
3.0E-02	I			5.0E-04	I					1	0.032		Trinitrotoluene, 2,4,6-	118-96-7	1.9E+01	c**	7.9E+01	c**					2.2E+00	c**		1.3E-02	
				2.0E-02	P					1	0.1		Triphenylphosphine Oxide	791-28-6	1.2E+03	n	1.2E+04	n					7.3E+02	n		3.0E+00	
2.0E-02	P			7.0E-03	P					1	0.1		Tris(2-chloroethyl)phosphate	115-96-8	2.4E+01	c*	8.6E+01	c*					3.4E+00	c*		3.3E-03	
3.2E-03	P			1.0E-01	P					1	0.1		Tris(2-ethylhexyl)phosphate	78-42-2	1.5E+02	c*	5.4E+02	c					2.1E+01	c		1.0E+02	
				3.0E-03	I	3.0E-04	A			1			Uranium (Soluble Salts)	NA	2.3E+02	n	3.1E+03	n	3.1E-01	n	1.3E+00	n	1.1E+02	n	3.0E+01	4.9E+01	1.4E+01
1.0E+00	C	2.9E-04	C							1	0.1		Urethane	51-79-6	4.9E-01	c	1.7E+00	c	8.4E-03	c	4.2E-02	c	6.7E-02	c		1.5E-05	
		8.3E-03	P	9.0E-03	I	7.0E-06	P			0.026			Vanadium Pentoxide	1314-62-1	4.0E+02	c**	2.0E+03	c**	2.9E-04	c*	1.5E-03	c*	3.3E+02	n			
				2.0E-02	H					0.026			Vanadium Sulfate	36907-42-3	1.6E+03	n	2.0E+04	n					7.3E+02	n			
				5.0E-03	S					1			Vanadium and Compounds	NA	3.9E+02	n	5.2E+03	n					1.8E+02	n		1.8E+02	
				1.0E-03	I					1	0.1		Vernolate	1929-77-7	6.1E+01	n	6.2E+02	n					3.7E+01	n		2.9E-02	
				2.5E-02	I					1	0.1		Vinclozolin	50471-44-8	1.5E+03	n	1.5E+04	n					9.1E+02	n		7.0E-01	
				1.0E+00	H	2.0E-01	I	V		1		2.8E+03	Vinyl Acetate	108-05-4	9.7E+02	n	4.1E+03	ns	2.1E+02	n	8.8E+02	n	4.1E+02	n		8.8E-02	
		3.2E-05	H			3.0E-03	I	V		1		0.0E+00	Vinyl Bromide	593-60-2	1.1E-01	c*s	5.6E-01	c*s	7.6E-02	c*	3.8E-01	c*	1.5E-01	c*		4.4E-05	
7.2E-01	I	4.4E-06	I	3.0E-03	I	1.0E-01	I	V	M	1		3.9E+03	Vinyl Chloride	75-01-4	6.0E-02	c	1.7E+00	c	1.6E-01	c	2.8E+00	c	1.6E-02	c	2.0E+00	5.6E-06	6.9E-04
				3.0E-04	I					1	0.1		Warfarin	81-81-2	1.8E+01	n	1.8E+02	n					1.1E+01	n		1.2E-02	
				2.0E-01	S	1.0E-01	S	V		1		3.9E+02	Xylene, P-	106-42-3	6.0E+02	ns	2.6E+03	ns	1.0E+02	n	4.4E+02	n	2.0E+02	n		2.0E-01	
				2.0E-01	S	1.0E-01	S	V		1		3.9E+02	Xylene, m-	108-38-3	5.9E+02	ns	2.5E+03	ns	1.0E+02	n	4.4E+02	n	2.0E+02	n		2.0E-01	
				2.0E-01	S	1.0E-01	S	V		1		4.3E+02	Xylene, o-	95-47-6	6.9E+02	ns	3.0E+03	ns	1.0E+02	n	4.4E+02	n	2.0E+02	n		2.0E-01	
				2.0E-01	I	1.0E-01	I	V		1		2.6E+02	Xylenes	1330-20-7	6.3E+02	ns	2.7E+03	ns	1.0E+02	n	4.4E+02	n	2.0E+02	n	1.0E+04	2.0E-01	9.8E+00
				3.0E-04	I					1			Zinc Phosphide	1314-84-7	2.3E+01	n	3.1E+02	n					1.1E+01	n			
				3.0E-01	I					1			Zinc and Compounds	7440-66-6	2.3E+04	n	3.1E+05	nm					1.1E+04	n		6.8E+02	
				5.0E-02	I					1	0.1		Zineb	12122-67-7	3.1E+03	n	3.1E+04	n					1.8E+03	n		5.3E+00	

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RESPONSE TO COMMENTS
Draft 2011 Five-Year Remedy Review Report
Dated March 30, 2011
Mountain Home AFB, Idaho
Air Combat Command Environmental Restoration Program 4-Base PBC
Contract FA8903-04-D-8679 Delivery Order 0053

Comments received from Elly Hale, Remedial Project Manager, EPA Region 10. Dated 4 May 2011.

General Comments:

1. The 2006 Five Year Review recommended implementation of BMPs for flightline surface water management. What follow-up is still needed on this?

   Response: **Agree.** BMPs have been implemented to ensure proper management of the Flight Line Storm Drain as recommended in the 2006 FYR.

   The current Table ES-1 will be updated to include the following bullet under "Current Status" for Site SD-25:

   - *Based on recommendations to implement BMPs in the 2006 FYR, construction was completed between May 2008 and September 2008 to convert the open storm ditch to approximately 1,200 feet of 54-inch reinforced concrete storm pipe and install a lift station (concrete vault only) at the end of the existing flight line pipe culvert. Additional construction activities were initiated in September 2010 and are estimated to be completed by May 31, 2011. Activities include adding a 360 foot by 360 foot treatment basin (membrane-lined basin with 2 to 4 inches of treatment rock), mechanical and electrical components to the lift station, and another 700 feet of 48-inch reinforced concrete storm pipe along Cedar Street. The treatment basin will be a detection basin with an outfall, and the rock will act as a treatment medium for stormwater (CH2M Hill 2007).*

2. Reviewers found the description of the 33 sites and OUs difficult to follow. The 33 sites don't include OU-3, do they, so as a denominator, 33 is not completely accurate. Perhaps a handy matrix could be inserted that fits 8.5 x 11 paper and shows the site numbers and names, including OU-3, base housing asbestos, and Fuel Management Program and shades out the ones for which the current FYR indicates no changes to the 2006 protectiveness statement, no issues and no recommendations or follow-up items. Throughout the document, check references to 33 (or 32, or 11 or 28) ERP sites and make sure the language is clear and consistent.

   Response: **Agree.** The 33 sites do include Basewide Regional Groundwater, which is typically referred to as OU-3. A matrix table will be added to the document including site numbers and site names, with shading as suggested, showing which sites are evaluated under this FYR and which ones have no changes to the 2006 FYR protectiveness statement. This table will be added as Table ES-1.

3. Figure 1-2 should also be cited in the Executive Summary and Section 4 (Remedial Actions). Figure 2 from the 1995 ROD was helpful in that it identifies the 33 sites with a brief description. Can a similar legend be included on figure 1-2? In any case, OU-3 regional groundwater is not listed as one of the 33 sites. Greater clarity is needed in terms of the scope of the Five Year Review (See specific comments on Section4).

   Response: **Agree.** Figure 1-2 will be cited under the Purpose and Scope section of the Executive Summary. In addition, a legend identifying the site numbers and site names will be added to Figure 1-2 as suggested. While OU-3 regional groundwater will not be outlined on Figure 1-2 since it encompasses all groundwater at Mountain Home AFB, it will be added to the legend. Figure 1-2 will also be referenced in the first paragraph of Section 4.

4. In general, the 2006 Five Year Review was a good example to follow, but due to editing of some sections, the current FYR appears terse and choppy. In other cases, EPA comments suggest changes to language used verbatim in the approved 2006 Five Year Review report. Such comments are intended to make the document more accessible to the general reader. While the AF is clearly familiar with EPA's guidance (OSWER 9355.7038P), the FYR needs further work to ensure coherence, consistency with the guidance and greater clarity. In particular, we recommend a close look at contents of a Five-Year Review Report (Exhibit 3-3) and the Content Checklist in appendix E, as well as examples of protectiveness determinations

   Response: **Agree.** The guidance will be reviewed as suggested, and the document will be updated for consistency with the guidance and to provide greater clarity.

5. EPA agrees with the statement that TCE vapors in bedrock at the site are a potential threat to groundwater and that a pilot study for vapor extraction should go forward, along with a focused feasibility study and ROD amendment. For this reason, we disagree with the statement that the OU-3 remedy of No Remedial Action with Long-Term Monitoring is protective. The 2006 Five Year Review noted that OU-3 "is no longer considered protective because TCE concentrations detected [in regional groundwater]…exceed the federal MCL…" The current FYR states that MCLs are not currently exceeded in the drinking water supply (a statement that should be supported by documentation in the FYR) and is thus protective. We accept that the 2006 conclusion for OU-3 can be revised, but it is not acceptable as currently written. The TCE concentrations in groundwater warrants "N" or indeterminate under current (it does not affect current protectiveness as there is no current exposure), followed by a "Y" under future. Currently, people are not drinking water that exceeds the MCL, but in future there may be changes in water quality or use. In addition, groundwater impacts due to TCE sources in the vadose zone could worsen. Please see recommended edits in the specific comments enclosed.

Response: **Agree.** The document will be updated throughout to reflect there is an issue with the future protectiveness for the remedy for OU-3. In addition, supporting documentation will be provided to show that MCLs are not currently exceeded in the drinking water supply. However, a feasibility study is planned for OU-3 and is currently being developed, as opposed to a focused feasibility study.

6. The discussion of issues (Section 8) is intended to document the basis for recommended actions. In the current FYR, Table 8-1 identifies issues, yet the narrative introducing the table makes an ambiguous statement regarding whether there are issues that affect protectiveness. Issues do not signify failure. EPA recommends that MHAFB introduce the section without the initial (ambiguous) sentence and introduce Table 1 with a brief explanation of Tier 1 and Tier 2 issues. Tier 1 (those that affect protectiveness) should be listed in Table 8-1 first, followed by Tier 2 issues. The same tiering can then be used in Section 9 to describe recommendations (Tier 1 recommendations needed to achieve protectiveness, Tier 2 recommendations to help track follow-up). Tier 1 issues are closely monitored by congress.

   Response: **Agree.** Section 8 will be updated as follows:

   "Issues identified during this five-year remedy review (FYR) are associated with maximum contaminant level (MCL) exceedances and the potential for future exceedances due to residual trichloroethene (TCE) mass in the vadose zone for Operable Unit (OU)-3 as follows:

   TCE concentrations in monitoring wells MW25, MW33, and MW35 have historically exceeded the Federal MCL of 5.0 micrograms per liter (µg/L). However, an exposure pathway that could result in unacceptable risks associated with the exposure to or ingestion of contaminated groundwater does not currently exist because regional groundwater samples from Mountain Home Air Force Base (MHAFB) production wells have not reported TCE above the Federal MCL. Six MHAFB production wells are sampled on a quarterly basis to meet requirements of the Safe Drinking Water Act. Recent results are included in Table 4-2.

   Table 8-1 summarizes any issues identified for each site and whether the protectiveness of the selected remedy is affected. Table 8-1 is organized by Tier 1 and Tier 2 issues. Tier 1 recommendations address actions that affect protectiveness, and Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness."

7. The FYR must acknowledge (in Sections 7, 8, and 9) the potential asbestos contamination from transite pipe removal and chlordane in soils in the housing area. We suggest this be identified as a Tier 2 issue being tracked, as work to assess the risk and address any problems identified as a Tier 2 issue being tracked, as work to assess the risk and address any problems

identified will be done under separate authorities. Section 10 does not have to include a protectiveness statement for this issue.

Response: **Disagree/Agree.** Inclusion of the potential asbestos contamination from transite pipe removal and chlordane in soils in the housing area is not required in the FYR. Since Sections 7, 8, and 9 of the FYR deal with sites that are managed under CERCLA, no information in regards to the asbestos and chlordane site will be added to those sections. EPA's Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P, dated June 2001 specifies, "The Five-Year Review requirement applies to all remedial actions selected under CERCLA §121." Neither issue is being addressed under CERCLA and does not require tracking as part of the FYR. These issues are being addressed with the State under a Global Consent Order. However, a brief summary of these sites and how they are being addressed will be included in Section 6.4 (Data Review) and Table ES-2. The following will be included in both of the aforementioned sections:

"Two sites at MHAFB are managed by the Base Compliance Program under a Consent Order with DEQ. These sites include potential asbestos contamination from transite pipe removal and chlordane in soils in the family housing area. Under the Consent Order, MHAFB will sample and assess the extent of inadvertent chlordane pesticide and transite asbestos concrete pipe fragmentation in military family housing and evaluate health risk to family housing occupants.

The problem arose with contract work in the demolition phase of military family housing. The potential contamination threat from the past use of chlordane as a termiticide under and around building foundations was not recognized early on in the project. In addition, a potential contamination threat existed due to the cutting and crushing of asbestos concrete water lines being abandoned as part of the project. An impact to the water line occurred during the trenching operations for new sewer and water lines and scattered asbestos pipe fragments over the site.

Compliance with assessment, disposition, and cleanup of these site conditions in military family housing is being strictly enforced and followed under the DEQ Consent Order. It is not anticipated this will become a CERCLA compliance issue."

In addition, the Recommendations column in Table ES-2 will read, "*None, since these sites are being addressed with the State under a Consent Order and are not managed under CERCLA."*

8. In Section 10, protectiveness statements can be made for specific ERP sites, as is done in the current FYR. However, at construction complete sites such as MHAFB, there must be a sitewide protectiveness statement. Until all the sites are protective (currently and in future),

the MHAFB site overall will not be considered protective on a sitewide basis this year. However, the statement can acknowledge that the site is expected to be protective, based on implementation of ICs at LF-23, completion of ongoing remedial action, and contaminant source removal from the vadose zone and that, barring unanticipated issues, remedial action and implementation of institutional controls will likely allow a determination that the remedy is protective sitewide within the next five years. As an editorial item, some protectiveness statements indicated protectiveness in the short term but not the long term. We think these are mistakes resulting from faulty editing.

Response: **Agree.** The following will be added to the end of Section Ten:

"10.14 MHAFB SITEWIDE

The remedy at MHAFB is expected to be protective of human health and the environment upon implementation of LUCs at Site LF-23, completion of ongoing remedial actions at Sites FT-08 and ST-11, and implementation of contaminant source removal from the vadose zone. Exposure pathways that could result in unacceptable risks are being controlled in the interim. Barring unanticipated issues, remedial action and implementation of LUCs will likely allow a determination that the remedy is protective sitewide within the next five years."

In addition, all site-specific protectiveness statements will be reviewed, and the text will be changed from "near-term" to "long term" as appropriate.

9. Annual inspections are a stated requirement of the ESDs for institutional controls at ST-11, LF-01 and LF-02. The current FYR implies that there is no need to do this, but a completed inspection checklist and documentation must be included in each five year review. Land use changes are not the only concern for LF-01 and LF-02.

Response: **Agree.** As described in Sections 4.3.1 (Site LF-01) and 4.3.2 (Site LF-02) annual on-site inspections are completed and documented. Inspection results are provided in the LTM Annual Reports. The last inspection of Site LF-01 was completed on May 25, 2011. The last Site LF-02 inspection was completed on November 1, 2010. Documentation of the 2010 inspection is included in the Draft 2010 LTM Annual Report, and the 2011 inspection will be provided in the 2011 LTM Annual Report. The inspection results will be added as an appendix to this FYR.

In addition, inspections are completed at Site ST-11 twice a year in conjunction with the Spring and Fall LTM sampling events. Documentation of the 2010 inspections is included in the Draft 2010 LTM Annual Report, but is not provided on a separate checklist. The most recent inspection in March 2011 will be documented in the 2011 LTM Report. The following text will be added to the beginning of Section 4.3.5 in the FYR:

"In accordance with the specific ICs for Site ST-11 as described in the ESD signed October 20, 1995 for the 1995 ROD, for four operable units (OU-1, OU-3, OU-5, and OU-6) at MHAFB a visual inspection is completed at least annually. The visual inspection is completed to verify compliance with the IC requirements, objectives, and controls in the ROD and the ESD, to determine violations of these controls, and to look for indications of tampering, incompatible use, and trespass. A report of the inspections is included in the LTM Annual Report each year including a statement as to whether all requirements, objectives, and controls in the ROD and ESD have been complied with and whether MHAFB's administrative procedures are effective."

a. Are signs still in place?

Response: **Yes,** signs are still in place at Site LF-02. No signs were installed or required as part of the ESD at Site LF-01.

b. Is there any evidence of damage to the monofill cover at LF-01 or improper use or access to LF-02?

Response: **No,** there is no evidence of damage to the monofill cover at Site LF-01 or improper use or access to Site LF-02.

10. For Site ST-38 (POL Storage Area) the Protectiveness Statement was "not currently protective". The 2011 draft FYR includes recommendations that other programs will implement but concludes that the CERCLA remedy of No Action at ST-38 is protective. EPA believes the determination regarding protectiveness of the no action remedy should probably be "*expected to be protective once the POL storage area is addressed pursuant to other authorities*." The recommendation should be a Tier 2 issue, with a recommendation for follow-up by ERP program staff to ensure that work done under the other programs is documented to be protective.

Response: **Disagree/Agree.** Please see specific comment #56 concerning protectiveness. Site ST-38 has no CERCLA remedy since it was not included in the 1995 ROD or any other CERCLA decision document. The last sentence in Section 10.12 will be updated to read, *"Because ongoing monitoring will continue under other authorities, the corrective action is currently protective of human health and the environment, and the selected corrective action is expected to be protective in the long term."*

Specific Comments:

1. **Executive Summary.** The first sentence gives the impression that the purpose of the five year review is to fulfill contract requirements. This statement should be moved to the end of the paragraph or left out.

Response: **Agree.** The first sentence will be moved to the end of the paragraph.

2. **Executive Summary.** Cite statue and regulation (page 1-2 of EPA's 2001 IC guidance). In citing CERCLA Section 121(c), it is unnecessary to reference amendments. Please directly use the language of the NCP. The NCP states "If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposures, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action." Then define unrestricted use and unlimited exposure (UU/UE).

   Response: **Agree.** The text in the middle of the first paragraph on page ES-1 will be updated as follows: *"...allow for unlimited use and unrestricted exposure (UU/UE) required by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and 40 Code of Federal Regulations Section 300.430(f)(4)(ii). As required by the National Contingency Plan (NCP), if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for UU/UE, the lead agency shall review such action no less than every five years after the initiation of the selected remedial action. UU/UE means that the selected remedy will place no restrictions on the potential land use or other natural resources."*

3. **Executive Summary.** "The remedy review team consists of ~~is comprised of environmental managers from~~ the Air Force, EPA, and DEQ." Read and cite to the FFA, Section XIX. The AF project team includes….MHAFB, AFCEE, and ACC.

   Response: **Agree.** The text in the first paragraph of page ES-1 will be updated to read, *"The remedy review team consists of the Air Force, U.S. Environmental Protection Agency (EPA) Region 10, and Idaho Department of Environmental Quality (DEQ) as dictated in Section XIX of the Federal Facility Agreement (FFA) for MHAFB (EPA, DEQ, and USAF 1991). The Air Force project team includes MHAFB, the Air Force Center for Engineering and the Environment (AFCEE), and Headquarters Air Combat Command (ACC)."*

4. **Executive Summary and throughout document.** Sometimes MHAFB is referred to as "The Base" (for example, under Installation Description). Either pick one or reference both short-hand terms the first time.

   Response: **Agree.** The document will be updated to consistently use MHAFB.

5. **Executive Summary.** This section states that it is the first five year remedy review. In this paragraph, provide the dates of the previous FYRs. Is there a good, short, consistent term (FYR or example) that can be used? The 'review document' and other terms are used inconsistently and are unwieldy.

   Response: **Agree.** Review of the document did not find a reference indicating this is the "first" five-year remedy review. The following will be added to the end of the first

paragraph on page ES-1: *"The initial FYR was submitted in June 2001 (FEC 2001) and the second FYR was completed in June 2006 (URS 2006b).*

In addition, as suggested, FYR will be used as an abbreviation of five-year review, review document, and other terms used to define the document.

6. **Executive Summary. Last sentence.** Delete 'implementation and performance of' and 'in place' and 'from June 2006 through June 2011.' The remedy review does focus on data from the last year years, but the review is not limited to that. In any case, June information has not been reviewed.

   Response: **Agree.** The last sentence in the first paragraph on page ES-1 will be updated to read, *"This FYR evaluates the selected remedies at MHAFB."*

7. **Pages ES-2 and 3.** It seems odd that LF-01 was removed from OU-2 and is listed under No Specific OU at the end of the list. What is the history?

   Response: **Comment noted.** Site LF-01 was investigated as part of OU-2 Remedial Investigation/Baseline Risk Assessment in 1992. The results of the Human Health Risk Assessment and Ecological Risk Assessment indicated no unacceptable health risks were expected from exposure to wastewater and soils at Site LF-01. The 1993 OU-2 Record of Decision (ROD) stated the results of the Remedial Investigation at the Lagoon Landfill (Site LF-01) indicated additional data on groundwater were needed to make a decision on remedial action. The ROD also noted that additional data needs and the remedial action decision at the Lagoon Landfill (Site LF-01) site would be addressed as part of OU-3. While the groundwater was addressed under OU-3, Basewide Regional Groundwater, the remainder of the site was not included in a different OU and not carried forward for evaluation under OU-2.

8. **Review Procedure.** The first sentence isn't needed. Please delete.

   Response: **Agree.** The sentence will be deleted as suggested.

9. **Pages ES-4.** Edit: "In accordance with EPA guidance (OSWER No. 9355.7-03B-P), the FYR is organized as follows:"

   Response: **Agree.** The first paragraph under Five-Year Review Document Organization on page ES-4 will be updated to read, *"In accordance with EPA guidance (OSWER No. 9355.7-03B-P), the FYR is organized as follows:"*

10. **Pages ES-5.** Section 2.0 – Summarizes ~~gives a summary of~~

Response: **Agree.** The suggested change will be made.

11. **Evaluation of Protectiveness.** "The site-specific remedies have been implemented for all sites in accordance with the RODs, etc." Selected remedies for all sites are protective of human health and the environmental currently, in the near term, and in the long term. EPA believes that some sites are not protective, particularly OU3, but in any case, for "construction complete" sites, the determination of protectiveness must be made on a sitewide basis. Site specific statements as provided in this FYR can be retained as they document the basis for the sitewide determination.

    Response: **Agree.** The following will be added to the end of the Evaluation of Protectiveness section on page ES-6:

    "The remedy at MHAFB is expected to be protective of human health and the environment upon implementation of land use controls (LUCs) at Site LF-23, completion of ongoing remedial actions at Sites FT-08 and ST-11, and implementation of contaminant source removal from the vadose zone. Exposure pathways that could result in unacceptable risks are being controlled in the interim. Barring unanticipated issues, remedial action and implementation of LUCs will likely allow a determination that the remedy is protective sitewide within the next five years."

12. **Evaluation of Protectiveness.** Of the 33 ERP sites, selected remedies are protective of human health and the environment and allow UU/UE, ~~as well as for UU/UE,~~ for the following 28 sites.

    Response: **Agree.** The text in the second paragraph on page ES-5 will be updated as suggested. In addition, the sites will be provided in a bulleted list based on Specific Comment #13.

13. **Pages ES-6.** "The selected remedies for the following ~~five~~ three sites include institutional controls and are protective of human health and the environment, but ~~not for~~ do not allow for UU/UE: LF-01, LF-2, and LF-23~~, ST-38, and OU-3~~." Suggest a bullet for each site. OU-3 is not protective of HH&E. ST-38 needs its own category.

    Response: **Agree.** The text will be updated as follows:

    "The selected remedies for the following three sites include institutional controls and are protective of human health and the environment, but do not allow for UU/UE:
    - *LF-01*
    - *LF-02*

- *LF-23*

The selected remedy for the following site is protective of human health and the environment, but does not allow for UU/UE:

- *ST-38*

The selected remedy for the following site is <u>not</u> protective of human health and the environment or for UU/UE:

- *OU-3"*

14. **Page ES-6.** The paragraph beginning "Long-term monitoring…" is focused on one issue (one OU among 33 sites) and, with well identification and dates and monitoring results, is too detailed. Perhaps the first sentence (without well specifics) and third sentence can be included as part of the last paragraph, with a reference to additional details elsewhere in the document. The link between these sentences will clarify how an exceedance of MCLs can be considered protective of human health and the environment. It may be protective in the short term, but with TCE sources in the vadose zone and potential changes in land use in future, EPA believes that remedial action is needed to ensure future protectiveness.

Response: **Agree.** The text will be updated as follows: *"Long-term monitoring (LTM) of the regional groundwater has historically detected trichloroethene (TCE) above its maximum contaminant level (MCL) in three monitoring wells. Volatile organic compounds, including TCE, have not been detected above MCLs in any of the MHAFB drinking water supply wells or perimeter wells during any sampling events. Additional details concerning results from the LTM are included in Table ES-2."*

15. **ES-6.** "However, expansion of the current vapor extraction system ~~in the northwest portion of the Base~~ is planned under OU-3 to address contaminant sources in fractured bedrock that pose a threat to groundwater. ~~recommended to provide additional source control in the bedrock vapor.~~"

Response: **Agree** with some minor changes**.** The text will be updated to read, "However, expansion of the current vapor extraction system is <u>recommended</u> under OU-3 to address contaminant sources in fractured bedrock that pose a <u>potential</u> threat to regional groundwater."

16. **Evaluation of Protectiveness: Consider the following edited language:** Base monitoring for VOCs has not detected MCL exceedances in the drinking water supply. However, long term monitoring (LTM) of the regional groundwater has detected trichloroethene (TCE) above the maximum contaminant level (MCL) at several wells near the industrial center of the base, and TCE is routinely detected near the MCL in monitoring wells across the base.

VOC concentrations in a large portion of the unsaturated zone are elevated and are believed to be a source of TCE to groundwater. For this reason, while No Remedial Action (NRA) remedy with LTM is currently protective of human health and the environment, the AF plans to amend the remedy to reduce sources of TCE in bedrock.

Response: **Comment noted.** The text will be updated based on responses to EPA Specific Comments #15 and #16.

17. **Summary of Review and Recommended Actions, p. ES-6. First paragraph, Second Sentence -** Replace "source removal of contamination, implementation of a remedial system, and/or the implementation of institutional controls" with "additional response action". Third sentence: Provide more detail on the recommended actions from 2006-there's a tidy list under the same section—and take credit for having accomplished most of them. The recommendations included revisiting TCE slope factor.

Response: **Agree.** The document will be updated to read, *"…were performed and revealed that additional response action was warranted at several sites to ensure the protectiveness of selected remedies. The 2006 FYR identified the following recommendations:*

- *No Further Action for eight sites (FT-05, FT-06, FT-07, SD-12, ST-11, SD-25, SS-30, and ST-32).*
- *Continue the Tank 1 petroleum, oil, and lubricants comprehensive engineering evaluation and implementation of the corrective action plan for ST-38 under the Risk Based Corrective Action or Risk Evaluation Manual.*
- *Implement institutional controls for two sites (LF-01 and LF-02) to prevent unacceptable risk due to exposure to potentially contaminated media.*
- *Complete an Engineering Evaluation/Cost Analysis and a potential non-time critical removal action for contaminated soils at five sites (FT-04, OT-16, LF-23, SD-27, and SS-29) to achieve unrestricted future land use.*
- *Complete pilot studies to evaluate potential remedial technologies for three sites (FT-08, ST-11, and SD-24).*
- *Complete a Baseline Risk Assessment (BRA) amendment, focused feasibility study, and proposed plan for ST-11, FT-08, and SD-24.*
- *Continue operations and maintenance activities for the current product recovery system at ST-13 and complete an OU-3 RI/BRA amendment to document the presence of light non-aqueous phase liquid (LNAPL) on regional groundwater in MW24. Additional characterization of the source area of LNAPL in MW24 and hot spots contributing volatile organic compound vapors to the vadose zone for ST-13.*

- *Revisit TCE toxicity data to evaluate the protectiveness of the selected remedies based on the outcome of the ongoing TCE slope factor review."*

18. **Summary of Review and Recommended Actions, p. ES-6. Second Paragraph:** The actions listed in the first sentence are too generic. Recommended text: Table ES-1 summarizes current status for all sites and recommendations for seven sites and OU-3. Section 9 discusses these recommendations and presents a schedule for implementing follow-up actions. Consider the tiering of recommendations, so that Tier 1 recommendations address actions that affect protectiveness, and Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness. An example of Tier 2 might be ongoing OM&M, coordination with other programs regarding POL yard upgrades, implementation of ICs under the LF-23 ESD. Examples of follow-up actions are summarized below:

Tier 1

a. ~~No Further Action for FT-04, OT-16, SD-24, SD-27, and SS-29~~ [this isn't a recommended action, and it doesn't affect protectiveness, so it's not a Tier 1 recommendation.

b. Implement ICs for LF-23 in accordance with ESD

c. Complete a pilot study, *focused* feasibility study, proposed plan and ROD amendment for OU-3 source removal.

Tier 2

d. Conduct LTM ~~for ST-13, ST-38 and OU-3~~ [monitoring to address specific sites, such as ST-13 and ST-38, as well as landfills, should be part of a comprehensive monitoring plan for the base, including regional and perched groundwater, as appropriate.]

e. Continue vapor extraction systems at ST-11 and FT-08 until cleanup objectives are met.

f. Monitor POL yard tank upgrades/replacement at ST-38

g. Monitor asbestos/chlordane issue at base housing area.

Response: **Agree.** The second paragraph will be updated as follows:

"Table ES-2 summarizes the current status for all sites and recommendations for eight sites, including OU-3. Section 9 discusses these recommendations and presents a schedule for implementing follow-up actions. Specific Tier 1 and Tier 2 recommendations are provided below and are summarized by site in Table ES-3. Tier 1 recommendations address actions

that affect protectiveness, and Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness."

Tier 1

- *Complete a pilot study, Feasibility Study, Proposed Plan, and ROD amendment for OU-3*
- *Implement LUCs for Site LF-23 in accordance with the ESD*

Tier 2

- *Continue LTM for basewide regional groundwater and perched groundwater, as appropriate*
- *Continue remedial actions at Sites FT-08 and ST-11 until cleanup objective are met*
- *Continue to track the actions being taken by Defense Logistics Agency/Defense Energy Support Center at the POL Storage Area"*

Page 4-13 (Exhibit 4-4) of the IC guidance includes a sample table. With the addition of issues, this table is appropriate for an executive summary (it is similar to Table 9-1, once revised to include tiering and a few other modifications in the comment below). Table ES-1 is comprehensive and can be included in the document, but the recommendations must be consistent with Table 9-1. This requires some cross-checks. Recommendations such as "continue to monitor/operate…" are helpful for tracking, but they are not Tier 1 issues.

Response: **Agree.** A table following the format of Exhibit 4-4 will be added to the Executive Summary as Table ES-3. Table ES-1 will remain a part of the Executive Summary and will be renamed as Table ES-2.

19. **Next Five-Year Remedy Review, p. ES-7.** Additional five-year remedy reviews are required, since contamination remains above levels that allow UU/UE at some ERP sites located at the base. The next remedy review will be due no later than June 2016. *[Note: The FYR can be compelled earlier, and if work done changes the determinations, the AF might want to consider this. However, given LF-01, LF-02, and LF-23, there will be FYRs required anyway.]*

Response: **Agree.** The text will be revised to read, *"Additional FYRs are required since contamination remains above levels that allow UU/UE at some ERP sites located at MHAFB. The next FYR will be due no later than June 2016."*

20. **Table ES-1 (which should be moved to another part of the document and replace with Table 9-1, as modified per comments)**

Response: **Agree/Disagree.** Table ES-1 will remain a part of the Executive Summary, and a new table following the format of Exhibit 4-4 will be added to the Executive Summary as Table ES-3.

a. **"Current Chemicals of Concern".** This column heading doesn't make sense – nor does it make sense to say "none" under the heading. Better to state "ROD chemicals of concern".

Response: **Agree.** The purpose of providing the "current" chemicals of concern is to show those chemicals still present at each site. Since many of the sites have been cleaned up and closed, there are no longer any chemicals of concern associated with those sites. However, the title of the column will be updated to *"Original ROD Chemicals of Concern in Soil"* and the applicable sites will be updated. In addition, the following note will be added to the bottom of the table , *"TCE is the primary COC for regional groundwater, and COCs included LNAPL fuels in regional groundwater at Site ST-13 (JP-4) and in perched groundwater at Sites ST-11 (JP-4) and ST-38 (JP-8)."*

b. **LF-03.** Current status 3rd bullet from end should be revised. LF-03 was in OU-1, and it is listed under Table 2 of the FFA. Please describe post-closure land use controls required.

Response: **Disagree** that the current status 3rd bullet from the end should be revised. While LF-03 has been considered part of OU-1, hazardous wastes have not been disposed at this site, and no sampling was completed at this site under CERCLA. No exposure pathways for soil were considered, and the site was not evaluated for exposures via the groundwater pathway. The site was determined to not pose an unacceptable risk to human health or the environment. As such, this site was not evaluated under CERCLA or the FFA team. In addition, discussions during the FFA team meeting on January 26, 2011 concluded the FYR should clarify this site is not evaluated under CERCLA or by the FFA and is currently closed and subject to solid waste laws.

Agree to include a description of post-closure land use controls required. The following will be added to the "Current Status" column:

- *"Post-closure activities specified in the MSW Landfill Post-Closure Plan (Sunrise Engineering, Inc. 2009) will be conducted for 30 years and include maintaining the effectiveness of any final cover and maintaining and operating a gas monitoring*

system. In addition, inspections will be completed on a semi-annual basis for the first year of post-closure care and annually thereafter for the 30-year period.

- *Access to the landfill will be controlled to prevent damage to the final cover. Access is prevented by a gate at the front entrance of the landfill and a perimeter fence around MHAFB, which is patrolled at all times. In addition, a sign identifies the point of access to the facility.*
- *MHAFB and the landfill will continue to be fenced and will not actively be used after closure. The area will be returned to a natural setting and planted to vegetation similar to the surrounding environment."*

c. FT-08. The COC list changes since 2006 FYR. Why?

Response: **Agree.** Due to actions taken and evaluations completed at Site FT-08 since the 2006 FYR, some contaminants are no longer a concern. See response to Specific Comment 20.a above.

d. ST-11. The COC's changed from BTEX to Benzene only. Why?

Response: **Agree.** Due to actions taken and evaluations completed at Site ST-11 since the 2006 FYR, some contaminants are no longer a concern. See response to Specific Comment 20.a above.

e. ST-13 – Current Status – Revise fifth bullet: not sure it's "more likely", but it may be the case. Qualify.

Response: **Agree.** The fifth bullet will be updated to read, *"An evaluation of the subsurface physical conditions at Site ST-13 (URS 2007f) has suggested the past presence of free product in MW24 was due to inadvertent introduction of product through the borehole drilled for MW24 as opposed to leakage from former Site ST-13 USTs."*

Recommendation "meets UU/UE" – This is jarring, given the variable presence of free product in groundwater and ongoing tank replacements. Suggest UU/UE be qualified as for SD-24, if accurate: The soil meets UU/UE. Monitoring of groundwater will be continued under another program. The ERP program will review in the next FYR.

Response: **Disagree.** Free product has not been observed in MW24 since January 2009, and benzene has been below the MCL since April 2007. In addition, as documented in the 2010 OUs 1, 3, 5, and 6 ROD Amendment, based on current site conditions, the FFA team agrees the site now meets UU/UE criteria and warrants NFA at this time. The ROD Amendment recommended evaluating LTM data and available information for Site ST-13 during the 2011 Five-Year Remedy Review. Since LTM data

collected since completion of the 2010 ROD Amendment indicate benzene remains below the MCL and no LNAPL is present, No Remedial Action and UU/UE are appropriate for Site ST-13. The site will continue to be monitored for LNAPL as part of the LTM Program.

f. **LF-23** – Not sure if this is a follow-up action, but documentation of IC implementation will be submitted, when?

Response: **Agree.** The LF-23 does not specify a timeframe when this documentation will be submitted. The "Recommendations" column in the current Table ES-1 and the "Recommendations & Follow-Up Actions" column in Table 9-1 will be updated to include an additional bullet as follows:

- *"Submit a deed notice for recordation at the Base Civil Engineer Squadron Real Estate Office; update the BCP and provide copies of the updated BCP to the EPA and DEQ; review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23; and 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 DEQ."*

In addition, Section 9.8 will be updated to read, *"..in accordance with the ESD. In addition, the following implementation actions should be completed:*

- *Submit a deed notice for recordation at the Base Civil Engineer Squadron Real Estate Office*
- *Update the BCP and provide copies of the updated BCP to the EPA and DEQ*
- *Review planning and design documents and dig permit applications for all projects proposed within the footprint of the LUC area at Site LF-23*
- *Do 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."*

g. **SD-24** – COCs changed. Why? Comparing this to 2006 ES-1, there are lots of items (ROD amendment, VI assessment) that should be discussed, to support the change.

Response: **Agree.** See response to Specific Comment 20.a above concerning the change in COCs. The following bullet will be added after the current third bullet under the "Current Status" column for Site SD-24:

- *"The Final OU-3 RI Report Amendment (URS 2008b) identified Site SD-24 as an ERP site still considered a potential or likely threat to regional groundwater quality."*

In addition, the following bullet will be added after the current sixth bullet under the "Current Status" column for Site SD-24:

- *"The ROD Amendment for OUs 1, 3, 5, and 6 (URS 2010f) concluded the impacted soil source is now removed from the site and soil meets UU/UE criteria. The ROD Amendment also indicated the need for further active remediation of the fractured bedrock at Site SD-24 as a full-scale remedial action was not known until the additional data obtained from the pilot scale VE testing could be fully evaluated."*

SD-24 VE work is not completely concluded, I think. I'm aware that additional areas of vapor extraction will be targeted, but is further action in the system at SD-24 going to be concluded under OU-3? Can this be clarified?

Response: Agree. VE work associated directly with Site SD-24 is completed since the FFA team agreed the site meets UU/UE based on the soils at the site. VE to address residual contamination in bedrock vadose zone vapors will be continued under OU-3. To clarify, the last bullets under the "Current Status" and "Recommendations" columns will be updated to read, *"…will be addressed and concluded under OU-3, Basewide Regional Groundwater."*

In addition, the current second to last bullet will be updated to read, *"During a meeting on January 26, 2011, the FFA team agreed to close Site SD-24 because site soils meet UU/UE criteria. The FFA team also agreed to continue VE activities under OU-3 to address residual contamination in bedrock vadose zone vapors."*

h. SD-25 – Please revisit the 2006 FYR for this site. Have BMPs for stormwater management been defined and implemented? What documentation can be referenced?

Response: Agree. See response to General Comment #1. No specific report has been produced to document BMP implementation activities, but design documents are available. The following reference will be added to Section 12: *"CH2M Hill. 2007. Design Storm Water Best Management Practices (BMP) for Flight Line Storm System. Mountain Home AFB, Idaho. Sheets 1-16. March."*

i. Various – "Selected Remedy" column shows NRA with LTM, then NFA. The FYR isn't a remedial decision document. What did OU-3 ROD amendment say?

Response: Agree. The OU-3 ROD Amendment provided a status of all the ERP sites and confirmed the recommendations for NFA made in the 2006 FYR. Those sites documenting a selected remedy of NFA from the 2006 FYR will be changed to reference the 2010 ROD Amendment under the "Status of Response" column.

j. ST-38 – It might be more clear to make the first recommendation "track actions to be taken [clarify by whom]" The subsequent recommendations are not going to be done by ERP, I think.

Response: Agree. The bullets under the "Recommendations" column will be changed as follows:

- *"Track the following actions to be taken by DLA/DESC*
  - *Manage the POL Storage Area*
  - *Sample perched water and monitor for the occurrence of LNAPL*
  - *Complete LNAPL removal, as necessary, to the maximum extent practicable as determined by DEQ*
  - *Complete a Tier 1 RBCA evaluation to obtain site closure after free product has been removed to the extent practical as determined by DEQ personnel"*

k. OU-3 – Reference 2006 recommendations under current status. Current recommendations should include "Track VOC monitoring under the Base drinking water program." The third bullet should be consistent form: Complete a pilot study, FFS, Proposed Plan, and ROD amendment for…VOC mass removal from unsaturated bedrock. (The 'northwest portion of the Base' is unclear.) Please be aware that, until a decision document is issued, a remedy has not been selected, and address VE pilot study discussion accordingly.

Response: Agree. The 2006 FYR recommendations will be added as the first bullet under the "Current Status" column as follows: *"The 2006 FYR recommended continuing regional groundwater and vapor monitoring in accordance with the approved work plan; completing an OU-3 RI amendment followed by a BRA amendment, FFS, PP, and ROD amendment; and re-evaluating the monitoring needs of the LTM program at least every other year (URS 2006b)."*

In addition, a bullet stating, *"Track VOC monitoring under the MHAFB drinking water program."* will be added under the "Recommendations" column. Furthermore, the last bullet in the "Recommendations" column will be updated as follows: *"Complete a pilot study, FS, Proposed Plan, and ROD amendment for OU-3 to address VOC mass removal from unsaturated bedrock."*

l. **NA** – I appreciate the addition of the fuel management program to this table. The topic of fuel management was in the OU-3 ROD. Filling in all headings might lead to conflict, but the Current Status heading could include reference to the ROD as the first bullet. Third bullet needs editing for clarity.

Response: **Agree.** The following new bullet will be added at the top of the "Current Status" column: *"While the Fuel Management Program is under the authority of DLA/DESC, the 1995 ROD specified a requirement for a leak detection program as part of the Limited Action remedy for Site ST-11. The purpose of the leak detection program is to ensure early detection of any future petroleum leaks at the site. The program includes petroleum inventory and annual flight line leak detection programs. As such, the current status of the Fuel Management Program is included in this FYR."*

In addition, the third bullet will be updated to read, *"A Mass Technology CPTM System was installed in Tanks 2 and 3 in January 2008 and February 2008, respectively. The CPTM system included valve replacement to provide automatic isolation of the tanks to provide monthly monitoring. Monitoring results are reported on a quarterly basis (URS 2009d)."*

21. **Five Year Review Summary Form:** EPA would like to review a revised version of this in advance of the final draft FYR.

Response: **Agree.** The revised version of the Summary Form will be provided prior to submittal of the draft final FYR.

a. **Site Name** in WasteLAN is Mountain Home AFB. I believe it isn't necessary (and is confusing) to list the individual sites.

Response: **Agree.** The Site name (from WasteLAN) field will be updated to "Mountain Home AFB."

b. **Construction Completion Date.** MHAFB is 'construction complete'. Insert the date of the PCOR.

Response: **Agree.** The date will be changed to May 6, 2010, the date of the Draft FT-08 PCOR.

c. **Recommendations and Follow-up Actions.** Delete "OU-3 is protective" language. It's not correct and doesn't belong here anyway.

Response: Agree. The sentence will be deleted as suggested.

d. Site Inspection. "NA." In the decision documents for these sites MHAFB committed to an annual site visit. Rather than NA, provide a basis for concluding that, without a site inspection, it is clear that the access restrictions, institutional controls, and cover are effective. Or, inspect the sites. Did someone visit LF-01 and LF-02?

Response: Agree. As described in Sections 4.3.1 (Site LF-01) and 4.3.2 (Site LF-02) annual on-site inspections are completed and documented. Inspection results are provided in the LTM Annual Reports. The last inspection of Site LF-01 was completed on May 25, 2011. The last Site LF-02 inspection was completed on November 1, 2010. Documentation of the 2010 inspection is included in the Draft 2010 LTM Annual Report, and the 2011 inspection will be provided in the 2011 LTM Annual Report. The inspection results will be added as an appendix to this FYR, and the dates of site inspection will be added to the FYR Summary Form.

e. Protectiveness Statements. Changes to language repeated (and committed on) elsewhere should be carried through. A sitewide protectiveness statement is needed. This can be presented before or after the individual sites are discussed.

Response: Agree. The following will be added under Protectiveness Statement(s) after the individual sites are discussed:

"The remedy at MHAFB is expected to be protective of human health and the environment upon implementation of land use controls (LUCs) at Site LF-23, completion of ongoing remedial actions at Sites FT-08 and ST-11, and implementation of contaminant source removal from the vadose zone. Exposure pathways that could result in unacceptable risks are being controlled in the interim. Barring unanticipated issues, remedial action and implementation of LUCs will likely allow a determination that the remedy is protective sitewide within the next five years."

f. Other Comments: This might be a place for reference to post-2006 ROD amendments and ESDs that have helped ensure protection of HH&E. ERP sites – OU-2 – See earlier comments on LF-01 and OU-2. Middle paragraph on SF-3: However, the remedy for some sites has changed since completion of the 1992, 1993, and 1995 RODs (delete the rest of the sentence). 2007 Action Memoranda – don't need NTCRA EE/CA, just 2007 Action Memorandum for Site LF-23.

Response: Agree. The word "None" will be deleted from the bottom of page SF-2. Page SF-3 currently summarizes all RODs, ROD amendments, ESDs, and other decision documents have helped ensure protection of human health and the environment.

The listing for OU-2 will be update as follows: *"OU-2 – Two sites, Lagoon Landfill (LF-01) (later removed from OU-2) and B-Street Landfill (LF-02)"*

The text, "through an Explanation of Significant Differences (ESD), Action Memorandum, or ROD amendment" will be deleted from the end of the paragraph in the middle of page SF-3 as suggested.

In addition, "NTCRA EE/CA" will be deleted for cited action memoranda.

22. **Section One** – Replace "components and monitoring associated with environmental sites" with "the selected remedy"

Response: **Agree.** The first sentence will be updated to read, *"This third post-Record of Decision (ROD) five-year remedy review (FYR) report evaluates the selected remedy at Mountain Home Air Force Base (MHAFB)."*

23. **Section Two** – Delete "listing of" and replace "Record of Decision" with decision documents (to include RODs, ROD-A, ESDs, Action Memos), and add Five Year Reviews to the text. **Table 2-1.** Use bold or some other way to highlight decision documents.

Response: **Agree.** The first sentence of Section Two will be revised as follows: *"Section Two provides dates and major events, key environmental studies, decision documents (to include Records of Decision [RODs] ROD Amendments, Explanations of Significant Differences, and Action Memoranda), and Five-Year Remedy Reviews completed at Mountain Home Air Force Base."*

In addition, decision documents included in Table 2-1 will be bolded, and the following note will be added to the end of the table: *"Bolded text indicates the item is a decision document."*

24. **Page 3-36 – 3rd bullet.** Edit to state that SD-24 is "the most likely SIGNIFICANT source of TCE contamination in groundwater." The vapor plume contours are speculative, and there are many other TCE sources that may have contributed to groundwater contamination.

Response: **Agree.** The second to last sentence in this bullet will be updated to read, *"…at the location of Site SD-24, which is viewed as the most likely significant source of TCE contamination in groundwater."*

25. **Fig 3-3.** 22,00 at MW27VP. Does this signify that shallow vapor at SD-24 has not been addressed by VE yet?

Response: **No,** this does not signify that the shallow vapor at Site SD-24 has not been addressed by VE yet. Historical concentrations of TCE in vapor were as high as 702,000 $\mu g/m^3$ in October 2007 at MW27-VP1, so substantial progress has been made in removing TCE from bedrock. As of August 2010, about 250 pounds of TCE have been removed due to VE activities. The Final SD-24 Data Report dated April 27, 2011 provides comprehensive results of long-term VE activities that were completed from July 2007 until August 2010.

26. Section 4.0. Reviewers found the description of sites, OUs and RODs in the introductory section confusing. It might help to reference Figure 1-2 showing the sites and to note that while some sites were remediated pursuant to other RODs, all 33 sites are addressed in the 1995 ROD, which concluded that no further action was necessary except institutional controls at ST-11 and long-term monitoring of regional groundwater. OU-3 doesn't have the status of an "ERP site", but it is included in Table 5-1, as it should be. Please clarify that OU-3 (regional groundwater) was evaluated during the FYR. EPA recommends changing "Although only 13 of the 33 ERP sites are evaluated…". It is more accurate to say that this FYR summarizes the status of all 33 sites and OU-3, but that sites with a NFA recommendation in 2006 were not re-evaluated.

Response: **Agree.** It should be noted that the interpretation of what constitutes the 33 ERP sites at Mountain Home AFB has evolved since completion of the 1995 ROD as presented in the 2001 and 2006 FYRs. Differences include the following:

1. In the 1995 ROD, Site FT-7A, B, and C was reported as three separate sites; in subsequent documents, it has been referenced as only one site.

2. Site ST-38 (POL Storage Area, RCRA SWMU) was not included in the 1995 ROD or any other ROD because it was transferred from the OU-3 Fuel Sites and reallocated to the state authorities prior to the 1995 ROD. However, ST-38 has generally been counted as one of the 33 ERP sites since it was originally investigated under OU-3.

3. Basewide Groundwater is considered one of the 33 ERP sites and is referred to as OU-3.

Based on these differences, the inclusion of ST-38 and Basewide Groundwater (OU-3) as ERP sites account for the change of Site FT-7A, B, and C from three sites to one, which still results in a total of 33 ERP sites. A complete listing of the 33 ERP sites is included under Purpose and Scope of the Executive Summary.

The introductory paragraphs of Section Four will be updated as follows:

"Thirty-three Environmental Restoration Program (ERP) sites, which are grouped into Operable Units (OUs) 1 through 6, were reviewed during the initial Five-Year Remedy Review (FYR) completed in 2001. Figure 1-2 shows the locations of the ERP sites. While some sites were remediated pursuant to other Records of Decision (RODs), all 33 ERP sites,

with the exception of Site ST-38, are addressed in the 1995 ROD. The 1995 ROD concluded that no further action was necessary except institutional controls at Site ST-11 and long-term monitoring of regional groundwater.

Decision documents that are in-place and signed by representatives of Mountain Home Air Force Base (MHAFB), Idaho Department of Environmental Quality (DEQ), and U.S. Environmental Protection Agency (EPA) include the following:

- *1992 ROD for OU-4, which addresses soils at the Fire Training Area 8 (FT-08)*
  - *2009 ROD Amendment for OU-4, which addresses soils at Site FT-08*
- *1993 ROD for OU-2, which addresses the B-Street Landfill (LF-02)*
  - *2006 ESD for Site LF-02*
- *1995 ROD for OUs 1, 3, 5, 6, the Lagoon Landfill, and the underground storage tank (UST) at the Fire Training Area 8 (FT-08)*
  - *2004 ESD for Site ST-11*
  - *2006 ESD for Site LF-01*
  - *2007 Action Memoranda for Sites OT-16, LF-23, SD-27, and SS-29*
  - *2010 ROD Amendment for OUs 1, 3, 5, 6, the Lagoon Landfill, and the UST at the Fire Training Area 8 (FT-08)*
  - *2011 ESD for Site LF-23*

This FYR summarizes the status of all 33 ERP sites, which include OU-3, but sites with a NFA recommendation in the 2006 FYR were not re-evaluated. Based on the approved decision documents, the following subsections present the selected and amended remedies, the remedial action objectives, the implementation of selected remedies, and the system operations and maintenance requirements for the selected remedies."

27. Sections 4.2.1 and 4.2.2, 4.3.1 and 4.3.2. Discussions regarding LF-01 and LF-02 should be revised for accuracy and supported with documentation. In 4.2.1 and 4.2.2, the sentence before the bullets says "provides the LUC actions implemented…" This is just the ESD with the tense changed. Not all the actions have been implemented, and some depend on circumstances (executed deed? Not needed. Notification—needed if unauthorized activity has occurred. Has it?). Some may have been done, and if so, this should be supported with specifics and/or documentation (Annual inspections: done? Maintenance and repair of the cover? Use restrictions communicated in the real estate records?). Discuss updates of the BCP and notifications: what has been done, should have been done, will be done. In Section 4.3.1 and 4.3.2, annual on-site inspections are referenced. Where is the documentation for this?

Response: **Agree.** Sections 4.2.1, 4.2.2, 4.3.1, and 4.3.2 will be reviewed and updated to include only those items implemented for each site.

Inspections of Site LF-01 have been completed at least annually since 2006, and inspections of Site LF-02 have been completed annually since November 2006. Inspection results are provided in the LTM Annual Reports. The last inspection of Site LF-01 was completed on May 25, 2011. The last Site LF-02 inspection was completed on November 1, 2010. Documentation of the 2010 inspection is included in the Draft 2010 LTM Annual Report, and the 2011 inspection will be provided in the 2011 LTM Annual Report. The inspection results will be added as an appendix to this FYR.

28. **Section 4.2.5.** The relationship between the pilot study and remediation needs to be clear. In first line, replace "implementation" with "selection." Following the four bullets, insert a transitional statement, such as: "In a ROD amendment (dated September 2010), Vapor Extraction was selected for Site ST-11 and remediation is in progress."

Response: **Agree.** The suggested changes will be made.

29. **Sections 4.3.4 and 4.3.5.** Reference the quarterly reporting for these sites.

Response: **Agree.** The following sentence will be added prior to the last paragraph in Sections 4.3.4 and 4.3.5: *"Performance monitoring and system operations activities are presented and summarized in quarterly Remedial Action/Operation (RA/O) Technical Memoranda (URS 2010…, URS 2011…)"*

30. **Section 4.3.5.** Reference the chemical oxidation work.

Response: **Disagree.** This section discusses O&M activities, and the second bullet on page 4-20 currently includes a discussion of the performance monitoring that will be completed after injection activities. Implementation of chemical oxidation injection activities is included in Section 4.2.5.

31. **Section 4.3.7.** Reference the signs posted. Since the ESD will have just been completed (knock wood), most of the ICs should be described in the future tense.

Response: **Agree.** The paragraph will be updated as follows: *"An annual on-site inspection will be completed for Site LF-23 in accordance with the specific LUCs for Site LF-23 as described in the June 2011 ESD for the 1995 ROD. During each inspection, the general landfill condition will be observed with particular attention paid to the area with signage surrounding the coal ash and debris area and whether any unauthorized activities (e.g., digging or dumping) are being done under the LUCs and the warning signs will be*

inspected to ensure they are properly in place. Each inspection will verify compliance with the LUC requirements, objectives, and controls in the ROD and ESD. A report discussing conditions and any recommendations required for maintenance and repairs will be completed after inspection for LUCs."

32. Table 4-1. Add "at the time" to the legend for "not installed" Lettering and symbols are difficult to read. Bold typeface or some other improvement is recommended. Will a Fall 2010 or Spring 2011 column be added?

Response: **Agree.** The legend will be updated as suggested. In addition, columns for sampling completed in October 2010, February 2011, and March 2011 will be added to the table. The scale and format of the table will be reviewed to make it more legible.

33. Section 6.4. Fuel Management Program. As I noted on the recent FFA team call, EPA recognizes the efforts the AF has made to improve the fuel storage and delivery system but continues to be concerned that fuel leakage may not be detected in time to prevent significant impacts to the environment. Spills under 0.3 gallons per hour won't be detected. This should be identified as a Tier 2 issue (in Section 8) and tracked by the ERP program.

Response: **Agree.** The Fuels Management Program will be added to Table 8-1.

34. Section 6.5. Inspections of the landfills are required. Please perform and document.

Response: **Agree.** Inspections of Site LF-01 have been completed at least annually since 2006, and inspections of Site LF-02 have been completed annually since November 2006. Inspection results are provided in the LTM Annual Reports. The last inspection of Site LF-01 was completed on May 25, 2011. The last Site LF-02 inspection was completed on November 1, 2010. Documentation of the 2010 inspection is included in the Draft 2010 LTM Annual Report, and the 2011 inspection will be provided in the 2011 LTM Annual Report. The inspection results will be added as an appendix to this FYR. Section 6.5 will be updated as follows:

"Findings from the initial inspections completed in 2001 are presented in the Final FYR Report (FEC 2001). Since URS is currently performing the basewide groundwater and vapor LTM activities and is knowledgeable of current site conditions, formal inspections of all site addressed in this FYR were not warranted.

In accordance with the specific land use controls for Sites LF-01 and LF-02, an inspection of Site LF-01 was completed on May 25, 2011, and an inspection for Site LF-02 was completed on November 1, 2010. Inspection results are included in Appendix A.

In addition, in accordance with specific ICs for Site ST-11 a visual inspection of Site ST-11 was completed in October 2010. The inspection was used to verify compliance with the IC requirements, objectives, and controls in the ROD and the ESD, to determine violations of these controls, and to look for indications of tampering, incompatible use, and trespass. The inspection verified the Air Force has met all requirements, objectives, and controls in the ROD and the ESD for Site ST-11. Additionally, inspection results verified MHAFB has effective administrative procedures in place to comply with all aspects and requirements of the ICs described in the ROD and ESD. This inspection is documented in the Draft 2010 LTM Annual Report (URS 2011b).

There have been no changes in the physical conditions of the sites or in the use of the sites since the last review that would reduce the protectiveness of the remedy or render the initial risk analysis invalid. The current land use for all sites is industrial except Sites DP-18 and ST-31. Site DP-18 is located in an open field adjacent to MHAFB residential housing and is managed as residential. Site ST-31 includes a Fitness Annex with an indoor running track and is managed as commercial. Current uses are not anticipated to change within the next five years."

35. Section 7. This section requires a little more thorough discussion. Each question should be answered initially with a yes or no, followed by the narrative explanation. Note that the FYR earlier stated that 13 sites were reviewed. Note specific sites in answering the question (and if no mention is made of them in answering these questions, explain).

Response: **Agree.** Section 7 will be updated to include a more detailed discussion and provide a yes or no answer to each question. Sites with operating remedies or LUCs will be described in more detail, and an explanation for the other sites evaluated, but for which there is no operating remedy, will be referenced.

36. Section 7. Question A: ICs need to be included under "is the remedy functioning as intended". Include reference to a map or maps showing areas with ICs (LF-01, LF-02, LF-23, ST-11. Before the global language in the second paragraph, add specific mention of ROD amendments and ongoing remedial work at ST-11 and FT-08, and what is meant by operating as intended by the decision documents (effectively removing TCE mass from the soil or vadose zone, for example). Note whether there are issues or opportunities to improve or optimize the remedy and whether the remedy is likely to meet RAOs in the anticipated timeframe. State whether costs for these actions in line with the estimates in the decision documents. Rather than "the selected remedies for 32 ERP sites…", answering this question should focus on sites with selected remedies that are OPERATING or that require ongoing effort.

Response: **Agree.** Figures showing the LUC boundary for Sites LF-01, LF-02, LF-23, and ST-11 will be added and referenced. In addition, the text will be updated as follows:

"Yes, the remedies are functioning as intended by the decision documents. The following criteria were examined to evaluate whether the selected remedies are functioning as intended: remedial action performance, system operations/operations and maintenance (O&M), opportunities for optimizations, potential issues or problems that could place protectiveness at risk, and the implementation of institutional controls and other measures to ensure immediate threats have been addressed. Remedies have been selected at five ERP sites (Sites LF-01, LF-02, FT-08, ST-11, and LF-23) since the last Five-Year Remedy Review (FYR) in 2006, which are still operating or that require ongoing effort.

Sites with Land Use Controls

Site LF-01

The remedy for Site LF-01 is functioning as intended by the Record of Decision (ROD), as modified by the Explanation of Significant Differences (ESD). Land use controls (LUCs) have been implemented to limit the future uses of Site LF-01 to the current use (an inactive landfill) or future uses that do not pose an unacceptable risk; prevent activities and land uses that disturb the protective cover; maintain the two-foot thickness and grade of the protective cover; and restrict drilling in and consumptive use of perched groundwater below Site LF-01. The LUC boundary is shown on Figure 4-1. Annual inspections have verified compliance with the institutional control (IC) requirements, objectives, and controls in the ROD and ESD. The most recent inspection report is included in Appendix A.

Site LF-02

The remedy for Site LF-02 is functioning as intended by the ROD, as modified by the ESD. LUCs have been implemented to limit the future uses of Site LF-02 to the current use (inactive landfill) or future uses that do not pose an unacceptable risk and prevent activities and land uses that disturb the existing ground surface. The LUC boundary is shown on Figure 4-2. Annual inspections have verified compliance with IC requirements, objectives, and controls in the ROD and ESD. The most recent inspection report is included in Appendix A.

Site LF-23

The remedy for Site LF-23 is expected to function as intended by the ROD, as modified by the ESD. LUCs will be implemented to 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 and prevent activities and land uses that disturb the existing ground surface. The LUC boundary is shown on Figure 4-6. Annual inspections will be completed to verify compliance with IC requirements, objectives, and controls in the ROD and ESD.

Sites with Operating Remedial Actions

Site FT-08

The remedy for Site FT-08 is performing as intended by the ROD amendment. Performance monitoring results indicate the soil vapor extraction (SVE) system is effectively removing volatile organic compounds (VOCs) from the soil. The air injection system was modified (valves on seven wells were closed) on December 9, 2010 to increase air injection flow rates around two specific soil extraction wells to optimize the system and to expedite removal of contaminant mass (URS 2010k). Since full-scale implementation of the SVE system in March 2010, approximately 7 pounds of trichloroethene (TCE), 3 pounds of 1,3,5-trimethylbenzene (TMB), and 16 pounds of total VOCs (including TCE and 1,3,5-TMB) have been removed. In February 2011, soil vapor sample results indicated all contaminants were below their remedial action objectives (RAOs) (URS 2011c). Soil sampling was completed in April 2011 to determine if contaminant concentrations in the soil are below their RAOs. Results indicated soil in the vicinity of the source area has contaminant concentrations in soil above their RAOs. The SVE system is expected to be optimized further to focus remedial activities on this source area. No large variance in O&M costs is anticipated, and the remedy is likely to meet RAOs by October 2011.

Site ST-11

The remedy for Site ST-11 is performing as intended by the ROD, as modified by the ESD and the ROD amendment. ICs have been implemented to minimize the potential for completing the contact and inhalation exposure pathways; limit future uses of Site ST-11 to industrial use; prevent residential or commercial future uses; minimize the potential for completing the ingestion exposure pathway for perched groundwater; prevent future uses of perched groundwater; minimize the potential for completing the ingestion exposure pathway for regional groundwater; and prevent drilling of wells or any other activity at Site ST-11 that would penetrate or otherwise disturb the perched aquifer or provide a pathway to the regional aquifer. The IC area is shown on Figure 4-4. Annual inspections have verified compliance with the IC requirements, objectives, and controls in the ROD and the ESD.

Performance monitoring results indicate the vapor extraction (VE) system is effectively removing VOCs from the perched groundwater. Since March 2010, approximately 150 pounds of VOCs have been removed via vapor effluent at Site ST-11 (URS 2011d). Chemical oxidant injection activities were completed in May 2011 at Site ST-11. Injection was

completed into fractured bedrock contaminated with fuel-related compounds. Performance monitoring is planned to determine the effectiveness of the chemical oxidant injection. Results of performance monitoring will be used to determine if opportunities to optimize the VE system exist. No large variance in O&M costs is anticipated, and the remedy is likely to meet RAOs by October 2011."

37. Section 7. Question B: Under Changes in Toxicity and Other Contaminant Characteristics, EPA notes that the US Navy has agreed to use of the 2009 external review draft at Bremerton Naval Shipyard, as the best TCE science. Starting on page 7-2, Second paragraph, change the language as follows:

a. 2nd Paragraph, Add "and oral" after "inhalation" in the first sentence.

Response: **Agree.** The suggested change will be made.

b. 2nd Paragraph, Add the following sentence after the first sentence. "In October 2009, EPA released a new external review draft health assessment of TCE titled "Toxicological Review of TCE In Support of Summary Information on the Integrated Risk Information System." This includes new inhalation and oral cancer potency factors and noncancer oral and inhalation toxicity factors. It also includes new information that one of the three cancer outcomes, renal cancer, is carcinogenic via a mutagenic mode of action, which necessitates the use of adjustments to cancer potency for exposures to children less than 16 years of age. This information is expected to be finalized in IRIS in the fourth quarter of federal fiscal year 2011. EPA Region 10 recommends its use at this time."

Response: **Disagree.** While the U.S. Navy has agreed to use the referenced external review draft, the Air Force will follow the EPA toxicity hierarchy and Air Force policy, which do not include using draft toxicity values. The Air Force is willing to consider use of the new TCE toxicity criteria only when they have been formally integrated into IRIS. However, the following text will be added after the first sentence: *"In October 2009, EPA released a new external review draft health assessment for TCE titled 'Toxicological Review of TCE in Support of Summary Information on the Integrated Risk Information System.' The draft document includes new inhalation and oral toxicity values for cancer and noncancer health effects. It also suggests that there is sufficient weight of evidence to conclude that TCE operates through a mutagenic mode of action for kidney tumors and recommends application of the default age-dependent adjustment factors for early life susceptibility for the evaluation of cancer risk. EPA is continuing to re-evaluate the toxicity of TCE and expects to provide an update to Integrated Risk Information System sometime in the future."*

c. In the 2nd paragraph, third sentence, change "are to be used in this order" to "are generally recommended in this order."

Response: **Agree.** The suggested change will be made.

d. In the bullet item on page 7-3, the last sentence is no longer correct, as it does not acknowledge that a new publicly-available external review draft TCE health risk assessment from ORD is available and has been received a primarily positive review from EPA's SAB. The AF should acknowledge its existence, even if it has not been finalized. (see http://yosemite.epa.gov/sab/sabproduct.nsf/02ad90b136fc21ef85256eba00436459/B73D5D39A8F184BD85257817004A1988/$File/EPA-SAB-11-002-unsigned.pdf).

Response: **Agree.** The sentence will be deleted, and the existence of the new assessment will be acknowledged as described in response to EPA Specific Comment #37.b above.

e. The first paragraph after the bullet on page 7-3. Delete "and are appropriate for use as determined by the Air Force" (and replace comma before "conform" with "and". Remove the "also" after policy.

Response: **Agree.** The suggested changes will be made.

f. The third paragraph after the bullet item on page 7-3 should be deleted, because EPA rescinded the memorandum that is described.

Response: **Agree.** The paragraph will be deleted as suggested.

g. The fourth paragraph after the bullet item on page 7-3 should be deleted, because it does not acknowledge the 2009 external review draft toxicological review for TCE.

Response: **Agree.** The paragraph will be deleted as suggested.

38. Question C: This is where the effectiveness of VE and the ongoing mass of TCE in the vadose zone should be discussed. In the first paragraph, change "targets" to "receptors". Delete sentence regarding monitoring.

Response: **Agree.** The first paragraph will be updated as suggested.

39. Question C: Revise 2nd sentence in 2nd Paragraph: "~~Currently, g~~Groundwater ~~concentrations~~ samples collected during the February 2011 sampling event ~~indicate TCE~~

~~concentrations are~~ had concentrations of TCE below the MCL of 5 ug/L in these ~~three~~ wells." LTM results for one (February 2010) round doesn't mean "currently". Also, revise, as elsewhere, "The ~~current~~ OU-3 remedy of NRA with LTM is currently protective of human health and the environment, but vapor concentrations in unsaturated bedrock are a potential source of TCE in groundwater and future groundwater use is not restricted. While some TCE mass has been removed from soil and shallow bedrock at Sites FT-08 and SD-24, the AF plans to take further action to remove TCE mass to protect regional groundwater."

Response: **Agree.** The second paragraph will be revised based on the suggested edits and the FFA status call on May 19, 2011 to read, *"Long-term monitoring (LTM) of the regional groundwater has historically detected TCE above its maximum contaminant level (MCL) in three monitoring wells (MW25, MW33, and MW35). Historical regional groundwater TCE analytical results are included in Table 3-3. Volatile organic compounds, including TCE, have not been detected above MCLs in any of the MHAFB drinking water supply wells or perimeter wells. Recent groundwater analytical results for the MHAFB production wells are included in Table 4-2. Furthermore, LTM of the bedrock vapor has been completed since September 2002, with historical results included in Table 3-4."*

In addition, the third paragraph will be revised to read, *"The OU-3 remedy of No Remedial Action (NRA) with LTM is currently protective of human health and the environment, but vapor concentrations in unsaturated bedrock are a potential source of TCE to groundwater, and future groundwater use is not restricted. While some TCE mass has been removed from soil and shallow bedrock at Sites FT-08 and SD-24, further action to remove TCE mass is recommended to protect regional groundwater."*

40. Question C: If the MCL is exceeded, the No Action remedy is not protective in the long term. However, if there are no ongoing human and ecological exposures, the remedy can be considered protective in the short term. Note that sites with selected remedies being implemented are expected to be protective of human health and the environment. Include a brief discussion of asbestos issues that are being addressed under State authorities.

Response: **Agree** that the remedy for OU-3 is considered protective in the short term but not the long term for human health and the environment. **Disagree** that a discussion of asbestos issues being addressed under State authorities should be included in Section 7. See response to EPA General Comment #7.

41. Section 7. A summary section is needed, if only to recap the answers (yes/no) to the questions and briefly state why.

Response: **Agree.** A summary will be included as follows:

"Technical Assessment Summary

According to the data reviewed, the LUCs for Sites LF-01 and LF-02 and ICs for Site ST-11 are functioning as intended by the RODs, as modified by the ESDs. In addition, the LUCs for Site LF-23 are expected to function as intended by the ROD, as modified by the ESD. Furthermore, the remedies for Sites FT-08 and ST-11 are functioning as intended by the RODs and ROD amendments. There have been no changes in the physical conditions of the sites or other information that calls into question the protectiveness of the remedies.

However, information concerning the remedy for OU-3 calls into question the future protectiveness of the remedy. Concentrations in unsaturated bedrock are a potential source of TCE to groundwater and future groundwater use is not restricted. As such, further action to remove TCE mass is recommended to protect regional groundwater."

42. Section 8. This section is the basis for recommended actions. Significant revision is required. The first sentence is illogical: "the presence of contaminated media" is what prevents the remedies from being protective. The second sentence is just incomplete: Issues … are associated with MCL exceedances and the potential for future exceedances due to residual TCE mass in the vadose zone." Second paragraph should be changed for consistency with previous comments. "Exposure pathway does not CURRENTLY exist". Document frequency and results of monitoring of VOCs in base drinking water supply wells. Revise "The current remedy for OU-3 is protective." If there is no exposure currently, it may be protective currently, but it is not protective in the long term. That's why additional actions will be taken.

Response: **Agree.** See response to EPA General Comment #6.

43. Section 8. Table 8-1. For OU-3, the "issues" discussion should be changed for consistency with comments on similar language, and the N under FUTURE should be a Y. Also, please add a line for asbestos issues, and under CURRENT and FUTURE insert I for indeterminate, with a footnote. Explain that actions taken by the AF may have addressed asbestos releases, but this has yet to be confirmed.

Response: **Agree** that the table will be updated to organize the table as Tier 1 and Tier 2 issues, and the Future column for OU-3 will be changed to "Y." **Disagree** that a line for the asbestos issues being addressed under State authorities should be included in Section 8. See response to EPA General Comment #7.

44. Section 9. As noted in EPA's general comments, this section should discuss the recommendations in terms of Tier 1 (issues that could affect protectiveness) and Tier 2. If the site-by-site discussion is retained, the introduction should discuss the tiering and

recommendations in each section should indicate what tier applies. The tiering should be clear in the summary table, with Tier 1 sites listed first. Many of the recommendations for continued operations and ICs (FT-08, ST-11, LF-01, LF-02) should fall under Tier 2, and others can be removed from Table 9-1 and discussed in the text under "no recommendations" or listed at the end of the table.

Response: **Agree.** The site-by-site discussion will be retained, so the following discussion will replace the second paragraph in the introduction of Section 9:

"This section discusses recommendations and presents a schedule for implementing follow-up actions for site evaluated during this FYR. Specific Tier 1 and Tier 2 recommendations are provided in Table 9-1. Tier 1 recommendations address actions that affect protectiveness, and Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness."

Each site-specific section will be updated to indicate what tier applies or if no tier applies for those sites with no recommendations or follow-up actions. In addition, the Table 9-1 will be updated to present Tier 1 issues first, followed by Tier 2 issues, and then sites with no recommendations.

45. **Section 9.6.** Continued inspection of MW24 and use of passive fuel absorbent socks should be recommended consistently (a Tier 2 recommendation).

Response: **Agree.** The document will be reviewed and updated to consistently recommend monitoring at MW24.

46. **Section 9.9.** This should reflect the fact that, while VE has been successful at reducing mass, additional VE will be performed as needed at SD-24. Last sentence is incorrect, as the site should be addressed in future five-year reviews.

Response: **Disagree.** Based on discussions during FFA team meeting on January 26, 2011, the FFA team agreed Site SD-24 now meets UU/UE and is considered closed. Additional VE to address contamination in the bedrock will be completed under OU-3. Site SD-24 does not require re-evaluation in future FYRs.

47. **Section 9.12.** Be clear that the recommendation (tier 2) is not for ERP to DO the work at ST-38 but to track and document the work as it proceeds under other programs.

Response: **Agree.** Section 9.12 will be updated as follows: *"Tracking the actions being completed under another program by DLA/DESC should continue. These actions include:*

- *Monitoring of the perched groundwater and occurrence of LNAPL in accordance with the Corrective Action Work Plan (Washington Group, Inc. et al. 2003)*
- *Completing LNAPL removal, as necessary, to the maximum extent practicable as determined by DEQ*
- *Evaluating the perched groundwater quality and site soils once LNAPL remediation goals have been reached using the DEQ Risk-Based Corrective Action analysis process to determine if further corrective action is required*

48. Section 9.13. The second paragraph here is better than similar language elsewhere. Expansion of the current vapor extraction system in the near future should be discussed in the context of a pilot study. VE has not been selected in a decision document. EPA recommends the following (edited) language: "To support protection of the regional groundwater, the Air Force (or MHAFB) plans to select a remedy to remove TCE mass from the bedrock vadose zone. Vapor extraction has been successful at FT-08, SD-24, and ST-11. A pilot study will be performed to evaluate vapor extraction in bedrock areas with high TCE vapor concentrations."

Response: **Agree.** The text will be updated to read, *"To support protection of the regional groundwater, MHAFB plans to select a remedy to remove TCE mass from the bedrock vadose zone. Vapor extraction has been successful at Sites FT-08, SD-24, and ST-11. A pilot study is recommended to evaluate vapor extraction in bedrock areas with high TCE vapor concentrations."*

49. Table 9-1. See comment above regarding grouping sites under Tiers 1 and 2 and (perhaps) pulling out or separating those with no recommendation or follow up actions. OU-3 should have Y under FUTURE. Asbestos releases at the housing demolition/reconstruction should be included on the table, consistent with recommendations above for the Issues section.

Response: **Agree.** Table 9-1 will be updated to present Tier 1 issues first, followed by Tier 2 issues, and then sites with no recommendations. OU-3 will be updated to include "Y" under the Future column. **Disagree** that the asbestos issues being addressed under State authorities should be included Table 9-1. See response to EPA General Comment #7.

50. Section 10. While it is acceptable to discuss protectiveness site by site, an overview and sitewide determination is needed. Until all OUs are protective, the determination must be NOT PROTECTIVE. However, the nuances behind this statement can and should be discussed. The recommendations identify the need for certain actions (in addition to ongoing remediation at ST-11 and FT-08) to ensure protectiveness in the long term. Implementation of the FYR recommendations will result in TCE source removal from OU-3, groundwater that meets the MCL permanently (at some point), restrictions on use of LF23, and

characterization of asbestos at the housing area to support a determination as to whether action is needed and if so under what program. Thus, the site is expected to be protective (possibly within the next five years?).

Response: **Agree.** See response to General Comment #8. **Disagree** that the asbestos issues being addressed under State authorities should be included in Section 10. See response to EPA General Comment #7.

51. **Sections 10.1, 10.2, 10.8** – If the remedy is protective both "currently and in the long term", it is acceptable to simply state that it is protective. Note that "in the near term" is used where I believe "long-term" was intended for LF-01, LF-02, and LF-23 Review the others carefully, lest the mistake occurred elsewhere. Include ESD dates and revise text to say these are protective in the long-term, not near-term.

Response: **Agree.** The protectiveness statements for applicable sites will be updated as suggested to indicate the remedy is protective in the long term (not currently). All sites, including LF-01, LF-02, and LF-23, will be reviewed, and the text will be changed from "near-term" to "long term" as appropriate. In addition, ESD dates will be added for Sites LF-01, LF-02, and LF-23.

52. **Section 10.5** – If ST-11 eventually meets MCLs for benzene, would the ICs be needed still? Review the 'duration' language of the ESD.

Response: **Agree.** According to the ESD, ICs will be enforced until and unless it is demonstrated that perched groundwater at ST-11 is no longer a threat to human health and the environment, verified by two years of semi-annual sampling events where analytical results show that the contaminants of concern are less than the MCLs. The remedy for Site ST-11 will be evaluated during the next Five-Year Review, which will be due no later than June 2016. No changes are required to Section 10.5 based on this information.

53. **Section 10.6.** Does No Further Action at ST-13 preclude monitoring and use of passive sorbent sock as needed?

Response: **Agree.** NFA would preclude monitoring and use of passive sorbent socks as needed. Since monitoring will continue, the second sentence will be updated to read, *"Based on current site conditions, the FFA team agrees the site now meets UU/UE criteria."*

54. **Section 10.8.** Change "have been" to "will be" implemented. For LF-23, state that it is expected to be protective in the long-term (as the ICs have not been implemented yet).

Response: **Agree.** The text will be updated to read, *"The selected remedy at Site LF-23 (NRA with LTM) is expected to be protective in the long term since institutional controls will be implemented pursuant to the ROD, as modified by the ESD dated May 2011."*

55. Section 10.9. Clarify that the work was completed under a pilot study, as NRA with LTM may confuse other readers). Add that SOILS at SD-24 are now protective. SOILS allow for UU/UE (not groundwater) and SOILS are not a source of TCE to groundwater.

Response: **Agree.** The text will be updated to read, *"Injection of a chemical oxidizing agent (sodium permanganate) was completed on January 15 and 16, 2008 under a pilot study. The purpose of the injection was to treat the small amount of remaining trichloroethene (TCE)-impacted soil present below an active water line at the source area. Based on the results of the injection activities, the selected remedy (NRA with LTM) for Site SD-24 is now considered protective for soils in the long term for UU/UE. Soils, but not groundwater, at Site SD-24 allow for UU/UE and are not a source of TCE to groundwater."*

56. Section 10.12. ST-38 has a CERCLA remedy of No Action, provided ongoing action is implemented under other authorities. It is acceptable to state that ST-38 is expected to be protective.

Response: **Disagree/Agree.** Site ST-38 has no CERCLA remedy since it was not included in the 1995 ROD or any other CERCLA decision document. The last sentence will be updated to read, *"Because ongoing monitoring will continue under other authorities, the corrective action is currently protective of human health and the environment, and the selected corrective action is expected to be protective in the long term."*

57. Section 10.13 – Amend this section for consistency with revised language elsewhere. Again, this section should indicate that the site is protective in the short term and in order to be protective in the long term, additional actions are recommendations to address contaminant sources to groundwater.

Response: **Agree.** This section will be updated as follows:

"LTM of the regional groundwater has historically detected TCE above its maximum contaminant level (MCL) in three monitoring wells (MW25, MW33, and MW35). Historical regional groundwater TCE analytical results are included in Table 3-3. Volatile organic compounds, including TCE, have not been detected above MCLs in any of the MHAFB drinking water supply wells or perimeter wells. Recent groundwater analytical results for the MHAFB production wells are included in Table 4-2. Furthermore, LTM of the bedrock vapor has been completed, with historical results included in Table 3-4.

The OU-3 remedy of NRA with LTM is currently protective of human health and the environment, but vapor concentrations in unsaturated bedrock are a potential source of TCE to groundwater, and future groundwater use is not restricted. As such, the OU-3 remedy will not be considered protective for the future until further action is implemented to remove TCE mass to protect regional groundwater."

58. Section 10. Conclude this section with the overall SITEWIDE statement.

Response: **Agree.** See response to Comment #8.

59. Asbestos issue. EPA recognizes that asbestos releases from transite pipe excavation at the base housing demolition and replacement project at MHAFB are being evaluated and addressed under state authorities. However, in reporting to Congress regarding whether Human Exposures are Under Control (HEUC), EPA has indicated that for MHAFB there is not sufficient information to make a determination of HEUC pending further characterization of risks in the affected areas. The asbestos issue should be briefly discussed as "new information" in Section Question C, Technical Assessment, and in the Issues section (Section 8). In Section 9, follow-up actions, such as periodic check-in, review of characterization and risk information, and revisiting in the 2016 FYR, can be identified as Tier 2 items, because current protectiveness is "indeterminate." The discussion should note that the AF has done initial sweep to remove visible transite fragments. In Section 10, the issue should be mentioned with the protectiveness determination "deferred". If there is a finding of unacceptable risk in future, AF actions, whether under other programs or CERCLA, may be necessary to be protective in the future.

Response: **Disagree** that the asbestos issue being addressed under State authorities should be included in Section 7. However, a brief summary will be provided in Section 6.4 and Table ES-2. See response to EPA General Comment #7.

60. Section 11. Revise as recommended for text on page ES-7.

Response: **Agree.** Section 11 will be updated to read, *"Additional five year remedy reviews (FYRs) are required since contamination remains above levels that allow unrestricted use/unlimited exposure at some Environmental Restoration Program sites located at Mountain Home Air Force Base. The next FYR will be due no later than June 2016."*

61. Section 12. Reference data for VOC monitoring in base supply wells, and include the currently applicable RSLs referenced in an appendix (they will change, so it's best to have a hard copy snapshot)

Response: **Agree.** Recent VOC monitoring data from base supply wells will be included in a table, and the currently applicable RSLs (May 2011) will be added as an appendix.

62. Add an appendix that includes a completed inspection checklist for LF-01 and LF-02, other IC related documentation (photos?) and summary data from base water supply monitoring. Will the hydrant leak testing documentation be included also?

Response: **Agree.** An appendix will be added to include inspection results for Sites LF-01 and LF-02. In addition, a summary of data from base water supply monitoring will be included as a table. Hydrant leak testing documentation is included in the Annual LTM Reports with the specific references included in Section 6.4 of the FYR; the documentation will not be added to the FYR.

63. Add a map or maps showing areas with ICs, ongoing remedial actions and potential future actions. Identify on a figure the base housing reconstruction area being characterizes.

Response: **Agree.** Figures showing the LUC/IC areas for Sites LF-01, LF-02, ST-11, and LF-23 will be included. In addition, figures showing the layout of the remedial systems at Sites FT-08 and ST-11 will be included as well as the proposed area for future actions for OU-3. However, since the asbestos and chlordane sites will only be briefly summarized in the document, no figure will be added showing this area.

RESPONSE TO COMMENTS
Draft 2011 Five-Year Remedy Review Report
Dated March 30, 2011
Mountain Home AFB, Idaho
Air Combat Command Environmental Restoration Program 4-Base PBC
Contract FA8903-04-D-8679 Delivery Order 0053

Comments received from Dean Nygard, Site Remediation Program Manager, Idaho Department of Environmental Quality. Dated 11 May 2011.

1. **Table ES-1, Site LF-03, Fifth Bullet**. Please explain how LF-03 was not evaluated under CERCLA or by the FFA, but is included in the Five Year Review process.

   Response: **Comment noted.** While LF-03 has been considered part of OU-1, hazardous wastes have not been disposed at this site, and no sampling was completed at this site under CERCLA. No exposure pathways for soil were considered, and the site was not evaluated for exposures via the groundwater pathway. The site was determined to not pose an unacceptable risk to human health or the environment. As such, this site was not evaluated under CERCLA or the FFA team. In addition, discussions during the FFA team meeting on January 26, 2011 concluded the FYR should clarify this site is not evaluated under CERCLA or by the FFA and is currently closed and subject to solid waste laws.

2. **Section 3.2, second paragraph, last sentence, page 3-3**. There appears to be a typo, for the number of gallons in 40 acre-feet. The total should be approximately 13 million gallons.

   Response: **Agree.** The text will be changed to "13 million."

3. **Section 3.4.13, Vapor LTM Program, first bullet, page 3-35**. The current vapor monitoring network does not accurately define the extent of vapor contamination beneath MHAFB as there are several areas on the base without vapor monitoring ports to define the true extent. Please modify this bullet to state that the existing vapor monitoring network has reasonably defined the areas of greatest contaminant concentrations and the most likely source areas for vapor contaminants at MHAFB.

   Response: **Agree.** The first bullet under Vapor LTM Program will be updated to read, *"The existing vapor monitoring network has reasonably defined the areas of greatest contaminant concentrations and the most likely source areas for vapor contaminants at MHAFB."*

4. **Section 4.1.5, second bullet after the first paragraph, page 4-5**. Please re-word this bullet to clarify the meaning.

   Response: **Agree.** The bullet will be updated to read, *"The Air Force will ensure paved areas of the flightline and parking apron that reduce surface water infiltration are not altered to decrease the area or thickness, except in the case of temporary changes due to construction or repair."*

5. **Section 4.2.5, last paragraph, page 4-13**. This paragraph does not address the ground water monitoring effort which will be required to verify that perched ground water cleanup levels are not exceeded. A statement to continue ground water monitoring is appropriate.

   Response: **Disagree.** This section discusses remedial action implementation activities as opposed to O&M activities. Section 4.3.5 includes a discussion of perched groundwater sampling as the first bullet on page 4-20.

6. **Section 4.2.11, last sentence, page 4-17**. Site ST-11 and the persistent vapor plume are both currently considered potential threats to the regional aquifer. Therefore, this sentence should qualify that ST-11 is one potential threat to the regional aquifer or state the vapor plume and ST-11 are the currently known threats to the regional aquifer.

   Response: **Agree.** The text will be update to read, *"Based on collective monitoring results, Site ST-11 is one potential threat to the regional groundwater."*

7. **Table 5-1, LF-23, Results of the Implemented Action, first bullet, page 3 of 6**. Language in this bullet appears general and should be modified to more closely resemble the language in the LUC's which presents more specific details for permissible land usage. This may include additional text addressing land usage to clarify residential land use is prohibited and that LUCs will prevent activities and land use that disturbs the existing ground surface except as approved by the agencies.

   Response: **Agree.** The bullet will be updated to read, *"The ESD limits 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. The ESD also prohibits activities and land uses that disturb the existing ground surface."*

8. **Table 5-1, OU-3, Results of Implementation Action, first bullet, page 5 of 6.** As TCE concentrations vary significantly in monitoring wells MW25, MW35, and MW33, it is not appropriate to point out one particular sampling event (the February 2011 event) where the TCE concentrations are below the MCL without qualifying the historical data which indicate TCE concentrations are routinely above MCLs in one of the three monitoring wells.

   Response: **Agree.** The first bullet will be updated to read, *"LTM of the regional groundwater has historically detected TCE above its MCL (5.0 µg/L) in three monitoring wells. Consistent with past results, widespread low-level TCE has been detected at eight other regional groundwater well locations during the LTM sampling events. In addition, VOCs, including TCE, have not been detected above MCLs in any of the MHAFB drinking*

water supply wells or perimeter wells during any sampling event. Historical regional groundwater TCE analytical results are provided in Section 3.4.13."

Additionally, based on the FFA team status call on May 19, 2011, tables with historic perched groundwater, regional groundwater, and bedrock vapor results will be included in Section 3. Changes will be made throughout the document to reference the historical data instead of providing results from specific sampling events.

RESPONSE TO COMMENTS
Draft Final 2011 Five-Year Remedy Review Report
Dated June 6, 2011
Mountain Home AFB, Idaho
Air Combat Command Environmental Restoration Program 4-Base PBC
Contract FA8903-04-D-8679 Delivery Order 0053

Comments received from Elly Hale, Remedial Project Manager, EPA Region 10. Dated 12 July 2011.

1. Editorial: Throughout the document, including the tables, the ESD for Site LF-23 has either a placeholder or May 2011 or June 2011 for the signature date. The ESD is now signed. Please check for references in text and tables to ensure that the date is listed correctly throughout.

   Response: **Agree.** The entire document, including text and tables, will be checked and updated to reference the final signature date of July 8, 2011.

2. General: An important question for the FYR is: are systems in place and working as needed to provide long-term protectiveness? "Systems" include monitoring plans, ICs, etc. At LF-23, the ESD will be the start of long-term protectiveness, but systems are not considered in place until the actions it requires are implemented (recordation, inclusion in the base comprehensive plan). While we have no reason to expect that these requirements will not be implemented for LF-23, they have not yet been implemented. Specific steps should be identified under recommendations and follow-up items (for example, documentation that the ESD requirements have been implemented), with dates included. The protectiveness statement in Section 9 should indicate that this affects protectiveness, and the document should be scanned to ensure consistent text.

   Response: **Agree.** While Section 9.8 and Table 9-1 identify actions that require implementation as a result of the LF-23 ESD, the second sentence in Section 9.8 will be updated to read, *"In addition, the following implementation actions should be completed and documented:"* Furthermore, Table 9-1 will be updated to include milestone dates for the requirements to submit a deed notice and update the BCP.

3. **Executive Summary -** For future reference, the Executive Summary should be distilled down to the important information. Typically, the Executive Summary would focus on the sites or OUs which were not UU/UE in the previous FYR and on issues and recommendations that relate to protectiveness.

   Response: **Comment noted.** Executive Summaries in future documents will be limited to the important information.

4. **Executive Summary** - The description of OUs should be shortened, as was done under Section 1.1 (and if the detail is needed, it should in that section, not the ES), and the list of documents reviewed should only be in Section 6.

   Response: **Agree.** The list of ERP sites and their associated OUs in the Executive Summary and the list included in Section 1.1 will be switched. In addition, the list of documents reviewed under the Review Procedure portion of the ES will be removed.

5. The chronology of events from Section 2 could be pared down considerably.

   Response: **Agree.** Tables 2-1 and 2-2 will be reviewed and updated to include only the most pertinent information.

6. **FYR Summary Form -** The review period on the FYR summary form refers to the duration of the review process itself. Please revise to show the FYR start date as September 2010 (per text under Review Procedure on page ES-3). In the Response to Comments, Item 21.b. states "The date will be changed to May 6, 2010, the date of the Draft FT-08 PCOR. Please revise to be the initial PCOR (September 1998) or leave the date out, as was done in the 2006 FYR."

   Response: **Agree.** The start date will be changed to *"09/2010."* In addition, the Construction Complete Date will be left blank.

7. **Table ES-2 -** Editorial. Changes were made to page 15 of ES-2 as indicated in the Response to Comments (Item 20k) below. The underlined text in the third bullet should be corrected for meaning. See excerpt from response to comments.

   In addition, the third bullet will be updated to read, *"A Mass Technology CPTM System was installed in Tanks 2 and 3 in January 2008 and February 2008, respectively. The CPTM system included valve replacement <u>to provide automatic isolation of the tanks to provide monthly monitoring</u>. Monitoring results are reported on a quarterly basis (URS 2009d)."*

   Response: **Agree.** The second and third sentences will be update to read, *"The CPTM system included valve replacement to provide automatic isolation of the tanks from the piping system when not in use. Monitoring results are generated monthly and reported on a quarterly basis (URS 2009d)."*

8. **Section 2. Site Chronology** - Editorial. Minor edits to the introductory paragraph are needed. In resubmitting the document, please change "to include Records of Decisions [RODS]" to "including Records of Decisions [RODS]"

   Response: **Agree.** The text will be update to read, *"…decision documents (including Records of Decision [RODs] ROD Amendments…"*

9. **Section 3. Background** - Editorial. Section 3.4 is helpful in stating that "a clearly stated protectiveness goal for unrestricted use is not provided in the 1995 [insert this clarification] ROD." Although some clarification is provided by more recent ESDs and RODs described in Section 4, it is difficult to assess the status of OUs (and sites) in terms of achievement of the overall goal of the 1995 ROD.

   Response: **Agree.** The text will be updated as suggested to read, *"…is not provided in the 1995 ROD."*

10. **Section 4. Remedial Actions** - Section 4 discusses FT-04. Unlike the other ERP Sites listed in Section 4, there has been no remedial or removal action or modified decision document at FT-04. Since agreement that no further action is necessary is demonstrated in the 2010 ROD Amendment, this anomalous site should be removed from Section 4. It is appropriately included in Section 5, in terms of followup from the previous 5-year review.

    Response: **Agree.** All subsections associated with Site FT-04 will be removed from Section 4.

11. Revise LF-23 references in Section 4.1.7 and 4.3.7.

    Response: **Agree.** The references to the Site LF-23 ESD in Sections 4.1.7 and 4.3.7 will be updated to reflect the final signature date of July 8, 2011.

12. **Section 5. Progress Since the Last FYR** - For CERCLIS purposes, EPA organized recommendations from the last FYR in 2006 according to OUs. EPA will summarize the status of these four recommendations in our concurrence letter.

    Response: **Comment noted.** It is understood EPA's concurrence letter will summarize progress according to OUs.

13. **Table 5-1 -** The COCs that prompted a need for remedial or removal action and that, following action, are now at levels that allow for UU/UE should be identified in the last column for each site, as they are intended to help answer Question B of the technical evaluation.

    Response: **Agree.** The concentrations of the COCs that allow for UU/UE will be added to the last column for the following sites: FT-04, ST-13, OT-16, SD-24, SD-27, and SS-29. All other sites included in Table 5-1 do not meet the criteria for UU/UE.

14. **Table 5-1 -** According to the EPA guidance, progress made at the sites should be linked to specific OUs and to remedial action objectives identified in decision documents. Table 5-1 should identify (in parentheses under ERP Site) the OU for which action was needed and taken.

    Response: **Agree.** The applicable OU(s) for which action was needed and taken will be added in parentheses under each ERP site.

15. **Table 5-1 -** Updated information is needed for each issue tracked in CERCLIS following the last FYR. There are four such issues, due to tracking by OU. Current status (complete, considered and not implemented, or continued in the next FYR) and the date (month/day/year) associated with the status must be entered in CERCLIS. Please add "complete, considered and not implemented, or continued in the next FYR as the first bullet for each of the ERP sites. Because the OU designations in CERCLIS and the Site OUs described in Section 1.1 don't match, EPA will identify the status for CERCLIS purposes in our concurrence letter.

    Response: **Agree.** A designation of "complete", "considered and not implemented", or "continued in the next FYR" will be added as the first bullet under the "Results of Implemented Actions" column for each ERP site.

16. **Section 6. Five-Year Review Process -** The EPA guidance states, "At a minimum, your community involvement activities during the five-year review should include notifying the community that the five-year review will be conducted, notifying the community that the five year review has been completed, and providing the results of the review to the local site repository (see Exhibit 3-2)." For the next review, this first step should be taken by the AF and documented in the FYR.

    Response: **Agree.** For the 2016 Five-Year Remedy Review, the Air Force will notify the community that a five-year review will be conducted.

17. **Section 7. Technical Assessment -** To make it clear that MCL exceedances were not observed until after the 1995 ROD for OU-3, please revise the second paragraph under

Question C to state: "Since the 1995 ROD, long-term monitoring (LTM) of the regional groundwater has ~~historically~~ routinely detected TCE above its maximum contaminant level (MCL) in three monitoring wells (MW25, MW33, and MW35)." Please seek out similar occurrences of this language and make changes throughout (e.g. Table 9-1, Section 8 text and table, Section 10.13)

Response: **Agree.** The suggested change will be made to the first sentence in the second paragraph under Question C. This change will also be made throughout the document where applicable.

18. Please make changes to the revised language of Section 7 as follows:
"EPA has ~~is continuing to~~ reevaluated the toxicity and cancer potency of TCE and expects to ~~provide~~ post an update to the Integrated Risk Information System (IRIS) database in August 2011~~sometime in the future~~." This information is from a recent internal fact sheet on TCE from ORD's chemical manager for TCE.

Response: **Agree.** The text will be updated as suggested.

19. **Section 8. Issues -** Since Table 8-1 repeats the text, and the other sites have no issues, please state in the text and in a footnote that the other sites have no issues, and shorten the table to only OU-3 and LF-23.

Response: **Agree.** The suggested changes will be made.

20. **Section 9. Recommendations and Follow-up Actions -** In the introductory text, omit the first two bullets and focus on (Tier 1) bullets that affect protectiveness. Also, please add LF-23 as a Tier 1 recommendation, as systems are not yet in place. The distinction between the other bullets—No Further Action and No Remedial Action with LTM--is unclear. Please delete the bullets.

Response: **Agree.** The first two bullets will be deleted from the introductory text. While Site LF-23 is already included as a Tier 1 recommendation in Section 9.8 and Table 9-1, the specific recommendations will be added as a bullet in the introductory paragraph of Section 9.

21. In each subsection with "No tiered recommendation was needed for this site" please delete "tiered" and insert after recommendation "or follow-up action"

Response: **Agree.** The suggested changes will be made.

22. **Section 9. Regarding SD-24 -** EPA's comments (#46) on the previous draft stated that Section 9.9 should reflect the fact that, while VE has been successful at reducing mass,

additional VE will be performed as needed at SD-24. **The response to comments stated:** Based on discussions during FFA team meeting on January 26, 2011, the FFA team agreed Site SD-24 now meets UU/UE for soils and soils are not a source of contamination to groundwater. ~~is considered closed. Additional~~ VE to address contamination in the bedrock will be ~~completed~~ continued under OU-3. Site SD-24 does not require re-evaluation in future FYRs.

This response is acceptable, but it is important to clarify that SD-24 meets UU/UE for soils. This should be stated wherever UU/UE is listed, or some text included that specifies that up front. To be off the table, a site must be UU/UE for soils AND not a source of contamination to groundwater.

Response: **Agree.** Section 9.9 will be update to read, *"Contaminated soil was treated with a chemical oxidizing agent (sodium permanganate) in January 2008 to treat the small amount of remaining TCE-impacted soil present below an active water line at the source area. Based on discussions during a FFA team meeting on January 26, 2011, the FFA team agreed Site SD-24 now meets UU/UE for soils and soils are not a source of contamination to groundwater. As a result, the selected remedy is now considered protective for UU/UE, and NFA is recommended for this site. No recommendation or follow-up action was needed for this site as it does not require re-evaluation during future FYRs."*

23. **Section 9** - EPA understands that generally the AF is lead and EPA performs oversight, but please add headings and include these roles in Table 9-1, to be consistent with EPA guidance. The milestone dates should include day, month, and year, but EPA can accept month and year only. However, the date for pilot study completion at OU-3 must be revised, as it was not completed in June 2011. Under Basis for Recommendations, the May 2011 date for the LF-23 ESD must be corrected. For follow-up, EPA disagrees with the Response to Comments and requests that a target date or dates be provided for implementation of the LF-23 ESD requirements, including recordation and documentation that information has been added to the Base Comprehensive Plan.

Response: **Agree.** Columns titled "Party Responsible" and "Oversight Agency" will be added to the table after the "Recommendations & Follow-up Actions" column. The Air Force will be included in the "Party Responsible" column for all sites, and EPA and DEQ will be included in the "Oversight Agency" column for all sites.

For sites where a milestone is applicable, a month will be added to the year.

All milestone dates for OU-3, including the pilot study will be revised based on the current status and schedule.

For LF-23, the date the ESD was issued will be updated to July 2011. In addition, target dates (month/year) will be added for implementation of the LF-23 ESD requirements.

24. **Section 9** - The FYR includes Tier 2 issues which EPA does not plan to track in CERCLIS. The issues can remain in the report, but EPA's concurrence letter will focus on issues affecting protectiveness, as well as pending studies and decision documents. LF-23 and OU-3 both affect long-term protectiveness.

    Response: **Comment noted.** It is understood EPA's concurrence letter will focus on issues affecting protectiveness and pending studies and decision documents.

25. **Section 9** - The other sites can be included in this section, but please put them into a new table, Table 9-2, with the title "Recommendations and Follow-up Actions That Do Not Affect Protectiveness". The table does not need the last two columns regarding protectiveness, and the heading Milestone Date can be changed to Schedule. "Not Applicable" should be replaced accordingly (e.g. state "in accordance with approved work plan, or June 2011).

    Response: **Agree.** Sites with recommendations and follow-up actions that do not affect protectiveness will be moved to a new and separate table as suggested. Modifications will be made to Table 9-2 as suggested.

26. **Section 10. Protectiveness Statement** - This section requires corrections to Section 10.8, LF-23 ESD date. Please delete the protectiveness statement in Section 10.12, Site ST-38. There has been no CERCLA decision document issued for the work, and including follow-up work under RCRA in (new) Table 9-2 should be sufficient.

    Response: **Agree.** The LF-23 ESD date will be update to July 2011. In addition, the protectiveness statement for Site ST-38 in Section 10.12 will be deleted, as suggested.

27. EPA notes that protectiveness statements are generally issued for each remedy and that a remedy is usually selected for each OU. To date, progress at MHAFB has been tracked primarily by ERP site. Since some RODs covered multiple OUs, some ERP sites were addressed in multiple RODs, and some ERP sites were moved or removed from OUs, EPA recommends that the site-by-site approach be continued, to ensure that project managers can track progress through the years. For purposes of reporting to Congress, EPA will restate the protectiveness statements by OU following the format in Exhibit 4-6 of the EPA FYR guidance.

    Response: **Comment noted.** It is understood that EPA will provide the protectiveness statements to Congress by OU and follow the format in Exhibit 4-6 in the FYR guidance.

RESPONSE TO COMMENTS
Preview Final 2011 Five-Year Remedy Review Report Version 1.0
Dated July 29, 2011
Mountain Home AFB, Idaho
Air Combat Command Environmental Restoration Program 4-Base PBC
Contract FA8903-04-D-8679 Delivery Order 0053

Comments received from Elly Hale, Remedial Project Manager, EPA Region 10. Dated August 3, 2011. Additional comments received via email from Elly Hale dated August 10, 2011 and Dean Nygard dated August 11, 2011.

1. **Page ES-6 and ES-7** - The listing of ERP sites should include the short descriptive text that goes with them and reference the photo/figure that shows and lists the sites.

   Response: **Agree.** A brief description of each site will be added to the list after the ERP Site ID. In addition, a reference to Figure 1-2 will be added to the section prior to the listing of the sites.

2. **Page ES-7** refers to the 'selected remedy' for ST-38 (Tank 1A). My understanding is that it covered by the FFA but not addressed under CERCLA and was instead dealt with under RCRA. The term "selected remedy" is a CERCLA term. Please search for similar references (including in tables)

   Response: **Agree.** Since this section refers to a site under RCRA, discussion of "selected remedy" for Site ST-38 will be removed from the "Evaluation of Protectiveness" section. Use of this term will also be updated throughout the document as applicable. The text in on this page will be updated as follows:

   "The following site is protective of human health and the environment, but does not allow for UU/UE:

   - *ST-38*

   Dean Nygard, DEQ Follow-up Comment: Why would we want to state in the FYR that ST-38 does not allow for UU/UE?

   ST-38 is a RCRA unit that was clean closed under RCRA, so why are we using a CERCLA term, UU/UE, to make a determination about the protectiveness of a RCRA action?

   Response: **Agree.** Since this section refers to a site under RCRA, the current site status will be added to the "Evaluation of Protectiveness" section for Site ST-38. Use of the term "selected remedy" and "UU/UE" when referring to ST-38 will be removed throughout the document as applicable. The text in on this page will be updated as follows:

   "The following site has been closed based on Risk-Based Corrective Action (RBCA) standards and requires no further remediation or monitoring:"

   - *ST-38, POL Storage Area, Resource Conservation and Recovery Act (RCRA) Solid Waste Management Unit (SWMU)*

3. **Page ES-8** - Right after talking about the OU-3 No Remedial Action or No Action, the text mentions expansion of the current VE system, which isn't described previously. To avoid confusion, add "expansion of the [strikeout: current] VE system [insert: installed to remove TCE vapor from soils at FT-08 and SD-24]."

   Response: **Agree.** This section will be updated to read, *"However, expansion of the vapor extraction systems, installed to remove TCE vapor from soils at Sites FT-08 and SD-24, is recommended, along with ICs, under OU-3 to address contaminant sources in fractured bedrock that pose a potential threat to regional groundwater in the long term."*

4. **Reference is made to a DEQ letter regarding ST-38 and the satisfaction of RCRA requirements**. I have no objection to including the text or to its content, but I don't know if this letter was provided to EPA. Please provide me with a copy.

   Response: **Agree.** The Air Force will provide a copy of the DEQ letter regarding the status of Site ST-38 to EPA.

5. **Table ES-2** - "meets the criteria for UU/UE" - I think EPA asked that the criteria be defined or described (does it mean less than 10E-5 cancer risk and less than HI of 1 for residential scenarios?) If I missed a section where it is described, please point it out, and reference it in the table.

   Response: **Agree.** The UU/UE criteria will be added as footnotes to the table to read as follows:

   "UU/UE for Site FT-04 is based on background values for arsenic since arsenic is naturally occurring in the MHAFB vicinity.

   UU/UE for all other sites is defined as a cancer risk less than 10E-5 or in the low 10E-5 risk range and a hazard index less than 1 for the residential scenario."

6. **Table ES-3 -** Tier 1 and Tier 2 headings are footnoted for the definition. Should be pretty easy to put a brief description in the title, say Tier 1 - Recommendations Affecting Protectiveness.

   Response: **Agree.** Both Tier 1 and Tier 2 headings within the table will be revised to the following:

   "TIER 1 – RECOMMENDATIONS AFFECTNG PROTECTIVENESS" and *"TIER 2 – RECOMMENDATIONS NOT AFFECTING PROTECTIVENESS TO TRACK FOLLOW-UP ITEMS"*

7. **Table ES-3 – LF-23 –** Is okay, but is this amount of detail needed, with deadlines for quarterly reports to be tracked by EPA and Congress? Reference June 2011 Recordation for ICs at LF-23. What documentation is there of this? EPA should be provided with such documentation. Please indicate whether the same recordation has been completed for LF-01 and LF-02 (and provide documentation to EPA).

Response: Comment noted. Based on email correspondence from Elly Hale (EPA) dated August 4, 2011, no changes are needed for this item. In addition, the Air Force will provide EPA with the requested documentation concerning recordation of the ICs.

8. FYR Summary Form - Under Recommendations and Follow-up, either omit the NFA (since it's not a recommendation for action) or reverse the order of discussion so it's the last thing. Under Protectiveness Statement, list the "protective for UU/UE" sites at the end, not at the beginning (or maybe it could be omitted)

Response: Agree. The section will be revised to the following:

"A pilot study, Feasibility Study, Proposed Plan, and RODA are recommended for OU-3. No Further Action (NFA) is recommended for seven sites (FT-04, ST-13, OT-16, SD-24, SD-27, SS-29, and ST-38)."

9. Table 2-2 – OU-3 is referenced as Regional Groundwater (does it not include perched water, too?). **Add information about when TCE first showed up above the MCL in the (then) new wells, and add the timing for discovery of the vapor sources and subsequent investigation work. **

Response: Agree. While OU-3 includes perched groundwater, events relating to perched groundwater are listed in the Site ST-11 portion of Table 2-2 as a release to the perched groundwater was investigated under Site ST-11. The descriptions under OU-3 will be updated to indicate sampling of perched groundwater is being addressed under the LTM Program.

Vapor discovery and initial investigation will be added under OU-3.

Information detailing when and where TCE first exceeded the MCL will be added under OU-3.

10. Table 5-1 – The concentrations should indicate medium (even if it could be inferred). Under FT-04, under Status heading, it's not that the arsenic poses no risk, but that the 33 mg/kg arsenic is in the range of background concentrations.

Response: **Agree.** The medium will be added for each of the sites. In addition, a notation will be added that the arsenic concentration is consistent with background arsenic values at MHAFB.

11. **Page 8-1** – It says "no issues" other than OU-3. I may need to be reminded of why that's so. It says there are no recommendations for Tier 2 Site, but Table 9-2 lists recommendations. Need to clarify text.

    Response: **Comment noted.** Site LF-23 will be added as an issue that affects protectiveness since all actions required by the ESD have not yet been implemented. Table 8-1 will also be updated to add "N" for the Current column and "Y" for the Future column.

    While Tier 2 recommendations are listed in Table 9-2, these recommendations do not protectiveness of each site and are only for tracking purposes. The last sentence will be modified for clarification as follows:

    "*No sites at MHAFB have Tier 2 recommendations that will affect protectiveness.*"

    Elly Hale, EPA Follow-up Comment: Requested the change to the following statement:

    "No sites at MHAFB have Tier 2 recommendations (recommendations that will affect protectiveness)."

    Response: **Disagree.** After further review, the above statement is misleading as the prior sentence reads: "….Tier 2 recommendations help track necessary follow-up items but do not affect protectiveness." This sentence indicates that Tier 2 recommendations do not affect protectiveness; therefore, based on that statement, if there are issues that do affect protectiveness it would be a Tier 1 recommendation. This sentence will be deleted from the FYR.

12. **Page 8-1** - LF-23 – No issues. See above comment.

    Response: **Agree.** An explanation of the issues at Site LF-23 will be added to Table 8-1. See response to comment #11.

13. **Page 9-1 –** LF-23 discussion uses term "recommended" deed notices. These are required under the ESD—so use that verb.

    Response: **Agree.** The sentence will be modified to the following:

    "A deed notice for recordation, an updated Base Comprehensive Plan (BCP), and procedures to restrict future activities are required for Site LF-23."

14. Table 9-2 – In some cases, it says LTM is recommended, and in others there are no recommendations. This is confusing, given the "issues/recommendations: relationship. Maybe "LTM is planned for OU-3", so "no recommendations" makes sense. **ST-13 text is confusing. Maybe clarify: "at MW24, under OU-3" [*this may not make sense without looking at the document together"].

Response: **Agree.** The table will be updated to indicate *"LTM at [well ID] is planned under OU-3 in accordance with the approved work plan."*

The second bulleted recommendation for Site ST-13 will be update to read, *"As part of OU-3 activities, continue LTM for regional groundwater and occurrence of LNAPL at MW24."*

15. OU-3 – TCE toxicity "so what, we have MCL" – I guess that's OK for groundwater, but if TCE toxicity value changes, vapor intrusion could be bigger issue.

Response: **Comment noted.** This reference could not be found in the report.

Elly Hale, EPA Follow-up Comment: Stated that she couldn't find the reference, either. Elly stated that changes in TCE toxicity information may mean the vapor intrusion issues should be revisited to ensure protectiveness, even if base drinking water wells meet the MCL. TCE mass removal from the vadose zone might lead to reduced VI, but this may need to be verified. Not an issue for the Five-Year Review.

16. P10-3 – Section 10.14 – Logic? The list in the first sentence doesn't include OU-3. Maybe it should be added.

Response: **Comment noted.** The first sentence discussed remedies that have already been implemented or selected, which is why OU-3 is not cited in the sentence. The next sentence proceeds to discuss the requirements related to OU-3 in regards to protectiveness.

17. Response to Comments from March 2011 was included in the document, but not subsequent comments. Should be both or neither.

Response: **Agree.** The response to comments from March and July 2011, as well as these comments, will be included in final document.