UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

June 23, 2006

Reply to AttnOf:ECL-115

Mr. John Schleicher
Chief, Environment Restoration
366 CES/CEVR
1181 Desert Street, Bldg. 1296

Mountain Home AFB Idaho 83648-5292

Re: EPA concurrence with 2006 Five Year Review

Dear Mr. Schleicher:

EPA has reviewed the June 2006 Five Year Review for the Mountain Home Air Force Base (MHAFB) Federal Facility. This is the second Five Year Review for MHAFB. EPA is encouraged by the progress MHAFB has made in implementing the recommendations set forth in the previous Five Year Review, published in 2001, and acknowledges the efforts of the Federal Facility Agreement (FFA) project team.

EPA reviewed the document for technical adequacy, accuracy, and consistency with EPA guidance. The document provides a clear summary of the status and the protectiveness of individual MHAFB sites. It also identifies actions to be taken that affect the protectiveness of the selected remedy and documents a schedule for completion of the recommended actions (see Table 9-1 of the Five Year Review).

Based on EPA's review of the 2006 Five Year Review, reports referenced in the document, and our expectation that the recommendations set forth in Table 9-1 will be completed in accordance with the schedule, EPA concurs with Air Force's determinations and recommendations except as noted below.

EPA guidance on the preparation of five-year reviews (OSWER directive 9355.7-03B-P, dated July 2001) was followed in almost every respect. One element of the document departs from EPA guidance, however. For sites which have achieved "construction complete", the guidance calls for a single comprehensive statement of protectiveness for the MHAFB site overall (see Exhibit 4-7, page 4-22).

MHAFB has achieved construction complete. This status was attained soon after signature of the ROD, which required institutional controls at ST-11 and long-term monitoring of perched and regional groundwater. Following the 2001 Five Year Review, however, a number of protectiveness concerns were identified that led to an ESD at ST-11 and removal of contaminated soils from several sites under the AFB's future first planning. As indicated in the 2006 Five Year Review, additional removal actions are

planned for the coming year, and a ROD amendment is likely in the future to establish institutional controls and remedial actions necessary to ensure protectiveness.

Section 10 of the 2006 Five Year Review provides a protectiveness statement for 21 of the 33 sites at MHAFB. Eleven sites previously found to be protective in the 2001 Five Year Review were not addressed in Section 10, as there was no new information. Eight of the 21 sites evaluated this year were found to be protective: FT-05, FT-06, FT-07, SD-12, ST-22, SD-25, SS-30, and ST-32. Thirteen were found not to be protective in the long term: LF-01, LF-02, FT-04, FT-08, ST-11, ST-13, OT-16, LF-23, SD-24, SD-27, SS-29, ST-38, and OU-3.

While EPA concurs with the protectiveness statements for individual sites, EPA must enter a comprehensive protectiveness determination for MHAFB into our tracking system for inclusion in our Annual Report to Congress. EPA concurs that of the 33 individual sites, most are protective, but 13 sites are not protective. If any portion (site or OU) of an overall site is not protective, the comprehensive determination must be "not protective." This does not alter the protectiveness statement for any of the individual sites.

In summary, the remedial actions at the majority of the sites at MHAFB are protective. However, because the remedial actions at thirteen sites are not protective, the MHAFB Federal Facility is not protective of human health and the environment at this time. Actions that need to be taken to ensure protectiveness are identified in Table 9-1 of the 2006 Five Year Review. EPA looks forward to working with MHAFB on implementing the recommended actions.

If you have questions concerning this letter, please call me at 206/553-1090, or contact the site manager, Ellen Hale, at 206/553-1215 (email: hale.ellie@epa.gov)

Sincerely,

Daniel D. Opalski, Director
for Environmental Cleanup Office

cc: Dean Nygard, Idaho Department of Environmental Quality

F I N A L

2006 FIVE-YEAR REMEDY REVIEW ACC 4-BASE PBC

MOUNTAIN HOME AIR FORCE BASE, IDAHO

June 2006

FINAL
2006 FIVE-YEAR REMEDY REVIEW REPORT
ACC 4-BASE PBC
MOUNTAIN HOME AIR FORCE BASE, IDAHO
June 27, 2006

Prepared for:

United States Air Combat Command
Contract FA8903-04-D-8679, Delivery Order No. 0053

Mountain Home Air Force Base

And

Air Force Center for Environmental Excellence

Prepared by:

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RMC CONSULTANTS INCORPORATED

FINAL 2006 FIVE-YEAR REMEDY REVIEW REPORT
ACC 4-BASE PBC

MOUNTAIN HOME AIR FORCE BASE, IDAHO
JUNE 27, 2006

AUTHORIZING SIGNATURE

TIMOTHY A. BYERS
COLONEL, USAF
DIRECTOR OF INSTALLATION

26 JUN 06
DATE

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ACC	Air Combat Command
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFI	Air Force Instruction
ARARs	applicable or relevant and appropriate requirements
bgs	below ground surface
BLM	Bureau of Land Management
BRA	baseline risk assessment
BTEX	benzene, toluene, ethylbenzene, xylenes
CAP	Corrective Action Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineering Squadron
CEVR	Civil Engineering Environment Restoration
COC	chemicals of concern
DCE	dichloroethene
DDT	dichlorodiphenyltrichloroethane
DESC	Defense Energy Support Center
DoD	U.S. Department of Defense
DRMO	Defense Reutilization and Marketing Office
ECB	Environmental Chemistry Branch
EE/CA	Engineering Evaluation/Cost Analysis
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ERP	Environmental Restoration Program
ESD	explanation of significant differences
FEC	Foothill Engineering Consultants

FFA	Federal Facility Agreement
FFS	focused feasibility study
FID	flame ionization detector
FRI	fuel release investigation
FS	feasibility study
FT	fire training
FW	Fighter Wing
GAC	granular activated carbon
GRO	gasoline range organics
HI	hazard index
IDEQ	Idaho Department of Environmental Quality
IRIS	Integrated Risk Information System
JP	jet propellant
LFI	limited field investigations
LMIC	Leak Manager Inventory Control
LNAPL	light non-aqueous phase liquid
LOX	liquid oxygen
LTM	long-term monitoring/management
LUC	land use control
LUST	leaking underground storage tank
MCL	maximum contaminant level
MHAFB	Mountain Home Air Force Base
MTMS	munitions trailer maintenance shop
MW	monitoring well
NAVFAC	Naval Facilities Command
NCP	national contingency plan
NCEA	National Center for Environmental Assessment

NEPA	National Environmental Policy Act
NFA	No Further Action
NFRAP	no further response action planned
NPL	national priority list
NRA	no remedial action
O&M	operations & maintenance
ORP	oxygen-reduction potential
OSWER	Office of Solid Waste and Emergency Response
OU	operable units
OWS	oil-water separator
PA/SI	preliminary assessment/site inspection
PAH	polycyclic aromatic hydrocarbons
PBC	performance based contract
PCB	polychlorinated biphenyls
PD-680	stoddard solvent (degreaser)
PID	photoionization detector
POL	petroleum, oil and lubricants
PP	proposed plan
PRG	preliminary remediation goal
PZMW	perched zone monitoring well
RAB	Restoration Advisory Board
RA-O	remedial action-operations
RAO	remedial action objectives
RBC	risk-based concentration
RBCA	Risk Based Corrective Action
RCC	Resources Conservation Company
RCRA	Resource Conservation and Recovery Act

RDA	Removal and Disposal Action
RI	remedial investigation
RMC	RMC Consultants, Inc.
RME	reasonable maximum exposure
ROD	record of decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SVOC	semi-volatile organic compound
TCA	trichloroethane
TCE	trichloroethene/trichloroethylene
TCO	total chromatographable organics
TRC	Technical Review Committee
TRPH	total recoverable petroleum hydrocarbons
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USGS	United States Geological Survey
UST	underground storage tank
URS	URS Group, Inc.
UU/UE	unrestricted use/unlimited exposure
VE/AS	vapor extraction/air sparge
VES	vapor extraction system
VEW	vapor extraction well
VOC	volatile organic compound
WERC	World-Wide Environmental Restoration Contract

List of Symbols

µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
mg/kg	milligrams per kilogram
msl	mean sea level
ppb_v	parts per billion volume

EXECUTIVE SUMMARY

This second five-year remedy review report is being submitted to fulfill the requirements of the Air Combat Command (ACC), Air Force Center for Environmental Excellence (AFCEE) World-Wide Environmental Restoration Contract (WERC) for services related to the Fixed Price Remediation at Mountain Home Air Force Base (AFB) under the URS Groups, Inc. (URS) contract Number FA8903-04-D-8679, Task Order 0053. The five-year remedy review evaluates the remedy components and monitoring data associated with environmental sites at Mountain Home Air Force Base (the Base). This review is required by statute because remedies were selected post- Superfund Amendments and Reauthorization Act (SARA) and will leave hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] §121). As required by the CERCLA and associated amendments, the remedy review is conducted to determine whether or not the selected remedies are protective of human health and the environment. The review team is comprised of environmental managers from the 366th Environmental Flight, Headquarters Air Combat Command, Idaho Department of Environmental Quality (IDEQ), U.S. Environmental Protection Agency (EPA) Region 10, and AFCEE and their contractors. This remedy review evaluates the implementation and performance of selected remedies in-place at the Base from June 2001 through June 2006.

INSTALLATION DESCRIPTION

The Base is located in Elmore County in southwestern Idaho, approximately 10 miles southwest of the city of Mountain Home (Figure 1-1). The Base is approximately 50 miles southeast of Boise and is 2 miles north of the Snake River. The Base 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 the Base.

PURPOSE AND SCOPE

The purpose of the five-year remedy review is to determine whether selected remedies as documented in the Records of Decision (RODs) for 33 Environmental Restoration Program (ERP) sites at the Base are protective of human health and the environment. Thirty-two of the ERP sites were closed under No Further Response Action Planned (NFRAP) in signed RODs, and one ERP site (ST-11) is undergoing long-term monitoring and limited action. The ERP sites are grouped into operable units (OUs) as follows:

- OU-1 - Fourteen sites for which limited field investigations have been completed and LF-03, the landfill
- OU-2 - Two sites, B-Street Landfill (LF-02) and the Lagoon Landfill (LF-01), which is also addressed in OU-3
- OU-3 - Base-wide regional groundwater and perched groundwater at ST-11
- OU-4 - One site, Fire Training Area 8 (FT-08)
- OU-5 - One site, low-level radioactive waste disposal site (RW-14)
- OU-6 - Twelve sites with remedial investigations completed

EXECUTIVE SUMMARY

REVIEW PROCEDURE

The five-year remedy review began with the Federal Facility Agreement (FFA) team members' meeting in July 2005 to determine the scope and general requirements of the remedy review. The FFA team members agreed on a general table of contents and outlined the issues and sites that were to be addressed in the review document in the October 5 and 6, 2005 FFA team meeting. The table of contents was altered to conform to the EPA's Comprehensive Five-Year Review Guidance (Office of Emergency and Remedial Response [EPA, June 2001]) following discussions with the IDEQ and EPA in December 2005. The preparation of the five-year remedy review document began with data gathering and information assessment at the FFA team meeting in October 2005. Selected site inspections were performed, interviews were conducted with key Base personnel in the 366th Environmental Flight, and relevant documents were collected. The types of documents reviewed included the following:

- Records of Decisions
- Remedial Investigations (RIs)
- Limited Field Investigations (LFIs)
- Preliminary Assessment/Site Inspections (PA/SIs)
- Risk Assessments
- Management Action Plan for Mountain Home AFB, dated December 2004.
- Fuel Inventory 1999 to Present
- EPA's Comprehensive Five-Year Review Guidance Document (Office of Solid Waste and Emergency Response [OSWER] Directive 9355.7-03B-P [EPA, 2001])
- Assessment of Water-Level Change in PZMW7 and Sources of Recharge to ERP Area ST-11, December 2000 through March 8, 2002 (Parliman, 2002)
- The Explanation of Significant Differences (ESD) for the Land Use Controls implemented at ST-11 (366 Environmental Flight, 2004)
- Final Vapor Monitoring Report (RMC Consultants, Inc. [RMC], 2003d)
- Final Report for Site Investigation at Multiple Sites (URS, 2003)
- Final Report for 17 Sites Evaluation/Investigation (URS, 2004)
- Final Report for the SD-24/SD-25 Removal and Disposal Action (URS, 2005a)
- Technical Memorandum for the summary of ST-11 field activities (pumping events) performed February 2004 through September 2004 (URS, 2005b)
- Final 2002 – 2005 LTM Annual Reports (RMC, 2003a, 2004b, 2005b, 2006)
- 366 Fighter Wing (FW) Plan 3202-05 Integrated Contingency Plan for Oil Spill Prevention and Response, April, 2005

EXECUTIVE SUMMARY

FIVE-YEAR REVIEW DOCUMENT ORGANIZATION

For the purposes of this review document, discussions related to sites at the Base are organized in the same categories as the recommendations from the EPA guidance document. The review document is organized as follows:

Section 1.0	Introduction – purpose and scope of the 5-year review, and authority statement
Section 2.0	Site Chronology – gives a summary of 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 remedy selected, implementation, and system operation / operation and maintenance
Section 5.0	Progress Since Last Review – protectiveness statements from last review, status of previous recommendations, and results of implemented actions
Section 6.0	Five-Year Review Process – gives a description of the administrative components, community involvement, document review, data review, site inspections, and interviews that were completed for this review
Section 7.0	Technical Assessment – technical assessment of the remedies in place at Mountain Home AFB
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 Cited

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

EVALUATION OF PROTECTIVENESS

The site-specific remedies have been implemented for all sites in accordance with the RODs. Selected remedies for most sites are protective of human health and the environment currently, in the near term, and in the long term, or are expected to be protective upon implementation of recommendations provided during this review.

Of the 33 ERP sites, selected remedies are protective of human health and the environment, as well as for unrestricted use and unlimited exposure (UU/UE), for the following 20 sites:

- LF-03, FT-05, FT-06, FT-07, DP-9, OT-10, SD-12, RW-14, OT-15, DP-18, ST-22, SD-25, SS-26, SS-28, SS-30, ST-31, ST-32, ST-34, ST-35, ST-39

The selected remedies for the following 13 sites are not protective of human health and the environment, or for UU/UE:

- LF-01, LF-02, FT-04, FT-08, ST-11, ST-13, OT-16, LF-23, SD-24, SD-27, SS-29, ST-38, OU-3

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, and included either 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}. The ROD goal of risks not exceeding 10^{-4} was based on assumed future uses of the base for industrial purposes. This goal is expected to be protective of human health and the environment under current and near-term uses because the facility is an active military base, and access and development is restricted. However, during the previous 2001 five-year review, the FFA team established an unrestricted use protectiveness goal for soils to be a non-carcinogenic hazard index not to exceed 1, and a carcinogenic risk not to exceed 1×10^{-6} to account for uncertainties in the site characterizations and risk results. Although the protectiveness goal for UU/UE remains 1×10^{-6} for this five-year review, in February 2006 the FFA team proposed a target risk level of 1×10^{-5} as an acceptable remedial action objective for UU/UE when use of this goal can be supported by an acceptable rationale based on the following criteria: nature of chemicals of concern (COCs), site conditions, and/or sufficient site data/characterization to demonstrate protectiveness at the 1×10^{-5} risk level with certainty under the UU/UE scenario. If it is possible to achieve the protectiveness goal of 1×10^{-6} without a significant cost impact, the AFB intends to do so, particularly where uncertainties remain in characterization. The protectiveness goal for unrestricted groundwater use is the Federal Safe Drinking Water Act (SDWA) MCL.

Long-Term Monitoring of the regional groundwater, with the addition of 10 new regional groundwater monitoring wells in 2004, has detected volatile organic compounds (VOCs) above MCLs in three monitoring wells (MW24, MW25, and MW35). VOCs have not been detected above MCLs in any of the Base drinking water supply wells, or perimeter wells. Additionally, the discovery of VOCs in vadose zone vapors with the installation of MW20 in May 2002 has led to the installation of 45 vapor monitoring ports at 16 locations at the base. The presence of significant vadose zone VOC vapors (of primary concern TCE) suggest a possible link to gas phase transport of VOC constituents from soil sources to deep 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 deep regional groundwater.

SUMMARY OF REVIEW AND RECOMMENDED ACTIONS

In completing the previous five-year remedy review for the Base, the FFA team members recognized that most of the sites investigated at the Base currently have NFRAP ROD documents in-place (32 of the 33 ERP sites). Current EPA Region 10 policy requires institutional control commitments in RODs at federal facilities where hazardous substances are allowed to remain on site at concentrations that prevent unrestricted use of the site (EPA, 1999). The FFA team has established the UU/UE protectiveness goal for soils to be a non-carcinogenic hazard index not to exceed 1 and a carcinogenic risk not to exceed 1×10^{-6}, and the unrestricted protectiveness goal for groundwater to be the Federal SDWA MCLs. As specified in the EPA Region 10 policy for the implementation of institutional controls (EPA, 1999), EPA requires an ESD be prepared for sites with existing RODs that do not explicitly state an institutional control requirement, and that do not meet the conditions of unrestricted use. Institutional controls are currently in place at site ST-11, Fuel Hydrant System Spill. However, as shown in Table ES-1, institutional controls (and therefore ESDs) are recommended for two additional sites (LF-01 and LF-02) to ensure future protectiveness.

A limited action was required by the 1995 OU-3 ROD for one site (ST-11) including base-wide groundwater monitoring. The limited action required at ST-11 included the implementation of institutional controls prohibiting drilling of the perched zone and use of the perched zone as a drinking water source, an improved fuel management (leak detection) program, and an LTM program (for at least 5 years) of the perched water at ST-11. In addition, the no remedial action alternative for the regional groundwater included a minimum of annual monitoring of the regional groundwater to verify uncertainties with the groundwater fate and transport model results, and to monitor whether COCs remain below the Federal SDWA MCLs.

The initial 2001 five-year remedy review identified the need for additional characterization of potential TCE sources and changes to the LTM plan, including replacement of certain 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 actions are warranted at several sites to ensure the protectiveness of selected-remedies. Recommendations for sites evaluated during this five-year remedy review include No Further Action, land use controls, and remedial actions. Additional requirements and recommendations specified for each site are provided in Table ES-1 and summarized below.

- No Further Action is recommended for eight sites (SS-30, SD-25, FT-05, FT-06, FT-07, SD-12, ST-22, and ST-32).
- Continue the Tank 1 petroleum, oil and lubricants (POL) comprehensive engineering evaluation and implementation of the corrective action plan for ST-38 under the Risk Based Corrective Action (RBCA) or Risk Evaluation Manual.
- Institutional controls are recommended for two sites (LF-01 and LF-02) to prevent unacceptable risk due to exposure to potentially contaminated media.

- An Engineering Evaluation/Cost Analysis (EE/CA) and a potential non-time-critical removal action are recommended for contaminated soils at five sites (FT-04, OT-16, LF-23, SD-27 and SS-29) to achieve unrestricted future land use.
- Pilot studies to evaluate potential remedial technologies are recommended for three sites (FT-08, ST-11, and SD-24).
- A Baseline Risk Assessment (BRA) amendment, focused feasibility study (FFS), and proposed plan (PP) are recommended for ST-11, FT-08, and SD-24.
- Continue Operations & Maintenance (O&M) 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 of LNAPL in MW24 and hot-spots contributing VOC vapors to the vadose zone is also recommended for ST-13.
- The TCE slope factor used in the human health risk assessment is currently being evaluated by EPA and others. TCE toxicity data should be revisited during the next five-year review to evaluate the protectiveness of the selected remedies based on the outcome of the ongoing TCE slope factor review.

NEXT FIVE-YEAR REMEDY REVIEW

Additional five-year remedy reviews will be necessary since contamination remains above levels that allow unrestricted use and/or unlimited exposure at some ERP sites bcated at the Base. The next five-year remedy review is scheduled to be completed by June 2011.

TABLE ES-1
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Site Description	Operable Unit #	Status of Response	Selected Remedy	Current Status	Recommendations	Current Chemicals of Concern in Soil
LF-01	Lagoon Landfill	OU-2 OU-3 (LTM)	ROD - 1995	NRA with LTM	• LTM of regional groundwater at MW7-2 and MW31, and LTM of vapors at MW31. • Although federal MCLs exceeded 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. • Post-closure activities (inspections) are performed for the monofill constructed over the footprint of LF-01, under the Base compliance program	• Continue monitoring regional groundwater at MW7-2 and MW31 in accordance with the approved work plan. • Continue vapor sampling at MW31 during the spring and fall RA-O sampling events. • Completion of an ESD and implementation of ICs.	Metals
LF-02	B-Street Landfill	OU-2 OU-3 (LTM)	ROD - 1993	NRA	• LTM of regional groundwater at MW3-2 and MW32, and LTM of vapors at MW32. • MW3-2 groundwater sampling results indicate that COCs are not migrating outside of installation boundaries. • Rubble areas are being leveled and covered with native soils as part of the Base beautification program.	• Continue monitoring regional groundwater at MW3-2. • Continue monitoring regional groundwater and vapors at MW32. • Completion of an ESD and implementation of ICs. • Annual landfill inspections following completion of ESD.	TCE, PAHs, pesticides, TPH, and metals
LF-03	Landfill	OU-1 OU-3 (LTM)	NA	NA	• Operated under a Conditional Use Permit issued by Elmore County. The Idaho Department of Health and Welfare, Central District Office provides oversight for the LF-03 permit. • ICs are currently in place for the active asbestos cell. The remaining two active cells consist of municipal solid waste and scrap metal/wood. No hazardous materials have been, or are currently, placed in the landfill. • Landfill cells closed prior to 1984 are ERP sites and cells closed after 1984 are covered under the state permit issued by Elmore County. • LF-03 meets the conditions for exemption in 40 CFR 258.1 (Criteria for Municipal Solid Waste Landfills), therefore groundwater monitoring is not required. • LTM of nearby monitoring well MW17-2.	• Sample MW17-2 in accordance with the approved work plan.	None
RW-14	Low-Level Radioactive Waste Disposal Area	OU-5 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore RW-14 does not require reevaluation during this or subsequent five-year reviews.	• None.	None
FT-04	Fire Training Area No. 4	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The Air Force has elected to perform a limited assessment at two “hot-spots” for arsenic in soils with potential removal and disposal of soils with arsenic above the IDEQ established background concentration. An EE/CA is required before a non-time-critical removal action can be implemented for this site.	• Complete the limited assessment activities as described in “current status”, and an EE/CA and non-time-critical removal action, if warranted.	Arsenic

TABLE ES-1 (CONTINUED)
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Site Description	Operable Unit #	Status of Response	Selected Remedy	Current Status	Recommendations	Current Chemicals of Concern in Soil
FT-05	Fire Training Area No. 5	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 PRGs for residential soil.	• NFA • FT-05 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	None
FT-06	Fire Training Area No. 6	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 PRGs for residential soil.	• NFA • FT-06 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	None
FT-7A, B, and C	Fire Training Area No. 7	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• LTM of regional groundwater at MW17-2 and MW29, and LTM of vapors at MW29.	• Sample MW17-2 in accordance with the approved work plan. • Continue LTM of the regional groundwater and vapors at MW29. • NFA. FT-07 meets the criteria of UU/UE for soils, therefore the site does not require re-evaluation during future five-year reviews.	None
FT-08	Fire Training Area No. 8 Adjacent to Existing Fire Training Area	OU-4 OU-3 (LTM)	ROD – 1992 ROD - 1995	NRA with LTM	• LTM of regional groundwater at MW11-2 and MW28, and LTM of vapors at MW28. • TCE detected in soils in 2002 show levels higher than detected during RI. • Passive soil gas survey conducted in 2004 indicates TCE in soils more widespread than indicated during the RI. • Vadose zone vapor samples collected from MW28 in 2004 indicate TCE vapors to a depth of 299 feet bgs.	• Continue LTM of the regional groundwater and bedrock vadose zone vapors at MW28. • Perform an extended pilot study to evaluate SVE as a potential remedial technology. • Completion of an OU-4 RI amendment, followed by a BRA amendment, FFS, PP, and ROD amendment to address TCE contaminant levels in soil and remediation of soils and shallow bedrock. • Implement recommended actions in accordance with ROD amendment.	c-1,2-DCE, benzene, ethylbenzene, toluene, PCE, TCE, and TPH
ST-11	Fuel Hydrant System Spill	OU-1 OU-3 (Fuel Sites)	ROD - 1995	Limited Action	• LTM of perched groundwater at PZMW7 - PZMW17. • LNAPL present in PZMWs violates IDAPA 58.01.02.852.04. • Fluctuations in perched zone groundwater levels and LNAPL present in some wells indicate system is not static. • LTM of regional groundwater and vapors at MW20 and MW26. • An ESD was completed in 2004 to clarify and enhance the ICs for the site.	• Continue to sample the PZMWs. • Continue LTM of regional groundwater and bedrock vadose zone vapors at MW20 and MW26. • Complete extended pilot studies to evaluate passive product recovery and bioventing/biosparging/vapor extraction as a potential remedial technology. • Completion of a BRA amendment, FFS, PP, and ROD amendment to address ineffective monitored natural attenuation of fuel constituents in perched zone groundwater. • Implement recommended actions in accordance with ROD amendment.	BTEX
Fuel Management Program	Fuel leaks associated with fuel operations	NA	NA	NA	• Inventory controls are in place and Tracer Tight leak tests are conducted annually since 1995. Inventory control procedures for petroleum products stored at the Base are consistent with DOD 4140.25-M.	• Continue to assess the Base fuel system leak detection procedures to minimize unaccounted fuel loss. • Summarize results of leak detection system with annual groundwater results.	BTEX

TABLE ES-1 (CONTINUED)
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Site Description	Operable Unit #	Status of Response	Selected Remedy	Current Status	Recommendations	Current Chemicals of Concern in Soil
DP-9	Waste Oil Disposal Area	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore DP-9 does not require re-evaluation during this or subsequent five-year reviews.	• None.	None
OT-10	Oiled Base Perimeter Road	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore OT-10 does not require re-evaluation during this or subsequent five-year reviews.	• None.	None
SD-12	Old Entomology Shop	OU-6 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The protectiveness goal for UU/UE is met for soil as agreed upon by FFA Team members in 2003, based on site conditions and nature of COCs and findings of the 17 Sites Investigation/Evaluation (URS, 2004).	• NFA • SD-12 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	None
ST-13	POL/MOGAS Tank Site	OU-3	ROD - 1995	NRA with LTM	• LTM of vapors at VW-1 and MW24. • LNAPL was first measured at MW24 with a product thickness of 0.93 feet in September 2004. • Operation & Maintenance activities are currently performed for the product recovery system at MW24 on a quarterly basis. • Operation of the product recovery system at MW24 since December 2004 has produced 89,000 gallons of water and not resulted in recovery of LNAPL. • Regional groundwater samples from MW24 indicate elevated concentrations of JP4 constituents. Maximum benzene concentrations were reported at 360 µg/L in April 2003. Benzene concentration reported in September 2005 was 0.5 µg/L. • Results of vapor sampling from MW24 indicate elevated concentrations of JP4 fuel constituents, including benzene, are present in the deep vapor port.	• Continue monitoring vapors at VW-1 and MW24. • Continue O & M activities for the current product recovery system at ST-13. • Complete an OU-3 RI/BRA amendment to document the presence of LNAPL on regional groundwater in MW24. • Additional characterization of the source of LNAPL in MW24 and hot-spots contributing VOC vapors to the vadose zone.	None
OT-15	Corker Material Burial Site	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore OT-15 does not require re-evaluation during this or subsequent five-year reviews.	• None.	None
OT-16	Munitions Burial Site	OU-6 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Results of the 2004 site investigation indicate that there is no evidence of a release of perchlorate in the subsurface soils at OT-16 and there is no fire or explosion hazard. • In lieu of LUCs, the Air Force has elected to complete a non-time-critical removal action of the munitions debris/scrap and underlying soils that contain PAHs at concentrations that prevent UU/UE. An EE/CA is required before a non-time-critical removal action can be implemented for this site.	• Complete an EE/CA and a non-time-critical removal action, if selected during the EE/CA process.	PAHs
DP-18	World War II Material Burial Trench	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore DP-18 does not require re-evaluation during this or subsequent five-year reviews.	• None.	None

TABLE ES-1 (CONTINUED)
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Site Description	Operable Unit #	Status of Response	Selected Remedy	Current Status	Recommendations	Current Chemicals of Concern in Soil
ST-22	Underground Storage Tanks – Bldg. 1333 (Titan Missile Maintenance Area)	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Historic assessment activities of the site soils and bedrock indicate that the site has not adversely impacted these media, and that no detectable contaminants are present at concentrations above USEPA Region 9 PRGs for residential soil. • LTM of regional groundwater and bedrock vadose zone vapors at MW25. • Bedrock vadose zone vapors monitored at MW25 indicate the site is not a source of bedrock VOC vapors. However, TCE has been detected above the MCL (5 ug/L) six out of ten times in regional groundwater sampled from MW25. • A 50-foot rock core drilled in the vicinity of the former USTs suggested the site was not a source for COCs. • A passive soil gas survey conducted in the area in 2004 suggested the site was not a source for COCs.	• Continue monitoring regional groundwater and vapors at MW25. • NFA • ST-22 meets the criteria of UU/UE for soils, therefore the site does not require re-evaluation during future five-year reviews.	None
LF-23	Solid Waste Disposal Area	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• In lieu of LUCs the Air Force has elected to complete a non-time-critical removal action of the debris and the underlying soils that contain PAHs at concentrations that prevent UU/UE. An EE/CA is required before a non-time-critical removal action can be implemented for this site.	• Complete an EE/CA and a non-time-critical removal action, if selected during the EE/CA process.	SVOCs (PAHs)
SD-24	LOX Loading Plant	OU-6 OU-3 (LTM)	ROD - 1995	NRA with LTM	• LTM of regional groundwater at MW19 and MW27, and LTM of vapors at MW27. • The passive soil gas survey conducted for the northwest industrial portion of the base identified a former sub-grade cement tank adjacent to Building 1340 (SD-24) as a TCE source area. • The Air Force completed a voluntary soil RDA at SD-24 in November 2004 and regional groundwater and vapor monitoring well MW27 was constructed adjacent to SD-24. • A sweet solvent-like odor was described in the evaluation of a shallow bedrock core at 46 feet during assessment activities in 2004. • SD-24 is the most likely source for bedrock vadose zone VOC vapors and TCE contamination to regional groundwater.	• Continue monitoring regional groundwater and vapors at MW27. • Perform a pilot study to evaluate a bedrock VE remediation system and remove or remediate the remaining contaminated soils left in-place during the 2004 RDA. • Complete a BRA amendment, FFS, PP, and ROD amendment to address the residual solvent and petroleum compounds that are present in the shallow bedrock and its effect on vadose zone vapors and potentially regional groundwater. • Complete an indoor vapor intrusion evaluation to evaluate the indoor air vapor intrusion pathway. • Implement recommended actions in accordance with ROD amendment.	TCE, TRPH, and lead
SD-25	Flightline Storm Drain	OU-6 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Storm water conveyances are being evaluated for upgrade to meet Idaho's Best Management Practices. • 874 tons of contaminated sediments previously identified in the ditch were removed during a voluntary RDA completed for sediment at SD-25 in November 2004.	• Implement Best Management Practices in order to ensure proper management of the Flight Line Storm Drain. • SD-25 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	None

TABLE ES-1 (CONTINUED)
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Site Description	Operable Unit #	Status of Response	Selected Remedy	Current Status	Recommendations	Current Chemicals of Concern in Soil
SS-26	Drum Accumulation Pad	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore SS-26 does not require re-evaluation during this or subsequent five-year reviews.	• None.	None
SD-27	Wash Rack – Bldg. 1354	OU-6 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Target PAH compounds were detected in Site soils at concentrations similar to historical concentrations during the 2004 site investigation.	• Complete an EE/CA to evaluate a non-time-critical removal action of the affected soils that contain PAHs above EPA Region 9 residential PRGs.	PAHs
SS-28	Wash Water Accumulation Basin	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Results from the passive soil gas survey completed in the spring of 2005 indicate that SS-28 is not a source of TCE to regional groundwater. • The recommendation for this site remains NFA, therefore SS-28 does not require re-evaluation during this or subsequent five-year reviews.	• None.	None
SS-29	Drum Storage Area	OU-6 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Target PAH compounds were detected in Site soils at concentrations similar to historical concentrations during the 2004 site investigation.	• Complete an EE/CA to evaluate a non-time-critical removal action of the affected soils that contain concentrations of PAHs that exceed EPA Region 9 residential PRGs.	PAHs
SS-30	DRMO Storage Area	OU-1 OU-3 (LTM)	ROD - 1995	NRA with LTM	• Results from the passive soil gas survey completed in the spring of 2005 indicate that SS-30 is not a source of TCE to regional groundwater. • No further characterization is warranted for soils at SS-30.	• NFA • SS-30 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	None
ST-31	Old Base Exchange Gas Station	OU-3 Fuel Sites	ROD - 1995	NRA with LTM	• A clean closure was documented for the USTs at ST-31 under RCRA, therefore, ST-31 does not require re-evaluation during this or subsequent five-year reviews.	• NFA	None
ST-32	Old Military Gas Station	OU-3 Fuel Sites	ROD - 1995	NRA with LTM	• The selected remedy for ST-32 is considered protective at the 1 x 10^{-5} risk level based on site conditions, conservative exposure assumptions used in the risk assessment, and sufficient site characterization.	• NFA • ST-32 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	BTEX, GRO
ST-34	Flightline Fuel Hydrant # 9 Leak Area	OU-3 Fuel Sites	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore ST-34 does not require re-evaluation during this or subsequent five-year reviews.	• None.	None
ST-35	JP-4 Pipeline Leak	OU-3 Fuel Sites	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore ST-35 does not require reevaluation during this or subsequent five-year reviews.	• None.	None

TABLE ES-1 (CONTINUED)
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Site Description	Operable Unit #	Status of Response	Selected Remedy	Current Status	Recommendations	Current Chemicals of Concern in Soil
ST-38	POL Storage Area, RCRA SWMU	OU-3 Fuel Sites	FRI - 1996	NA	• ST-38 was transferred from the OU-3 Fuel Sites and reallocated to the state authorities prior to the 1995 ROD. Although ST-38 has been removed from the CERCLA program, the site is still evaluated under the FFA. • Removal of LNAPL in perched water under a Corrective Action Plan submitted for the Tank 1 Fuel Release site. • An Integrated Contingency Plan for Oil Spill Prevention and Response was completed in April 2005. • Tank 1 is currently out of commission due to corrosion pits detected on the outside of the tank side walls during the ongoing Comprehensive Engineering Evaluation for Tank 1. All of the contaminated soil encountered during the removal of a section of the Tank 1 concrete cap has been removed and landfarmed. NAVFAC is currently evaluating whether Tank 1 should be repaired or removed. • The replacement of the three POL tanks is scheduled for 2007.	• Continue the investigation and remediation of the POL release at Tank 1 under the RBCA or Risk Evaluation Manual.	VOCs, SVOCs, DRO, GRO, and metals
ST-39	15,000-gallon UST at FT-08	OU-6 OU-3 (LTM)	ROD - 1995	NRA with LTM	• The recommendation for this site remains NFA, therefore ST-39 does not require reevaluation during this or subsequent five-year reviews.	• None.	None
OU-3 Regional Groundwater	Base-wide	OU-3	ROD - 1995	NRA with LTM	• Groundwater is currently sampled from 12 regional groundwater monitoring wells on a semi-annual basis and from four wells on an annual basis. Fifteen wells have vapor monitoring ports installed for a total of 45 sampling ports. High capacity Base production wells are no longer sampled under the ERP RA-O program. • Twelve of the 25 regional monitoring wells available were surveyed in 2004 for deviation from vertical in order to obtain accurate groundwater elevations. • Of the 33 ERP sites, SD-24 has been identified as the likely primary source of TCE contamination present in the regional groundwater and bedrock vapors. • Bedrock vapor contamination has been identified over a large section of the Base northern industrial area. • TCE concentrations currently exceed the SWDA MCL (5.0 ug/L) at MW25 (7.3 ug/L) and MW35 (13.0 ug/L). Consistent with past results, widespread low-level TCE concentrations below the MCL were detected at 12 remaining regional groundwater well locations in 2005. Regional groundwater sample results for OU-3 generally have remained constant and do not indicate an upward or downward trend in COC concentrations.	• Continue water level measurements on all available wells in the spring and fall of each year. • Continue vapor sampling at the existing vadose zone vapor ports and monitoring regional groundwater in accordance with the approved work plan.	Not applicable

TABLE ES-1 (CONTINUED)
SUMMARY OF CURRENT ERP SITE STATUS AND RECOMMENDATIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Note: Soil COCs identified for each site are based on the most recent findings associated with post-ROD investigations performed to date.
TCE is the primary COC for regional groundwater, and LNAPL fuels are present in regional groundwater at ST-13 (JP-4), and in perched groundwater at ST-11 (JP4) and ST-38 (JP8).

bgs = Below Ground Surface
BRA = Baseline Risk Assessment
BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
COC = Chemical of Concern
DRMO = Defense Reutilization and Marketing Office
DRO = Diesel Range Organics
EE/CA = Engineering Evaluation/Cost Analysis
ESD = Explanation of Significant Differences
FDD = Final Decision Document
FFA = Federal Facilities Agreement
FFS = Focused Feasibility Study
FRI = Fuel Release Investigation
GRO = Gasoline Range Organics
ICs = Intuitional Controls
ID = Identification
IDAPA = Idaho Administrative Procedures Act
IRP = Installation Restoration Program
LNAPL = Light Non-Aqueous Phase Liquids
LTM = Long-Term Monitoring/Management
LUCIP = Land Use Control Implementation Plan
MOGAS = Motor Gasoline
NA = Not Applicable
NAVFAC = Naval Facilities Command
NFA = No Further Action
NRA = No Remedial Action
PA = Preliminary Assessment
PAH = Polycyclic Aromatic Hydrocarbons
PCB = Polychlorinated Biphenyl
POL = Petroleum, Oil, and Lubricants
PP = Proposed Plan
PRG = Preliminary Remediation Goal
RCRA = Resource Conservation and Recovery Act
RDA = Removal and Disposal Action
ROD = Record of Decision
SAP = Sampling and Analysis Plan
SVE = Soil Vapor Extraction
SVOCs = Semivolatile Organic Compounds
SWMU = Solid Waste Management Unit
TCE = Trichloroethene
TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
USGS = U.S. Geological Survey
UST = Underground Storage Tank
UU/UE = Unrestricted Use/Unlimited Exposure
VOCs = Volatile Organic Compounds

Five-Year Review Summary Form

Site name *(from WasteLAN)*: There are 33 ERP sites at Mountain Home Air Force Base. The following ERP Sites are evaluated during this five-year review: LF-01, LF-02, FT-04, FT-05, FT-06, FT-07, FT-08, ST-11, SD-12, ST-13, OT-16, ST-22, LF-23, SD-24, SD-25, SD-27, SS-29, SS-30, ST-32, and ST-38.

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)

Lead agency: ☐ EPA ☐ State ☐ Tribe ☒ Other Federal Agency: AFB

Author name: URS Group/RMC Consultants, Inc.

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

Review period:** 6 / 27 / 2001 to 6 / 27/ 2006

Date(s) of site inspection: 10 / 6 / 2005

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 / 2001

Due date *(five years after triggering action date)*: 6 / 27 / 2006

* ["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.

An issue that currently prevents the selected remedy (NRA) from being protective is the exceedances of risk-based residential screening criteria and/or current and UU/UE protectiveness goals for calculated cancer risks. An additional issue regarding a potential exposure pathway that may exist from the inhalation of vadose zone vapors from the bedrock via ambient air and/or indoor air has been identified, but not confirmed.

Recommendations and Follow-up Actions:

The recommendations and follow-up actions listed below are associated with findings from this five-year remedy review.

No Further Action is recommended for eight sites (SS-30, SD-25, FT-05, FT-06, FT-07, SD-12, ST-22, and ST-32). Institutional controls are recommended for two sites (LF-01 and LF-02). An Engineering Evaluation/Cost Analysis and a potential non-time-critical removal action is recommended for contaminated soils at five sites (SS-29, SD-27, FT-04, OT-16, and LF-23). A ROD amendment for active remediation is recommended following a pilot study, RI/BRA amendment, and FFS for three sites (FT-08, ST-11, and SD-24). An OU-3 RI/BRA amendment is recommended for ST-13 to document the presence of LNAPL in MW24. Completion of a vapor intrusion evaluation is recommended to determine whether an exposure pathway via indoor air and/or ambient air exist, and whether ARARs are exceeded.

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 unrestricted use/unlimited exposure (UU/UE): FT-05, FT-06, FT-07, SD-12, ST-22, SD-25, SS-30, and ST-32. The selected remedies for the following sites are not considered protective for UU/UE: LF-01, LF-02, FT-04, FT-08, OT-16, LF-23, SD-24, SD-27, SS-29, ST-38, and 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. However, institutional controls already implemented at ST-11 will ensure long-term protectiveness with respect to human exposure to the perched groundwater at ST-11.
Since free-product has been encountered at MW24, the selected remedy at ST-13 (no remedial action with long-term monitoring) is no longer considered protective.

Five-Year Review Summary Form (Continued)

Other Comments:

Make any other comments here.

The 33 ERP sites are grouped into operable units (OUs) as follows:

- OU-1- 14 sites for which limited field investigation have been completed and LF-03
- OU-2- two sites, LF-01 and LF-02
- OU-3- base-wide regional groundwater and perched groundwater at ST-11
- OU-4- one site, FT-08
- OU-5- one site, RW-14
- OU-6- 12 sites with remedial investigations completed

The selected remedies specified in the RODs for 32 of the ERP sites consist of No Remedial Action (NRA), which includes a minimum of annual LTM for regional groundwater at the Base. The Limited Action alternative was selected as the remedy for ST-11.

This second post-record of decision (ROD) five-year remedy review report evaluates the remedy components and monitoring data associated with environmental sites at Mountain Home Air Force Base (MHAFB or the Base). The review team is comprised of environmental managers from the 366th Environmental Flight, Idaho Department of Environmental Quality (IDEQ), Headquarters Air Combat Command (ACC), United States (U.S.) Environmental Protection Agency (EPA) Region 10, and Air Force Center for Environmental Excellence (AFCEE). This review is required by statute because remedies were selected post- Superfund Amendments and Reauthorization Act (SARA) and will leave hazardous substances, pollutants, or contaminants onsite above levels that allow unlimited use and unrestricted exposure (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] §121). This remedy review evaluates the implementation and performance of selected remedies in-place at the Base from June 1992 through June 2006.

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 Priority List (NPL) sites are grouped into operable units (OUs) as follows:

- OU-1 - Fourteen sites for which limited field investigations (LFIs) have been completed and LF-03, the landfill
- OU-2 - Two sites, B-Street Landfill (LF-02) and the Lagoon Landfill (LF-01), which is also addressed in OU-3
- OU-3 - Base-wide regional groundwater and perched groundwater at ST-11
- OU-4 - One site, Fire Training Area 8 (FT-08)
- OU-5 - One site, low-level radioactive waste disposal site (RW-14)
- OU-6 - Twelve sites with remedial investigations (RIs) completed

Three RODs are in-place and signed by representatives of the Air Force, IDEQ, and EPA for all 33 ERP sites. The OUs are addressed in the three RODs as follows:

- 1992 ROD for OU-4, which addresses 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)

A summary of ERP sites is provided in Table ES-1 of the Executive Summary. Twenty-one of the 33 ERP sites, including OU-3, reviewed during the 2001 five-year remedy review required evaluation during this review. During the 2001 five-year review, No Further Action was recommended for the following twelve 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). The No Remedial Action remedy remains

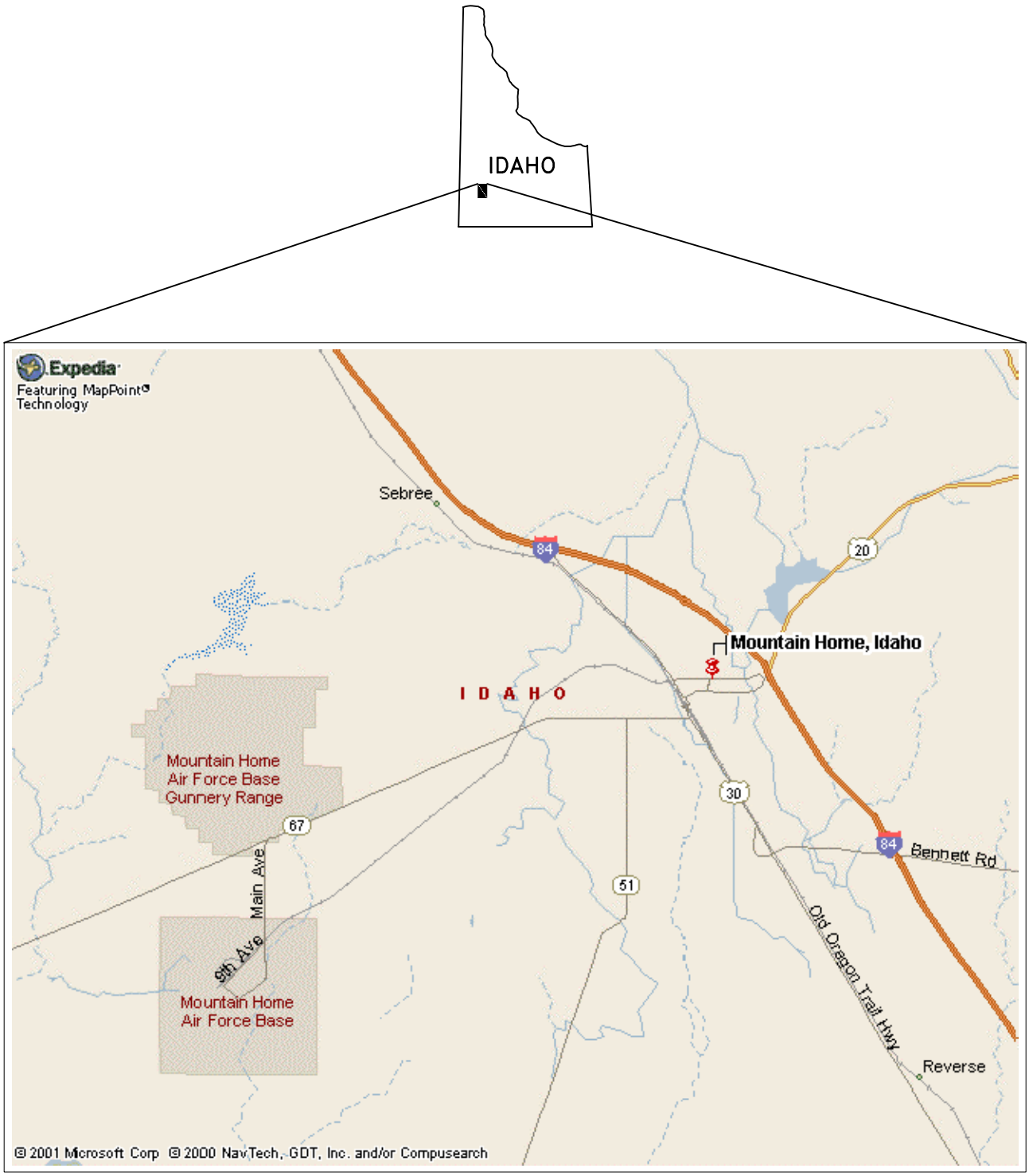
protective for all these sites, in which NFA was previously recommended, except ST-13. ST-13 was one of the twenty-one ERP sites evaluated during this five-year remedy review due to new site information (indicating the presence of free-product) since the previous review. Although institutional controls were recommended for site ST-31 during the previous five-year review, this site is not addressed in this five-year review because underground storage tanks (USTs) at ST-31 were closed under the Resource Conservation and Recovery Act (RCRA) and do not warrant further review under CERCLA. The closure report for the USTs removed from ST-31 was filed with IDEQ in August 1996.

The Base 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 United States Air Force (USAF) has conducted this review pursuant to the following:

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



LOCATION MAP
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRN. BY: DPG	DATE: 11/14/05	PROJECT NO.	FIG. NO.
CHK'D. BY: SEM	DATE: 11/14/05	16169962	1-1

January 06, 2006 1:48:13 p.m.
Drawing: T:\4-BASE\mh\20000\fig01-1.dwg

Legend

- Active Base Production Well
- Inactive Base Production Well
- Regional Groundwater and Vapor Monitoring Well
- Regional Groundwater Monitoring Well
- ERP Site
- Sanitary Sewer Line

2,000 1,000 0 2,000 Feet

1 inch = 1,000 feet

ERP SITE LOCATION MAP
MOUNTAIN HOME AIR FORCE BASE, IDAHO

DRAWN BY: JAS	DATE: 6-13-06	PROJECT NO. 16169962	FIG NO. 1-2
CHK'D BY: CDM	REVISION: 1		

Section Two provides dates of major events, listing of key environmental studies, and RODs completed at the 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.

TABLE 2-1
SUMMARY OF KEY ENVIRONMENTAL STUDIES AND REGULATORY ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Date	Key Environmental Studies/Regulatory Actions	Details
1983, July and October	Phase I and Phase II Records Search and Pre-survey	17 sites studied; 5 recommended for field investigation.
1987, December	EPA Hazard Ranking System Scoring of Mountain Home AFB	Declaration of an observed release of bromoform in groundwater.
1990	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, August	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.
1991, October	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.
1992, January	USAF, EPA, and IDHW signed the FFA	5 OUs established which included 25 sites; schedule of reports set.
1992, May	Record of Decision, OU-4, FT-08	No Further Action; deferral of groundwater impact to OU-3.
1992, August	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, WA facility.
1992, September	RI/ BRA Report for OU-2	No unacceptable risks.
1992, October	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 ST-13 with the stipulation that it will become active if post closure isn't adequately address under the FFA.
1993, January	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}).
1993, May	Record of Decision, OU-2, LF-02	No Further Action; deferral of groundwater impact to OU-3.
1993, March and October	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.
1994, October	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}.

TABLE 2-1 (CONTINUED)
SUMMARY OF KEY ENVIRONMENTAL STUDIES AND REGULATORY ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Date	Key Environmental Studies/Regulatory Actions	Details
1995, October	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 the Base, and the Limited Action alternative for ST-11, which includes a notice of restriction, leak detection program, and perched groundwater monitoring.
1996, May	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).
1998, September	Remedial Action Report by 366 CES/CEVR	Documentation of all CERCLA environmental investigations and actions at Mountain Home AFB.
1998, September	Preliminary Close-Out Report by EPA Region 10	Documentation that Mountain Home AFB has completed all construction activities required in RODs for all sites investigated under CERCLA, as amended.
2001, June	Five-Year Remedy Review Report	Evaluates the remedy components and monitoring data associated with environmental sites at Mountain Home AFB.
2001, Summer	Oil-Water Separator Investigation	Consisted of resampling and characterizing 11 OWS sites.
2001, September	LTM Technical Memorandum	Reports the findings of the May 2001 LTM sampling event.
2002, March	LTM Technical Memorandum	Reports the findings of the October 2001 LTM sampling event.
2002, March	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, JP4 and JP8, to LNAPL in PZMW7.
2003, July	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.
2003, December	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.
2003, February	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.
2004, March	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.
2004, August	2003 LTM Report	Reports the findings of the 2003 LTM program.
2004, September	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.
2005, August	2004 LTM Report	Reports the findings of the 2004 LTM program.
2006, April	2005 LTM Report	Reports the findings of the 2005 LTM program.

TABLE 2-1 (CONTINUED)
SUMMARY OF KEY ENVIRONMENTAL STUDIES AND REGULATORY ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

AFB = Air Force Base
BRA = Baseline Risk Assessment
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CES = Civil Engineering Squadron
CEVR = Civil Engineering Environment Restoration
DRMO = Defense Reutilization and Marketing Office
EPA = U.S. Environmental Protection Agency
ERA = Ecological Risk Assessment
FFA = Federal Facility Agreement
FS = Feasibility Study
IDHW = Idaho Department of Health and Welfare
LFI = Limited Field Investigation
LTM = Long Term Monitoring/Management
NPL = National Priorities List
OU = Operable Unit
RCRA = Resource Conservation and Recovery Act
RFA = RCRA Facility Assessment
RI = Remedial Investigation
ROD = Record of Decision
SWMUs = Solid Waste Management Units
TSDF = Treatment, Storage, and Disposal Facility
USAF = United States Air Force
UST = Underground Storage Tank

TABLE 2-2
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
Lagoon Landfill (LF-01)	
The Lagoon Landfill served as the main base 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 Base wastewater treatment facility.	1997
MW7 was replaced by MW7-2 when declining static water levels dropped below the bottom of its screened interval.	February 2000
An ESD to address implementing institutional controls was recommended for LF-01 in the Final Five-Year Remedy Review Report.	June 2001
Three regional groundwater monitoring wells (MW21, MW22, and MW23) were installed near the rapid infiltration basins and south of the former sewage lagoons, as part of the wastewater land application permit.	Summer 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
Regional groundwater and vapor monitoring well, MW31, was installed near LF-01, as part of the OU-3 LTM program.	April 2004
LF-01 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
B-Street Landfill (LF-02)	
The B-Street Landfill served as the main base 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 the Base with the greatest potential for environmental hazards.	1983
A regional groundwater monitoring well was installed at the B-Street Landfill as part of the Phase II Stage 1 site investigation.	1984
During a Phase II RI, three additional regional groundwater monitoring wells were installed at the Trench Area.	1987 - 1988
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

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
B-Street Landfill (LF-02) (Continued)	
An ESD to address implementing institutional controls was recommended for LF-02 in the Final Five-Year Remedy Review Report.	June 2001
Regional groundwater and vapor monitoring well, MW32, was installed south of LF-02, as part of the OU-3 LTM program.	Summer 2004
LF-02 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
Fire Training Area 4 (FT-04)	
FT-04 was the original fire training area for the Base.	1943 - 1944
A soil gas survey of the site was conducted as part of the LFI study for OU-1.	1991
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 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
Fire Training Area 5 (FT-05)	
FT-05 was the second location for the fire training area at the Base.	1944 - 1945
A soil gas survey of the site was conducted as part of the LFI study for OU-1.	1991
No remedial action was the selected remedy for FT-05 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-05 in the Final Five-Year Remedy Review Report.	June 2001
Confirmation soil sampling was conducted at FT-05 during the evaluation and/or investigation of 17 sites at MHAFB.	June 2004
Fire Training Area 6 (FT-06)	
FT-06 was a fire training area near the flight line.	1948 - 1953
A soil gas survey of the site was conducted as part of the LFI study for OU-1.	1991
No remedial action was the selected remedy for FT-06 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-06 in the Final Five-Year Remedy Review Report.	June 2001
Confirmation soil sampling was conducted at FT-06 during the evaluation and/or investigation of 17 sites at MHAFB.	June 2004

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
Fire Training Areas 7A, 7B, and 7C (FT-7A, B, C)	
FT-7A, FT- 7B, and FT-7C were fire training areas.	1953 - 1962
A soil gas survey of FT-7A, FT- 7B, and FT-7C was conducted as part of the LFI study for OU-1.	1991
A human health risk assessment was completed as part of the OU-3 RI to evaluate potential risks associated with releases from FT-7B and FT-7C soil that might have affected the groundwater pathway.	1995
No remedial action was the selected remedy for FT-7A, FT-7B, and FT-7C 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-7A and additional site characterization was recommended for FT-7B and FT-7C in the Final Five-Year Remedy Review Report.	June 2001
Additional site characterization and evaluation were completed for FT-7B and FT-7C during the Site Investigations at Multiple Sites, as recommended in the previous five-year review.	February 2003
Confirmation soil sampling was conducted at FT-7A during the evaluation and/or investigation of 17 sites at MHAFB.	June 2004
Fire Training Area 8 (FT-08)	
FT-08 is the Base'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
The USACE installed three regional groundwater-monitoring wells (two assumed down-gradient wells, MW10 and MW11, and one assumed up-gradient well, MW9) at FT-08.	February and March 1989
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
Regional groundwater was sampled from monitoring well MW11 at FT-08.	May 1996 - April 1999
Regional groundwater was sampled from monitoring well MW11-2 at FT-08.	April 2000 - present
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
FT-08 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
Regional groundwater and vapor monitoring well MW28 was installed at FT-08, as part of the OU-3 LTM program.	September 2004

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
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 ST-11 during the OU-3 Fuel Sites RI/FS.	1995
Well abandonment was performed for the ST-11 perched groundwater monitoring wells.	1995
PZMW7 was installed in the area of maximum fuel contamination as determined by the RI.	1996
An assessment of water-level change in PZMW7 and sources of recharge to ST-11 was performed by USGS.	March 2002
Eight perched zone monitoring wells (PZMW8 through PZMW17) were installed at ST-11. Soil samples, rock cores, and perched groundwater samples were collected from each perched zone well location.	July - August 2002
A soil gas survey was completed to obtain data on the distribution of vapor-phase subsurface petroleum in soils underlying ST-11. Soil gas samples were collected from each new perched zone well boring.	August 2002
Three shallow bedrock and three soil vapor extraction wells were installed at ST-11 to determine the radius of influence and optimum operating performance of a potential vapor extraction system at ST-11. Two soil pilot vapor extraction tests were performed at ST-11 to determine the radius of influence and likely effectiveness of vapor extraction as a remedial action.	August 2002
Where sufficient groundwater was present, perched zone monitoring wells were sampled for BTEX and natural attenuation parameters (sulfate, alkalinity, nitrate/nitrite and methane) and water level data was collected.	Spring and Fall 2002 through 2004
The USGS installed micro transducers and data collectors in wells PZMW7, 11, 13 and 16 to continuously monitor water levels at these locations.	January 2003
Three additional micro transducers and data recorders were installed in monitoring wells PZMW8, 12, and 14 to continuously monitor water levels. A barrotroll transducer was also installed at ST-11 to identify possible correlations between water levels and barometric pressure at ST-11.	June 2003

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
Fuel Hydrant System Spill (ST-11) (Continued)	
An LNAPL sample was collected from PZMW12 and identified as weathered JP-4 by the USACE ECB laboratory in Omaha, Nebraska.	April 2003
Pre-activity (pump test) groundwater sampling and monitoring is performed.	February 2004
Two separate pump tests for PZMW16 and PZMW14 indicated little to no hydraulic connection between the perched zone monitoring wells.	March 2004
Two separate pump tests performed at PZMW8 indicated little to no hydraulic connection exists between the perched zone monitoring wells. Analytical results from samples collected before and after the pump tests indicated no conclusive evidence of fuel-related constituent mobilization as a result of pumping, though LNAPL did appear on the water table following the second pump test.	June 2004
Where sufficient groundwater was present, perched zone monitoring wells were sampled for BTEX and water level data was collected.	April and September 2005
Old Entomology Shop Yard (SD-12)	
The building constructed on-site in 1958 was converted to the Entomology Shop. Herbicides, pesticides, and application equipment were stored and handled at the facility.	Late 1960s
Wastewater generated from cleaning the application equipment was collected in a UST installed adjacent to the northwest side of the building. Wastewater was previously discharged to surface soils outside the building and through a buried drainpipe.	After 1981
A Phase I records search identified the site as potentially contaminated.	1983
An ERP Phase II, Stage 1 investigation was completed for SD-12.	1986
The Entomology Shop was demolished and the USTs were removed.	1987
Soil samples were collected from SD-12 as part of the LFI study for OU-1.	1991
The site was included in an RI/BRA for OU-6.	1993
No remedial action was the selected remedy for SD-12 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 SD-12 in the Final Five-Year Remedy Review Report.	June 2001
The protectiveness goal for current and future unrestricted use is met for soil as agreed upon by FFA Team members, based on site conditions and nature of COCs.	February 2003
SD-12 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
The SD-12 area was included in the passive soil gas survey conducted in the vicinity of MW35 to determine if TCE source area(s) exist.	Spring 2005

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
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
MW24 was installed at ST-13 to monitor regional groundwater and vadose zone vapors, as part of the OU-3 LTM program.	March 2003
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
A layer of bioslime was encountered between the LNAPL and water interface at MW-24. The bioslime is most likely associated with an increase in oxygen in the well due to the absence of a well cap on the well as a result of the pump configuration and the presence of fuel.	2005
Munitions Burial Site (OT-16)	
The facility was built sometime between 1950 and 1957 and consisted of two burn operation areas operated by explosive ordnance disposal (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/BRI completed for OU-6.	1993
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
Underground Storage Tanks – Bldg. 1333 (ST-22)	
The exact dates of operation for the site are unknown. However, the three off-base Titan Missile sites operated by the Base were active from April 1962 to June 1965.	1962 - 1965
ST-22 was investigated as part of the LFI study for OU-1.	1991
No remedial action was the selected remedy for ST-22 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 ST-22 in the Final Five-Year Remedy Review Report.	June 2001

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
Underground Storage Tanks – Bldg. 1333 (ST-22) (Continued)	
Regional groundwater and vapor monitoring well, MW25 was installed near ST-22 as part of the OU-3 LTM program.	September 2002
Area ST-22 was included in the passive soil gas survey conducted in the northwest industrial area to evaluate it as a potential source for TCE.	Spring and Summer 2004
A shallow soil/rock core borehole, ST22-R-1, was advanced to a total depth of 50 feet below ground surface (bgs) at the former location of four USTs associated with the Titan Missile Maintenance Area housed in Building 1333.	July 2004
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
LF-23 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
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
The Munitions Trailer Maintenance Shop has occupied the facility since about 1982.	1982 - present
Soil samples were collected from 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 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 SD-24 along with an approximate soil margin of 2 feet was removed as part of a MILCON project to improve the Base storm water system (WCC 1998). However, much of the impacted soil was left in-place during this removal effort.	1997
Monitoring well MW19 was installed in the vicinity of SD-24.	July 2000
MW19 was sampled for VOCs as part of the comparison study between diffusion bag samplers and purge sampling methods.	August 2000
Additional characterization was recommended for SD-24 in the Final Five-Year Remedy Review Report.	June 2001

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
LOX Loading Plant (SD-24) (Continued)	
A site investigation was completed for 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
SD-24 was included in the passive soil gas survey completed for the Northwest Industrial Area.	Spring 2004
A shallow soil/rock core borehole was advanced immediately to the east of the anticipated horizontal extent of the ERP site SD-24. Elevated concentrations of TCE in the shallow subsurface soil and elevated PID/FID headspace readings in the shallow bedrock were detected.	July 2004
SD-24 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
A soil removal action was completed at SD-24 to eliminate shallow soil contamination as a potential future source for petroleum and solvents to the regional groundwater.	November 2004
Monitoring well MW27 was installed at SD-24 for monitoring regional groundwater and vadose zone vapors, as part of the OU-3 LTM program.	Fall 2004
Flight Line Storm Drain (SD-25)	
Soil, sediment, and surface water sampling were conducted along portions of the open ditches of SD-25 as part of the LFI study 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 SD-25 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	1995
Additional characterization was recommended for SD-25 in the Final Five-Year Remedy Review Report.	June 2001
Additional site characterization was completed for SD-25, as documented in the Site Investigations at Multiple Sites Final Report.	February 2003
SD-25 was evaluated in the Final Report for additional evaluation and/or investigation activities at 17 sites.	September 2004
Removal and disposal action completed.	November 2004
Wash Rack – Bldg. 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

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
Wash Rack – Bldg. 1354 (SD-27) (Continued)	
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 Report.	February 2003
Soil sampling was conducted at SD-27 during the evaluation and/or investigation of 17 sites.	June 2004
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 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 SS-29 in the Final Five-Year Remedy Review Report.	June 2001
Soil sampling was conducted at SS-29 during the evaluation and/or investigation of 17 sites.	June 2004
Defense Reutilization and Marketing Office Storage Area (SS-30)	
Prior to December 1987, SS-30 was a temporary storage point for drummed wastes collected around the Base and other military facilities in the area.	Prior to December 1987
Soil samples were collected at SS-30 as part of the LFI study for OU-1	1991
No remedial action was the selected remedy for SS-30 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 SS-30 in the Final Five-Year Remedy Review Report.	June 2001
Area SS-30 was included in the passive soil gas survey conducted in the vicinity of MW35 to determine if TCE source area(s) exist.	Spring 2005
The DRMO Storage Area is now used to store pipe, conduit, and some decommissioned USTs.	Present
The gas station was built and consisted of one 5,000-gallon steel UST (diesel), one 12,000-gallon steel UST (gasoline), and one 19,000-gallon steel UST (diesel).	1948

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
Old Military Gas Station (ST-32)	
The three USTs were removed. A 3-millimeter diameter hole was observed in the 19,000-gallon UST following removal. Contaminated soil was removed from the site, and excavations were backfilled with clean material.	1992
Soil sampling was completed at ST-32 after the tanks were removed as part of the OU-3 RI.	1992
No remedial action was the selected remedy for ST-32 as documented in the ROD signed for OUs 1, 3, 5, 6, lagoon landfill, and fire training area 8.	October 1995
POL Storage Area, RCRA Solid Waste Management Unit (ST-38)	
The yard originated as a tank farm to store aviation fuel when the Base was established in the 1940s. Sixteen horizontally placed aboveground storage tanks (ASTs) were located in the northeast quarter of the present yard for the storage of aviation gasoline (AVGAS).	1940 - 1950
Three 1.5- million gallon ASTs were constructed in the POL Yard for storage of Jet Fuel No. 4 (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. removes four USTs from an area southeast of the small pump house area (ST-13) used for temporary storage of segregated POL wastes (Woodward-Clyde, 1995). Soil samples collected prior to and during the removal indicated the presence of volatile organic compounds. 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 (JP-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

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Event	Date
POL Storage Area, RCRA Solid Waste Management Unit (ST-38) (Continued)	
An Integrated Contingency Plan for Oil Spill Prevention and Response was completed.	April 2005
A Comprehensive Engineering Evaluation for Tank 1 is currently underway, which includes removing a section of the concrete cap and removing contaminated soil.	November 2005 - present
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 the Base.	May 1996
Regional groundwater and vapor monitoring well MW20 was installed as part of the OU-3 LTM program.	May 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 the Base's active production wells.	2003 (3 wells) & 2004 (10 wells)
Weathered JP-4 LNAPL layer measured on the water table at MW24.	Fall 2003
Gyroscopic well deviation surveys were performed for 12 of the regional monitoring wells to determine deviation from true vertical and allow for calculation of true static water levels in relation to ground surface at those wells.	October 2004
Product recovery system constructed at MW24 to pump and treat contaminated groundwater and LNAPL.	December 2004
Semi-annual sampling of regional groundwater wells for VOCs per the LTM program.	Spring and Fall of 2000 through 2005
Semi-annual sampling of 15 vapor monitoring wells with a total of 41 distinct vapor ports.	Spring and Fall of 2003 through 2005
Regional groundwater monitoring well MW37 was installed with vapor ports, approximately 2,000 feet northeast of MW27.	March 2006

TABLE 2-2 (CONTINUED)
SUMMARY OF MAJOR SITE EVENTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

AFB = Air Force Base
AST = Above-ground Storage Tank
AVGAS = Aviation Gasoline
BRA = Baseline Risk Assessment
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CES = Civil Engineering Squadron
CEVR = Civil Engineering Environment Restoration
COC = Contaminant of Concern
DRMO = Defense Reutilization and Marketing Office
ECB = Environmental Chemistry Branch
EOD = Explosive Ordnance Disposal
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
EPA = U.S. Environmental Protection Agency
ERA = Ecological Risk Assessment
FFA = Federal Facility Agreement
FID = Flame Ionization Detector
FS = Feasibility Study
FT = Fire Training (Area)
JP = Jet Propellant
LF = Landfill
LFI = Limited Field Investigation
LNAPL = Light Non-Aqueous Phase Liquid
LTM = Long Term Monitoring/Management
MHAFB = Mountain Home Air Force Base
MW = Monitoring Well
OU = Operable Unit
PD-680 = Stoddard Solvent
PID = Photoionization Detector
POL = Petroleum, Oil and Lubricants
PZMW = Perched Zone Monitoring Well
RCRA = Resource Conservation and Recovery Act
RI = Remedial Investigation
ROD = Record of Decision
TCA = Trichloroethane
TCE = Trichloroethene
USACE = United States Army Corps of Engineers
USGS = United States Geological Survey
UST = Underground Storage Tank
VOC = Volatile Organic Compound

3.1 PHYSICAL CHARACTERISTICS

The Base is located in Elmore County in southwestern Idaho, approximately 10 miles southwest of the city of Mountain Home (Figure 1-1). The Base is approximately 50 miles southeast of Boise and is 2 miles north of the Snake River. The Base 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 the Base. 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 OU-3 RI Report Amendment, and the annual long-term monitoring/management (LTM) reports.

3.1.1 Generalized Geology

In the vicinity of Mountain Home, Idaho and the Base, 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 the Base and the city of Mountain Home, and is likely continuous beneath the Base. The nature of and depth to the contact between the two basalt units beneath the Base (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 Ma) 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 (IDEQ, 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 the Base.
- Basalt beneath the Base 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 the Base. Within the basalt flows there exist rubbly, broken, or horizontally fractured zones 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 the Base; however, some intervals are continuous across small portions of the Base.

3.1.2 Hydrogeology

Water level data were collected from on-Base and off-Base wells from 1990 to 1994 (Woodward-Clyde, 1995) and have been collected since 1996 during the LTM program (Foothills Engineering Consultants [FEC], 2001; RMC, Inc. [RMC] 2006). The principal conclusions drawn from the water-level measurement program is 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 the Base.
- The direction of groundwater movement at the Base 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 the base and trends in a direction northwest-southeast. Groundwater flow along the southern boundary of the Base is reversed with flow to the north and toward the Base production wells. Pumping by off-Base production wells has the greatest impact on the western side of the Base; however, impact to the water levels in this part of the Base is offset somewhat by groundwater recharge from the rapid infiltration basins.
- An abrupt change in water levels northeast of the Base boundary has been observed on all monthly water table maps. Water levels measured in wells one to two miles northeast of the Base 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 the Base via underflow. For this reason, the water table below the Base 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 the Base 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 2005 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 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 PZMW7 and sources of recharge to ST-11 was completed by USGS in March 2002. Findings from the 2002 study are summarized in Section 6.4.1, ST-11 Data Review.

In addition to ST-11, perched groundwater has also been observed at the petroleum, oil and lubricants (POL) Yard (ST-38) in the vicinity of Tank 1 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 (Weston, 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 the Base POL Yard between October 2001 and June 2002.

3.2 LAND AND RESOURCE USE

The Base 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 the Base is also residential with approximately 7,500 service men and women and their dependents living at the Base. 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 and including Mountain Home, Idaho and the Base 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 13,000 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 the Base. 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 the Base 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 (DRMO) for final disposition. The Base was placed on the NPL of hazardous waste sites under the CERCLA in August 1990.

The history of contamination and the pre-ROD activities (initial response) performed at each site are summarized in Table 3-1, presented at the end of this section. The scope of the pre-ROD investigations is discussed in the 2001 Five-Year Remedy Review Report (FEC, 2001).

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, and included either 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 that 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 ROD.

The following discussion summarizes the findings from the pre-ROD site investigations, which consisted primarily of RIs, risk assessments, and 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 of Selected Remedies. The analytical results from the pre-ROD investigations are summarized in the 2001 Five-Year Remedy Review Report (FEC, 2001).

3.4.1 LF-01 (Lagoon Landfill)

RI/Baseline Risk Assessment (BRA) 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 near the lagoons at concentrations that exceeded RBCs, but below the range of arsenic background concentrations. Since the lagoons were considered a potential continuous source of contaminants to the regional groundwater, LF-01 was included in the OU-3 base-wide groundwater investigation.

3.4.2 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}. However, the excess cancer risk calculated for future on-site residential scenario exceeded 1×10^{-6}.

3.4.3 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 No Further Action alternative was recommended during the LFI study and selected in the ROD.

3.4.4 FT-05 (Fire Training Area 5)

A soil gas survey was performed in 1991 for site FT-05 during the LFI study for OU-1. Results for total VOCs did not exceed background levels. Based on the soil gas results, the No Further Action alternative was recommended during the LFI study and selected in the ROD.

3.4.5 FT-06 (Fire Training Area 6)

One soil gas sample location resulted in a total VOC concentration of 27 micrograms per liter (µg/L) (above the background level), however, no soil samples were collected from this location. Therefore, concentrations obtained from FT-08 were used for comparison. FT-08 concentrations were three orders of magnitude higher than 27 µg/L. FT-08 was recommended for No Further Action following the completion of a risk assessment. Therefore, FT-06 also was recommended

for No Further Action during the 1991 soil gas investigation conducted as part of the LFI study for OU-1.

3.4.6 FT-7A, B, and C (Fire Training Area 7A, 7B, and 7C)

The No Further Action alternative was recommended for FT-7A during the 1991 soil gas investigation conducted as part of the LFI study for OU-1. The No Further Action alternative was also recommended for FT-7B and FT-7C as a result of the LFI and human health risk assessment.

3.4.7 FT-08 (Fire Training Area 8)

The extent of contamination was determined from the boreholes advanced in 1986 and 1988 during the ERP Phase IV-A investigation (Resources Conservation Company [RCC], 1988). 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 that 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 [HI] less than 1.0) 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 should be noted that the RME excess cancer risk for the hypothetical on-site resident (for an adult) was 3.9×10^{-5}.

3.4.8 ST-11 (Flight Line Fuel Spill)

Results of the RI indicated fuel contamination containing benzene, toluene, ethylbenzene, and xylenes (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 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 10^{-2}. Evaluation of alternatives in a focused feasibility study (FFS) identified institutional controls 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.

3.4.9 SD-12 (Old Entomology Shop Yard)

The results of the LFI and RI showed that the site soils are contaminated with varying amounts of VOCs, semi-volatile organic compounds (SVOCs), pesticides, herbicides, total recoverable petroleum hydrocarbon (TRPH), and lead. The highest concentrations and frequencies of chemical detections occurred northwest of the former location of the Entomology Shop in the

general area where wastewater was released to the site soils. Pesticides and herbicides were the principal compounds detected, mainly in the shallow soils (0 to 1 foot deep).

The risk assessment results indicated no unacceptable health risks relative to the protectiveness goal at the time of 1×10^{-4} excess cancer risk for industrial use. As a result of the LFI, RI, and risk assessment, the No Further Action alternative was recommended for SD-12 and selected in the ROD.

3.4.10 ST-13 (POL Yard UST Site)

Soil samples collected before and during the UST removal indicated that soil had been contaminated by VOCs including tetrachloroethene (11.8 milligrams per kilogram [mg/kg]), trichloroethene (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 RCRA.

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 chemicals of concern (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 ST-13. No evidence of petroleum hydrocarbon contamination was found in the rock core below 30 feet bgs. No further investigation was recommended.

3.4.11 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 concentrations of VOCs, explosive compounds, and polycyclic 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 No Further Action alternative was recommended for OT-16 and selected in the ROD.

3.4.12 ST-22 (Titan Missile Maintenance Area)

The No Further Action alternative was recommended for ST-22 during the 1991 LFI. The maximum concentrations of VOCs detected in soil were all below their respective EPA Region 3 RBCs for residential soil exposure.

3.4.13 LF-23 (Solid Waste Disposal Area)

The extent of contamination detected during the excavation of 12 test pits at LF-23 in August 1991 was confined to the bottom portion of the trenches in an area around one test pit (10B), and 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 No Further Action alternative was recommended for LF-23 during the 1991 LFI and selected in the ROD.

3.4.14 SD-24 (Old Liquid Oxygen Tank Facility and Auto Hobby Shop)

Results from the LFI and RI investigation at SD-24 indicated that 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 Base 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. As a result of the LFI and RI site investigations and risk assessment, the No Further Action alternative was recommended for SD-24 and selected in the ROD.

3.4.15 SD-25 (Flight Line Storm Drain)

Results from the LFI and RI investigation at SD-25 indicated that ditch sediments were contaminated with varying concentrations of VOCs, SVOCs, TRPH, pesticides, PCBs, and metals. The highest concentrations of VOCs, SVOCs, and TRPH were detected in sediments collected at or close to the Flight Line Storm Drain outfall. Several pesticides and heavy metals were detected above background concentrations in sediments sampled throughout most of the length of the ditch. Two PCB compounds (Arochlor-1254 and Arochlor-1260) were detected in samples near the Flight Line Storm Drain outfall. Only very low concentrations (27 µg/L or less) of VOCs and SVOCs were detected in surface water samples.

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. As a result, the No Further Action alternative was recommended for SD-25 and selected in the ROD.

3.4.16 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 are contaminated with varying amounts of VOCs, SVOCs, pesticides, TRPHs, and metals.

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

3.4.17 SS-29 (Drum Accumulation Pad)

The results of the LFI and RI indicated that the site soils are 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 Base protectiveness goal at the time of 1 x 10^{-4} excess cancer risk for industrial use. As a result of the LFI and RI site investigations and risk assessment, the No Further Action alternative was recommended for SS-29 and selected in the ROD.

3.4.18 SS-30 (Defense Reutilization and Marketing Office Storage Area)

All VOCs, SVOCs, and metal compounds detected during the 1991 LFI were reported at concentrations below the EPA Region 3 screening-level RBCs for residential soil exposure and/or within soil background levels. No pesticides, herbicides, or PCBs were detected in any soil samples. The No Further Action alternative was recommended for SS-30 during the LFI study for OU-1 and selected in the ROD.

3.4.19 ST-32 (Old Military Gas Station)

A total of 22 soil samples were collected from 10 soil borings at ST-32 during the RI and analyzed for BTEX, gasoline range organics (GRO), total chromatographable organics (TCO), and lead. Results of the RI indicated that the majority of fuel contamination in site soils occurs under the east end of the former concrete pump island pad, which is likely the result of leakage from the underground distribution piping, and underneath the UST excavations at depths mainly 10 feet bgs or greater. Analytical results also indicated that the organics in the soils most resembled weathered gasoline.

The RME excess cancer risk calculated for future occupational workers and hypothetical future residential receptors are 6 x 10^{-6} and 1.2 x 10^{-5}, respectively. Inhalation of 1,2-dichloroethane and benzene is the primary contributor to the carcinogenic risk estimate. The total RME hazard index calculated for non-carcinogenic health effects due to multiple pathway chronic exposures to COCs in soils at ST-32 via dermal contact, inhalation, and ingestion pathways is 1.5 (Woodward-Clyde, 1995). The HI calculated for ST-32, which was driven by inhalation of the estimated maximum concentration of n-hexane in soil, is based on the composition of fresh gasoline and assumes that residents are exposed to the maximum estimated concentration of n-hexane in the soil for 30 years with no degradation of organic compounds over the exposure period (Woodward-Clyde, 1995). This is an unrealistic assumption since n-hexane is very volatile and would rapidly decay if exposed to the atmosphere in surface soils. Most of the n-hexane discharged to soil or water would volatilize rapidly with a half-life of 3 hours to 7 days, depending on environmental conditions.

Potentially hazardous constituents of gasoline that may be present and have EPA-established toxicity factors were included as presumptive COCs in the risk assessment. The concentrations of potentially hazardous gasoline constituents (other than BTEX) were estimated based on the type and amount of fuel present and the literature values of the percent composition of the constituents in fuel (measured as GRO). The method used to estimate the exposure point concentrations of gasoline constituents is very conservative because the fuel composition was based on fresh fuel, which generally has more toxic volatile constituents present than weathered fuel. In addition, it was assumed that every chemical with a toxicity factor was present in the fuel at the maximum percent concentration reported in the literature (Woodward-Clyde, 1995).

The results of the risk assessment indicated no unacceptable risks from exposure to soils at ST-32 based on a target carcinogenic risk range (1×10^{-6} to 1×10^{-4}) applicable at the time of the RI/BRA. As a result of the RI and risk assessment, the No Further Action alternative was recommended for ST-32 and selected in the ROD.

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

The 1994 RI results for ST-38 indicated that site soils were contaminated with residual fuel compounds. The COCs in the soil included benzene, toluene, ethylbenzene, and total xylenes. 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 No Further Action alternative was recommended for ST-38. However, an additional investigation was conducted in 1996.

VOCs, SVOCs, DRO, and GRO were detected during the 1996 RI in soil and perched groundwater samples collected at ST-38, Area No. 6. In addition, light non-aqueous phase liquid (LNAPL) was measured in one site 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 (CAP). 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 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. No Further Action was recommended in 1998 based on the 1994 risk assessment and the fuel release investigation (FRI) risk assessment for Area No. 6.

3.4.21 OU-3 (Base-wide Regional Groundwater)

OU-3 represented the final operable unit investigated at the Base and addressed known or suspected fuel releases at five 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 base-wide groundwater investigation. The initial OU-3 groundwater investigation was documented in the Final RI report (Woodward-Clyde, 1995) submitted in May 1995.

In the four rounds of groundwater sampling conducted during the RI, TCE was the only contaminant that was consistently detected. Metals species detected were within or near apparent background concentration ranges, or present at concentrations below EPA MCLs.

Results of the fate and transport modeling performed as part of the OU-3 RI/BRA suggest 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 10^{-6} and 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 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 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 10^{-6} (1.6 µg/L and 0.15 µg/L, respectively) but were below the RBCs for excess cancer risk of 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 10^{-6} (1.6 µg/L) but was below the RBC for excess cancer risk of 10^{-4} (160 µg/L).
- Estimated cumulative risks for the groundwater pathway were 3.7×10^{-5} for LF-02, 3.8×10^{-5} for FT-7B, 7×10^{-6} for FT-7C, and 1.1×10^{-6} for 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 10^{-6} to 10^{-4}.

Note: The RBCs referred to above are 1994 EPA Region 3 risk-based concentrations for residential tap water based on 10^{-6} and 10^{-4} excess cancer risks and a hazard quotient of 1.0 for non-cancer effects. The peak 30-year average concentration is based on results of fate and transport modeling performed as part of the OU-3 RI/BRA. 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.

TABLE 3-1
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

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 that 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 (CH_2M 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 (Woodward-Clyde, 1992a). 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	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 (CONTINUED)
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Site ID	History of Contamination	Initial Response
FT-05	FT-05 was used for fire fighting exercises during 1944 and 1945. Motor and aviation fuels, solvents, waste oils, and petroleum lubricants were poured onto a mock-up aircraft within the training area (approximately 200 feet by 200 feet) 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.
FT-06	FT-06 was used for fire fighting exercises from 1948 to 1953. Motor and aviation fuels, solvents, waste oils, and petroleum lubricants were poured onto a mock-up aircraft within the circular training area (approximately 310 feet in diameter) 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.
FT-07	FT-07 served as the Base fire training area from 1953 to 1962. FT-07 consists of three areas (FT-7A, FT-7B, and FT-7C) with five unlined burn pits ranging in size from 50 to 150 feet in diameter. Motor and aviation fuels, solvents, waste oils, and petroleum lubricants were poured onto a mock-up aircraft within the burn pits 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 FT-7A, FT-7B, and FT-7C was conducted in 1991 as part of the LFI study for OU-1. • A risk assessment was conducted at FT-7B and FT-7C to evaluate potential risks associated with releases from soil to regional groundwater.
FT-08	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 (Woodward-Clyde, 1992b). 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 a protein foam that was mixed with water and became aerated upon dispersal. The investigation area associated with 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 FT-08 in 1991.

TABLE 3-1 (CONTINUED)
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Site ID	History of Contamination	Initial Response
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 remedial investigation was conducted in 1990. • The OU-3 Fuel Sites RI/FS was conducted in 1995.
SD-12	An existing building was converted to the Entomology Shop in the late 1960s. Herbicides, pesticides, and application equipment were stored and handled at the facility. Pesticides handled inside the building included Diazinon, Malathion, Sevin, Baygon, Ficam W, Dursban, and Chlordane. The application equipment was filled and cleaned inside the building. Wastewater generated from cleaning the application equipment was discharged to surface soils outside the building through a concrete ditch and later (from 1969 to 1981) through a buried drainpipe. After 1981, the wastewater was collected in a UST installed adjacent to the northwest side of the building. In 1987, the Entomology Shop was demolished and the USTs were removed.	• An ERP Phase II, Stage 1 investigation was conducted in 1986. • Soil sampling was conducted at SD-12 in 1991 as part of the LFI study for OU-1. • An RI/BRA was completed in 1993.
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 date of installation 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.

TABLE 3-1 (CONTINUED)
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Site ID	History of Contamination	Initial Response
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 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 OT-16.
ST-22	The Titan Missile Maintenance Area was housed in Building 1333. Although the exact dates of operation for the facility are unknown, the three off-base Titan Missile sites operated by the Base were active from April 1962 to June 1965. ST-22 consisted of four USTs, which historically contained solvents, acids, and caustic solutions. The tanks were placed into an excavation in the basalt with an associated pit and piping, and were reportedly abandoned in-place by filling them with sand and cementing shut the access ports sometime prior to 1990, although this has not been documented.	• ST-22 was investigated in 1991 as part of the LFI study for OU-1.
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 twelve test pits excavated at LF-23 in August 1991.
SD-24	This facility was originally built in 1960 and 1961 as a liquid oxygen 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 (Woodward-Clyde, 1994). The Munitions Trailer Maintenance Shop (MTMS) has occupied the facility since about 1982. Inspections of the MTMS have indicated no out-of-compliance handling of hazardous wastes (Woodward-Clyde, 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 SD-24.

TABLE 3-1 (CONTINUED)
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Site ID	History of Contamination	Initial Response
SD-25	SD-25 consists of approximately 6,000 feet of open ditches and approximately 7,000 feet of underground pipe or culverts. Storm water runoff from the flight line area, parking lots, and streets, and wastewater from former and current operation facilities, drain into the Flight Line Storm Drain. An underground concrete drain, that graduates from 8 inches to a 48-inch diameter, runs the length of the flight line operations area and discharges to the open ditch at the south end of Cedar Street through the Flight Line Storm Drain outfall. Facilities along the flight line have OWSs that discharge to this storm drain. Potential contaminants include waste petroleum, oil, lubricants, JP-4, gasoline, and diesel fuel that may have been carried into the storm drain from the hard surface areas by storm water runoff.	• SD-25 was investigated during the 1991 LFI for OU-1. • The site was included in the 1993 RI. • A risk assessment was completed for SD-25.
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 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 (Woodward-Clyde, 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 SS-29.
SS-30	Prior to December 1987, the DRMO Storage Area was a temporary storage point for drummed wastes collected around the Base and other military facilities in the area. Potential wastes received at the site included TCE, waste solvents, waste paints and thinners, and other associated products. The wastes were processed for recycling depending on the nature, quantity, and purity of the wastes.	• Soil sampling was conducted at the site as part of the 1991 LFI for OU-1.

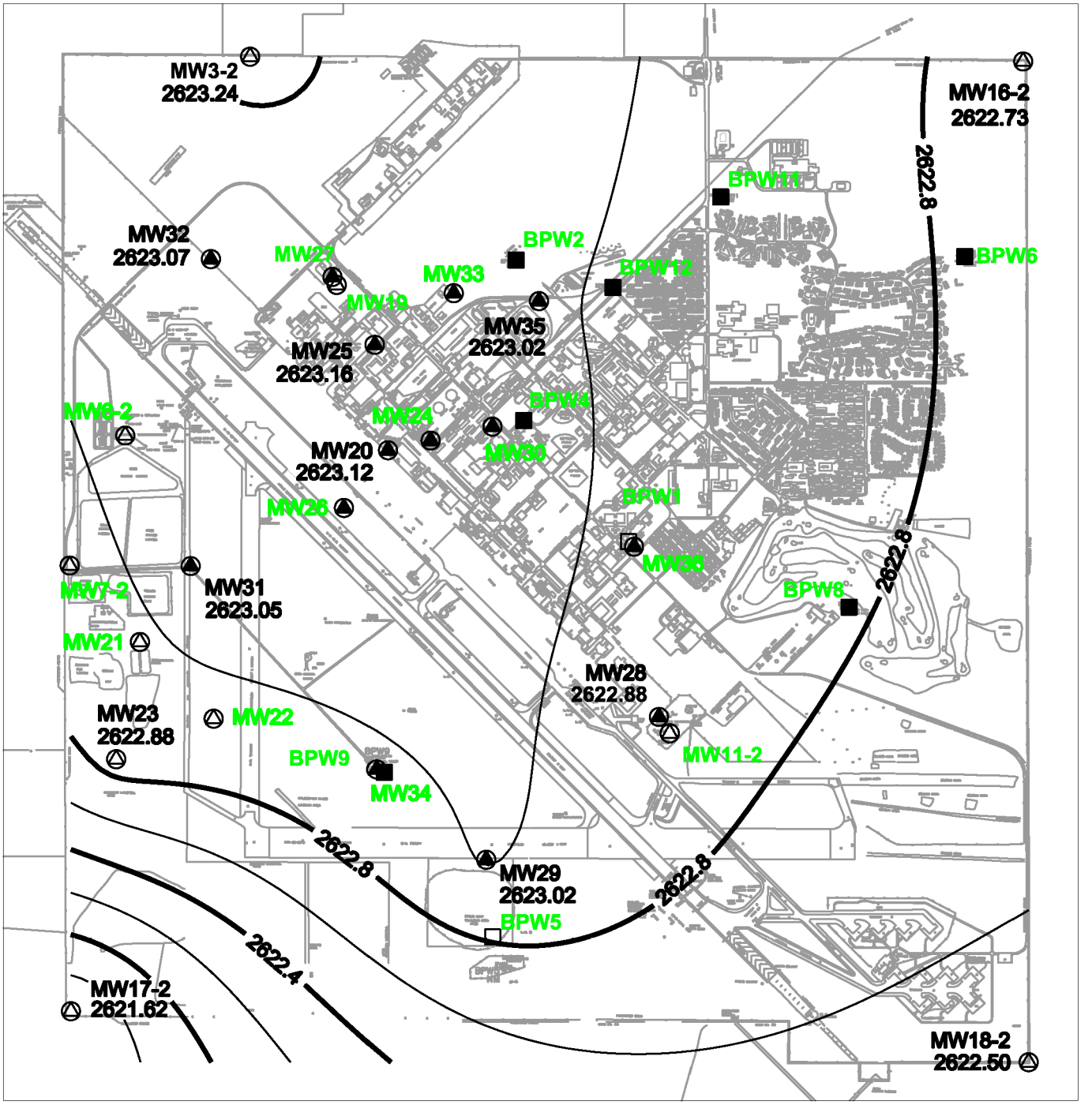
TABLE 3-1 (CONTINUED)
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Site ID	History of Contamination	Initial Response
ST-32	The gas station was constructed in 1948 and consisted of one 5,000-gallon steel UST (diesel), one 12,000-gallon steel UST (gasoline), one 19,000-gallon steel UST (diesel), and six pumps. A 3-millimeter diameter hole was observed in the 19,000-gallon UST following removal of the USTs in 1992. Contaminated soil was removed from the site, and excavations were backfilled with clean material. Historical information indicates that an unknown quantity of fuel was released in the vicinity of Pump 2. Fuel may have been released to the subsurface soils from leakage at piping connections that may have occurred from the original piping for the pumps prior to the replacement of fuel lines in 1962.	• ST-32 was investigated in 1993 as part of the RI for OU-3. • A risk assessment was completed for ST-32.
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 currently consists 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 consists 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.	• ST-38 was investigated in 1994 as part of the RI for OU-3. • A risk assessment was completed for 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.

TABLE 3-1 (CONTINUED)
HISTORY OF SITE CONTAMINATION AND INITIAL RESPONSE
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Site ID	History of Contamination	Initial Response
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 ug/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 SD-24.	• The OU-3 Base-Wide Groundwater and Ecological Risk Assessment RI Report was completed in 1995.

bgs = Below Ground Surface
BRA = Baseline Risk Assessment
DCE = Dichloroethene
DDT = Dichlorodiphenyltrichloroethane
DRMO = Defense Reutilization and Marketing Office
ERP = Environmental Restoration Program
FS = Feasibility Study
FT = Fire Training (Area)
JP = Jet Propellant
LFI = Limited Field Investigation
LOX = Liquid Oxygen
LTM = Long-Term Monitoring/Management
MCL = Maximum Contaminant Level
Mg/Kg = Milligram Per Kilogram
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
USACE = United States Army Corps of Engineers
UST = Underground Storage Tank
VOC = Volatile Organic Compound



LEGEND

MW23
2622.28 REGIONAL GROUNDWATER MONITORING WELL
GROUNDWATER ELEVATION (FEET ABOVE MSL)

MW34
2621.88 REGIONAL GROUNDWATER AND VAPOR MONITORING WELL

BPW9
ACTIVE BASE PRODUCTION WELL

BPW5
INACTIVE BASE PRODUCTION WELL

ONLY WELLS CORRECTED FOR DEVIATION ARE MAPPED

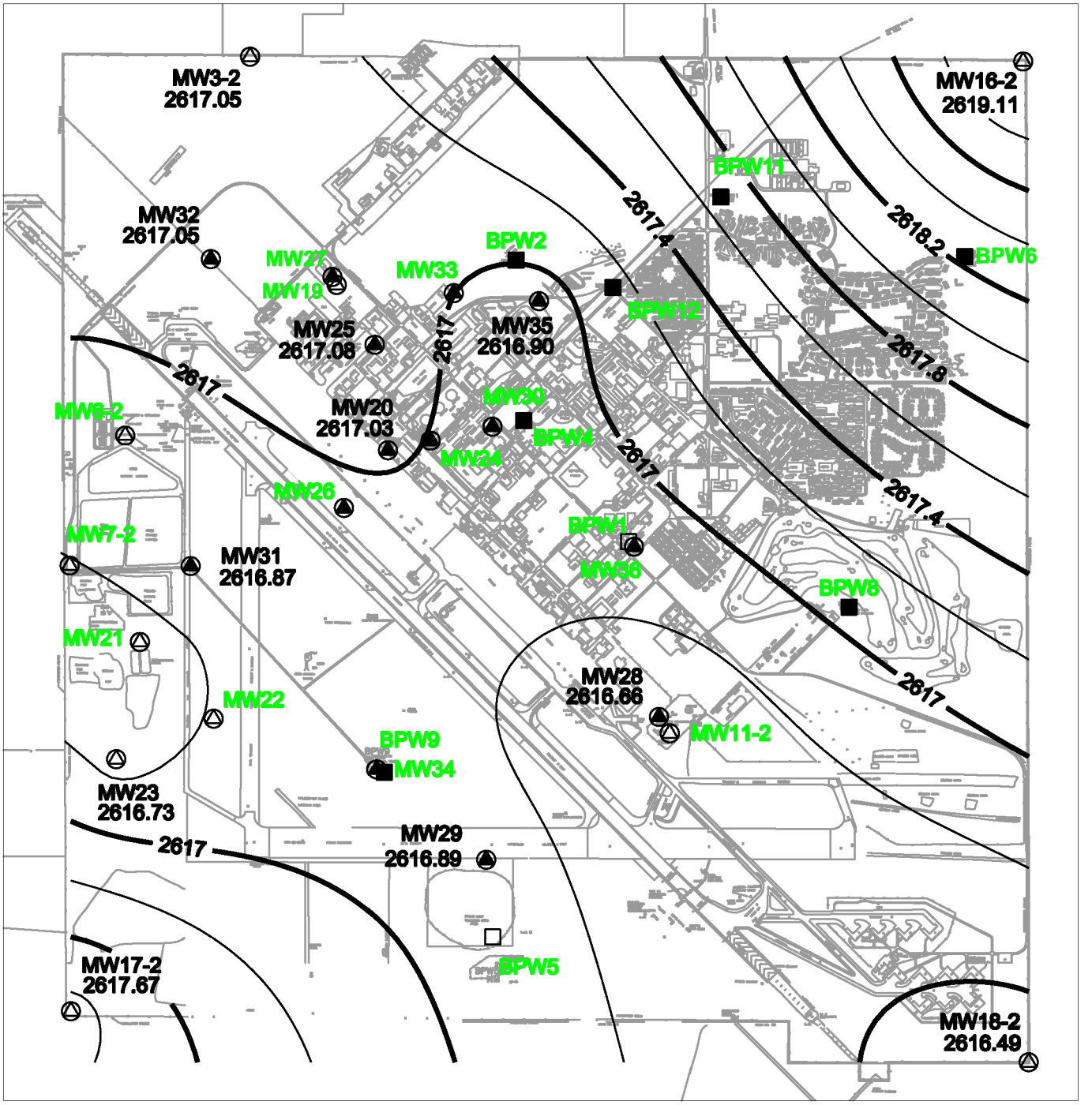
N

0 1250 2500
SCALE IN FEET

CONTOUR INTERVAL – 0.2 FEET

REGIONAL GROUNDWATER ELEVATION MAP
APRIL 2005
MOUNTAIN HOME AIR FORCE BASE.

DRN. BY: KI	DATE: 4/19/06	PROJECT NO. 16169962	FIG. NO. 3-1
CHK'D. BY: CM	REVISION: 0		



LEGEND

MW23
2618.49 REGIONAL GROUNDWATER MONITORING WELL
GROUNDWATER ELEVATION (FEET ABOVE MSL)

MW34
2617.76 REGIONAL GROUNDWATER AND VAPOR MONITORING WELL

BPW9
ACTIVE BASE PRODUCTION WELL

BPW5
INACTIVE BASE PRODUCTION WELL

ONLY WELLS CORRECTED FOR DEVIATION ARE MAPPED

N

0 1250 2500
SCALE IN FEET

CONTOUR INTERVAL – 0.2 FEET

REGIONAL GROUNDWATER ELEVATION MAP
SEPTEMBER 2005
MOUNTAIN HOME AIR FORCE BASE.

DRN. BY: KI	DATE: 4/19/06	PROJECT NO. 16169962	FIG. NO. 3-2
CHK'D. BY: CM	REVISION: 0		

Thirty-three ERP sites, which are grouped into OUs 1 through 6, were reviewed during the initial Five-Year Remedy Review completed in 2001. Three RODs are in-place and signed by representatives of the Air Force, IDEQ, and EPA for all 33 ERP sites. The OUs are addressed in the three RODs as follows:

- 1992 ROD for OU-4, which addresses 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)

The 33 ERP sites are grouped into the OUs as follows:

- OU-1 - Fourteen sites for which limited field investigations have been completed and LF-3, the landfill
- OU-2 - Two sites, B-Street Landfill (LF-02) and the Lagoon Landfill (LF-01), which is also addressed in OU-3
- OU-3 - Base-wide regional and perched (ST-11) groundwater LTM
- OU-4 - One site, Fire Training Area 8 (FT-08)
- OU-5 - One site, low-level radioactive waste disposal site (RW-14)
- OU-6 - Twelve sites with RIs completed

Although only 21 of the 33 ERP sites are evaluated during this Five-Year Remedy Review, the selected remedies specified in the RODs for all 33 ERP sites are discussed below since they share the same remedy, with the exception of one site (ST-11). The following subsections present the selected 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 RODs for 32 of the ERP sites consist of No Remedial Action (NRA), which includes a minimum of annual LTM for regional groundwater at the Base to ensure protection of human health and the environment (chemicals of concern remain below the Federal Safe Drinking Water Act [SDWA] MCLs) and to verify uncertainties regarding the groundwater fate and transport model. After conducting a FFS on remedial alternatives, the limited action alternative was selected as the remedy for 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. The Plan has been registered on land plat maps held by the Base. The land is held by lease by the USAF and cannot return to the land holder (Bureau of Land Management [BLM]) 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 the Base fuel inventory and leak detection program is included in Section 6.4.
- 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 five years in accordance with the approved groundwater sampling plan.

The remedial action objectives (RAOs) for ST-11 are presented in the ROD for OUs 1, 3, 5, 6, the Lagoon Landfill, and the UST at the Fire Training Area 8 (signed in September and October 1995 by representative FFA team members) 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 Explanation of Significant Differences (ESD) was issued on March 23, 2004 for the 1995 ROD and signed by the USAF, EPA Region 10, and IDEQ. 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 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. The revised site-specific IC requirements for ST-11 are listed in Section III.C of the ESD.

4.2 REMEDY IMPLEMENTATION

The limited action remedy for ST-11 has been implemented in accordance with the OU-3 ROD and ESD. Base-wide groundwater monitoring required by the OU-3 ROD has been implemented in accordance with LTM work plans reviewed and approved by the FFA team. The ICs for ST-11 are implemented, monitored, enforced and maintained by the MHAFB through the facility-wide IC or land use control procedures established under the base comprehensive plan and programs implemented under Air Force Instruction (AFI) 32-1021 and AFI 32-1001 (366 Environmental Flight, 2004). The following summary provides the administrative procedures in place to assure that the potential actions listed do not impact an ERP site with LUCs.

- All work performed on Air Force property (lands, facilities and appurtenances) requires an approved work request either through completion of an AF Form 332, which is used to request routine work, or AF Form 1391, which is used to request new construction to include MILCON. The AF Form 332 requires coordination with, but not limited to, base environmental and bioenvironmental personnel and can satisfy the National Environmental

Policy Act (NEPA) process if a Categorical Exclusion is appropriate. An AF Form 1391 includes an environmental review.

- Any work requiring surface excavation or drilling requires a dig permit issued by the CES Site Development Office. Site developers refer to the Base Comprehensive Plan as a part of their dig permit issuing process.
- Any lands transferring from or to the Air Force or any change in Air Force land use requires an Environmental Baseline Survey, which determines whether there is an environmental liability associated with the land transfer or change in land use. Any existing ICs would be identified during the Environmental Baseline Survey.
- LUCs are addressed in the Base Comprehensive Plan. Site developers are required to refer to the Base Comprehensive Plan during project development.
- All federal actions require compliance with the NEPA. Potential ERP impacts are evaluated under the Environmental Impact Analysis process, documented in AF Form 813, as part of the NEPA process.
- MHAFB is a controlled access environment with manned entry gates. Access is further restricted on to areas around the flightline, munitions areas, and fuel storage areas where Security Forces perform patrols routinely. Base Environmental Flight personnel perform design reviews on all construction designs at the 35% and 95% design phases, participate in work order review boards and airfield operations boards, and brief environmental requirements at all project kick off meetings. The need for a construction waiver for sanitary sewer line repair adjacent to site ST-13 was identified during a 35% design review. No violations of land use controls have occurred on MHAFB.

Petroleum inventory and annual flight line leak detection monitoring are completed for the Base as part of the fuel management program, as specified for ST-11 in the 1995 ROD. Inventory control procedures for petroleum products stored at the Base are compliant with DoD 4140.25-M, and fuel system leak detection procedures are continuously assessed to minimize unaccounted fuel loss. Additional discussion of the Base fuel management program is included in Section 6.4.

The LTM program, which includes both the perched (Fuel Spill Site ST-11) and regional groundwater, was initiated in May 1996 with the completion of the Final Post-ROD Groundwater Monitoring Plan for Operable Unit No. 3 (Woodward-Clyde, 1996). LTM of the regional groundwater and perched groundwater are currently conducted on a semi-annual basis in accordance with the LTM Program 2002 through 2006 Final Work Plan and its yearly Addendums (RMC, 2002, 2003b, 2004a, 2005a). Beginning in 2002, monitoring vadose zone vapors was included in the remedial action-operations (RA-O) program. A summary of samples collected as part of the LTM program since 1996 is shown on Table 4-1.

4.3 SYSTEM OPERATION/OPERATION AND MAINTENANCE

The primary Operations & Maintenance (O&M) activities associated with the implemented remedial action alternatives (limited action and NRA with LTM) include LTM of perched groundwater for ST-11 and LTM of regional groundwater and vadose zone vapors for OU-3. Regional groundwater, perched groundwater, and vadose zone vapors are currently sampled semi-annually (spring and fall) in accordance with the current LTM Final Work Plan 2002 through 2006 (RMC, 2002) and associated Addendum (RMC, 2005a). A summary of the sampling schedule for the regional groundwater wells, perched groundwater wells, and vapor ports are provided in Table 4-1. Specific sampling and analysis requirements for the current LTM program are presented in the 2002 through 2006 Final Work Plan and its yearly Addendums (RMC, 2002, 2003b, 2004a, 2005a).

The LTM program was initiated in May 1996 in accordance with the Final Post-ROD Groundwater Monitoring Plan for OU-3 (Woodward-Clyde, 1996). Changes have been made to the LTM program since 1996, based on deficiencies identified in the 2001 five-year remedy review and in subsequent annual LTM reports. The most significant changes to the LTM program since the previous five-year review include the increase in monitoring well locations (installation of eighteen regional groundwater wells and eight perched groundwater monitoring wells); the analysis of additional parameters of concern such as PCBs, pesticides, and metals for select wells; the evaluation of vadose zone vapors in bedrock from 45 existing vapor ports; and the installation of a product recovery system at regional groundwater monitoring well MW24.

Estimated annual O&M costs over the review period (2001 through 2006) are presented in Table 4-2 for LTM activities.

TABLE 4-1
SUMMARY OF SAMPLING SCHEDULE FOR GROUNDWATER AND VAPOR
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

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	Jul 03	Aug 03	Oct 03	May 04	Aug 04	Sep 04	Oct 04	Apr 05	Sep 05
BPW1	✓	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	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	✓	✓	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
BPW8	X	X	X	X	X	X	X	X	X	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
BPW11	X	X	X	X	X	X	X	X	X	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	X	X	X	X
MW3-2	X	X	X	X	X	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	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	X	X	✓	✓	X	X	✓	X	✓
MW17/ MW17-2	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X	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	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	✓	✓	X	X	✓	X	X
MW20[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	✓	VP	VP	VP	VP	VP	✓	GW	✓	GW	✓	✓	X	X	✓	✓	✓
MW24[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	✓	✓	✓	✓	X	X	✓	✓	VP
MW25[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	VP	VP	VP	VP	VP	✓	GW	✓	GW	✓	✓	X	✓	✓	✓	✓
MW26[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	VP	VP	VP	VP	VP	VP	✓	X	VP	X	✓	✓	X	X	✓	✓	✓
MW27[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	✓
MW28[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	✓
MW29[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	✓	✓	✓
MW30[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	X	X	✓	✓	✓
MW31[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	X	X	✓	✓	✓
MW32[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	X	✓	✓	✓
MW33[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	✓
MW34[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	X	X	✓	✓	✓
MW35[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	✓	✓	✓	✓
MW36[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	X	X	✓	✓	✓	✓
PZMW7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	✓	✓	FP
PZMW8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	FP	FP	✓
PZMW11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	✓	✓	✓
PZMW12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	✓	X	X
PZMW13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	✓	✓	✓
PZMW14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	✓	✓	✓
PZMW15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	D	D	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	FP	FP	FP
PZMW16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓	X	X	X	X	X	✓	X	X	X	✓	✓	X	X	✓	✓	✓
PZMW17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	D	D	X	X	X	X	X	D	X	X	X	D	✓	X	X	✓	✓	✓
VW1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	VP	VP	VP	VP	✓	✓	✓	X	✓	X	✓	✓	X	X	✓	✓	✓

✓ = Sample collected [a] = Well includes vapor ports — = Not installed 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 X = not sampled

TABLE 4-2
SUMMARY OF LTM AND O&M COST FOR MOUNTAIN HOME AFB, ID
CALENDAR YEARS 2001 THROUGH 2005
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Calendar Year	Regional GW LTM†	Perched GW LTM†	Vapor LTM	Reporting	Contractor Project Management	Meetings	Totals
2001	$ 6,000.00	$ 1,000.00	$ -	$ 6,000.00	$ 1,800.00	$ 5,000.00	$ 19,800.00
2002	$ 30,000.00	$ 25,000.00	$ 35,000.00	$ 25,896.00	$ 15,000.00	$20,461.00	$151,357.00
2003	$ 34,856.00	$ 26,948.00	$ 56,356.00	$ 35,404.00	$ 23,577.00	$26,638.00	$203,779.00
2004	$ 42,196.00	$ 16,400.00	$ 47,109.00	$ 45,000.00	$ 16,000.00	$ 9,000.00	$175,705.00
2005	$ 37,785.00	$ 11,657.00	$ 44,107.00	$ 40,168.00	$ 16,690.00	$ 8,760.00	$159,167.00
Totals	**$ 150,837.00**	**$ 81,005.00**	**$182,572.00**	**$152,468.00**	**$ 73,067.00**	**$69,859.00**	**$709,808.00**

Note: Costs do not include well installations associated with the 2002 and 2004 year investigations and installation of 10 new regional groundwater monitoring wells. Cost for year 2001 and 2002 are estimates.

* = Includes design and installation costs.

† = Does not include cost for well installation.

LTM = Long-Term Monitoring/Management (program)

O&M = Operations and Maintenance

The first five-year remedy review of the 33 ERP sites was completed in 2001. Since 2001, 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. Most of the previous five-year review recommendations that have not yet been implemented are associated with the implementation of ICs. The 2001 five-year review recommended institutional controls (and, therefore ESDs) for 17 sites in accordance with EPA's Region 10 policy for the implementation of ICs. EPA requires the preparation of an ESD for sites with existing RODs that do not explicitly state an institutional control requirement, but do not meet the conditions of unrestricted use. The ACC policy to document the implementation of ICs required the use of a Memorandum of Agreement as post-ROD documentation. However, in 2002 the Air Force issued new policy stating RODs should include IC language where contaminants remain in place above levels allowing for unrestricted use, and in 2004 ACC signed the ESD for site ST-11.

Subsequent to ACC policy changes, the AF plans an ESD to the 1995 ROD to implement ICs at sites LF-01 and LF-02. In lieu of ICs the AF plans to evaluate a non-time critical removal action at sites FT-04, OT-16, LF-23, SD-27, and SS-29. As referenced in Table ES-1, Table 5-1, and Table 9-1 of this report sites FT-05, FT-06, FT-07, SD-12, SD-25, ST-31, and ST-32 currently meet UU/UE criteria and sites FT-08 and SD-24 are being proposed for further evaluation and possible remedial action. Site ST-38 is being managed by State authorities.

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.

TABLE 5-1
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions
LF-01	• The selected remedy at LF-01 is not protective because the calculated excess cancer risk from exposure to sediment exceeds the protectiveness goal for current site occupational use (a carcinogenic risk range not to exceed 1 x 10^{-4}) and for future unrestricted use scenarios (a carcinogenic risk not to exceed 1 x 10^{-6}). In order for the remedy to be protective currently for occupational use (a carcinogenic risk not to exceed 1 x 10^{-4}) and in the long-term for future unrestricted use (a carcinogenic risk not to exceed 1 x 10^{-6}), institutional controls must be implemented to prevent exposure to potentially contaminated site sediment. • A protectiveness determination relative to groundwater protection is uncertain because federal MCLs are exceeded by modeled groundwater concentrations of compounds detected in sediment.	• As per recommendations provided for LF-01 during the previous review, MW7-2 is currently sampled as part of the base-wide groundwater LTM program and preparation of an ESD and implementation of ICs are currently scheduled for LF-01. • Regional groundwater and vapor monitoring well MW31 was installed near LF-01 in April 2004 and is currently sampled as part of the OU-3 LTM program. • 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 off and away from the monofill. • LF-01 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation. • Post-closure activities (inspections) are performed for the monofill constructed over the footprint of LF-01. • Water level data is collected from the three regional groundwater monitoring wells (MW21, MW22, and MW23) installed south of the former sewage lagoons, as recommended in the previous review.	• MW31 extends the vapor sampling coverage to the western portion of the Base to provide better spatial coverage for the vapor plume. • There have been no exceedances of EPA Safe Drinking Water MCLs in groundwater sampled from MW7-2 and MW31 (RMC, 2006). • 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, LF-01 does not appear to pose a threat to the regional aquifer. • Construction of the monofill minimizes further leaching of COCs the regional groundwater and limits future residential exposure to lagoon sediments. Post-closure activities, which include annual inspection and maintenance of the monofill cover, are addressed under the Base compliance program and are summarized in the Final Closure and Post-Closure Maintenance Plan (Mactec, 2002). • No additional soil sampling was conducted at LF-01 since LUCs are already required for landfill closure.
LF-02	• The selected remedy at LF-02 is protective currently and in the near-term because the calculated risks do not exceed the current use protectiveness goal (a carcinogenic risk not to exceed 1 x 10^{-4}). However, in order for the remedy to be protective in the long-term for future unrestricted use (a carcinogenic risk not to exceed 1 x 10^{-6}), institutional controls must be implemented to prevent exposure to potentially contaminated site soil	• As per recommendations provided for LF-02 during the previous review, MW3-2 is currently sampled as part of the base-wide groundwater LTM program and preparation of an ESD and implementation of ICs are currently scheduled for LF-02. • Access to the LF-02 area has not been restricted with an entrance gate and/or fencing as recommended in the previous review. • Regional groundwater and vapor monitoring well, MW32 was installed near LF-02 in the summer of 2004 and is currently sampled as part of the OU-3 LTM program. • LF-02 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation.	• There have been no exceedances of EPA Safe Drinking Water MCLs in groundwater sampled from MW3-2 and MW32 (RMC, 2006). MW3-2 sampling results indicate that COCs from LF-02 are not migrating outside of installation boundaries. • No additional soil sampling was conducted at LF-02 due to physical site restrictions associated with ongoing hardfilling and covering activities.
FT-04	• The selected remedy for FT-04 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, in order for the remedy to be protective in the long-term, institutional controls must be implemented to prevent exposure to potentially contaminated site soil.	• Confirmation soil sampling was conducted at FT-04 during the evaluation and/or investigation of 17 sites in June 2004. • Neither the preparation of an ESD or the implementation of ICs, which were both recommended for FT-04 during the previous five-year review, have been completed for this site.	• Arsenic results exceeded the IDEQ background concentration during the 2004 site investigation. As a result, the Air Force is scheduled to perform a limited assessment at two “hot-spots” and a possible non-time-critical removal action of the soils with arsenic above the IDEQ background concentration. A non-time-critical removal action would be performed in lieu of LUCs, which were recommended in the previous review, and result in closure of the site.
FT-05	• The selected remedy for FT-05 is currently protective of human health because the site is covered by Building 1325, thereby preventing exposure to site soil. However, in order for the remedy to be protective in the long-term, institutional controls must be implemented to prevent exposure to potentially contaminated site soil.	• Confirmation soil sampling was conducted at FT-05 during the evaluation and/or investigation of 17 sites in June 2004. • An ESD and ICs, which were recommended during the previous review, are no longer warranted for FT-05 based on findings from the 2004 site investigation.	• No target compounds were detected in site soils at concentrations exceeding the screening criteria or background ranges used in the 17 Sites Investigation Report (URS, 2004). The recommendation for FT-05 was NFA during the 2004 site investigation.

TABLE 5-1 (CONTINUED)
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions
FT-06	• The selected remedy for FT-06 is currently protective of human health because the majority of the site is covered by flightline concrete and asphalt, preventing exposure to site soil. However, in order for the remedy to be protective in the long-term, institutional controls must be implemented to prevent exposure to potentially contaminated site soil.	• Confirmation soil sampling was conducted at FT-06 during the evaluation and/or investigation of 17 sites in June 2004. • An ESD and ICs, which were recommended during the previous review, are no longer warranted for FT-06 based on findings from the 2004 site investigation.	• No VOCs or SVOCs were detected in site soils at concentrations exceeding the screening criteria and metals concentrations are consistent with naturally occurring background concentrations. The recommendation for FT-06 was NFA during the 2004 site investigation.
FT-07	• FT-7A: The selected remedy for FT-7A is currently protective of human health and the environment because the site lies on vacant land and the current site use does not involve exposure to site soil. However, in order for the remedy to be protective in the long-term, IC must be implemented to prevent exposure to potentially contaminated site soil. • FT-7B and FT-7C: A protectiveness determination of the remedy at FT-7B and FT-7C cannot be made based on the available information. Additional characterization of this site is necessary to assess concentrations of VOCs in soil to determine whether this site poses an unacceptable risk to human health or the environment, or a threat to the regional aquifer. Furthermore, the federal MCL, which is used for the protectiveness goal of groundwater, is exceeded by the modeled concentration of TCE in groundwater at FT-7B.	• Additional site characterization and evaluation were completed for FT-7B and FT-7C during the 2002 Site Investigation at Multiple Sites. •Confirmation soil sampling was conducted at FT-7A during the evaluation and/or investigation of 17 sites in June 2004. • An ESD and ICs, which were recommended during the previous review for FT-7A, are no longer warranted for this site based on findings from the 2002 and 2004 site investigations. • Regional groundwater and vapor monitoring well MW29 was installed near FT-7C in July 2004 and is currently sampled as part of the OU-3 LTM program.	• No target compounds were detected in FT-7A, B, and C site soils at concentrations exceeding the screening criteria or background ranges. The recommendation for FT-7A, B, and C was NFA during the 2002 and 2004 site investigations. • MW29 extends the vapor sampling coverage to the southern portion of the Base to provide better spatial coverage and provides regional groundwater and water level information that was lost after BPW5 was removed from the LTM due to insufficient water column present in the well. • Although the modeled concentration of TCE (9.4 µg/L) in groundwater for FT-7B exceeds its current federal MCL, TCE has only been detected at estimated concentrations below the reporting limit in groundwater sampled from the nearest monitoring well MW29 and historically from BPW-5. • There have been no exceedences of EPA Safe Drinking Water MCLs in groundwater sampled from MW29 and BPW5.
FT-08	• The selected No Further Action remedy is protective currently and in the near term because the calculated risks do not exceed the current use protectiveness goals. However, in order for the remedy to be protective in the long-term for future unrestricted use (a carcinogenic risk not to exceed 1×10^{-6}), institutional controls must be implemented to prevent exposure to potentially contaminated site soil. Additionally, the potential exists for VOCs (specifically TCE) to adversely impact regional groundwater quality.	• Additional site characterization and evaluation were completed for FT-08 during the 2002 Site Investigation at Multiple Sites. • FT-08 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation. • A passive soil gas survey was conducted at FT-08 in July 2004. • Regional groundwater and vapor monitoring well, MW28 was installed adjacent to FT-08 in September 2004 and is currently sampled as part of the OU-3 LTM program. • As of the Spring 2006 sampling event, MW11-2 is no longer sampled for groundwater. • An ESD to address implementing institutional controls has not been prepared for the OU-4 ROD, as recommended during the previous review.	• Six VOC compounds were reported in site soils at concentrations exceeding screening criteria during the 2002 Multiple Sites Investigation. TCE detected in soils during the 2002 site investigation exhibit levels higher than those detected during the RI. • The passive soil gas survey conducted in 2004 suggest TCE in soils is more widespread than indicated during the RI. • Vadose zone vapor collected from MW28 indicate TCE vapor concentrations to a depth of 299 feet bgs. • There have been no exceedences of EPA Safe Drinking Water MCLs in groundwater sampled from MW11-2 and MW28.

TABLE 5-1 (CONTINUED)
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions
ST-11	• The remedy for ST-11 is protective currently and for the near term. Institutional controls have been implemented pursuant to the ROD, and there is no current human exposure to the perched groundwater. LTM to date has not detected fuel compounds in the regional groundwater. • The potential for ST-11 contamination to migrate from the perched zone, based on LNAPL presence and water level fluctuations, will be evaluated according to the recommendations in the five-year review. At this time, a determination cannot be made as to whether the selected remedy is protective in the long term with respect to potential releases of contamination to the perched aquifer, or from the perched aquifer to the regional aquifer. Incorporation of EPA Region 10 institutional controls language into the selected remedy will ensure long-term protectiveness with respect to human exposure to the perched groundwater at ST-11.	• An assessment of water-level change in PZMW7 and sources of recharge to ST-11 was performed by USGS in March 2002. • Regional groundwater and vapor monitoring well MW20 was installed along the fuel line in May 2002, as recommended during the previous five-year remedy review. • Eight perched zone monitoring wells (PZMW8 through PZMW17) were installed at ST-11 during the summer of 2002. Soil samples, rock cores, and perched groundwater samples were collected from each perched zone well location. • A soil gas survey was completed to obtain data on the distribution of vapor-phase subsurface petroleum in shallow soils underlying ST-11. Soil gas samples were collected from each perched zone well boring in August 2002. • Two pilot vapor extraction tests were performed at ST-11, following the installation of three shallow bedrock and three soil vapor extraction wells in August 2002. A feasibility study to assess the effectiveness of an active remediation system for removing COCs from the shallow soil was not performed for ST-11, as recommended during the previous five-year review. • An ESD was completed in 2004 to clarify and enhance the ICs for the site, as recommended during the previous five-year remedy review. • Two separate pump tests per well were performed at perched groundwater monitoring wells PZMW8, PZMW14, and PZMW16 in March and June 2004 to establish the degree of connectivity, if any, between the perched zone wells. • Semi-annual sampling of the perched zone wells for BTEX and natural attenuation parameters was conducted in accordance with the LTM program (2002 through 2006). • Inventory controls are in place and Tracer Tight leak tests are conducted annually to insure that the Base fuel system leak detection procedures are adequate.	• Findings from the 2002 study indicate a consistent and non-seasonal source of recharge to the perched water body at ST-11 since about 1999. No conclusive decision had been reached about the source, or sources, of water recharge at ST-11. Indications are that recharge is either from precipitation or from leaks in the storm water drainage system adjacent to the site. • Hazardous vapors in the bedrock vadose zone were initially detected during the installation of regional groundwater monitoring well MW20. • The pilot tests indicated vapor extraction and air sparging would be an effective remedial strategy for ST-11. • The pump tests indicated little to no connectivity between the perched zone wells at ST-11. • Sampling of ST-11 monitoring wells indicate that BTEX levels have remained relatively unchanged. Benzene levels continue to exceed the SDWA MCL concentration (5 ug/L) in several wells (PZMW7, PZMW8, PZMW12, and PZMW15). LNAPL (JP-4) of varied thickness have been encountered in perched zone wells PZMW7, PZMW8, PZMW12, and PZMW15. Monitoring for natural attenuation parameters was discontinued in 2005. • Fluctuations in perched zone groundwater levels and LNAPL present at times in monitoring wells indicate the system changes with time and is not static.
SD-12	• The selected remedy for SD-12 is protective currently and in the near term because the calculated risks do not exceed the current use protectiveness goals. Furthermore, the site is covered by an asphalt parking lot, and the current and near-term planned site use does not involve exposure to site soil. However, in order for the remedy to be protective in the long-term for future unrestricted use, institutional controls must be implemented to prevent exposure to potentially contaminated site soil.	• The FFA Team members determined in 2003 that the protectiveness goal for UU/UE is met for soil at SD-12 based on site conditions and nature of COCs (per teleconference on February 5, 2003). Therefore an ESD and ICs, which were recommended during the previous review, are no longer warranted for SD-12. • SD-12 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation. • Area SD-12 was included in the Spring 2005 passive soil gas survey conducted in the vicinity of MW35 to determine if TCE source area(s) exist.	• No sampling was proposed for SD-12 during the 17 Sites Evaluation/Investigation since historically identified risks are within acceptable ranges even for unrestricted future use. • A single hot-spot encompassing one soil gas sample location placed adjacent to ERP Site SD-12 is depicted on the PCE contour map.

TABLE 5-1 (CONTINUED)
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions
ST-13	• The selected remedy for ST-13 is expected to be protective of human health and the environment under current, near term, and long term uses (unrestricted use) because contaminated soils were removed.	• Regional groundwater and vapor monitoring well, MW24 was installed at ST-13 in March 2003 and is currently sampled as part of the OU-3 LTM program, along with vapor monitoring well VW-1. • LNAPL was first measured in MW24 with a product thickness of 0.93 feet in August 2004. Therefore, the No Further Action recommendation made for ST-13 during the previous review is no longer valid. • A product recovery system was installed in December 2004 for the removal of the LNAPL product (JP-4) from MW24. • Water samples for inorganic and bacterial analysis were collected from MW24 in November 2005 to develop a strategy to treat the bacterial slime that has developed in the well since installation of the product recovery system.	• Vapor results for MW24 and VW1 have reported VOC concentrations, including TCE and benzene. • Since MW24 was installed, groundwater has been sampled ten times with results indicating decreasing benzene concentrations from 360 ppb in April 2003 to 21 ppb in April 2006. • Operation & Maintenance activities are currently performed for the product recovery system at MW24 on at least a quarterly basis. • The results for the well chemistry and bacterial analysis indicate that water chemistry is oxidative and that there is a diverse bacterial population in the water resulting in substantial biofouling in the well casing and near-well formation. If hydrocarbons are present, they will serve to stimulate biological growth within the well and formation. Continued monitoring of well conditions should be completed to determine whether chemical rehabilitation and continued treatment for disinfection is warranted.
OT-16	• The selected remedy for OT-16 is protective currently and in the near term because the calculated risks do not exceed the current use protectiveness goals. However, in order for the remedy to be protective in the long-term for future unrestricted use, institutional controls must be implemented to prevent exposure to potentially contaminated site soil.	• Soil sampling was conducted at OT-16 during the evaluation and/or investigation of 17 sites in June 2004 to evaluate whether the white crystalline material observed during historic investigations poses a safety hazard (i.e., from perchlorate). • Neither the preparation of an ESD or the implementation of ICs, which were both recommended for OT-16 during the previous five-year review, have been completed for this site. In lieu of LUCs, the Air Force has elected to complete an EE/CA and a possible non-time-critical removal action for the munitions debris/scrap and underlying soils that contain PAHs at concentrations that might prevent UU/UE.	• Results of the 2004 site investigation indicate that there is no evidence of a release of perchlorate in the subsurface soils at OT-16 and there is no fire or explosion hazard. The Site does not require further investigation for perchlorate.
ST-22	• A protectiveness determination of the remedy at ST-22 cannot be made based on the available information. Additional characterization of this site is necessary to assess concentrations of VOCs in soil to determine whether this site poses an unacceptable risk to human health or the environment, or a threat to the regional aquifer.	• Regional groundwater and vapor monitoring well, MW25 was installed near ST-22 in September 2002 and is currently sampled as part of the OU-3 LTM program. • As per recommendations provided for ST-22 during the previous review, additional characterization of this site was completed to address concerns that potential TCE in soil may be acting as a source of contamination to the regional groundwater. • The area near ST-22 was included in the passive soil gas survey conducted in the northwest industrial area in the spring and summer of 2004 to evaluate it as a potential source for TCE. • A shallow soil/rock core borehole, ST22-R-1, was advanced to a total depth of 50 feet bgs in July 2004 at the former location of four USTs, which historically contained solvents, acids, and caustic solutions associated with the Titan Missile Maintenance Area housed in Building 1333. A soil sample was collected just above the bedrock interface from 2.5 to 3.0 feet bgs and analyzed for VOCs, SVOCs, and RCRA eight metals.	• Bedrock vadose zone vapors monitored at MW25 indicate the site is not a source of bedrock VOC vapors. Groundwater samples have resulted in detections of TCE (5.1 µg/L in April 2004 to 7.3 µg/L in September 2005) that exceed the MCL. However, ST-22 has been sufficiently characterized to remove it as a site posing a threat to the regional groundwater. • The passive soil gas survey indicated no significantly high detections of shallow soil VOC gases at ST-22. • The results of the ST22-R-1 borehole indicate no contamination present from surface to 50 feet bgs. Based on findings reported in the Final 2004 Annual LTM Report, the Air Force recommends that ST-22 be considered fully characterized and that No Further Action is required.
LF-23	• The selected remedy for LF-23 is currently protective of human health and the environment because the site is located on vacant land, and current and near-term use does not involve exposure to soil. However, in order for the remedy to be protective in the long-term, institutional controls must be implemented to prevent exposure to potentially contaminated soil.	• LF-23 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation. • Neither the preparation of an ESD or the implementation of ICs, which were both recommended for LF23 during the previous five-year review, have been completed for this site. In lieu of LUCs, the Air Force has elected to complete an EE/CA and a possible non-time-critical removal action of the debris and the underlying soils that contain PAHs at concentrations that might prevent UU/UE.	• No sampling was proposed for LF-23 during the 17 Sites Evaluation/Investigation.

TABLE 5-1 (CONTINUED)
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions
SD-24	• The selected remedy for SD-24 is protective currently and in the near term because the calculated risks do not exceed the current use protectiveness goals. Furthermore, a concrete cover is present at the site which limits exposure to soil. However, in order for the remedy to be protective in the long-term for future unrestricted use, institutional controls must be implemented to prevent exposure to potentially contaminated site soil. A protectiveness determination of the remedy at SD-24 relative to groundwater protection cannot be made based on the available information. Additional characterization of this site is necessary to determine whether this site poses a threat to the regional aquifer.	• As per recommendations provided for SD-24 during the previous review, MW19 is currently sampled as part of the base-wide groundwater LTM and additional characterization of this site was performed to address concerns that TCE in soil may be acting as a source of contamination to the regional aquifer. An ESD to address implementing institutional controls at SD-24 has not been prepared. • A site investigation was completed for SD-24 to evaluate the site's potential as a source of TCE to regional groundwater during the 2002 Site Investigations at Multiple Sites. • The area including SD-24 was included in the passive soil gas survey conducted in the northwest industrial area in the spring and summer 2004 to evaluate it as a potential source for TCE. • A shallow soil/rock core borehole, SD24-R-1, was advanced in the center of the highest relative TCE anomaly for the passive soil gas survey to a total depth of 50 feet bgs in July 2004. A soil sample was collected just above the bedrock interface from 9.0 to 10.0 feet bgs and analyzed for VOCs, SVOCs, and RCRA eight metals. • Regional groundwater and vapor monitoring well MW27 was installed in the fall of 2004 approximately 20 feet southeast of the anticipated horizontal extent of surface contamination associated with the SD-24 site and is currently sampled as part of the OU-3 LTM program. • The Air Force completed a voluntary soil RDA at SD-24 in November 2004 to eliminate shallow soil contamination as a potential future source for petroleum and solvents to the regional groundwater (URS, 2005a). Impacted soils were excavated to the bedrock surface over an area of approximately 25 by 40 feet at the site. • SD-24 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation.	• Although target VOCs (including TCE) were reported to be present in Site soils with concentrations exceeding one or more of the compound-specific screening criterion, the recommendation for SD-24 during the 2002 site investigation was No Further Action due to the following findings: the extent of the impacted soil is small, the maximum TCE concentrations are much lower than historical concentrations, and the potential for a driving force to leach contaminants to groundwater is also small (URS, 2003). • The results of the SD24-R-1 borehole confirmed elevated concentrations of TCE in the shallow subsurface soil (19,000 mg/Kg) and elevated PID/FID headspace readings down to 46 feet bgs in the shallow bedrock. • Soil gas, regional groundwater, and vapor results indicate that SD-24 is the most likely source for bedrock vadose zone VOC vapors and possibly TCE contamination to regional groundwater. Soil gas results indicate a localized TCE and DCE hot-spot at SD-24. Although TCE concentrations in groundwater have not exceeded MCLs in MW19 and MW27, vapors in MW27 have been detected at high concentrations. • The installation of MW27 provides a monitoring well with vapor monitoring ports associated with site SD-24. • Although a soil removal action was completed at SD-24, the shallow bedrock is likely contaminated with residual solvent and petroleum compounds that may continue to source the vadose zone vapors. • No sampling was proposed for SD-24 during the 17 Sites Evaluation/Investigation.
SD-25	• The selected remedy for SD-25 is protective currently and in the near term because the calculated risks do not exceed the current use protectiveness goals. However, in order for the remedy to be protective in the long-term for future unrestricted use, institutional controls must be implemented to prevent exposure to potentially contaminated site sediment. A protectiveness determination of the remedy at SD-25 relative to groundwater protection cannot be made based on the available information.	• Passive soil gas samples were collected from SD-25 and analyzed for VOCs during the 2002 Site Investigations at Multiple Sites. • SD-25 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation. • 874 tons of contaminated sediments previously identified in the ditch were removed during a voluntary RDA completed for sediment at SD-25 in November 2004, and during the installation of a runway threshold concrete culvert under a Base construction project prior to 2004. Therefore an ESD and ICs, which were recommended during the previous review, are no longer warranted for SD-25. • Storm water conveyances are being evaluated for upgrade to meet Idaho's Best Management Practices.	• Relatively low soil gas concentrations of only two compounds (TCE and toluene) were reported in a few samples that were all located at or downstream of the flightline drain outfall. The recommendation for SD-25 during the 2002 site investigation was No Further Action. • No sampling was proposed for SD-25 during the 17 Sites Evaluation/Investigation. • Institutional controls are no longer warranted for SD-25, since contaminated sediment has been removed from the site and the remedy is now considered protective in the long-term for UU/UE.
SD-27	• The selected remedy for SD-27 is protective currently and in the near term because the calculated risks do not exceed the current use protectiveness goals. However, in order for the remedy to be protective in the long-term for future unrestricted use, institutional controls must be implemented to prevent exposure to potentially contaminated site soil and sediment. A protectiveness determination of the remedy at SD-27 relative to groundwater protection cannot be made based on the available information.	• A site investigation was completed for SD-27 to evaluate the site's potential as a source of TCE to regional groundwater during the 2002 Site Investigations at Multiple Sites. • Soil sampling was conducted at SD-27 during the evaluation and/or investigation of 17 sites in June 2004. • Neither the preparation of an ESD or the implementation of ICs, which were both recommended for SD-27 during the previous five-year review, have been completed for this site. In lieu of LUCs, the Air Force has elected to complete an EE/CA and a possible non-time-critical removal action for soils that contain PAHs above EPA Region 9 residential PRGs.	• No target VOC compounds were detected in Site soils at concentrations exceeding the screening criterion during the 2002 site investigation. • Target PAH compounds were detected in Site soils at concentrations similar to historical concentrations during the 2004 site investigation.

TABLE 5-1 (CONTINUED)
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions
SS-29	• The selected remedy for SS-29 is protective currently and in the near term because the calculated risks do not exceed the current use protectiveness goals. However, in order for the remedy to be protective in the long-term for future unrestricted use, institutional controls must be implemented to prevent exposure to potentially contaminated site soil. A protectiveness determination of the remedy at SS-29 relative to groundwater protection cannot be made based on the available information.	• Soil sampling was conducted at SS-29 during the evaluation and/or investigation of 17 sites in June 2004. • An ESD for implementing institutional controls at SS-29 is no longer warranted, since the Air Force has elected to complete a non-time-critical removal action, in lieu of LUCs, for soils that contain concentrations of PAHs that exceed EPA Region 9 residential PRGs.	• Target PAH compounds were detected in Site soils at concentrations similar to historical concentrations during the 2004 site investigation. Specific recommendations for SS-29 were not made at this time.
SS-30	• A protectiveness determination of the remedy at SS-30 cannot be made based on the available information. Additional characterization of this site is necessary to assess concentrations of VOCs in soil to determine whether this site poses an unacceptable risk to human health or the environment, or a threat to the regional aquifer.	• Area SS-30 was included in the Spring 2005 passive soil gas survey conducted in the vicinity of MW35 to determine if TCE source area(s) exist. • Regional groundwater and vapor monitoring well, MW35 was installed near SS-30 in July 2004 and is currently sampled as part of the OU-3 LTM program.	• Results from the passive soil gas survey indicate that SS-30 is not a source of TCE to regional groundwater.
ST-32	• The No Further Action remedy for ST-32 is protective of human health and the environment currently and in the near term. However, in order for the remedy to be protective in the long-term for future unrestricted use, institutional controls must be implemented to prevent exposure to contaminated soil.	• An ESD for implementing institutional controls at ST-32 has not been prepared as recommended in the previous five-year review, nor is it currently scheduled for the site. • Regional groundwater and vapor monitoring well, MW30 was installed at ST-32 in March 2004 and is currently sampled as part of the OU-3 LTM program. • ST-32 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation.	• Only trace VOC concentrations, with the exception of TCE, have been detected in regional groundwater sampled from MW30. The maximum TCE concentration detected in regional groundwater at MW30 is 1.5 µg/L, well below the Federal SDWA MCL for TCE (5 µg/L). The vadose zone vapors monitored at MW30 indicate the site is not a source of bedrock VOC vapors or posing a threat to the regional groundwater. • No sampling was proposed for ST-32 during the 17 Sites Evaluation/Investigation.
ST-38	• Based on the remedial investigation results, site ST-38 is expected to be protective of human health and the environment from exposure to contaminated soil currently and in the near term. However, in order to ensure protectiveness in the long-term, institutional controls must be implemented to prevent exposure to contaminated soil. Therefore, additional evaluation under the FFA is warranted. Additionally, characterization of this site is necessary to determine whether the site poses a threat to the regional aquifer.	• A two-phased environmental site investigation was completed between October 2001 and June 2002 for the POL Yard in response to a jet fuel 8 (JP-8) release from Tank 1. • A CAP was submitted for the Tank 1 Fuel Release site in August 2003. • ST-38 was evaluated in the 2004 Final Report for the 17 Sites Evaluation/Investigation. • An Integrated Contingency Plan for Oil Spill Prevention and Response was completed in April 2005. • A Comprehensive Engineering Evaluation for Tank 1 was initiated in November 2005, which includes removing a section of the concrete cap and removing/remediating contaminated soil. • An ESD for implementing institutional controls at ST-38 has not been prepared as recommended in the previous five-year remedy review.	• Fuel fingerprinting conducted during the two-phase ESI confirmed that the free product was from a recent release; liquid fuels management records indicated a potential fuel loss of 2,000 gallons. The data indicates the JP-8 released from Tank 1 migrated through the soil berm and overburden and into the basalt bedrock to a depth of approximately 80 feet bgs. Residual JP-8 fuel remains within vesicles and fractures at the top of the basalt and in selected fractures in the flow interiors. • No sampling was proposed for ST-38 during the 17 Sites Evaluation/Investigation. • Removal of LNAPL from the perched groundwater is conducted under a Corrective Action Plan. • Tank 1 is currently out of commission due to corrosion pits detected on the outside of the tank side walls during the ongoing comprehensive Engineering Evaluation for the east side of Tank 1. All of the contaminated soil encountered during the removal of a section of the Tank 1 concrete cap has been removed and landfarmed. The Naval Facilities Command team is currently evaluating whether Tank 1 should be repaired or removed.

TABLE 5-1 (CONTINUED)
PROGRESS SINCE LAST FIVE-YEAR REVIEW
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Protectiveness Statement From Previous Review	Status of Previous Recommendations/Follow-up Actions	Results of Implemented Actions
OU-3	• The remedy for OU-3 base-wide groundwater is protective currently and for the near term because COC concentrations do not exceed applicable federal MCLs. The potential for COC concentrations to exceed MCLs in the long term will be evaluated according to the recommendations in the five-year review. At this time, a determination cannot be made as to whether the selected remedy is protective in the long term. Additional characterization and monitoring are necessary to assess the long-term protectiveness of the remedy.	• Regional groundwater and vapor monitoring well MW20 was installed near ST-11 in May 2002. • Thirteen regional groundwater monitoring wells (MW24 through MW36), with up to three distinct vapor ports per well, were installed between 2002 and 2004 to better delineate the extent of the groundwater and vapor contamination, identify potential sources, and provide sentry wells in relation to the Base's active production wells. • Three regional groundwater monitoring wells (MW16-2, 17-2, and 18-2) were constructed in 2003 as replacement wells for Base perimeter wells MW16, 17, and 18 due to declining water table. • Regional groundwater monitoring well MW37 was installed with vapor ports, approximately 2,000 feet northeast of MW27 in March 2006. • Regional groundwater wells were sampled semi-annually for VOCs, as well as SVOCs, pesticides/PCBs, and RCRA metals for select wells, 2000 through 2005. Vapor monitoring wells were sampled semi-annually 2003 through 2005. • Gyroscopic well deviation surveys were performed for 12 of the regional wells in October 2004 to determine deviation from true vertical and allow for calculation of accurate static water levels in relation to ground surface at those wells. • Multiple attempts at conducting a 24-hour pump test at BPW4 to measure the draw down, aquifer properties, and cone of influence within the regional aquifer were unsuccessful. • A passive soil gas survey was conducted for the northwest industrial portion of the base to identify potential TCE source areas or hot spots in shallow subsurface soils.	• Previously sampled base production wells have been replaced by new regional groundwater monitoring wells, which were constructed adjacent to the production wells (see Figure 1-2). • The passive soil gas survey identified a former sub-grade cement tank adjacent to Building 1340 (SD-24) as a TCE source area or "hot spot". As a result of this finding, a soil removal action was performed at SD-24 and regional groundwater and vapor monitoring well MW27 was constructed adjacent to SD-24. •Vapor sample TCE concentration results for MW27 have been as high as 95,000 ppb_v in the shallow vapor port. It appears likely that SD-24 is the source area responsible for the TCE concentrations found within the regional aquifer. • Regional groundwater sample results for OU-3 do not indicate an upward or downward trend in COC concentrations. TCE concentrations currently exceed the SWDA MCL (5.0 ug/L) at MW25 (7.3 ug/L) and MW35 (13.0 ug/L). Consistent with past results, widespread low-level TCE concentrations below the MCL were recorded at 12 of the remaining regional groundwater wells.

AFB = Air Force Base
BRA = Baseline Risk Assessment
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CES = Civil Engineering Squadron
CEVR = Civil Engineering Environment Restoration
COC = Contaminant of Concern
DCE = Dichloroethene
DRMO = Defense Reutilization and Marketing Office
ECB = Environmental Chemistry Branch
EE/CA = Engineering Evaluation/Cost Analysis
EOD = Explosive Ordnance Disposal
EPA = U.S. Environmental Protection Agency
ERA = Ecological Risk Assessment
ERP = Environmental Restoration Program
ESD = Explanation of Significant Differences
FFA = Federal Facility Agreement
FID = Flame Ionization Detector
FS = Feasibility Study
FT = Fire Training (Area)
JP = Jet Propellant
LFI = Limited Field Investigation
LNAPL = Light Non-Aqueous Phase Liquid
LTM = Long-Term Monitoring/Management
µg/L = Micrograms Per Liter
MHAFB = Mountain Home Air Force Base
MW = Monitoring Well
OU = Operable Unit
PAH = Polycyclic Aromatic Hydrocarbons
PD-680 = Stoddard Solvent (Degreaser)
PID = Photoionization Detector
POL = Petroleum, Oil and Lubricants
ppb_v = Parts Per Billion Volume
PRG = Preliminary Remediation Goal
PZMW = Perched Zone Monitoring Well
RCRA = Resource Conservation and Recovery Act
RI = Remedial Investigation
ROD = Record of Decision
TCA = Trichloroethane
TCE = Trichloroethene
USACE = United States Army Corps of Engineers
USGS = United States Geological Survey
UST = Underground Storage Tank
VOC = Volatile Organic Compound

6.1 ADMINISTRATIVE COMPONENTS

The second five-year remedy review began with the FFA team members' meeting in July 2005 to determine the scope and general requirements of the remedy review. The FFA team members agreed on a general table of contents and outlined the issues and sites that were to be addressed in the review document in the October 5 and 6, 2005 FFA team meeting. The table of contents was altered following discussions with the IDEQ and EPA to conform to the EPA's Comprehensive Five-Year Review Guidance (Office of Solid Waste and Emergency Response [OSWER] Directive 9355.7-03B-P [EPA, 2001]). The preparation of the five-year remedy review document began with data gathering and information assessment at the FFA team meeting in October 2005.

The review team is comprised of environmental managers from the 366th Environmental Flight, Headquarters Air Combat Command, IDEQ, EPA Region 10, and the Air Force Center for Environmental Excellence and their contractors.

6.2 COMMUNITY INVOLVEMENT

The Air Force will notify the community of the completion of the five-year remedy review through a notice published in the Base newspaper and the Mountain Home News, and via a letter sent to Restoration Advisory Board (RAB) members.

Results of this five-year remedy review are made available to the public through the following:

- Report presentation to the Base 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 (TRC), 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. RAB meetings are now held semi-annually.

A notice was sent to a local newspaper that a five-year review was to be conducted and that there would be a public meeting on November 17, 2005. There were no concerns expressed by the public regarding the five-year review during the November 2005 RAB meeting.

6.3 DOCUMENT REVIEW

This five-year review consisted of a review of relevant documents including the following:

- Management Action Plan for Mountain Home AFB, dated September 30, 1993
- Fuel Inventory 1999 to Present

- EPA's Comprehensive Five-Year Review Guidance Document (OSWER Directive 9355.7-03B-P [EPA, 2001])
- Assessment of Water-Level Change in PZMW7 and Sources of Recharge to ERP Area ST-11, December 2000 through March 8, 2002 (Parliman, 2002).
- The ESD for the Land Use Controls implemented at ST-11 (366 Environmental Flight, 2004)
- Final Vapor Monitoring Report (RMC, 2003c)
- Final Report for Site Investigations at Multiple Sites (URS, 2003)
- Final Report for 17 Sites Evaluation/Investigation (URS, 2004)
- Final Report for the SD-24/SD-25 Removal and Disposal Action (URS, 2005a)
- Technical Memoranda for the summary of ST-11 field activities (pumping events) performed February 2004 through September 2004 (URS, 2005b)
- Final 2002 – 2005 LTM Annual Reports (RMC, 2003a, 2004b, 2005b, 2006)
- 366th Fighter Wing (FW) Plan 3202-05 Integrated Contingency Plan for Oil Spill Prevention and Response, April, 2005

Documents reviewed during the initial five-year review consisted of RODs, RIs, LFIs, preliminary assessment/site inspections (PA/SIs), and risk assessments.

6.4 DATA REVIEW

Data presented in the documents listed in the previous Section 6.3 were reviewed during this five-year review. Findings from pre-ROD activities and actions implemented since the 2001 five-year remedy review are summarized by site in Section 3.4 (Basis for Taking Action/Selected Remedy) and Table 5-1 of Section 5.0 (Progress Since Last Five-Year Review), respectively. Additional discussions regarding the current findings of the RA-O LTM program, occurrence of COCs, and groundwater and vapor monitoring data are provided below for OU-3 and ST-11, as well as a review of the Base's fuel management program. Data reviewed for the remaining sites have been adequately summarized in previous sections of this report and are therefore not repeated in this section.

6.4.1 ST-11 (Fuel Hydrant System Spill)

Fuel constituent compounds (BTEX) remain the COCs for site ST-11 at concentrations relatively unchanged during the semi-annual groundwater monitoring events for the preceding five-year period. Benzene concentrations at PZMW7, 8, and 15 consistently exceeded the MCL (5.0 µg/L). In addition, the benzene result for PZMW11 (32 µg/L) exceeded the MCL for the September 2005 sampling event. Analytical results for toluene, ethylbenzene, and total xylenes have remained relatively consistent at levels below their respective MCLs. Upward or downward trends in BTEX concentrations were not discernable upon review of the annual LTM reports from 2002 through 2005 (see summary of BTEX results in Table 6-1).

A layer of LNAPL (chemically typed as a weathered degraded JP-4 fuel) was observed floating on top of the perched water in one well (PZMW7) at the onset of perched zone monitoring in February 1994. The LNAPL layer was not observed again in PZMW7 until April 1998 and was repeatedly detected in PZMW7 during subsequent monitoring events through May 2001. The LNAPL layer was not observed again in PZMW7 until September 2005. The Base switched from JP-4 to JP-8 fuel in the 1990 to 1997 time frame, which suggests the LNAPL is from a pre-1990s release.

LNAPL was encountered at the water table in perched groundwater monitoring wells PZMW7, 12 and 15 during the September 2005 sampling event at 0.01, 0.60 and 0.54 feet, respectively. LNAPL has also been previously detected in PZMW8. The occurrence and thickness of LNAPL has varied between sampling events. In general, the occurrence or thickness of weathered JP-4 LNAPL does not appear to be declining at ST-11. IDEQ requires that the Air Force make every effort to remove LNAPL when present on the waters of the State. The Air Force will be implementing a product recovery program in 2006 to remove the product from the wells (RMC, 2006). According to the Draft 2005 Annual LTM Report, active remediation of the site and a focused evaluation of an air-based vapor extraction system (VES) and sparge system to remediate subsurface soils, perched groundwater, and shallow bedrock should also be considered for ST-11.

The perched zone wells at ST-11 have also been sampled for natural attenuation parameters including nitrate/nitrite, alkalinity, sulfate, methane, dissolved oxygen, oxygen-reduction potential (ORP), and ferrous iron (2000 through 2004). Results for these parameters have also remained consistent during the semi-annual sampling events. Analysis of natural attenuation parameters indicate degradation is occurring at a slow rate, but is not an effective remedial strategy due to the excessive time period required and associated monitoring costs. As of the spring 2005 sampling event, perched groundwater is no longer analyzed for natural attenuation parameters.

An assessment of water-level change in PZMW7 and sources of recharge to ST-11 was completed by USGS in March 2002. Findings from the 2002 study suggest a consistent and non-seasonal source of recharge to the perched water body at ST-11 since about 1999. However, no conclusive decision had been reached about the source, or sources, of water recharge at ST-11. Recharge is most likely from precipitation, since an inspection of the flight line storm drain line from the area upstream of site ST-11 to downstream near building 1330 was inspected and reported in October 2003 as either in fair or good condition. The storm drain line from near building 1330 to the outfall to the north was inspected and reported in March 2005. A section from northwest of building 1330 to east of the hush house was reported as needing immediate attention due to poor slope and holes/cracks in the pipe.

Two separate pumping tests per well were performed at perched groundwater monitoring wells PZMW8, PZMW14, and PZMW16 between March and September 2004 to establish the degree of connectivity, if any, between the perched zone wells. The pumping tests suggested little to no connectivity between the perched zone wells at ST-11.

An 8-hour vapor extraction pilot test was completed in August 2002 at ST-11. The vapor extraction pilot test consisted of two vapor extraction wells (VEW-1 and VEW-4) to extract air from and four vapor monitoring wells (VEW-2, -3, -5, and -6) to monitor vacuum pressure responses during three steps each at different vacuum rates. VEWs 1, 2, and 3 are screened in the soil horizon and VEWs 4, 5, and 6 are screened in the shallow bedrock. The 8-hour vapor extraction pilot test revealed that vacuum responses occurred quickly in outlying wells and across the soil-basalt contact, and recommended longer term constant rate tests to establish a basis for extrapolation of contaminant removal rates.

6.4.2 Fuel Management Program

There have been no significant changes to the Base's fuel management program since it was presented in the Final 2001 Five-Year Remedy Review Report (FEC, 2001), which discusses fuel operations including leak detection systems, inventory controls, secondary containment, and cathodic protection. The fuel inventory system for the Base includes procedures, requirements, and information contained in the following documents:

- Air Force Manual 23-110 Volume 1, Part 3
- DoD Manual 4140.25-M (general guidelines for inventory control procedures and accountability for fuel stored on base 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).
- 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 five-year review and changes to the fuel management program are presented in the following discussion.

During an annual Tracer Research (Praxair) sampling event for Tank 1, free product was detected in probe 9. The entire east side of this tank had detections of hydrocarbons, however only probe 9 had detected fuel. Tank 1 contained 1.3 million gallons of fuel when the release was detected. On October 9, 2001 as much fuel as possible was transferred to Tank 2, leaving approximately 744,000 gallons in Tank 1. On October 10, 2001, fuel remaining in Tank 1 was transferred to tanker trucks, aircraft and hydrant system tanks to further reduce the level of fuel in Tank 1. The release detected from POL Tank 1 was approximately 2,000 gallons of JP-8. Tank 1 was refurbished in the spring 2002, and passed an API 653 inspection prior to being placed back into service in June 2002 for fuel storage.

A Phase I investigation of the POL release was completed in December 2001 by Weston. Phase I sampling results indicated petroleum contamination in the soil berm surrounding Tank 1 and in the underlying bedrock. Concentrations of a number of solvents unrelated to the JP-8 release were detected by the Bioenvironmental Flight in a boring drilled to a total depth of 101 feet bgs during a Phase II investigation completed in June 2002 by Weston. Vapor monitoring well VW-1 was installed at this time. A Corrective Action Plan was approved by IDEQ in October 2003 and Alternative 1, Passive Free Product Skimming and Groundwater Monitoring, was

implemented in December 2003. Tank 1 is currently out of commission due to corrosion pits detected on the outside of the tank side walls during the ongoing comprehensive Engineering Evaluation for the east side of Tank 1. All of the contaminated soil encountered during the removal of a section of the Tank 1 concrete cap has been removed and landfarmed. The Naval Facilities Command (NAVFAC) team is currently evaluating whether Tank 1 should be repaired or removed.

The three 1.5-million gallon tanks (Tanks 1, 2, and 3) located at the POL Yard were last inspected in June 2002 (after completion of repair for the October 2001 leak in the upper tank shell), October 2002 (an out-of-service inspection), and December 2002 (after completion of maintenance and re-coating of the tank interior), respectively. Tank inspections were performed according to API 653. There have been no other repairs to the tanks since the 2002 work completed on Tank 3. The replacement of the three 1.5 million gallon POL tanks is tentatively scheduled for 2007.

In 2003, a Leak Manager Inventory Control (LMIC) Program was installed on the three 50,000 gallon JP-8 USTs at hydrant pump house B265 and the three main JP-8 bulk tanks. The six tanks are monitored continuously and tested monthly. The two de-fuel USTs are not on the Leak Manager program but funding has been requested from the Defense Energy Support Center (DESC) to get them on the LMIC program. Currently, the two USTs are monitored daily for inventory control and tested annually via the Tracer leak test.

The Base has implemented a leak detection program, which includes a tracer tightness test initiated in 1995. 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 includes 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 (Tracer, 1999). The pipeline is tested quarterly, and the three bulk tanks and 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. There have been no failures in the Tracer tests since 1995, and no identified leaks or unaccounted losses in the last five years, besides the Tank 1 release.

Automatic line leak detectors are not installed on any of the fuel lines, as previously reported in the 2001 Five-Year Remedy Review Report (FEC, 2001). An automatic alarm system was previously used on the hydrant laterals, but it was inoperative and therefore replaced by Tracer probes.

6.4.3 OU-3 (Base-Wide Regional Groundwater)

TCE remains the primary COC in the regional aquifer with the exception of fuel constituents detected in MW24. TCE detections at MW25 and MW35 have exceeded the Federal SDWA MCL for TCE (5 µg/L) since 2003 and 2004, respectively. During the most recent sampling event (September 2005), the highest concentrations of TCE in regional groundwater were again detected at MW35 (13 µg/L) and MW25 (7.3 µg/L). TCE concentrations in regional groundwater from other wells sampled during the 2005 LTM events were all below the MCL and

consistent with prior years' results. A chronology of TCE analytical results for regional groundwater samples, dating back to 1987, is presented in Table 6-2. Additional VOCs have been detected in the regional aquifer at concentrations below their corresponding drinking water MCLs. A summary of the prevalence of VOC detections reported for regional groundwater samples analyzed from 2002 through 2005 is provided in Table 6-3.

An LNAPL layer that was analyzed and found to be a weathered JP-4 was first detected in MW24 in August 2004; the fuel typing results are presented in the 2004 LTM Annual Report (RMC, 2005b). The LNAPL layer has appeared each of the last two years beginning in late summer through early fall, which corresponds to the seasonal water table low 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.

A product recovery system was installed at MW24 in December of 2004. As of November 16, 2005 a total of 83,981 gallons of water was pumped from MW24 through the oil-water separator and treated through GAC prior to being discharged to the Base waste-water treatment system. Although the product recovery pump intake was adjusted at least twice a month, in order to optimize product recovery, no measurable quantity of LNAPL has been recovered during 2005.

Samples of the MW24 discharge effluent were collected in February, September, and October 2005 at a sample port located after the oil-water separator but before the first GAC treatment unit. Effluent analytical results indicate the concentration of benzene declined from 25 µg/L in February 2005 to 0.51 µg/L in October 2005.

Water samples for inorganic and bacterial analysis were collected from MW24 in November 2005 to develop a strategy to treat a bacterial slime that has developed in the well since installation of the product recovery system. The results for the well chemistry and bacterial analysis indicate that water chemistry is oxidative and there is a diverse bacterial population in the water resulting in substantial biofouling in the well casing and near-well formation. When available, hydrocarbons will serve to stimulate biological growth within the well and formation. Therefore, chemical rehabilitation and continued treatment for disinfection may be considered, since the development of a bacterial slime in the well could affect the recovery of LNAPL in the product recovery pump.

6.4.4 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 and 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, 2002).

The six-month vapor monitoring program, initiated in 2002, constitutes the first comprehensive investigation of bedrock vapors that has been implemented at the Base. Conclusions reached

during field sampling and analysis of the analytical data generated during the six monthly vapor sampling events conducted September 2002 through February 2003 and subsequent semi-annual sampling events conducted in 2004 and 2005 include the following:

- No correlation appears to exist between barometric pressure and analytical contaminants detected during the vapor port monitoring events and the rate of the pressure change. During periods of barometric pressure drop, the vapor ports are observed to be strongly exhaling, and during periods of rising barometric pressure the vapor ports are observed to be inhaling, (i.e., there is an atmospheric pressure gradient between the permeable zone screened by each individual port and atmosphere, and the ports serve as conduits for equalization of the pressure). The relative percent difference between contaminant concentrations from vapor ports sampled during inhaling versus exhaling conditions were less than two percent for MW25-VP1 and 23 percent for MW25-VP2. The primary factor that must be considered during vapor sampling is to ensure the sampling pumps can maintain a constant flow rate and overcome negative pressure created during inhaling conditions.
- 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. 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 vapor contamination. 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 SD-24.
- Vapor sample results from the fall of 2004 and the spring and fall of 2005 indicate SD-24 is the primary source of TCE to the vadose zone vapors detected in the bedrock at the Base. Concentrations of TCE from MW27-VP1 screened from 64 to 79 feet bgs were reported at 95,000 parts per billion volume (ppb_v) for the September 2005 monitoring event. The concentration of TCE detected in the deep vapor port at MW27 (VP3) screened from 340 to 345 feet bgs was reported at 5,300 ppb_v. The existing vapor monitoring network at the Base has defined the western and southern extent of the vapor contamination; however, the northern and eastern extent of vapor contamination in the vadose zone is not well determined. The Air Force recommends installing an additional regional groundwater monitoring well (MW37) with at least three vapor ports approximately 2,000 feet northeast of MW27. This well would define the northern boundary of vapor contamination and provide an additional up-gradient groundwater monitoring location.
- The FFA team also recommends a pilot air VES be conducted in the vadose zone vapors in the vicinity of MW27 to determine the radius of influence of an extraction system in the regional basalts. This would require an additional vapor extraction well be drilled in the vicinity of MW27. The goal of the VES would be to remove VOC vapors from the vadose zone. In addition, the FFA team recommends that an indoor air vapor intrusion evaluation be completed. The vapor intrusion evaluation should evaluate the indoor air vapor intrusion

pathway and risk assessment calculations to determine whether there is a potential for bedrock vapors to infiltrate enclosed spaces and pose a potential human health risk.

- FT-08 has been identified as a potential secondary source of shallow vadose zone TCE contamination. TCE was detected in vapors from the middle vapor port of MW28, which is located within FT-08, at 990 ppb_v in the fall of 2004. All other regional wells with elevated bedrock vapor concentrations are located within the general vicinity of SD-24 and MW27. Upward or downward trends in organic vapor concentrations are not discernable upon review of the limited vapor sampling history at the Base (2002 through 2005, or less).

6.5 SITE INSPECTION

Findings from the initial site inspections completed in 2001 are presented in the Final Five-Year Remedy Review Report (FEC, 2001). Site visits were performed for several sites (FT-08, LF-02, SD-24, and ST-13) during the FFA Team meeting in October 2005. Since URS/RMC is currently performing the base-wide groundwater and vapor LTM activities and is knowledgeable of current site conditions, formal inspections of all sites addressed in this five-year review were not warranted. 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 analyses invalid. The current land use for all sites is industrial except site DP-18 which is located in an open field adjacent to base residential housing and is managed as residential, and site ST-31 which is planned as a recreational indoor running track which will be managed as commercial. Current uses are not anticipated to change within the next five years.

6.6 INTERVIEWS

Interviews were conducted with key Base personnel in the 366th Environmental Flight while conducting this five-year review. Mr. John Schleicher and Ms. Karen Wilson submitted questions regarding the fuel management program, which have been included as Appendix A, to Stephen Gowin, Chief Master Sergeant, Fuels Manager who in turn contacted Wes Wainwright, Liquid Fuels Manager Supervisor. Information obtain through interviews is presented throughout this document.

TABLE 6-1
SUMMARY OF PERCHED GROUNDWATER BTEX ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Well ID	Sample/ Monitoring Date	BTEX by Method SW8021B (µg/L)				Total BTEX
		BZ	T	E	X	
PZMW7	6/26/2002	**4900**	ND (20)	**140**	ND (20)	5040
	8/19/2002	**4200**	**20 J+**	**150**	ND (18)	4370
	9/28/2002	**2400**	ND (10)	**50**	**7.0 J-**	2457
	4/19/2003	**1700**	ND (25)	**86 J+**	**39**	1825
	10/4/2003	**4400 J1**	ND (10)	**180 J1**	**20 J1**	4600
	5/8/2004	**4500 J+**	**0.97 JB**	**150**	**22.5 J-**	4672.5
	10/31/2004	**4000**	ND (0.5)	**120**	**15**	4135
	4/23/2005	**4,600 D**	ND (0.5)	**170**	**35 JP**	4805
	9/24/2005	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
PZMW8	8/18/2002	**2500**	**7.4 J+**	**270**	**10**	2787
	9/28/2002	**3100**	ND (10)	**310**	**5.6 J-**	3416
	4/19/2003	**2500**	ND (50)	**370**	**33 J**	2903
	10/4/2003	**3300 J1**	ND (1.0)	**250 J1**	**8.2 J1**	3558
	5/8/2004	**2000J+**	**0.64 JB**	**270**	**3.8**	2273.8
	10/31/2004	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	4/23/2005	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	9/24/2005	**2100 D**	ND (5)	**190 D**	**3.4 JD**	2293.4
PZMW11	8/18/2002	**0.62**	**2.7 J+**	ND (1.0)	ND (1.0)	3
	9/29/2002	**1.1 J+**	**2958.88**	ND (1.0)	**1.1 J-**	2961
	4/19/2003	**14**	ND (1.0)	**21**	**2.1 J+**	37
	10/4/2003	**8.9 J1**	ND (1.0)	**15 J1**	**7.3 J1**	31
	5/8/2004	**3.9 J+**	**0.32 JB**	**5.4**	**2.5**	11.8
	10/31/2004	**2.4**	ND (0.5)	**4.9**	**5.8**	13.1
	4/23/2005	**2.3**	ND (0.5)	**3.9**	**2.5 JP**	8.7
	9/24/2005	**32**	ND (0.5)	**6.8**	ND (0.5)	38.8

TABLE 6-1 (CONTINUED)
SUMMARY OF PERCHED GROUNDWATER BTEX ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Well ID	Sample/ Monitoring Date	BTEX by Method SW8021B (µg/L)				Total BTEX
		BZ	T	E	X	
PZMW12	8/18/2002	**210**	**8.1 J+**	**270**	**160**	648
	9/28/2002	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	4/19/2003	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	10/5/2003	**150 J1**	ND (50)	**320 J1**	**67 J1**	537
	5/8/2004	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	10/31/2004	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	4/23/2005	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	9/24/2005	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
PZMW13	8/18/2002	**13**	**2.1 J-**	**3.4**	ND (1.0)	19
	9/28/2002	**4.6**	**1.2 J+**	**1.7**	**0.42 J+**	8
	4/19/2003	**7.9**	ND (1.0)	**13**	ND (1.0)	21
	10/5/2003	**0.62 J1**	ND (1.0)	**0.52 J, J1**	UJ (1.0)	1
	5/8/2004	ND (0.5)	**0.29 JB**	**0.17 J+**	**0.76 J-**	0.93
	10/31/2004	**0.36 J**	ND (0.5)	**0.26**	**0.82**	1.44
	4/23/2005	**0.34 J**	ND (0.5)	ND (0.5)	**1.67 JP**	2.01
	9/24/2005	**0.27 J**	**0.13 J**	ND (0.5)	ND (0.5)	0.4
PZMW14	8/18/2002	**19**	**2.7 J+**	ND (1.0)	ND (1.0)	22
	9/28/2002	**0.96**	**1.0 J-**	**0.27 J**	**0.47 J-**	3
	4/19/2003	**8.9**	ND (1.0)	**1.5 J+**	ND (1.0)	10
	10/5/2003	UJ (50)	ND (1.0)	UJ (1.0)	UJ (1.0)	----
	5/8/2004	**0.41 J+**	ND (1.0)	ND (1.0)	**0.53 J+**	0.94
	10/31/2004	ND (0.5)	**0.24 JB**	ND (1.0)	**0.55**	0.55
	4/23/2005	**0.25 J**	ND (0.5)	ND (0.5)	**0.94 J**	1.19
	9/24/2005	ND (0.5)	ND (0.5)	**0.3 J**	ND (0.5)	0.3
PZMW15	8/18/2002	----	----	----	----	----
	9/28/2002	----	----	----	----	----
	4/19/2003	**6700**	ND (100)	**310**	**1300**	8310
	10/5/2003	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	5/8/2004	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	10/31/2004	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	4/23/2005	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]
	9/24/2005	NS[2]	NS[2]	NS[2]	NS[2]	NS[2]

TABLE 6-1 (CONTINUED)
SUMMARY OF PERCHED GROUNDWATER BTEX ANALYTICAL RESULTS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Well ID	Sample/ Monitoring Date	BTEX by Method SW8021B (µg/L)				Total BTEX
		BZ	T	E	X	
PZMW16	8/18/2002	**1.9**	**6 J+**	**19**	**6.1 J+**	33
	9/29/2002	**2.2 J+**	**2.7 J-**	**17**	**1.9 J-**	24
	4/20/2003	**1.6 J+**	ND (1.0)	**12 J+**	**4.9 J+**	19
	10/5/2003	**7.5 J1**	ND (1.0)	**3.8 J1**	**1.3**	13
	5/8/2004	**1 J+**	**0.43 JB**	**1.9 J-**	**1.1**	4
	10/30/2004	**2.1 J+**	ND (0.5)	**6.2**	**1.7**	10
	4/24/2005	**0.93 JP**	ND (0.5)	**2.3**	**2.01 JP**	5.24
	9/25/2005	**1.8 J1**	UJ	**1.1 J1**	ND (0.5)	0.2
PZMW17	8/18/2002	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	9/29/2002	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	4/20/2003	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	10/5/2003	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	5/8/2004	NS[1]	NS[1]	NS[1]	NS[1]	NS[1]
	10/30/2004	**0.65**	ND (0.5)	**2.60**	**16.5 J-**	19.75
	4/24/2005	**0.56**	ND (0.5)	**2.20**	**12.70**	15.46
	9/25/2005	ND (0.5)	UJ	ND (0.5)	ND (0.5)	0.11

= Values exceed the MCL of 5 µg/L for benzene.

[1] = Not sampled due to insufficient volume of water present.

[2] = Not sampled due to the presence of LNAPL.

B = The result is an estimated value due to field blank contamination.

BZ = Benzene

D = The reported result is from a dilution

E = Ethylbenzene

Ft = feet

J = The result is an estimated value between the MDL and MRL.

J1 = Analyte was positively identified, but numerical value of concentration is approximate due to compromised quality control or inherent inability to analyze the sample (e.g., matrix effects).

J- = Estimated result with a low bias. See discussion in Groundwater Data Quality Report in Appendix B.

J+ = Estimated result with a high bias. See discussion in Groundwater Data Quality Report in Appendix B.

LNAPL = Light non-aqueous phase liquid

µg/L = micrograms per Liter

msl = mean sea level

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

NS = Not sampled

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

TABLE 6-2
CHRONOLOGY OF TRICHLOROETHENE REGIONAL GROUNDWATER ANALYTICAL RESULTS*
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Date Sampled	BPW1	BPW4	BPW5	BPW9	BPW12	MW7 7-2	MW11 11-2	MW16 16-2	MW17 17-2
1987 to 1994									
10/21/87	ND	ND							
11/12/87						ND			
12/27/88	0.5	0.90							
2/28/89	1.7	0.50							
4/6/89							1.50		
5/30/89	1.8	ND							
8/28/89	1.2	1							
10/17/89	1.5	1.20		1.20					
11/6/89	1.3	1.30		1.40					
12/18/89	0.9	1.60		1.40					
2/14/90	1.1	0.66		ND					
4/2/90	1.9	1.10	0.20	1.40			1.30		
5/2/90		1.10	0.20						
5/3/90	1.7								
6/21/90	1.6	1.20	0.20						
7/25/90		1.20	ND						
8/13/90			ND	2					
8/24/90	2.4	1.60							
9/21/90	1.5		ND						
10/16/90	1.7	1	0.20						
1/9/91	2.0	0.58		1.50					
2/13/91				1					
3/20/91				1.80					
7/11/91	14.7								
7/24/91		3.40		4.70					
8/20/91	1.88								
9/5/91	1.1	1		1.80					
11/21/91	1.9			2.10		0.20	1.30		
11/29/91			0.50						
12/8/91			ND	1.60					
12/10/91	1.8	1							
6/3/92								ND	ND
7/27/92		0.79		1.55					
10/28/92		0.90		1.75					
1/11/93		1.30		2.20					
5/18/93		1.00		2.40		ND	1.60	ND	ND
9/26/93		1.00				0.22		ND	
9/27/93				2.40			1.50		ND
9/29/93	1.9								
2/15/94	1.9	1.10		3.00		ND	2.70	ND	ND
5/15/96	2.2	1.30	5 U	2.80		5 U	5 U	5 U	5 U

TABLE 6-2 (CONTINUED)
CHRONOLOGY OF TRICHLOROETHENE REGIONAL GROUNDWATER ANALYTICAL RESULTS*
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

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
4/2/97	2.8	1 U	1 U	3		1 U	1.5	1 U	1 U						
12/3/97					0.7										
2/17/98					0.7										
4/29/98		NS**	1 U	3.2	1.1	1 U	2.5	1 U	1 U						
5/29/98	2.6														
10/07/98	1.8	NS	0.5 U	2.7	1.1	0.5 U	NS	0.5 U	0.5 U						
1/20/99	2.6	NS	0.5 U	2.6	0.9	0.5 U	NS	0.5 U	0.5 U						
4/13/99	2.5	1.3	0.5 U	2.6	0.9	0.5 U	NS	0.5 U	0.5 U						
7/20/99	1.6	1.7	0.5 U	0.5 U***	0.8	NS	NS	0.5 U	0.5 U						
4/05/00	2.0	1.8	0.5 U	2.3***	NS	0.5 U	1.0	0.5 U	0.5 U						
7/00 to 8/00****	NS	1.6	0.5 U	2.2	NS	NS	0.99	NS	NS	NS	1.6				
5/06/01	1.8	NS	0.5 U	2.3	NS	0.5 U	0.94	0.5 U	0.5 U	0.5 U	1.4				
10/09/01	1.4	NS	1 U	2	NS	0.15 J1	0.83 J1	NS	1 U	1 U	1.3				
6/27/02	1.9	NS	0.5 U	1.9	NS	0.17 J1	0.85	NS	0.5 U	0.5 U	2.2	1.3			
9/28/02	2.1	NS	0.5 U	2.0	NS	0.12 J1	1.0	0.5 U	0.5 U	0.5 U	1.9	1.8		3.3	2.1
4/20/03	2.4	NS	NS	2.1	NS	0.5 U	1.1	0.5 U	0.5 U	0.5 U	1.7	1.9	0.5 U	4.5	2
6/16/03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.1	0.10 U	6.6	NS
7/22/03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2.0	2.5 U	6.8	NS
8/19/03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.6	2.5 U	5.2	NS
10/3/03	1.9	1.7	NS	2.0	NS	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
5/7/04	NS	1.6	NS	NS	NS	0.21 J	1.0	0.5 U	0.5 U	0.5 U	1.8	1.2	2.5 U	5.4	1.8
10/28/04	NS	1.7	NS	NS	NS	0.18 J	1.3	0.5 U	0.5 U	0.5 U	2.2	1.5	NS	4.6	1.8
4/23/05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1.0	ND	5.1	1.7
9/24/05	NS	NS	NS	NS	NS	UJ	NS	UJ	UJ	UJ	NS	1.4	NS	7.3	1.7

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.

* = Results reported in micrograms per liter (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 reported results for TCE at 2.2 µg/L.

**** = 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.

ND = Not detected
NS = Not sampled
TCE = Trichloroethene
U = Not detected above the 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).

TABLE 6-2 (CONTINUED)
CHRONOLOGY OF TRICHLOROETHENE REGIONAL GROUNDWATER ANALYTICAL RESULTS*
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

Date Sampled	BPW2	MW18-2	MW27	MW28	MW29	MW30	MW31	MW32	MW33	MW34	MW35	MW36
5/7/04		0.18 J				1.4	0.59			1.4		2.7
8/19/04		NS			0.16 J	NS	NS	0.5 U		NS	8.8	NS
9/23/04		NS			NS	NS	NS	NS		NS	7.7	NS
10/28/04	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
4/23/05	NS	NS	1.6	1.4	0.33 J	1.5	0.29 J	ND	1.2	1.9	8.7	2.7
9/24/05	NS	NS	1.9	1.3	0.16 J	1.2	1.1	ND	1.3	1.7	13	2.7

* Results reported in micrograms per liter (parts per billion). Analytical results prior to May 15, 1996 are taken from Woodward-Clyde (1995).
NS = Not sampled
TCE = Trichloroethene
U = Not detected above the method reporting limit.

TABLE 6-4
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

76-13-1	Freon 113 (Trichlorotrifluoroethane)	13	13	100%	55	7.1
127-18-4	Tetrachloroethene	13	13	100%	86	13
79-01-6	Trichloroethene	13	13	100%	2,600	480
156-59-2	cis-1,2-Dichloroethene	13	12	92%	61	15
67-66-3	Chloroform	13	11	85%	28	5.6
75-69-4	Freon 11 (Trichlorofluoromethane)	13	11	85%	48	8.6
71-55-6	1,1,1-Trichloroethane	13	9	69%	17	3.1
75-15-0	Carbon Disulfide	13	7	54%	46	15
78-93-3	2-Butanone (MEK)	13	5	38%	9.9	3.4
67-64-1	Acetone	13	5	38%	56	24
56-23-5	Carbon Tetrachloride	13	5	38%	5.4	0.86
136777-61-2	m,p-Xylenes	13	5	38%	22	5.1
108-88-3	Toluene	13	3	23%	37	9.9
95-47-6	o-Xylene	13	2	15%	7.7	1.8
108-05-4	Vinyl Acetate	13	2	15%	11	3.2
75-34-3	1,1-Dichloroethane	13	3	10%	4	1
75-27-4	Bromodichloromethane	13	1	8%	19	2.8
108-90-7	Chlorobenzene	13	1	8%	33	7.2
100-41-4	Ethylbenzene	13	1	8%	6.8	1.6
71-43-2	Benzene	13	1	8%	9.1	2.8
75-69-4	Freon 11 (Trichlorofluoromethane)	13	13	100%	33	5.8
76-13-1	Freon 113 (Trichlorotrifluoroethane)	13	13	100%	44	5.8
127-18-4	Tetrachloroethene	13	13	100%	74	11
79-01-6	Trichloroethene	13	13	100%	1,400	270
71-55-6	1,1,1-Trichloroethane	13	11	85%	20	3.7
67-66-3	Chloroform	13	11	85%	18	3.6
124-48-1	Chlorodibromomethane	13	8	62%	41	4.8
136777-61-2	m,p-Xylenes	13	7	54%	53	12
56-23-5	Carbon Tetrachloride	13	7	54%	4.8	0.77
67-64-1	Acetone	13	6	46%	100	43
156-59-2	cis-1,2-Dichloroethene	13	5	39%	8	2
78-93-3	2-Butanone (MEK)	13	5	38%	71	24
108-88-3	Toluene	13	5	38%	45	12
75-15-0	Carbon Disulfide	13	4	31%	40	13
71-43-2	Benzene	13	3	23%	21	6.7
75-27-4	Bromodichloromethane	13	3	23%	34	5.1

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

				Prevalence		
95-47-6	o-Xylene	13	3	23%	7.2	1.7
108-05-4	Vinyl Acetate	13	3	23%	8.4	2.4
75-25-2	Tribromomethane	13	1	8%	5.9	0.57
95-63-6	1,2,4-Trimethylbenzene	5	5	100%	20,635	4,200
108-67-8	1,3,5-Trimethylbenzene	5	5	100%	29,970	6,100
100-41-4	Ethylbenzene	8	7	88%	2,300	1,100
71-43-2	Benzene	8	5	63%	702	220
127-18-4	Tetrachloroethene	19	11	58%	36	5.4
95-47-6	o-Xylene	8	4	50%	1,259	290
79-01-6	Trichloroethene	19	9	47%	22	4.1
136777-61-2	m,p-Xylenes	8	3	38%	3,666	830
67-66-3	Chloroform	19	4	21%	15	2.9
71-55-6	1,1,1-Trichloroethane	19	3	16%	14	2.5
71-55-6	1,1,1-Trichloroethane	8	8	100%	17	3.1
75-69-4	Freon 11 (Trichlorofluoromethane)	8	8	100%	42	7.5
76-13-1	Freon 113 (Trichlorotrifluoroethane)	8	8	100%	55	7.1
127-18-4	Tetrachloroethene	8	8	100%	150	22
79-01-6	Trichloroethene	8	8	100%	1,100	210
136777-61-2	m,p-Xylenes	8	5	63%	49	11
78-93-3	2-Butanone (MEK)	8	4	50%	11	3.6
67-64-1	Acetone	8	4	50%	36	15
67-66-3	Chloroform	8	4	50%	4.4	0.9
108-05-4	Vinyl Acetate	8	4	50%	8.7	2.5
95-47-6	o-Xylene	8	3	43%	29	6.7
75-15-0	Carbon Disulfide	8	3	38%	9.5	3.1
56-23-5	Carbon Tetrachloride	8	2	25%	1.4	0.23
95-50-1	1,2-Dichlorobenzene	8	1	13%	1.4	0.24
71-43-2	Benzene	8	1	13%	22	6.9
100-41-4	Ethylbenzene	8	1	13%	3.5	0.81
108-10-1	Methyl Isobutyl Ketone	8	1	13%	1.7	0.41
100-42-5	Styrene (Monomer)	8	1	13%	2.6	0.61
108-88-3	Toluene	8	1	13%	41	11
108-05-4	Vinyl Acetate	8	1	13%	2.7	0.76

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

76-13-1	Freon 113 (Trichlorotrifluoroethane)	8	8	100%	58	7.5
79-01-6	Trichloroethene	8	8	100%	5,700	1,100
71-55-6	1,1,1-Trichloroethane	8	6	75%	17	3.1
78-93-3	2-Butanone (MEK)	8	7	88%	51	17
67-64-1	Acetone	8	6	75%	91	38
67-66-3	Chloroform	8	6	86%	11	2.3
75-69-4	Freon 11 (Trichlorofluoromethane)	8	7	88%	38	6.7
136777-61-2	m,p-Xylenes	8	5	63%	17	3.9
127-18-4	Tetrachloroethene	8	7	88%	150	23
75-15-0	Carbon Disulfide	8	5	63%	62	20
56-23-5	Carbon Tetrachloride	8	4	50%	2.3	0.36
156-59-2	cis-1,2-Dichloroethene	8	4	50%	77	19
95-47-6	o-Xylene	8	3	38%	5.1	1.2
108-88-3	Toluene	8	3	38%	20	5.2
108-05-4	Vinyl Acetate	8	2	25%	6.3	1.8
106-46-7	1,4-Dichlorobenzene	8	1	13%	3.3	0.54
71-43-2	Benzene	8	1	13%	8.6	2.7
75-00-3	Chloroethane	8	1	13%	1.4	0.53
74-87-3	Chloromethane	8	1	13%	4	1.9
100-41-4	Ethylbenzene	8	1	13%	1.9	0.44
75-09-2	Methylene Chloride	8	1	13%	14	4
75-01-4	Vinyl Chloride	8	1	13%	1.7	0.68
95-63-6	1,2,4-Trimethylbenzene	5	5	100%	113,000	23,000
108-67-8	1,3,5-Trimethylbenzene	5	5	100%	108,090	22,000
71-43-2	Benzene	6	5	83%	23,626	7,400
100-41-4	Ethylbenzene	6	5	83%	28,642	6,600
136777-61-2	m,p-Xylenes	6	5	83%	251,694	58,000
95-47-6	o-Xylene	6	5	83%	65,094	15,000
127-18-4	Tetrachloroethene	13	7	54%	46	6.8
79-01-6	Trichloroethene	13	7	54%	140	26
71-55-6	1,1,1-Trichloroethane	13	4	31%	7.8	3.3
108-88-3	Toluene	6	1	25%	640	170
67-66-3	Chloroform	13	3	23%	10	2.1
156-59-2	cis-1,2-Dichloroethene	13	13	100%	710	180
79-01-6	Trichloroethene	13	13	100%	5,700	1,100

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

76-13-1	Freon 113 (Trichlorotrifluoroethane)	13	10	77%	43	5.6
71-55-6	1,1,1-Trichloroethane	13	10	77%	35	6.4
127-18-4	Tetrachloroethene	13	10	77%	63	9.3
67-66-3	Chloroform	13	4	31%	19	3.8
75-15-0	Carbon Disulfide	13	4	31%	46	15
67-64-1	Acetone	13	3	23%	100	42
136777-61-2	m,p-Xylenes	13	3	23%	67	15
75-69-4	Freon 11 (Trichlorofluoromethane)	13	3	23%	19	3.5
78-93-3	2-Butanone (MEK)	13	2	15%	32	11
75-34-3	1,1-Dichloroethane	13	2	15%	12	2.9
71-43-2	Benzene	13	2	15%	17	5.3
108-88-3	Toluene	13	2	15%	62	16
108-05-4	Vinyl Acetate	13	2	15%	9.3	2.6
75-35-4	1,1-Dichloroethylene	11	1	9%	1.4	0.35
100-41-4	Ethylbenzene	13	1	8%	11	2.6
541-73-1	M-Dichlorobenzene	13	1	8%	6.6	1.1
75-09-2	Methylene Chloride	13	1	8%	2	0.58
95-47-6	o-Xylene	13	1	8%	12	2.7
156-60-5	Trans-1,2-Dichloroethylene	13	1	8%	2.2	0.57
56-23-5	Carbon Tetrachloride	13	1	8%	1.6	0.25
79-01-6	Trichloroethene	14	14	100%	5,900	1,200
156-59-2	cis-1,2-Dichloroethene	13	12	92%	410	100
127-18-4	Tetrachloroethene	14	7	50%	67	9.8
76-13-1	Freon 113 (Trichlorotrifluoroethane)	13	6	46%	40	5.2
67-66-3	Chloroform	14	4	29%	23	4.8
67-64-1	Acetone	12	3	25%	650	270
71-55-6	1,1,1-Trichloroethane	14	3	21%	35	6.3
78-93-3	2-Butanone (MEK)	12	2	17%	46	15
136777-61-2	m,p-Xylenes	13	2	15%	110	26
95-47-6	o-Xylene	13	2	15%	34	7.8
108-88-3	Toluene	13	2	15%	68	18
75-15-0	Carbon Disulfide	12	1	8%	9.4	3
100-42-5	Styrene (Monomer)	12	1	8%	5	1.2
71-43-2	Benzene	13	1	8%	37	12
100-41-4	Ethylbenzene	13	1	8%	11	2.5
541-73-1	M-Dichlorobenzene	13	1	8%	6.6	1.1

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

75-09-2	Methylene Chloride	13	1	8%	5.1	1.5
75-15-0	Carbon Disulfide	13	13	100%	32	10
75-69-4	Freon 11 (Trichlorofluoromethane)	13	13	100%	77	14
67-64-1	Acetone	13	12	92%	130	55
76-13-1	Freon 113 (Trichlorotrifluoroethane)	13	12	92%	108	3.9
127-18-4	Tetrachloroethene	13	12	92%	13	1.8
79-01-6	Trichloroethene	13	12	92%	24	4.5
71-55-6	1,1,1-Trichloroethane	13	11	85%	2.8	0.52
78-93-3	2-Butanone (MEK)	13	11	85%	35	12
136777-61-2	m,p-Xylenes	13	10	77%	38	8.8
108-88-3	Toluene	13	8	62%	35	9.3
108-05-4	Vinyl Acetate	13	6	46%	7.4	2.1
95-47-6	o-Xylene	13	5	36%	11	2.5
91-20-3	Naphthalene	11	2	18%	4.2	0.8
75-35-4	1,1-Dichloroethylene	13	1	8%	25	6.4
71-43-2	Benzene	13	2	8%	3.2	1
100-41-4	Ethylbenzene	13	1	8%	3.6	0.83
10061-01-5	cis-1,3-Dichloropropene	13	1	8%	2.1	0.46
75-09-2	Methylene Chloride	13	1	8%	25	7.3
56-23-5	Carbon Tetrachloride	13	1	8%	2.1	0.34
75-69-4	Freon 11 (Trichlorofluoromethane)	13	13	100%	46	8.2
75-15-0	Carbon Disulfide	13	12	92%	29	9.3
76-13-1	Freon 113 (Trichlorotrifluoroethane)	13	12	92%	62	4.6
127-18-4	Tetrachloroethene	13	12	92%	20	2.9
79-01-6	Trichloroethene	13	12	92%	24	4.5
71-55-6	1,1,1-Trichloroethane	13	11	85%	2.8	0.52
67-64-1	Acetone	13	11	85%	57	24
78-93-3	2-Butanone (MEK)	13	10	77%	25	8.5
136777-61-2	m,p-Xylenes	13	8	62%	34	7.8
67-66-3	Chloroform	13	7	54%	47	9.5
108-05-4	Vinyl Acetate	13	5	39%	8.6	2.5
108-88-3	Toluene	13	5	39%	12	3.1
95-47-6	o-Xylene	13	4	31%	8.9	2
91-20-3	Naphthalene	11	3	27%	5.1	0.97
71-43-2	Benzene	13	3	23%	2.4	0.76

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

75-27-4	Bromodichloromethane	13	2	15%	1.6	0.24
74-87-3	Chloromethane	13	2	15%	1.7	0.82
591-78-6	Methyl N-Butyl Ketone	13	1	8%	3.1	0.75
75-25-2	Tribromomethane	13	1	8%	17	1.7
100-41-4	Ethylbenzene	13	1	8%	2.7	0.61
108-67-8	1,3,5-Trimethylbenzene	4	4	100%	12,774	2,600
95-63-6	1,2,4-Trimethylbenzene	4	3	75%	13,265	2,700
136777-61-2	m,p-Xylenes	7	5	71%	5,880	4,200
67-64-1	Acetone	3	2	66%	5,700	2,400
79-01-6	Trichloroethene	12	7	58%	52	9.6
127-18-4	Tetrachloroethene	12	6	50%	25	3.7
71-43-2	Benzene	7	3	43%	2,011	630
100-41-4	Ethylbenzene	7	3	43%	2,560	1,600
75-71-8	Freon 12 (Dichlorodifluoromethane)	4	1	25%	64	13
71-55-6	1,1,1-Trichloroethane	14	2	14%	24	4.4
67-66-3	Chloroform	12	1	8%	14	2.9
156-59-2	cis-1,2-Dichloroethene	3	3	100%	195,500	50,000
79-01-6	Trichloroethene	3	3	100%	526,153	95,000
75-15-0	Carbon Disulfide	3	1	33%	440	140
136777-61-2	m,p-Xylenes	3	1	33%	340	78
156-59-2	cis-1,2-Dichloroethene	3	3	100%	2,200	560
127-18-4	Tetrachloroethene	3	3	100%	82	12
79-01-6	Trichloroethene	3	3	100%	12,857	1,400
71-55-6	1,1,1-Trichloroethane	3	2	66%	42	7.7
75-34-3	1,1-Dichloroethane	3	2	66%	37	8.9
67-66-3	Chloroform	3	1	33%	21	4.2
75-15-0	Carbon Disulfide	3	1	33%	24	7.6
108-05-4	Vinyl Acetate	3	1	33%	16	4.6
71-43-2	Benzene	3	1	33%	15	4.7
156-59-2	cis-1,2-Dichloroethene	3	3	100%	1,500	390
79-01-6	Trichloroethene	3	3	100%	28,538	5,300
67-66-3	Chloroform	3	1	33%	11	2.3

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

CAS No	Analyte	Number of		Prevalence	Maximum Concentration	
		Samples	Detections		($\mu g/m^3$)	(ppb_v)
MW28-VP1						
79-01-6	Trichloroethene	3	3	100%	4,800	890
67-66-3	Chloroform	3	2	66%	91	19
75-15-0	Carbon Disulfide	3	1	33%	5	1.6
108-05-4	Vinyl Acetate	3	1	33%	5.7	1.6
75-69-4	Freon 11 (Trichlorofluoromethane)	3	1	33%	9.3	1.6
MW28-VP2						
67-66-3	Chloroform	3	3	100%	120	25
156-59-2	cis-1,2-Dichloroethene	3	3	100%	150	38
75-71-8	Freon 12 (Dichlorodifluoromethane)	1	1	100%	64	13
79-01-6	Trichloroethene	3	3	100%	5,317	990
75-69-4	Freon 11 (Trichlorofluoromethane)	3	2	66%	20	3.6
75-15-0	Carbon Disulfide	3	1	33%	17	5.5
MW28-VP3						
75-71-8	Freon 12 (Dichlorodifluoromethane)	1	1	100%	153	31
79-01-6	Trichloroethene	3	3	100%	2,470	460
67-66-3	Chloroform	3	2	66%	49	10
75-69-4	Freon 11 (Trichlorofluoromethane)	3	2	66%	90	16
136777-61-2	m,p-Xylenes	3	1	33%	18	4
108-88-3	Toluene	3	1	33%	7.8	2.1
95-47-6	o-Xylene	3	1	33%	7	1.6
75-15-0	Carbon Disulfide	3	1	33%	17	5.5
MW29-VP1						
71-55-6	1,1,1-Trichloroethane	4	4	100%	31	5.6
75-15-0	Carbon Disulfide	4	4	100%	75	24
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	615	110
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	864	110
127-18-4	Tetrachloroethene	4	4	100%	55	8
79-01-6	Trichloroethene	4	4	100%	32	5.7
108-05-4	Vinyl Acetate	4	4	100%	23	6.7
75-34-3	1,1-Dichloroethane	4	3	75%	2	0.49
78-93-3	2-Butanone (MEK)	4	3	75%	16	5.3
67-64-1	Acetone	4	3	75%	25	11
75-09-2	Methylene Chloride	4	3	75%	4.2	1.2
75-35-4	1,1-Dichloroethylene	4	2	50%	1.9	0.48
71-43-2	Benzene	4	1	25%	1.7	0.53
MW29-VP2						
71-55-6	1,1,1-Trichloroethane	4	4	100%	19	3.6

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

CAS No	Analyte	Number of		Prevalence	Maximum Concentration	
		Samples	Detections		($\mu g/m^3$)	(ppb_v)
MW29-VP2	**(continued)**					
78-93-3	2-Butanone (MEK)	4	4	100%	4.7	1.6
67-64-1	Acetone	4	4	100%	52	22
75-15-0	Carbon Disulfide	4	4	100%	29	9.3
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	497	67
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	89	12
127-18-4	Tetrachloroethene	4	4	100%	25	3.8
79-01-6	Trichloroethene	4	4	100%	2.9	0.54
108-05-4	Vinyl Acetate	4	3	75%	26	7.4
71-43-2	Benzene	4	2	50%	1.5	0.47
108-88-3	Toluene	4	1	25%	2.2	0.58
136777-61-2	m,p-Xylenes	4	1	25%	3	0.58
78-93-3	2-Butanone (MEK)	4	4	100%	14	4.9
67-64-1	Acetone	4	4	100%	42	18
75-15-0	Carbon Disulfide	4	4	100%	170	56
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	118	21
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	164	21
79-01-6	Trichloroethene	4	4	100%	27	4.9
71-43-2	Benzene	4	3	75%	8.6	2.8
108-05-4	Vinyl Acetate	4	2	50%	89	25
127-18-4	Tetrachloroethene	4	2	50%	2.2	0.33
74-87-3	Chloromethane	4	1	25%	1.8	0.85
91-20-3	Naphthalene	4	1	25%	32	6
136777-61-2	m,p-Xylenes	4	1	25%	5	1
108-88-3	Toluene	4	1	25%	4.2	1.1
95-47-6	o-Xylene	4	1	25%	1.5	0.34
71-55-6	1,1,1-Trichloroethane	4	4	100%	23	4.2
56-23-5	Carbon Tetrachloride	4	4	100%	27	4.3
67-66-3	Chloroform	4	4	100%	49	10
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	180	31
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	245	31
127-18-4	Tetrachloroethene	4	4	100%	280	41
79-01-6	Trichloroethene	4	4	100%	1,706	320
156-59-2	cis-1,2-Dichloroethene	4	3	75%	4	1
75-15-0	Carbon Disulfide	4	2	50%	19	6
78-93-3	2-Butanone (MEK)	4	2	50%	3.2	1.1

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

CAS No	Analyte	Number of		Prevalence	Maximum Concentration	
		Samples	Detections		($\mu g/m^3$)	(ppb_v)
MW30-VP1	**(continued)**					
67-64-1	Acetone	4	2	50%	28	12
108-05-4	Vinyl Acetate	4	2	50%	17	2
108-88-3	Toluene	4	1	25%	1.8	0.47
71-55-6	1,1,1-Trichloroethane	4	4	100%	9.2	1.7
56-23-5	Carbon Tetrachloride	4	4	100%	7	1.1
67-66-3	Chloroform	4	4	100%	7.1	1.4
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	37	6.7
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	71	9.3
127-18-4	Tetrachloroethene	4	4	100%	220	32
79-01-6	Trichloroethene	4	4	100%	420	78
67-64-1	Acetone	4	3	75%	17	7.3
136777-61-2	m,p-Xylenes	4	2	50%	16	3.7
95-47-6	o-Xylene	4	2	50%	13	3
78-93-3	2-Butanone (MEK)	4	1	25%	4.3	1.4
75-15-0	Carbon Disulfide	4	1	25%	37	12
100-41-4	Ethylbenzene	4	1	25%	2.9	0.67
108-88-3	Toluene	4	1	25%	3	0.81
108-05-4	Vinyl Acetate	4	1	25%	7.4	2.1
79-01-6	Trichloroethene	3	3	100%	141	26
127-18-4	Tetrachloroethene	3	3	100%	113	17
67-64-1	Acetone	3	3	100%	27	11
76-13-1	Freon 113 (Trichlorotrifluoroethane)	3	3	100%	20	2.6
75-69-4	Freon 11 (Trichlorofluoromethane)	3	3	100%	14	2.6
75-15-0	Carbon Disulfide	3	3	100%	12.2	3.8
67-66-3	Chloroform	3	3	100%	4	0.87
56-23-5	Carbon Tetrachloride	3	3	100%	2.7	0.44
108-05-4	Vinyl Acetate	3	2	66%	4.3	1.2
78-93-3	2-Butanone (MEK)	3	2	66%	3.5	1.2
108-88-3	Toluene	3	1	33%	3.4	0.89
136777-61-2	m,p-Xylenes	3	1	33%	2	0.37
71-55-6	1,1,1-Trichloroethane	3	1	33%	1.6	0.29
71-55-6	1,1,1-Trichloroethane	4	4	100%	21	3.9
75-15-0	Carbon Disulfide	4	4	100%	41	13
67-66-3	Chloroform	4	4	100%	17	3.6

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

CAS No	Analyte	Number of		Prevalence	Maximum Concentration	
		Samples	Detections		($\mu g/m^3$)	(ppb_v)
MW31-VP1	**(continued)**					
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	370	65
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	182	24
127-18-4	Tetrachloroethene	4	4	100%	22	3.2
79-01-6	Trichloroethene	4	4	100%	120	22
78-93-3	2-Butanone (MEK)	4	2	50%	169	57
67-64-1	Acetone	4	2	50%	53	22
108-05-4	Vinyl Acetate	4	1	25%	2	0.57
71-55-6	1,1,1-Trichloroethane	4	4	100%	6	1.1
78-93-3	2-Butanone (MEK)	4	4	100%	5.2	1.8
67-64-1	Acetone	4	4	100%	25	11
75-15-0	Carbon Disulfide	4	4	100%	30	9.6
74-87-3	Chloromethane	4	2	100%	1.9	0.93
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	170	30
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	229	30
127-18-4	Tetrachloroethene	4	4	100%	7.6	1.1
79-01-6	Trichloroethene	4	4	100%	130	24
108-05-4	Vinyl Acetate	4	3	75%	5.2	1.5
67-66-3	Chloroform	4	2	50%	1.8	0.38
75-00-3	Chloroethane	4	1	25%	1.6	0.62
591-78-6	Methyl N-Butyl Ketone	4	1	25%	1.4	0.33
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	161	29
67-64-1	Acetone	4	3	75%	29	12
75-15-0	Carbon Disulfide	4	3	75%	6.7	2.2
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	3	75%	35	4.6
79-01-6	Trichloroethene	4	3	75%	54	10
71-43-2	Benzene	4	2	50%	2.9	0.92
74-87-3	Chloromethane	4	2	50%	1.7	0.84
108-88-3	Toluene	4	2	50%	1.7	0.46
71-55-6	1,1,1-Trichloroethane	4	2	50%	3	0.53
78-93-3	2-Butanone (MEK)	4	2	50%	2.9	0.97
67-66-3	Chloroform	4	2	50%	3	0.59
156-59-2	cis-1,2-Dichloroethene	4	2	50%	1.3	0.36
127-18-4	Tetrachloroethene	4	2	50%	8.8	1.3
108-05-4	Vinyl Acetate	4	2	50%	12	3.5
591-78-6	Methyl N-Butyl Ketone	4	1	25%	1.8	0.44

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

75-09-2	Methylene Chloride	4	1	25%	1.6	0.45
71-55-6	1,1,1-Trichloroethane	4	4	100%	6	1.1
75-34-3	1,1-Dichloroethane	4	4	100%	10.3	2.5
67-64-1	Acetone	4	4	100%	180	75
75-15-0	Carbon Disulfide	4	4	100%	87	28
156-59-2	cis-1,2-Dichloroethene	4	4	100%	75	19
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	2.6	0.47
75-09-2	Methylene Chloride	4	4	100%	4	1.1
79-01-6	Trichloroethene	4	4	100%	427	78
107-06-2	1,2-Dichloroethane	4	3	75%	1.6	0.39
78-93-3	2-Butanone (MEK)	4	3	75%	3.7	1.3
67-66-3	Chloroform	4	3	75%	9.8	2
108-88-3	Toluene	4	2	50%	3.7	1
75-01-4	Vinyl Chloride	4	2	50%	2	0.77
71-43-2	Benzene	4	1	25%	3	1
75-00-3	Chloroethane	4	1	25%	2.6	1
74-87-3	Chloromethane	4	1	25%	4.4	2.2
136777-61-2	m,p-Xylenes	4	1	25%	2.1	0.49
108-05-4	Vinyl Acetate	4	1	25%	5.3	1.5
71-55-6	1,1,1-Trichloroethane	4	4	100%	7.8	1.4
75-34-3	1,1-Dichloroethane	4	4	100%	12	2.9
67-66-3	Chloroform	4	4	100%	7.9	1.6
156-59-2	cis-1,2-Dichloroethene	4	4	100%	170	44
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	8.6	1.5
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	4.5	0.59
127-18-4	Tetrachloroethene	4	4	100%	11	1.5
79-01-6	Trichloroethene	4	4	100%	1,100	200
107-06-2	1,2-Dichloroethane	4	3	75%	5.5	1.4
67-64-1	Acetone	4	3	75%	33	14
75-15-0	Carbon Disulfide	4	3	75%	40	13
108-05-4	Vinyl Acetate	4	2	50%	3.8	1.1
78-93-3	2-Butanone (MEK)	4	2	50%	4.2	1.4
136777-61-2	m,p-Xylenes	4	1	25%	4.6	1.1
108-88-3	Toluene	4	1	25%	2.1	0.56

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

CAS No	Analyte	Number of		Prevalence	Maximum Concentration	
		Samples	Detections		($\mu g/m^3$)	(ppb_v)
MW32-VP3						
71-55-6	1,1,1-Trichloroethane	4	4	100%	8.2	1.5
75-34-3	1,1-Dichloroethane	4	4	100%	15	3.7
67-64-1	Acetone	4	4	100%	180	78
67-66-3	Chloroform	4	4	100%	6.1	1.3
156-59-2	cis-1,2-Dichloroethene	4	4	100%	187	49
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	7.1	1.3
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	7.7	1
127-18-4	Tetrachloroethene	4	4	100%	11	1.6
79-01-6	Trichloroethene	4	4	100%	1152	220
78-93-3	2-Butanone (MEK)	4	3	75%	4.9	1.7
75-15-0	Carbon Disulfide	4	3	75%	52	17
107-06-2	1,2-Dichloroethane	4	3	75%	6.1	1.5
71-43-2	Benzene	4	2	50%	5.1	1.6
108-05-4	Vinyl Acetate	4	2	50%	23	6.3
75-00-3	Chloroethane	4	1	25%	1.5	0.56
74-87-3	Chloromethane	4	1	25%	2.1	1
136777-61-2	m,p-Xylenes	4	1	25%	1.8	0.41
108-88-3	Toluene	4	1	25%	2	0.52
156-59-2	cis-1,2-Dichloroethene	3	3	100%	1,200	310
127-18-4	Tetrachloroethene	3	3	100%	667	97
79-01-6	Trichloroethene	3	3	100%	15,000	2800
67-66-3	Chloroform	3	2	66%	69	14
75-69-4	Freon 11 (Trichlorofluoromethane)	3	1	33%	70	13
71-55-6	1,1,1-Trichloroethane	3	1	33%	78	14
127-18-4	Tetrachloroethene	3	3	100%	230	34
79-01-6	Trichloroethene	3	3	100%	2,500	460
75-69-4	Freon 11 (Trichlorofluoromethane)	3	2	66%	36	6.3
71-55-6	1,1,1-Trichloroethane	3	2	66%	24	4.4
67-66-3	Chloroform	3	2	66%	37	7.5
75-15-0	Carbon Disulfide	2	1	50%	11	3.4
127-18-4	Tetrachloroethene	3	3	100%	89	13
79-01-6	Trichloroethene	3	3	100%	1,700	320
75-69-4	Freon 11 (Trichlorofluoromethane)	3	2	66%	17	3
67-66-3	Chloroform	3	2	66%	73	15

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

75-15-0	Carbon Disulfide	2	1	50%	4	1.3
56-23-5	Carbon Tetrachloride	3	1	33%	3.6	0.58
108-88-3	Toluene	3	1	33%	3.4	0.89
71-55-6	1,1,1-Trichloroethane	3	1	33%	6.4	1.2
71-55-6	1,1,1-Trichloroethane	4	4	100%	85	16
75-35-4	1,1-Dichloroethylene	4	4	100%	17	4.3
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	1,413	250
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	1944	250
127-18-4	Tetrachloroethene	4	4	100%	58	8.6
79-01-6	Trichloroethene	4	4	100%	39	7.2
75-34-3	1,1-Dichloroethane	4	3	75%	2.7	0.68
75-15-0	Carbon Disulfide	4	3	75%	24	7.6
67-66-3	Chloroform	4	3	75%	2.5	0.51
78-93-3	2-Butanone (MEK)	4	1	25%	3.9	1.3
67-64-1	Acetone	4	1	25%	21	8.8
108-05-4	Vinyl Acetate	4	1	25%	3.6	1
71-55-6	1,1,1-Trichloroethane	4	4	100%	31	5.7
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	947	170
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	1292	170
127-18-4	Tetrachloroethene	4	4	100%	17	2.6
79-01-6	Trichloroethene	4	4	100%	53	10
75-35-4	1,1-Dichloroethylene	4	3	75%	6.5	1.6
67-64-1	Acetone	4	3	75%	30	13
75-15-0	Carbon Disulfide	4	3	75%	14	4.4
108-05-4	Vinyl Acetate	4	3	75%	4	1.1
79-34-5	1,1,2,2-Tetrachloroethane	4	1	50%	3.9	0.56
78-93-3	2-Butanone (MEK)	4	2	50%	4.5	1.5
67-66-3	Chloroform	4	2	50%	3.4	0.67
71-55-6	1,1,1-Trichloroethane	4	4	100%	34	6.2
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	880	160
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	1280	160
127-18-4	Tetrachloroethene	4	4	100%	28	4.3
79-01-6	Trichloroethene	4	4	100%	59	11
107-06-2	1,2-Dichloroethane	4	3	75%	3.3	0.82

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

CAS No	Analyte	Number of		Prevalence	Maximum Concentration	
		Samples	Detections		($\mu g/m^3$)	(ppb_v)
MW34-VP3	**(continued)**					
75-15-0	Carbon Disulfide	4	3	75%	13	4.3
67-64-1	Acetone	4	3	75%	42	18
75-00-3	Chloroethane	4	2	50%	2.4	0.9
75-34-3	1,1-Dichloroethane	4	2	50%	2	0.48
75-35-4	1,1-Dichloroethylene	4	2	50%	12	3.1
78-93-3	2-Butanone (MEK)	4	2	50%	8.2	2.8
67-66-3	Chloroform	4	2	50%	3.4	0.64
91-20-3	Naphthalene	4	2	50%	51	9.8
108-05-4	Vinyl Acetate	4	1	25%	2.1	0.61
136777-61-2	m,p-Xylenes	4	1	25%	2	0.46
100-41-4	Ethylbenzene	4	1	25%	1	0.33
95-47-6	o-Xylene	4	1	25%	1.4	0.32
108-88-3	Toluene	4	1	25%	42	11
75-01-4	Vinyl Chloride	4	1	25%	1.9	0.74
71-55-6	1,1,1-Trichloroethane	4	4	100%	49	9
67-66-3	Chloroform	4	4	100%	23	4.7
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	250	44
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	300	40
127-18-4	Tetrachloroethene	4	4	100%	498	73
79-01-6	Trichloroethene	4	4	100%	3,094	570
56-23-5	Carbon Tetrachloride	4	3	75%	26	4.2
75-15-0	Carbon Disulfide	4	2	50%	20	6.5
156-59-2	cis-1,2-Dichloroethene	4	3	50%	18	4.6
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	200	26
127-18-4	Tetrachloroethene	4	4	100%	551	81
79-01-6	Trichloroethene	4	4	100%	6,100	1,100
71-55-6	1,1,1-Trichloroethane	4	3	75%	59	11
56-23-5	Carbon Tetrachloride	4	3	75%	21	3.5
67-66-3	Chloroform	4	3	75%	81	16
156-59-2	cis-1,2-Dichloroethene	4	3	75%	107	21
75-69-4	Freon 11 (Trichlorofluoromethane)	4	3	75%	150	26
75-15-0	Carbon Disulfide	4	1	25%	14	4.5
67-66-3	Chloroform	4	4	100%	24	5.1
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	100	14

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

CAS No	Analyte	Number of		Prevalence	Maximum Concentration	
		Samples	Detections		($\mu g/m^3$)	(ppb_v)
MW35-VP3	**(continued)**					
127-18-4	Tetrachloroethene	4	4	100%	118	17
79-01-6	Trichloroethene	4	4	100%	2,423	450
156-59-2	cis-1,2-Dichloroethene	4	3	75%	16	4
75-69-4	Freon 11 (Trichlorofluoromethane)	4	3	75%	12	2.1
71-55-6	1,1,1-Trichloroethane	4	3	50%	8	9.6
75-15-0	Carbon Disulfide	4	2	50%	27	8.8
56-23-5	Carbon Tetrachloride	4	2	50%	6	1
108-05-4	Vinyl Acetate	4	1	25%	4.5	1.3
67-64-1	Acetone	4	1	25%	32	13
56-23-5	Carbon Tetrachloride	4	4	100%	52	8.3
67-66-3	Chloroform	4	4	100%	36	7.3
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	47	8.3
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	710	92
127-18-4	Tetrachloroethene	4	4	100%	110	16
79-01-6	Trichloroethene	4	4	100%	1116	210
75-15-0	Carbon Disulfide	4	3	75%	77	25
71-55-6	1,1,1-Trichloroethane	4	3	75%	6	1.1
136777-61-2	m,p-Xylenes	4	3	75%	15	3.4
67-64-1	Acetone	4	2	50%	52	22
108-05-4	Vinyl Acetate	4	2	50%	48	14
78-93-3	2-Butanone (MEK)	4	2	50%	9.2	3.1
108-88-3	Toluene	4	2	50%	48	13
71-43-2	Benzene	4	1	25%	90	28
74-87-3	Chloromethane	4	1	25%	9.6	4.6
100-41-4	Ethylbenzene	4	1	25%	35	8.1
91-20-3	Naphthalene	4	1	25%	97	18
100-42-5	Styrene (Monomer)	4	1	25%	130	31
71-55-6	1,1,1-Trichloroethane	4	4	100%	4	0.72
56-23-5	Carbon Tetrachloride	4	4	100%	62	10
67-66-3	Chloroform	4	4	100%	32	6.6
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	35	6.2
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	740	96
127-18-4	Tetrachloroethene	4	4	100%	171	25
79-01-6	Trichloroethene	4	4	100%	1038	190
75-15-0	Carbon Disulfide	4	2	50%	11	3.4

TABLE 6-4 (CONTINUED)
SUMMARY OF PREVALENCE OF VAPOR DETECTIONS BY VAPOR PORT
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

108-88-3	Toluene	4	2	50%	4.2	1.1
71-43-2	Benzene	4	1	25%	2	0.63
75-00-3	Chloroethane	4	1	25%	1.7	0.65
74-87-3	Chloromethane	4	1	25%	2.6	1.3
67-64-1	Acetone	4	1	25%	12	4.9
136777-61-2	m,p-Xylenes	4	1	25%	1.6	0.37
75-27-4	Bromodichloromethane	4	1	25%	11	1.7
78-93-3	2-Butanone (MEK)	4	1	25%	2.1	0.72
75-15-0	Carbon Disulfide	4	4	100%	37	12
56-23-5	Carbon Tetrachloride	4	4	100%	50	7.9
67-66-3	Chloroform	4	4	100%	22	4.4
75-69-4	Freon 11 (Trichlorofluoromethane)	4	4	100%	37	6.6
76-13-1	Freon 113 (Trichlorotrifluoroethane)	4	4	100%	640	84
127-18-4	Tetrachloroethene	4	4	100%	77	11
79-01-6	Trichloroethene	4	4	100%	527	98
78-93-3	2-Butanone (MEK)	4	3	75%	2.3	0.78
71-55-6	1,1,1-Trichloroethane	4	2	50%	3.1	0.57
67-64-1	Acetone	4	3	50%	16	6.6
108-05-4	Vinyl Acetate	4	2	50%	6.9	2
108-88-3	Toluene	4	1	25%	1.5	0.4
75-27-4	Bromodichloromethane	4	1	25%	6.2	0.93
95-63-6	1,2,4-Trimethylbenzene	3	3	100%	13,265	2,700
108-67-8	1,3,5-Trimethylbenzene	3	3	100%	32,426	6,600
136777-61-2	m,p-Xylenes	11	11	100%	99,000	23,000
95-47-6	o-Xylene	11	11	100%	31,000	7,000
108-88-3	Toluene	11	11	100%	26,000	6,900
71-43-2	Benzene	11	9	82%	3,700	1,200
100-41-4	Ethylbenzene	11	9	82%	79,000	18,000
79-01-6	Trichloroethene	12	8	66%	3,400	630
127-18-4	Tetrachloroethene	12	3	25%	136	20
71-55-6	1,1,1-Trichloroethane	12	1	8%	78	5.2
67-66-3	Chloroform	12	1	8%	19	3.9

$\mu g/m^3$ = Micrograms Per Cubic Meter
ppb_v = Parts Per Billion Volume

A technical assessment of the remedies in place at Mountain Home AFB was completed for this 5-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 RAOs used at the time of 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 10.0.

Question A: Is the remedy 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/O&M, opportunities for optimization, potential issues or problems that could place protectiveness at risk, and the implementation of institutional controls and other measures to ensure that immediate threats have been addressed.

The site-specific remedies have been implemented for all sites in accordance with the RODs. The selected remedy, NRA with LTM, for the 32 ERP sites continues to function as designed, except for those sites where the selected remedy is no longer considered protective under current, near term, and/or long term uses (UU/UE). The selected remedy for ST-11 (Limited Action) is currently functioning as intended by the ROD, since institutional controls have been implemented pursuant to the ROD, as modified by the ESD. Although, institutional controls already implemented at ST-11 will ensure long-term protectiveness with respect to human exposure to the perched groundwater at ST-11, the Limited Action alternative is not protective with respect to potential releases of contamination from the perched aquifer to the regional aquifer. Protectiveness determinations for each site are presented in Section 10.0. The Air Force is taking the following action to achieve protectiveness goals for both current land use and UU/UE: source removal of contamination, implementation of a remedial system, and/or the implementation of institutional controls.

In general, the limited action remedy for ST-11 has achieved the RAOs specified in the ROD through the completion of an ESD and implementation of institutional controls. Opportunities for optimization of the RA-O program to improve the performance and/or reduce the costs of monitoring/sampling have been discussed with the FFA team and will be documented in an approved RA-O LTM work plan.

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

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 RI/BRA for OU-2, OU-3, and OU-4 have not changed since the RODs were signed, with the exception of a potential exposure pathway existing from the inhalation of vadose zone vapors from the bedrock via ambient air and/or indoor air. A Vapor Intrusion Evaluation is currently underway to determine whether there are any human health routes of exposure or receptors with respect to vapors that could affect the protectiveness of the 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 MCLs for exposure to groundwater. Decisions made on human health risk screening results were based on comparisons of site concentrations to RBCs applicable at the time, and included either EPA Region 3 or EPA Region 10 RBCs. 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}. However, unacceptable risks determined in the RODs were based on an assumption that future residential use of the sites would be unlikely. Since then, the FFA team has recognized that future industrial land uses assumed in the RODs are not assured, and therefore land use (and hence exposure) assumptions used at the time of remedy selection are no longer valid.

During the previous 2001 five-year review, the FFA team established an unrestricted use protectiveness goal for soils to be a non-carcinogenic hazard index not to exceed 1, and a carcinogenic risk not to exceed 1×10^{-6} to account for uncertainties in the site characterizations and risk results. Although the protectiveness goal for UU/UE remains 1×10^{-6} for this five-year review, in February 2006 the FFA team agreed to a target risk level of 1×10^{-5} as an acceptable remedial action objective for UU/UE when it can be either supported by acceptable rationale (i.e., nature of COCs, site conditions, and/or sufficient site data/characterization to demonstrate protectiveness at the 1×10^{-5} risk level with certainty under the UU/UE scenario) or a ROD amendment states the protectiveness goal for UU/UE at 1×10^{-5} . The Federal SDWA MCL remains the protectiveness goal for groundwater. For those chemicals for which Federal SDWA MCLs are not available, groundwater concentrations were compared to EPA Region 9 tap water preliminary remediation goals (PRGs) (EPA, 2004) for screening purposes. For this five-year remedy review, results for soils sampled since the 2001 review were compared to EPA Region 9 PRGs for residential use of soils (applicable for unrestricted use) (EPA, 2004). Previous and current soil and groundwater screening criteria referenced in this five-year review are provided in Appendix C.

No Remedial Action with LTM was the selected remedy for all ERP sites except ST-11, which was assigned limited action as its selected remedy. The RAOs, used at the time of remedy selection for ST-11 and presented in the 1995 ROD, remain valid for protection of human health and the environment. Due to changes in the land use (and hence exposure) assumptions used during the ROD decision-making process and additional site characterization, RA-O objectives have been modified for several sites since the RODs were signed to include source removal of contamination, implementation of a remedial system, and/or the implementation of institutional controls. However, none of the revised objectives for the RA-O program have been formalized through ROD amendments.

The RODs were based on human health risk assessment results using a provisional slope factor for TCE that had been withdrawn from the Integrated Risk Information System (IRIS) database in 1994. IRIS is the preferred source of human health toxicity values. In August 2001, the USEPA National Center for Environmental Assessment (NCEA) released the document Trichloroethylene Health Risk Assessment: Synthesis and Characterization for external review and proposed a new inhalation slope factor for TCE. The USEPA Science Advisory Board panel and the Department of Defense reviewed and provided comments on the NCEA 2001 report. To date, the USEPA NCEA 2001 document has not been revised and the toxicity values for TCE remain withdrawn from the IRIS database. Because there is no replacement value for the TCE slope factor in IRIS, the original assumptions and toxicity values used at the time of the remedy selection are the basis for the protectiveness statement.

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

The discovery of VOCs in vadose zone vapors with the installation of MW20 in May 2002 has led to the installation of 45 vapor monitoring ports at 16 locations at the base. The presence of significant vadose zone VOC vapors (of primary concern TCE) 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, which could compromise the protectiveness of the selected remedy for OU-3 (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.

There are no current site operations, activities, or physical conditions (other than the presence of contaminated media), that currently prevent the remedy from being protective or are considered to have a potential affect on future protectiveness of the remedy for any of the sites evaluated during this five-year remedy review. Issues identified during this five-year review are associated with exceedances of risk-based residential screening criteria and/or UU/UE protectiveness goals for calculated cancer risks, as well as potential exposure pathways. Table 8-1 summarizes the issues identified for each site and whether the protectiveness of the selected remedy is affected.

TABLE 8-1
ISSUES

ERP Site	Issues	Affects Protectiveness	
		Current	Future
LF-01	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}). Institutional controls have not yet been implemented for LF-01, as recommended in the previous five-year review.	Y	Y
LF-02	The standard default RME HI exceeded 1.0 at the Ash Disposal Area, indicating a potential non-carcinogenic hazard. Institutional controls have not yet been implemented for LF-02, as recommended in the previous five-year review.	Y	Y
FT-04	Arsenic was detected in site soils at concentrations exceeding IDEQ's background concentration. The site is located on vacant land, and current and near-term use does not involve exposure to soil.	N	Y
FT-05	None.	--	--
FT-06	None.	--	--
FT-07	None.	--	--
FT-08	The calculated RME excess cancer risk for the hypothetical on-site adult resident (3.9 x 10^{-5}) exceeds the UU/UE protectiveness goal (a carcinogenic risk not to exceed 1 x 10^{-6}).	N	Y
ST-11	LNAPL is present in the perched groundwater and has been detected in as many as four wells. However, the selected remedy (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.	N	Y
SD-12	None.	--	--
ST-13	The presence of LNAPL on regional groundwater at MW24. The development of a bacterial slime in the well may be affecting the recovery of LNAPL in the product recovery pump. Alternatively, the measured thickness of LNAPL may not be accurate for a variety of reasons.	Y	Y
OT-16	The munitions debris/scrap and underlying soils contain PAHs at concentrations that prevent UU/UE; the excess cancer risks calculated for future occupational receptors and future residential receptors were 2 x 10^{-5} and 7 x 10^{-5}, respectively, and benzo(a)pyrene was detected at concentrations that exceed the EPA Region 9 residential PRG.	N	Y
ST-22	None.	--	--
LF-23	Since no risk assessment was conducted for LF-23, there is uncertainty regarding whether PAH concentrations detected in soil above the EPA Region 9 residential PRGs during the 1991 LFI pose an unacceptable risk to human health and the environment. The site is located on vacant land, and current and near-term use does not involve exposure to soil.	N	Y

TABLE 8-1 (CONTINUED)
ISSUES

ERP Site	Issues	Affects Protectivenss	
		Current	Future
SD-24	Approximately three cubic feet of TCE-contaminated soil is present along the east wall of the previous SD-24 excavation near the hydrant thrust block at concentrations above the EPA Region 9 residential PRG. A potential exposure pathway that may exist from the inhalation of vadose zone vapors from the bedrock via ambient air and/or indoor air has been identified, but not confirmed. SD-24 is the most likely source for bedrock vadose zone VOC vapors and TCE contamination to the regional groundwater.	Y Uncertain	Y Uncertain
SD-25	None.	--	--
SD-27	The excess cancer risk calculated for hypothetical residential exposures to site soils (3×10^{-4}) exceeds the protectiveness goal for UU/UE (a carcinogenic risk not to exceed 1×10^{-6}). Site soils contain PAH concentrations above EPA Region 9 residential PRGs.	N	Y
SS-29	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}). Site soils contain PAH concentrations above EPA Region 9 residential PRGs.	N	Y
SS-30	None.	--	--
ST-32	None.	--	--
ST-38	LNAPL is present in perched water as a result of a jet fuel 8 (JP-8) release from Tank 1.	Y	Y
OU-3	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 exis t since regional groundwater samples from base-production wells have not reported COCs above applicable federal MCLs. Significant vadose zone VOC vapors (of primary concern TCE) are present 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.	Y Uncertain	Y Uncertain

EPA = U.S. Environmental Protection Agency
HI = hazard index
LNAPL = light non-aqueous phase liquids
MCLs = maximum contaminant level
PAH = polycyclic aromatic hydrocarbons
PRG = Preliminary Remediation Goal
RMC = reasonable maximum exposure
TCE = trichloroethene
UU/UE = Unrestricted Use/Unlimited Exposure
VOCs = volatile organic compounds

The initial 2001 five-year remedy review 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 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.

Recommendations for sites evaluated during this five-year remedy review include No Further Action, land use controls, and remedial actions. These recommendations and follow-up actions are summarized below, and additional requirements and recommendations specified for each site are provided in the following subsections.

- No Further Action is recommended for eight sites (SS-30, SD-25, FT-05, FT-06, FT-07, SD-12, ST-22, and ST-32).
- Continue the Tank 1 POL comprehensive engineering evaluation and implementation of the corrective action plan for Tank 1 under the Risk Based Corrective Action (RBCA) or Risk Evaluation Manual.
- Institutional controls are recommended for two sites (LF-01 and LF-02) to prevent unacceptable risk due to exposure to potentially contaminated media.
- An EE/CA and a potential non-time-critical removal action are recommended for contaminated soils at five sites (FT-04, OT-16, LF-23, SD-27 and SS-29) in lieu of land use controls (LUCs) to achieve UU/UE.
- The remaining TCE-impacted soil beneath the water line at SD-24 should be evaluated for the need to be removed or treated in place.
- Pilot studies to evaluate potential remedial technologies are recommended for three sites (FT-08, ST-11, and SD-24).
- A BRA amendment, FFS, and proposed plan (PP) are recommended for ST-11, FT-08, and SD-24.
- Continue O&M activities for the current product recovery system at ST-13 (MW24) and complete an OU-3 RI/BRA amendment to document LNAPL in MW24.
- The TCE slope factor used in the human health risk assessment is currently being evaluated by EPA and others. TCE toxicity data should be revisited during the next five-year review to evaluate the protectiveness of the selected remedies based on the outcome of the ongoing TCE slope factor review.

The sites requiring an RI/BRA amendment, FFS, PP, and ROD amendment will be addressed together, if possible, under OU-3. The completion of the OU-3RI/BRA amendment, FFS, and PP will be completed for specified sites to consider active remediation of the sites and evaluate potential remedial technologies. A ROD amendment is required to select the remedial technology to be implemented for the sites.

The Air Force has determined the need for a non-time-critical removal action under CERCLA at select sites in lieu of LUCs, which would restrict and limit use of the site. Section 3000.415(b)(4)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires an Engineering Evaluation/Cost Analysis (EE/CA) for all non-time-critical removal actions, prior to implementation. The EE/CA identifies the objectives of the removal action and analyzes the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives (EPA, 1993).

If the non-time-critical removal action alternative is selected during the EE/CA, removal action activities will consist of the following tasks: preparation of an removal action work plan amendment to the basewide work plan, completion of a limited assessment at "hotspots", where necessary, followed by removal of impacted soils above screening criteria, collection of confirmation soil samples from the excavation, and off-site disposal of excavated soils in accordance with RCRA criteria. Confirmation soil samples will be analyzed to determine whether cleanup goals have been achieved. The following subsections provide additional details for the basis for determining the recommendations and follow-up actions presented in accompanying Table 9-1.

9.1 LF-01 (LAGOON LANDFILL)

Monitoring of the regional groundwater at MW7-2 and MW31 and vapors at MW31should be continued as part of the base-wide RA-O program to ensure that levels of COCs (specifically TCE) in groundwater do not increase with time and remain below the MCL, and to further characterize vapor concentrations in the vadose zone bedrock.

Because the calculated excess cancer risk from exposure to sediment exceeds the protectiveness goal for UU/UE (exceeds 1×10^{-6}), institutional controls are warranted to ensure restricted and limited use of the site in accordance with EPA's Region 10 policies on institutional controls at federal facilities. An ESD should be prepared to address the implementation of institutional controls at LF-01 to limit exposure to sediment for current and future unrestricted land use.

9.2 LF-02 (B-STREET LANDFILL)

Monitoring of the regional groundwater and vapors at MW32 should be continued, as part of the base-wide RA-O program to ensure that levels of COCs (specifically TCE) in groundwater do not increase with time and remain below the MCL, and to further characterize vapor concentrations in the vadose zone bedrock. Monitoring of the regional groundwater at MW3-2 should also be continued, as part of the base-wide RA-O program to ensure that COCs associated with LF-02 are not migrating outside of installation boundaries.

Because the standard default RME HI exceeded 1.0 at the Ash Disposal Area, indicating a potential non-carcinogenic hazard, institutional controls are warranted to ensure restricted and limited use of the site in accordance with EPA's Region 10 policies on institutional controls at federal facilities. An ESD should be prepared to address the implementation of institutional controls at LF-02 to limit exposure to soil for UU/UE.

9.3 FT-04 (FIRE TRAINING AREA 4)

A limited assessment at two "hot-spots" identified during the 2004 site investigation and a potential non-time-critical removal action of the soils with arsenic above the IDEQ background concentration are recommended for FT-04. If findings from the limited action determine the need for a non-time-critical removal action, an EE/CA will be required to confirm that the non-time-critical removal action is the most appropriate alternative to eliminate the need for LUCs. The Air Force prefers a non-time-critical removal action for this site rather than institutional controls due to the limitations and restrictions associated with the implementation of LUCs.

9.4 FT-05 (FIRE TRAINING AREA 5)

Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 PRGs for residential soil. Therefore, No Further Action is recommended for FT-05. This site does not require re-evaluation during subsequent five-year reviews.

9.5 FT-06 (FIRE TRAINING AREA 6)

Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 PRGs for residential soil. Therefore, NFA is recommended for FT-06. This site does not require re-evaluation during subsequent five-year reviews.

9.6 FT-07 (FIRE TRAINING AREA 7)

Monitoring of the regional groundwater at MW17-2 and MW29 and vapors at MW29 should be continued, as part of the base-wide RA-O program to ensure that levels of COCs (specifically TCE) in groundwater do not increase with time and remain below the MCL, and to further characterize vapor concentrations in the vadose zone bedrock.

Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 PRGs for residential soil. Therefore, NFA is recommended for FT-7A, B, and C. This site does not require re-evaluation during subsequent five-year reviews.

9.7 FT-08 (FIRE TRAINING AREA 8)

Monitoring of the regional groundwater and vapors at MW28 should be continued, as part of the base-wide RA-O program to ensure that levels of COCs (specifically TCE) in groundwater do not increase with time and remain below the MCL, and to further characterize vapor concentrations in the bedrock of the vadose zone.

The recommendation for soils at FT-08 is to select a remedial system that will result in closure of the site using EPA Region 9 residential PRGs as remedial target levels. A pilot study should be completed to evaluate SVE as a potential remedial technology for removing COCs from the shallow overburden soils and shallow bedrock. A BRA amendment, FFS, and PP should be

completed to consider active remediation of the site to address TCE contaminant levels in soils and remediation of soils and shallow bedrock. A ROD amendment is required to select and implement a remedial technology for the site. The Air Force prefers a full-scale remediation system rather than institutional controls due to the limitations and restrictions associated with the implementation of LUCs.

9.8 ST-11 (FLIGHT LINE FUEL SPILL)

Monitoring of the perched groundwater at perched zone monitoring wells (PZMWs) should be continued as part of the RA-O program to monitor the concentration of COCs (BTEX compounds) and determine whether concentrations of COCs are increasing, decreasing, or are stable. The presence of LNAPL, which has been detected in perched groundwater in as many as four wells, should also be monitored. IDEQ requires that the Air Force make every effort to remove LNAPL when present on the waters of the State. Monitored natural attenuation of fuel constituents in perched zone groundwater is not effective due to site conditions and the presence of LNAPL. The Air Force recommends completing longer term (24 to 36 hours) pilot studies using Vapor Extraction/Air Sparge (VE/AS) at the existing wells at the site. Additionally, the Air Force recommends the continued use, as necessary, of passive oil recovery canisters into the wells where LNAPL is present to remove the product from the wells. An OU-3RI/BRA amendment and FFS should be completed to consider active remediation of the site and a focused evaluation of an air-based VES and sparge system to remediate subsurface soils, perched groundwater, and shallow bedrock. A ROD amendment is required to select the remedial technology for this site.

Monitoring of the regional groundwater and bedrock vadose zone vapors should also be continued at the two wells located in the vicinity of ST-11 (MW20 and MW26) during the RA-O program.

9.9 SD-12 (OLD ENTOMOLOGY SHOP YARD)

The excess cancer risks calculated for future occupational receptors, current occupational receptors, and future residential receptors were 6×10^{-6}, 3×10^{-5}, and 2×10^{-5}, respectively, during the risk assessment performed for SD-12 in 1993. Although the calculated risks exceed the 1×10^{-6} risk level, FFA team members determined that SD-12 meets the criteria for UU/UE based on site conditions and the nature of COCs (pesticides/herbicides) (teleconference with FFA team on February 5, 2003) and findings from the 17 Sites Evaluation/Investigation (URS, 2004) Therefore, NFA is recommended for SD-12. This site does not require re-evaluation during subsequent five-year reviews.

9.10 ST-13 (POL YARD UST SITE)

Monitoring of the bedrock vadose zone vapors should be continued at VW-1 and MW24 as part of the RA-O program. In addition to continued LTM, O&M activities should be continued for

the current product recovery system at MW24 as long as LNAPL is present in the well. The following recommendations are made for ST-13.

- Complete an OU-3 RI/BRA amendment and FFS/PP, if warranted, to support a remedy selection in the ROD amendment.
- At the end of November 2005, the pneumatic pump was removed following collecting water samples for inorganic and bacterial analysis. This analysis may be used to develop a strategy to treat the bacterial slime that has developed in the well since installation of the product recovery system. The development of a bacterial slime in the well may be affecting the recovery of LNAPL in the product recovery pump. Alternatively, the measured thickness of LNAPL may not be accurate for a variety of reasons.
- If the LNAPL continues to be present in the well, reinstall the product recovery pump into the well or install passive oil recovery canisters into the well to recover the product.
- Continue monthly O&M of the product recovery system at MW24 to optimize product recovery and assure mechanical systems are running properly.
- Additional characterization of the source of LNAPL in MW24 and hot-spots contributing VOC vapors to the vadose zone.

9.11 OT-16 (MUNITIONS BURIAL SITE)

The excess cancer risks calculated for future occupational receptors and future residential receptors were 2×10^{-5} and 7×10^{-5}, respectively. The recommendation for OT-16 is to complete an EE/CA and a possible non-time-critical removal action of the munitions debris/scrap and underlying soils that contain PAHs at concentrations that prevent UU/UE. The non-time-critical removal action would eliminate the need for institutional controls.

9.12 ST-22 (TITAN MISSILE MAINTENANCE AREA)

Monitoring of the regional groundwater and vapors at MW25 should be continued, as part of the base-wide RA-O program to monitor TCE levels in groundwater, which have been reported above the MCL, and to further characterize vapor concentrations in the bedrock of the vadose zone. The vadose zone vapors monitored at MW25 indicate the site is not a source of bedrock VOC vapors. Site ST-22 has been sufficiently characterized to remove it as a site posing a threat to the regional groundwater, therefore, NFA is recommended for ST-22. This site does not require re-evaluation during subsequent five-year reviews.

9.13 LF-23 (SOLID WASTE DISPOSAL AREA)

PAHs detected in soil during the 1991 LFI occurred at concentrations exceeding the 2000 EPA Region 9 residential PRGs, as determined in the previous five-year remedy review. Because no risk assessment was conducted, there is uncertainty regarding whether these detected PAH concentrations pose an unacceptable risk to human health and the environment. Therefore, the recommendation for LF-23 is to complete an EE/CA and a possible non-time-critical removal

action of debris and underlying soils that contain PAHs at concentrations that might prevent UU/UE. The non-time-critical removal action would eliminate the need for institutional controls.

9.14 SD-24 (OLD LIQUID OXYGEN TANK FACILITY AND AUTO HOBBY SHOP)

Monitoring of the regional groundwater and vapors at MW27 should be continued as part of the base-wide RA-O program to monitor whether concentrations of COCs (specifically TCE) in groundwater increase with time or remain below the MCL, and to further characterize vapor concentrations in the bedrock of the vadose zone.

In addition, the remaining soil contaminated above the current EPA Region 9 residential PRGs, based on a 10^{-6} excess cancer risk level, should be removed or treated in place. Indoor air vapor intrusion sampling and evaluation should be completed, as planned, to determine whether exposure pathways via indoor air and/or ambient air exist, and whether applicable or relevant and appropriate requirements (ARARs) are exceeded. A pilot study should also be completed at SD-24 to evaluate the effectiveness of vapor extraction for the removal of COCs in bedrock. The completion of a BRA amendment, FFS, PP and ROD amendment may be necessary if the vapor intrusion sampling indicates a risk to human health and environment exists as a result of contaminated bedrock vapors impacting indoor and or ambient air. Once soils contaminated with COCs are removed or remediated, NFA is recommended for soils at the site.

9.15 SD-25 (FLIGHT LINE STORM DRAIN)

Contaminated sediments were removed from a portion of the ditch during removal and disposal activities completed in November 2004. In addition, TCE was only detected at relatively low soil gas concentrations (8 to 20 ppb_v) in samples collected at or downstream of the flightline drain outfall during the 2002 Site Investigations at Multiple Sites. As a result, the selected remedy is now considered protective for UU/UE at SD-25 and NFA is recommended for this site. This site does not require re-evaluation during subsequent five-year reviews. Idaho's Best Management Practices should be met in order to ensure proper management of the Flight Line Storm Drain.

9.16 SD-27 (EQUIPMENT WASH RACK)

The recommendation for SD-27 is to complete an EE/CA and a possible non-time-critical removal action of the soils that contain PAHs above EPA Region 9 residential PRGs. The possible non-time-critical removal action would eliminate the need for institutional controls. The Air Force prefers a non-time-critical removal action for this site rather than institutional controls due to the limitations and restrictions associated with the implementation of LUCs.

9.17 SS-29 (DRUM ACCUMULATION PAD)

The recommendation for SS-29 is to complete an EE/CA and a possible non-time-critical removal action of the soils that contain PAHs above EPA Region 9 residential PRGs. The non-time-critical removal action would eliminate the need for institutional controls. The Air Force prefers a non-time-critical removal action for this site rather than institutional controls due to the limitations and restrictions associated with the implementation of LUCs.

9.18 SS-30 (DEFENSE REUTILIZATION AND MARKETING OFFICE STORAGE AREA)

Results from the 2005 passive soil gas survey conducted in the vicinity of MW35 indicate that SS-30 is not a source of TCE to regional groundwater. As a result, NFA is recommended for SS-30. This site does not require re-evaluation during subsequent five-year reviews.

9.19 ST-32 (OLD MILITARY GAS STATION)

The total RME hazard index calculated for non-carcinogenic health effects due to multiple pathway chronic exposures to COCs in soils at ST-32 via dermal contact, inhalation, and ingestion pathways is 1.5 (Woodward-Clyde, 1995). The RME excess cancer risk calculated for future occupational workers and hypothetical future residential receptors are 6×10^{-6} and 1.2×10^{-5}, respectively. Although the calculated cancer risks exceed the 1×10^{-6} risk level and the total HI from all relevant pathways is greater than 1.0, UU/UE is appropriate for ST-32 at the 1×10^{-5} risk level based on the rationale presented in the following discussion and the risk assessment assumptions summarized in Section 3.4.19.

The HI calculated for ST-32, which was driven by inhalation of the estimated maximum concentration of n-hexane in soil, is based on the composition of fresh gasoline and assumes that residents are exposed to the maximum estimated concentration of n-hexane in the soil for 30 years with no degradation of organic compounds over the exposure period. This is an unrealistic assumption since n-hexane is very volatile and would rapidly decay if exposed to the atmosphere in surface soils. Furthermore, the method used to estimate exposure point concentrations of gasoline constituents in the risk assessment was very conservative because the fuel composition was based on the fresh gasoline, which generally has more toxic volatile constituents present than weathered fuel.

Results of the RI indicate that the majority of fuel contamination in site soils occurs under the east end of the former concrete pump island pad (removed following the RI), which is likely the result of leakage from the underground distribution piping, and underneath the UST excavations at depths mainly 10 feet bgs or greater. Only trace VOC concentrations, with the exception of TCE, have been detected in regional groundwater sampled from MW30, located at the periphery of the ST-32 site. The maximum TCE concentration detected in regional groundwater at MW30 is 1.5 µg/L, well below the Federal SDWA MCL for TCE (5 µg/L). Furthermore, the vadose

zone vapors monitored at MW30 indicate the site is not a source of bedrock VOC vapors or posing a threat to the regional groundwater.

Based on site conditions (contaminated soil present in subsurface soils, rather than at or near the surface), MW30 groundwater and vapor results, the conservative exposure assumptions used in the risk assessment, and sufficient site data/characterization, the selected remedy for ST-32 is considered protective at the 1×10^{-5} risk level for UU/UE. Therefore, NFA is recommended for ST-32. This site does not require re-evaluation during subsequent five-year reviews.

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

Continue the investigation and remediation of the POL release at Tank 1 under the RBCA or Risk Evaluation Manual.

9.21 OU-3 (BASE-WIDE REGIONAL GROUNDWATER)

Continued monitoring of the OU-3 base-wide regional groundwater and bedrock vadose zone vapors has been recommended by the FFA team members to ensure that selected remedies remain protective of human health and the environment. The LTM RA-O program should be continued for as long as contaminants remain at concentrations that prevent UU/UE, with modifications and additions made per the five-year remedy review. Modifications to the RA-O program have been discussed with the FFA team to optimize resources and increase efficiency and will be documented in an approved RA-O LTM work plan. The following general recommendations are based primarily on findings presented in the Draft 2005 Annual LTM Report (RMC, 2006).

- Collect water levels on all available monitoring wells in the spring and fall to fully insure water level elevation maps are as accurate as possible.
- Continue sampling the regional groundwater wells and existing vadose zone vapor ports in accordance with the approved RA-O work plan.
- Continue to monitor MW24 for LNAPL and continue to operate and maintain the product recovery system as necessary for any LNAPL observed at MW24.
- The FFA team should re-evaluate monitoring needs of the RA-O program at least every other year.

TABLE 9-1
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Milestone Date	Affects Protectiveness? Current	Future
LF-01	The calculated risks for sediment exceed the protectiveness goal for UU/UE.	• Continue groundwater sampling at MW7-2 and MW31 in accordance with the approved work plan. • Continue vapor sampling at MW31 during the spring and fall RA-O sampling events. **· Completion of an ESD and implementation of ICs.**	2006 **Final ESD – Dec. 2006** **Final LUCIP – Feb. 2007**	N N **Y**	N N **Y**
LF-02	The standard default RME HI exceeded 1.0.	• Continue monitoring regional groundwater at MW3-2 in accordance with the approved work plan. • Continue monitoring regional groundwater and vapors at MW32 in accordance with the approved work plan. **· Completion of an ESD and implementation of ICs.** • Annual landfill inspections following completion of ESD.	2006 for LTM activities **Final ESD – Dec. 2006** **Final LUCIP – Feb. 2007**	N N **Y** N	N N **Y** N
FT-04	Arsenic was detected in site soils at concentrations exceeding IDEQ's background concentration.	**· Complete an EE/CA and a possible non-time-critical removal action of the soils containing arsenic above the IDEQ background concentration.**	**Draft EE/CA – Sept. 2006** **Final EE/CA – Oct. 2006** **Initiate Action – Nov. 2006**	**Y**	**Y**
FT-05	Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 residential PRGs for soil.	• NFA • FT-05 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	Not Applicable	N	N

TABLE 9-1 (CONTINUED)
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Milestone Date	Affects Protectiveness?	
				Current	Future
FT-06	Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 PRGs for residential soil.	• NFA • FT-06 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	Not Applicable	N	N
FT-07	Concentrations of site-related chemicals are all below the 2002 USEPA Region 9 residential PRGs for soil.	• Continue LTM of the regional groundwater at MW17-2 in accordance with the approved work plan. • Continue LTM of the regional groundwater and vapors at MW29 in accordance with the approved work plan. • NFA • FT-07 meets the criteria of UU/UE for soils, therefore the site does not require re-evaluation during future five-year reviews.	2006 Not Applicable	N N	N N
FT-08	A pilot study for a soil vapor extraction remedial system would address TCE contaminant levels in soil and remediation of soils and shallow bedrock.	• Continue LTM of the regional groundwater and bedrock vadose zone vapors at MW28 in accordance with the approved work plan. • Perform a pilot study to evaluate SVE as a potential remedial technology. • Completion of an OU-4 RI amendment, followed by a BRA amendment, FFS, PP, and ROD amendment prior to initiating any active soil vapor remediation system.	2006 Final BRA Amendment – Dec. 2006 Final FFS/PP – March 2007 Final OU4 ROD Amendment – June 2007 Final RD – Sept. 2007	N N N	N N N

TABLE 9-1 (CONTINUED)
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Milestone Date	Affects Protectiveness?	
				Current	Future
ST-11	The Idaho Department of Environmental Quality requires that the Air Force make every effort to remove LNAPL when present on the waters of the State. Furthermore, monitored natural attenuation of fuel constituents in perched zone groundwater is an ineffective method with respect to cost and duration.	• Continue to sample the PZMWs for BTEX.	2006	N	N
		• Continue LTM of regional groundwater and bedrock vadose zone vapors at MW20 and MW26.			
		• Perform a pilot study to evaluate passive product recovery and bioventing/biosparging/vapor extraction as a potential remedial technology.	Complete Pilot Study – Dec. 2006	N	N
		• Completion of an OU-3 RI amendment, followed by a BRA amendment, FFS, PP, and ROD amendment prior to initiating full scale remediation at the site.	Final FFS/PP – Feb. 2007 Final OU-3 ROD Amendment – June 2007	N	N
		• Continue to assess the Base fuel system leak detection procedures to minimize unaccounted fuel loss.	2006	N	N
		• Summarize results of leak detection system with annual groundwater results.			
SD-12	SD-12 meets the protectiveness goal for UU/UE, based on findings from the 17 Sites Evaluation/Investigation and subsequent discussions with the FFA team.	• NFA	Not Applicable	N	N
		• SD-12 meets the criteria of UU/UE based on site conditions and nature of COCs, therefore the site does not require re-evaluation during future five-year reviews.			

TABLE 9-1 (CONTINUED)
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Schedule for Proposed Recommendations	Affects Protectiveness?	
				Current	Future
ST-13	LNAPL was not identified in the regional groundwater until August 2004. As a result, the presence of LNAPL in MW24 at ST-13 was not addressed in the OU-3 RI/BRA. The development of a bacterial slime in the well may be affecting the recovery of LNAPL in the product recovery pump. Alternatively, the measured thickness of LNAPL may not be accurate for a variety of reasons.	• Continue monitoring vapors at VW-1 and MW24. **• Continue monthly O&M of the product recovery system at MW24.** • Evaluate results from water chemistry and bacterial analysis, along with continued water and LNAPL level measurements. • Completion of an OU-3 RI/BRA amendment to document LNAPL in MW24.	2006 **2006** 2006 Final FFS/PP – May 2007 Final OU-3 ROD Amendment – June 2007 Final LUCIP – Feb. 2008 2006	N **Y** N N	N **Y** N N
OT-16	The munitions debris/scrap and underlying soils contain PAHs at concentrations that prevent UU/UE; the excess cancer risks calculated for future occupational receptors and future residential receptors were 2×10^{-5} and 7×10^{-5}, respectively.	**• Complete an EE/CA and a possible non-time-critical removal action of the munitions debris/scrap and underlying soils that contain elevated concentrations of PAH compounds, in lieu of LUCs.**	**Draft EE/CA – Sept. 2006** **Final EE/CA – Oct. 2006** **Initiate Action – Nov. 2006**	**Y**	**Y**
ST-22	ST-22 has been excluded as a potential source area for TCE.	• Continue monitoring regional groundwater and vapors at MW25. • NFA; ST-22 meets the criteria of UU/UE for soils, therefore the site does not require re-evaluation during future five-year reviews.	2006	N	N

TABLE 9-1 (CONTINUED)
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Schedule for Proposed Recommendations	Affects Protectiveness? Current	Affects Protectiveness? Future
LF-23	Debris and the underlying soils contain PAHs at concentrations that prevent UU/UE.	· **Complete an EE/CA and a possible non-time-critical removal action of the debris and underlying soils that contain elevated concentrations of PAH compounds, in lieu of LUCs.**	**Draft EE/CA – Sept. 2006** **Final EE/CA – Oct. 2006** **Initiate Action – Nov. 2006**	**Y**	**Y**
SD-24	A pilot study for a bedrock vapor extraction remedial system would demonstrate whether TCE levels in regional groundwater can be reduced by remediation of the vadose zone vapors, which are the likely source of TCE contamination to regional groundwater.	• Continue monitoring regional groundwater and vapors at MW27. • Perform a pilot study to evaluate a bedrock vapor extraction remediation system. **• Treat the remaining impacted soils in situ or remove and dispose impacted soil to Region 9 PRGs at 10^{-6} risk levels.** • Evaluate vapor intrusion sampling results to determine whether an exposure pathway via indoor air and/or ambient air exist, and whether ARARs are exceeded. • Completion of an OU-3 RI amendment, followed by a BRA amendment, FFS, PP, and ROD amendment prior to initiating any active bedrock vadose zone vapor remediation.	2006 Complete Pilot Study – Oct. 2006 **November 2006** Complete Vapor Intrusion Study – Oct. 2006 Final FFS/PP May 2007 Final OU-3 ROD amendment – June 2007 Final RD – Oct. 2007	N N **Y** N N	N N **Y** N N
SD-25	Contaminated sediments previously identified in the ditch were removed during removal and disposal activities completed at SD-25 in November 2004, and during the installation of a runway threshold concrete culvert under a Base construction project prior to 2004.	• Implement Best Management Practices in order to ensure proper management of the Flight Line Storm Drain. • SD-25 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	2006	N	N

TABLE 9-1 (CONTINUED)
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Schedule for Proposed Recommendations	Affects Protectiveness?	
				Current	Future
SD-27	Site soils contain PAH compounds at concentrations that prevent UU/UE.	**· Complete an EE/CA and a possible non-time-critical removal action of the soils that contain elevated concentrations of PAH compounds, in lieu of LUCs.**	**Draft EE/CA – Sept. 2006** **Final EE/CA – Oct. 2006** **Initiate Action – Nov. 2006**	**Y**	**Y**
SS-29	Site soils contain PAH compounds at concentrations that prevent UU/UE.	**· Complete an EE/CA and a possible non-time-critical removal action of the soils that contain elevated concentrations of PAH compounds, in lieu of LUCs.**	**Draft EE/CA – Sept. 2006** **Final EE/CA – Oct. 2006** **Initiate Action – Nov. 2006**	**Y**	**Y**
SS-30	Results from the passive soil gas survey completed in the spring of 2004 indicate that SS-30 is not a source of TCE to regional groundwater. Therefore, no further characterization is warranted for soils at SS-30.	• NFA • SS-30 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews.	Not Applicable	N	N
ST-32	Site ST-32 is considered protective at the 1×10^{-5} risk level based on site conditions, conservative exposure assumptions used in the risk assessment, and sufficient site characterization.	• NFA • ST-32 meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews	Not Applicable	N	N
ST-38	LNAPL is present in perched water as a result of a jet fuel 8 (JP-8) release from Tank 1.	**· Continue the investigation and remediation of the POL release at ST-38 under the RBCA or Risk Evaluation Manual.**	**2006**	**Y**	**Y**

TABLE 9-1 (CONTINUED)
RECOMMENDATIONS AND FOLLOW-UP ACTIONS
MOUNTAIN HOME AFB, IDAHO – ACC FOUR BASE PBC

ERP Site	Basis for Recommendations	Recommendations & Follow-Up Actions	Schedule for Proposed Recommendations	Affects Protectiveness?	
				Current	Future
OU-3	Based on the findings associated with the characterization of potential TCE source areas and LTM activities for groundwater and vapors, changes to the RA-O program should be implemented to reduced cost and improve efficiency and documented in an approved work plan.	• Continue regional groundwater and vapor monitoring in accordance with approved work plan. • Completion of an OU-3 RI amendment, followed by a BRA amendment, FFS, PP, and ROD amendment. • The FFA team should re-evaluate monitoring needs of the RA-O program at least every other year.	2006 Final BRA Amendment – Dec. 2006 Final OU-3 ROD Amendment – June 2007	N N	N N

Note: The Air Force is the party responsible and the IDEQ and EPA are the oversight agencies.
Recommendations and Follow Up Actions that affect the protectiveness of the selected remedies are highlighted in **blue**.

AF = Air Force
BRA = Baseline Risk Assessment
COC = Chemical of Concern
EE/CA = Engineering Evaluation/Cost Analysis
EPA = Environmental Protection Agency
ESD = Explanation of Significant Differences
FFA = Federal Facility Agreement
FFS = Focused Feasibility Study
HI = Hazard Index
IDEQ = Idaho Department of Environmental Quality
LNAPL = Light Non-Aqueous Phase Liquid
LTM = Long-Term Monitoring/Management
LUCIP = Land Use Control Implementation Plan
MCL = Maximum Contaminate Level
NFA = No Further Action
O&M = Operation and Maintenance
OU = Operable Unit
PAH = Polycyclic Aromatic Hydrocarbons
PP = Proposed Plan
RA-O = Remedial Action-Operations
RCRA = Resource Conservation and Recovery Act
RD = Remedial Design
RGW = Regional Groundwater
RME = Reasonable Maximum Exposure
ROD = Record of Decision
SVE = Soil Vapor Extraction
TCE = Trichloroethene
UU/UE = UnrestrictedUse/Unlimited Exposure
VOC = Volatile Organic Compounds

10.1 LF-01 (LAGOON LANDFILL)

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 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, LF-01 does not appear to pose a threat to the regional aquifer.

10.2 LF-02 (B-STREET LANDFILL)

The selected remedy at 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.

10.3 FT-04 (FIRE TRAINING AREA 4)

The selected remedy at 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 IDEQ's bacgkground 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 IDEQ background concentration.

10.4 FT-05 (FIRE TRAINING AREA 5)

The selected remedy at FT-05 (NRA with LTM) is protective of human health and the environment because concentrations of site-related chemicals are all below the 2002 USEPA Region 9 residential PRGs for soil.

10.5 FT-06 (FIRE TRAINING AREA 6)

The selected remedy at FT-06 (NRA with LTM) is protective of human health and the environment because concentrations of site-related chemicals are all below the 2002 USEPA Region 9 residential PRGs for soil.

10.6 FT-07 (FIRE TRAINING AREA 7)

The selected remedy at FT-7A, B, and C (NRA with LTM) is protective of human health and the environment because concentrations of site-related chemicals are all below the 2002 USEPA Region 9 residential PRGs for soil.

10.7 FT-08 (FIRE TRAINING AREA 8)

The selected remedy at 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 FT-08 until a full-scale remedial system is implemented, as planned, and results in closure of the site.

10.8 ST-11 (FLIGHT LINE FUEL SPILL)

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 VES 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.

10.9 SD-12 (OLD ENTOMOLOGY SHOP YARD)

Although the excess cancer risk calculated for future residential receptors (2×10^{-5}) exceed the protectiveness goal for UU/UE, the selected remedy (NRA with LTM) at SD-12 is considered protective for UU/UE based on site conditions and nature of COCs determined during the 17 Sites Evaluation/Investigation (URS, 2004) and as agreed upon by FFA team members during a teleconference conducted on February 5, 2003.

10.10 ST-13 (POL YARD UST SITE)

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.

10.11 OT-16 (MUNITIONS BURIAL SITE)

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 1×10^{-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 OT-16 (NRA with LTM) is not considered protective. To ensure long-term protectiveness, a non-time-critical removal action 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.

10.12 ST-22 (TITAN MISSILE MAINTENANCE AREA)

Site ST-22 has been sufficiently characterized to remove it as a site posing a threat to the regional groundwater and to exclude it as a potential source area for TCE. Additional site characterization since the previous five-year remedy review indicates that the selected remedy for ST-22 (NRA with LTM) is protective of human health and the environment.

10.13 LF-23 (SOLID WASTE DISPOSAL AREA)

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 LF-23, the selected remedy (NRA with LTM) may not be protective for UU/UE. To ensure long-term protectiveness, a non-time-critical removal action 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 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.

10.14 SD-24 (OLD LIQUID OXYGEN TANK FACILITY AND AUTO HOBBY SHOP)

Approximately three cubic feet of TCE-contaminated soil is present along the east wall of the previous SD-24 excavation near the hydrant thrust block at concentrations above the EPA Region 9 residential PRG. Therefore, the selected remedy for 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 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.

10.15 SD-25 (FLIGHT LINE STORM DRAIN)

Contaminated sediment was removed from the site in 2004. As a result, the selected remedy (NRA and LTM) at SD-25 is now considered protective currently and in the long-term for UU/UE.

10.16 SD-27 (EQUIPMENT WASH RACK)

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 (3×10^{-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.

10.17 SS-29 (DRUM ACCUMULATION PAD)

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.

10.18 SS-30 (DEFENSE REUTILIZATION AND MARKETING OFFICE STORAGE AREA)

Results from the 2005 passive soil gas survey conducted in the vicinity of MW35 indicate that SS-30 is not a source of TCE to regional groundwater. Therefore, the selected remedy (NRA and LTM) is considered protective since SS-30 does not pose an unacceptable risk to human health or the environment.

10.19 ST-32 (OLD MILITARY GAS STATION)

Although, the RME excess cancer risks and non-carcinogenic HI calculated for ST-32 exceed the protectiveness goal for UU/UE (a non-carcinogenic hazard index not to exceed 1, and a carcinogenic risk not to exceed 1×10^{-6}), the selected remedy at ST-32 (NRA and LTM) is considered protective for UU/UE at the 1×10^{-5} risk level, based on site conditions, the conservative exposure assumptions used in the risk assessment, and sufficient site data/characterization.

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

Due to the presence of LNAPL in perched water as a result of a JP-8 release from Tank 1, 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 1 is necessary to assess the long-term protectiveness.

10.21 OU-3 (BASE-WIDE REGIONAL GROUNDWATER)

The remedy for OU-3 base-wide 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.

11.1 NEXT REVIEW

A future five-year remedy review will be necessary since contamination remains above levels that allow unrestricted use and/or unlimited exposure at some ERP sites located at the Base. The next five-year remedy review is scheduled to be completed by June 2011.

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Woodward-Clyde. 1995. Final OU3 Fuel Sites Remedial Investigation Report. Mountain Home Air Force Base.

Woodward-Clyde. 1996. Final Post-ROD Groundwater Monitoring Plan for OU3; prepared for U.S. Army Corps of Engineers, Omaha District, May.

Interview Questions for the Fuel Management Program

On October 18, 2006, Mr. John Schleicher and Ms. Karen Wilson of the 366th Environmental Flight submitted the following interview questions regarding the fuel management program to Stephen Gowin, Chief Master Sergeant, Fuels Manager who in turn contacted Wes Wainwright, Liquid Fuels Manager Supervisor. Information obtained through these interview questions is presented in Section 6.4.2, Fuel Management Program.

- Has the Memorandum on Fuel Inventory Control Information by the Mountain Home AFB Fuels Management Flight (LGSF, 1999) been revised or replaced?

- Are the following statements still true?
    - Daily physical inventories are completed for active bulk fuel storage tanks and are determined by use of an approved automatic tank gauging system that was implemented in 1997.
    - Inactive storage tanks equipped with a continuous leak detection system are inventoried monthly and those without are inventoried manually on a daily basis.
    - A gain or loss of 0.25% of total jet fuel handled for the month is tolerated. Based on the approved tolerance factor, approximately 7,500 gallons of fuel can be gained or lost in inventory per month without triggering an investigation.
    - Automatic line leak detectors are currently installed on approximately 20 percent of the fuel lines.
    - The average rate of receipt of JP-8 fuel via the 4-inch Holly Corporation pipeline is 276,000 gallons per day.

- Are the automatic fuel line leak detectors currently operative? (The automatic line leak detectors were inoperative and waiting repair in the spring of 2000.)

- When were tank inspections last performed for POL Tanks 1, 2, and 3? Were any repairs made following the most recent inspections, other than repairs completed for Tank 1 in May 2002?

- Have there been any identified leaks or unaccounted losses in the last five years, besides those associated with Tank 1?

- Is the tracer tightness test still conducted annually for the POL Hydrant Piping System and USTs, as well as the primary fuel lines which includes the Holly Corporation Pipe Line 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?

- Has the Tracer Tight Leak test failed since 1999?

- Have findings of the tracer tight leak tests been provided in annual reports prepared by Tracer Researcher Corp. for 2000 to present?

- Have there been any significant changes in the fuel management program and inventory system for the Base since 2000? Are the current procedures used for the leak detection systems and inventory controls similar to those implemented in 2000?

RESPONSES TO COMMENTS

MOUNTAIN HOME AFB DRAFT FIVE-YEAR REMEDY REVIEW REPORT
MOUNTIAN HOME AFB, IDAHO

Responses to IDEQ comments received February, 18, 2006

Comment 1: Executive Summary, Evaluation of Protectiveness, last paragraph, page E-4

Please elaborate on the "physical characteristics of the system indicate this mode of contaminant transport is unlikely to readily result in contaminant dissolution into groundwater…." It is not clear whether this statement is referring to vapor phase partitioning into ground water or free product dissolving into ground water or whether some other characteristic is thought to influence the transport.

Response: *The text referenced in the comment has been deleted per FFA team discussion in February 2006. The sentence now reads:* "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 deep regional groundwater."

Comment 2: Executive Summary, Summary f Review and Recommended Actions, Table ES-1, page E-8

The language included for the vapor intrusion scenario analysis for site SD-24 should be included on this page for site FT-08 even though the vapor concentrations are lower. Occupied housing with basements is located much closer to FT-08 than any housing units with respect to SD-24. Please add similar language for FT-08.

Response: *The vapor intrusion evaluation has been referenced under SD-24 in Table ES-1 because SD-24 is considered the primary source of contaminate vapors at the Base. The vapor intrusion work plan will outline specific locations that will be evaluated to determine risk associated with the vapors to indoor air at multiple locations at the Base.*

Comment 3: Executive Summary, Summary f Review and Recommended Actions, Table ES-1, page E-13

There is a minor typographical error in column 6. Bullet 4 should read "is currently ongoing…."

Response: *Suggested typo has been corrected.*

Comment 4: Executive Summary, Five-Year Review Summary Form, Recommendations and Follow-up Actions, page E-16

It is not clear why this list of sites for "no further action" is not consistent with Table ES-1. Please clarify the reasons the sites identified in the table and this list are not the same or revise this list to be consistent with the noted table.

Response: *The sites listed on the Five-Year Summary Form only address the 20 sites (seven of which were determined NFA) evaluated during this review, while Table ES-1 presents all 33 ERP sites. A note has been inserted into the form to specify that the listed recommendations are associated with findings from this five year review, only.*

Comment 5: Section One, 1.1, paragraph 2, page 1-1

The paragraph states 10 sites "remain no further action as determined in the 2001 five-year review…." Table ES-1 lists 13 sites that are no further action. Please clarify the text to describe difference in the number of sites that were and are now no further action sites.

Response: *The second paragraph of Section 1.1 was revised so that the number of sites referenced would correctly reflect the total number of sites that were evaluated during this review and those sites that did not require further evaluation since the 2001 review. This paragraph has been modified as follows:*

"A summary of ERP sites is…Twenty of the 33 ERP sites, including OU-3, reviewed during the 2001 five-year remedy review required evaluation during this review. During the 2001 five-year review, no further action was recommended for the following twelve 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. The No Remedial Action remedy remains protective for all these sites, in which NFA was previously recommended, except ST-13. ST-13 was one of the twenty ERP sites evaluated during this five-year remedy review due to new site information (indicating the presence of free-product) since the previous review. Although institutional controls were recommended for the remaining…"

Comment 6: Section Three, 3.2, paragraph 2, page 3-3

Please add in parentheses a conversion of the volumes presented in units of acre-feet into gallons so the average reader has a better concept of the large volumes of ground water that are described.

Response: *The volumes in acre-feet have been converted into gallons and inserted in parentheses within the text.*

Comment 7: Section Three, Figure 3-2, page 3-19 (un-numbered)

The closed contour around wells MW21, MW22, and MW23 appears to be a remnant from a contouring software interpretation of the data. This apparent hydraulic sink does not appear to be logical given the lack of a production well in this area. DEQ recommends eliminating this contour unless a rationale for a hydraulic sink exists within the contour interval.

Response: *The closed contour around wells MW21, MW22, and MW23 is a remnant from the contouring software interpretation of the data. This contour has been modified to open toward the west boundary of the Base. Figure 3-2 has also been revised to illustrate the rapid infiltration basins located near wells MW21, MW22, and MW2.*

Comment 8: Section Six, 6.4.4, first bullet, page 6-7

The last sentence of this bullet states "vapor concentrations in the vadose zone as bedrock vapor concentrations at FT-08 are orders of magnitude below those of SD-24." The difference in maximum concentrations noted in the next bullet item is one order of magnitude, 95,000 ppbV versus 5,300 ppbV. Please correct the order of magnitude statement.

Response: *The order of magnitude stated in Section 6.4.4, first bullet has been edited per comment.*

Comment 9: Section Six, Table 6-4, page 6-29

The summary of prevalence of vapor detections by vapor port does not report Freon-113 in the MW27 vapor ports although it appears quite often in the other vapor ports with lower overall vapor concentrations of the compounds detected. For informational purposes (not necessarily an edit to the report) please check on the minimum reportable detection limit for Freon-113 in the low and high vapor concentrations seen at the Base. The presence of this compound has implications on the treatment technology that may be selected for vapor phase remediation at site SD-24.

Response: *This issue will be looked into and addressed during the vapor pilot tests.*

Comment 10: Section Seven, Question B, paragraph 3, page 7-2

This paragraph accurately portrays the risk range used in the CERLCA decision process but the description of how it is applied to the risk management decision process is not clear. Bottom line, this paragraph will probably confuse a reader that is not familiar with the history of the

risk management decisions that have been made at the Base. DEQ recommends beginning this discussion with a clear statement of the risk range criteria from the NCP that is followed by a description of the risk management decisions that are applied to the contaminants that result in the application of different risk criterion. It also would be beneficial to check the wording in previous sections that deal with the risk ranges to verify their clarity after editing this paragraph.

Response: *Edits have been made to the second and third paragraphs under Question B.*

The following text has been inserted at the end of the second paragraph under Question B: "However, unacceptable risks determined in the RODs were based on an assumption that future residential use of the sites would be unlikely. Since then, the FFA team has recognized that future industrial land uses assumed in the RODs are not assured, and therefore land use (and hence exposure) assumptions used at the time of remedy selection are no longer valid."

The third paragraph has been revised as follows:

"During the previous 2001 five-year review, the FFA team established an unrestricted use protectiveness goal for soils to be a non-carcinogenic hazard index not to exceed 1, and a carcinogenic risk not to exceed 1×10^{-6} to account for uncertainties in the site characterizations and risk results. Although the protectiveness goal for unrestricted use and unlimited exposure (UU/UE) remains 1×10^{-6} for this five-year review, in February 2006 the FFA team proposed a target risk level of 1×10^{-5} as an acceptable remedial action objective for UU/UE when it can be either supported by acceptable rationale (i.e., nature of COCs, site conditions, and/or sufficient site data/characterization to demonstrate protectiveness at the 1×10^{-5} risk level with certainty under the UU/UE scenario) or a ROD amendment states the protectiveness goal for UU/UE at 1×10^{-5}. The Federal SDWA MCL remains the protectiveness goal for groundwater. For those chemicals for which Federal SDWA MCLs are not available, groundwater concentrations were compared to EPA Region 9 tap water preliminary remediation goals (PRGs) (EPA, 2004) for screening purposes. For this five-year remedy review, results for soils sampled since the 2001 review were compared to EPA Region 9 PRGs for residential use of soils (applicable for unrestricted use) (EPA, 2004)."

Comment 11: Section Seven, Table 7-1, ST-11, page 7-5

The last sentence under "Basis" does not fit the "Answer" of "No (long term)" for site ST-11. Please reword the last sentence to be consistent with the "No" response to the question.

Response: *Table 7-1 has been deleted from Section 7 per Comment #71 of EPA's Region 10 comments received March 9, 2006; information provided in the table is now summarized within the text under Section 7.*

Comment 12: Section Nine, 9.20 OU-3, bullet #3, page 9-7

DEQ agrees that sampling should be discontinued on wells MW19 and MW11-2 since these wells are redundant because of newer wells located nearby. All other monitoring wells noted should be sampled at least once before the next five-year review and a decision should be made at that time, based on the data, as to whether additional sampling is warranted.

Response: *Modifications to the LTM sampling program as agreed upon by the FFA team during the February 2006 Seattle meeting have been inserted into Section 9, and other sections where applicable. With the exception of MW19 and MW11-2, all other monitoring wells noted are recommended for sampling at least once before the next five-year review; see response to Comment 13.*

Comment 13: Section Nine, 9.20 OU-3, bullet #5, page 9-7

The semi-annual monitoring frequency should be continued for monitoring wells MW27, MW28, and MW33 which are not noted in this list. The wells (MW27 and MW33) located in the vicinity of site SD-24 and the highest TCE ground water concentrations found on the Base should be continued in the semi-annual sampling schedule as should MW28 located at site FT-08.

Also, please revise this bullet and bullet #6 to more clearly convey to the reader which wells will be sampled semi-annually and which wells will be sampled annually. It is not clear as presented.

Response: *The bullets listed in Section 9.20 have been revised according the modifications made to the LTM sampling program during the FFA meeting in February 2006. The following bullets have been inserted into Section 9.20 to replace existing bullets addressing modifications and recommendations to the RA-O program.*

- *To fully insure water level elevation maps are as accurate as possible, complete well deviation surveys on the remaining 13 existing wells and the one newly installed well (MW37).*
- *Discontinue sampling groundwater from MW11-2 and MW19. These monitoring locations are redundant to wells with vapor monitoring ports (i.e., MW28, and MW27).*
- *Sample the following wells every other year: MW7-2, MW31. Alternate sampling these wells between years (i.e., sample MW7-2 one year and then MW31 the next year). The wells would be analyzed for VOCs every*

other year and for RCRA 8 metals, Pesticides and PCBs only once within 5-years.

- *Sample the following wells once within the next five years for VOCs: MW16-2, MW17-2, and MW18-2. These wells have many years of analytical results that indicate either non-detection or very low detection of contaminants of concern (i.e., MW17-2 and MW18-2). MW16-2 has never had a detection of chemicals of concern. Additionally, MW17-2 and MW18-2 are down-gradient sentry wells that now have wells further up-gradient but still will function as down gradient sentry wells to contaminants of concern (i.e., MW29 and MW34).*
- *Sample the following regional groundwater wells in the spring and fall for VOCs:*
  a. MW20, MW24, MW25, MW26, MW27, MW28, MW29, MW30, MW33, MW35, MW36, and MW37 (new proposed well)
  b. Collect water levels on all available monitoring wells in the spring and fall
- *Sample the following perched zone monitoring wells in the spring and fall for BTEX:*
  c. PZMW7, 8, 11, 12, 13, 14, 15, 16, and 17
- *Sample the existing vadose zone vapor ports in the spring and fall*
- *Sample the following regional groundwater monitoring wells in the fall for VOCs (MW3-2 will also be analyzed for RCRA 8 metals, pesticides, and PCBs):*
  d. MW3-2, MW32, and MW34
- *Evaluate the need for reducing groundwater sampling frequency and reducing the number of vapor ports sampled, following each annual LTM*

Comment 14: Section Nine, Table 9-1, OU-3, bullet #2, page 9-17

Semi-annual ground water sampling should be maintained in wells MW27, MW28, and MW33 which are not listed under the column "Recommendations & Follow-Up Actions." Please add these wells to this list.

Response: *Table 9-1 has been revised according to changes to LTM sampling program, as agreed upon by the FFA team during the February 2006 meeting. See response to Comment #13 for changes.*

Comment 15: Section Nine, Table 9-1, OU-3, bullet #3, page 9-17

Please list the vapor ports via the well names where you propose curtailing vapor sampling. It is difficult to track the recommended changes as shown.

Response: *The third Bullet listed in Table 9-1, under OU-3, has been replaced with "Evaluate the need for reducing groundwater sampling frequency and*

reducing the number of vapor ports sampled in 2007." The remaining bullets listed in Table 9-1, OU-3, have also been replaced with the revised recommendations summarized in Comment #13.

Comment 16: Section Nine, Table 9-1, OU-3, bullet #4, page 9-17

All wells but the redundant wells (MW19 and MW11-2) should be included in a base wide sampling round prior to the writing of the next five-year review to ensure the conclusions down at this point in time are still valid. At that time, next five-year review, a decision can be made regarding the need for another round of sampling prior to the next review or if conditions warrant further sampling at a different frequency.

Response: *The bullets under OU-3 have been revised to reflect that only MW11-2 and MW-19 are recommended for discontinuing groundwater sampling and that all other monitoring wells are recommended for sampling at least once before the next five-year review.*

Comment 17: Section Ten, 10.13 LF-23, page 10-3

The last sentence in this section, and it appears earlier in the document, states "the site is located within a non-irrigated field…." Is the term "field" correct since it implies the ground is used for agricultural purposes, usually growing crops or pasture. Exposure to the soil would be greater to any one plowing the field or to livestock grazing on the land if it is pasture. Please verify that "field" is the correct term to use for this area.

Response: *"located within a non-irrigated field..." has been replaced with "vacant land".*

RESPONSES TO COMMENTS

MOUNTAIN HOME AFB DRAFT FIVE-YEAR REMEDY REVIEW REPORT
MOUNTIAN HOME AFB, IDAHO

Responses to EPA Region 10 comments by Elly Hale received March 9, 2006

EPA page-specific comments on the draft 2006 five year remedy review

Comment 1: Generally: "unrestrictive" use should be "unrestricted" use.

Generally: The text under "Site Description" column in Table ES-1 is a handy shorthand way to evoke the ERP site and its issues. In text headings and table headings, please include this text with the site name wherever possible.

Page ii – Editorial: first line INVOLVEMENT is all caps.

Response: *"unrestrictive" use has been replaced with "unrestricted" use as requested. Text used to describe a site (i.e, Lagoon Landfill) in addition to its site ID (LF-01), as presented under the "Site Description" column in Table ES-1, has been inserted into subsection headers and table headers (where space allowed) for site names. The Section 6.2 title in the table of contents has been edited so that Involvement is no longer in all caps.*

EXECUTIVE SUMMARY

Comment 2: Page E-4: first full paragraph – At the February meeting in Seattle, you provided EPA with a copy of your notes from the February 5, 2003 telephone call referenced in this paragraph. After further discussion at the February meeting, with all parties present, we concluded that, while the risk goal for cleanup is 10E-6, a cleanup objective based on 10E-5 risk for unrestricted use and unlimited exposure should be acceptable, but should be adopted in the ROD, with an acceptable rationale using CERCLA criteria.

In other words, in conducting a soil cleanup, if the AFB can achieve 10E-6 readily with a minor increase in soil removal, the AFB will do so to further the goal. However, a risk of 10E-5 for unrestricted use/unlimited exposure (UU/UE) may be acceptable at this site and would be the basis for cleanup levels that must be achieved at the conclusion of the cleanup.

There should be no distinction between TCE and other contaminants in terms of risk, although to achieve protective risk levels in groundwater

might require a more stringent soil cleanup level than risk-based concentrations based on direct exposure only. TCE is identified as a contaminant of concern (COC) because it is widely present at levels which drive the risk. However, cleanup is expected to achieve a "cumulative" risk level of 10E-5. Generally, cumulative risk is for combined media and pathways; however, because federal maximum contaminant levels (MCLs) are used for drinking water cleanup levels (for those contaminants which have MCLs), the cumulative risk should primarily be for soil pathways (ingestion, inhalation, dermal) and vapor inhalation risk.

Response: *The corresponding text has been revised throughout the report according to discussions during the February 2006 FFA Team meeting in Seattle and EPA's comments presented above and in the accompanying letter dated March 7, 2006. The protectiveness goal discussion presented in the Executive Summary under the Evaluation of Protectiveness, second paragraph (Page E-4) has been revised as follows:*

"Many of the remedies selected … Human health protectiveness goals 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}. This carcinogenic risk range is expected to be protective of human health and the environment under current and near-term uses because the facility is an active military base, and access and development is restricted. However, during the previous 2001 five-year review, the FFA team established an unrestricted use protectiveness goal for soils to be a non-carcinogenic hazard index not to exceed 1, and a carcinogenic risk not to exceed 1×10^{-6} to account for uncertainties in the site characterizations and risk results. Although the protectiveness goal for unrestricted use and unlimited exposure (UU/UE) remains 1×10^{-6} for this five-year review, in February 2006 the FFA team proposed a target risk level of 1×10^{-5} as an acceptable remedial action objective for UU/UE when it can be supported by acceptable rationale based on the following criteria: nature of chemicals of concern (COCs), site conditions, and/or sufficient site data/characterization to demonstrate protectiveness at the 1×10^{-5} risk level with certainty under the UU/UE scenario. If it is possible to achieve the protectiveness goal of 1×10^{-6} without a significant cost impact, the AFB is encouraged to do so, particularly where uncertainties remain in characterization. The unrestricted protectiveness goal for groundwater is the Federal Safe Drinking Water Act (SDWA) MCL."

Comment 3: Page E-4 – second full paragraph. We discussed removing the first part of the sentence beginning "Even though physical…. into groundwater," for clarity.

Response: *The suggested text has been deleted from the last sentence of the second full paragraph on Page E-4, which now reads as follows: "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 deep regional groundwater."

Comment 4: Page E-4 – third paragraph. The language about protectiveness goal should be revised consistent with the comments above.

Response: The language used to discuss the protectiveness goal in the first paragraph under Summary of Review and Recommended Actions (formerly third paragraph of Page E-4) has been revised as follows: "For the first and second five-year remedy review, the FFA team has established the UU/UE protectiveness goal for soils to be a non-carcinogenic hazard index not to exceed 1 and a carcinogenic risk not to exceed 1 x 10^{-6}, and the unrestricted protectiveness goal for groundwater to be the Federal SDWA MCLs."

Comment 5: Page E-5 – First full para. Clarify first sentence to indicate that the limited action was required by the 1995 OU-3 ROD.

Response: The requested text has been inserted into the first sentence of the first full paragraph on Page E-5 to clarify that limited action was required by the 1995 OU-3 ROD.

Comment 6: Page E-5 – 2nd Bullet: ST-38 discussion should be updated to reflect any changes or new information following discussions at our meeting.

Response: "implement" has been replaced with "implementation of" in the 2nd bullet on Page E-5. Per comment, the fourth bullet listed under Current Status for ST-38 in Table ES-1 has been revised as follows: "Tank 1A is currently out of commission due to corrosion pits detected on the outside of the tank side walls during the inspection performed by AIP. All of the contaminated soil encountered during the removal of a section of the Tank 1A concrete cap has been removed and landfarmed. NAVFAC is currently evaluating whether Tank 1A should be repaired or removed."

Comment 7: Page E-5 - 4th bullet – Voluntary removal and disposal action

Response: Requested edit has been made to the 4th bullet on Page E-5.

Comment 8: Page E-5 – 5th bullet – maybe pilot <u>studies</u>, rather than pilot study?

Response: pilot study has been changed to Pilot studies in the 5th bullet on Page E-5.

Comment 9: Page E-5 – 6th bullet – Sentence reads as though all the steps (RI/BRA amendment, FFS, proposed plan) at all the sites listed are needed to evaluate the effectiveness and improve the optimization of the existing

product recovery system at MW-24. It may be best to make a separate bullet for ST-13. ST-13 actions should be stated more tentatively. Additional information may indicate that we don't need a full-scale remedial action for ST-13. EPA recommends additional characterization of the source term before concluding that removal of free product at one well is a successful remedial approach.

Response: *Further evaluation of the product removal system is needed prior to determining that there is insufficient information to warrant additional characterization of the source at this time.*

Text associated with MW24/ST-13 has been deleted from the 6th bullet on Page E-5 and inserted into a separate bullet as follows: "Continue O & M activities for the current product recovery system at MW24 and complete a BRA amendment, FFS, PP, and ROD amendment to evaluate the effectiveness and improve the optimization of the existing product recovery system at MW24."

Comment 10: Page E-6 – To manage readers' expectations, it would be prudent to change "A future five year remedy review" to "Additional five year remedy reviews" since LF-01 and LF-02 are likely to include institutional controls for a long time or for the indefinite future)

Response: *The suggested change has been made per comment.*

Comment 11: Table ES-1 – General: Make sure changes to the LTM are reflected here.

COCs – It may be helpful to list only soil COCs, since the groundwater COCs are not always clearly linked to a particular site. I think stating "None" under this heading is somewhat misleading. You may want to specify "Soil and groundwater COCs by site from ROD or RI/FS" or something similar, so as to avoid the suggestion that they are currently at levels of concern. Groundwater COCs should be listed, perhaps in a footnote at the end. In some cases, we changed our view of whether a site is a potential source of TCE following the ROD. How is that reflected?

Response: *Changes to the LTM program per discussions held during the February 2006 FFA Team meeting in Seattle have been made to the Recommendations column in Table ES-1.*

The Chemicals of Concern column in Table ES-1 only lists current COCs based on the most recent data gathered during post-ROD investigations and that can be clearly linked to a particular site. This has been clarified in the table header, which now reads "Current Soil Chemicals of Concern" and by a footnote that reads "Soil COCs identified for each site are based on the most recent findings associated with post-ROD

investigations performed to date." Groundwater COCs have been deleted from the table and inserted as a footnote: "TCE is the primary COC for regional groundwater, and LNAPL fuels are present in regional groundwater at ST-13 (JP-4), and in perched groundwater at ST-11 (JP4) and ST-38 (JP8)."

Comment 12: The phrase "Obtain regulatory acceptance…etc." should be deleted throughout. As we discussed, closure can be provided by the ROD amendment, but the recommendation to obtain closure is really a recommendation AFB contractors are giving the FFA team. Use of capitalized terms that are not defined under CERCLA should be avoided.

Response: The phrase "Obtain regulatory acceptance…etc." has been deleted throughout the recommendations listed in Table ES-1.

Comment 13: The phrase "conservative risk-based residential screening concentrations" should be replaced with R9 PRGs (or R3 or R10 risk based concentrations (RBCs), if using comparisons done pre-ROD), which could be defined in a footnote, with the risk level and exposure assumption (residential or other) specified.

Response: The phrase "conservative risk-based residential screening concentrations", which was taken directly from the 17 Sites Evaluation/Investigation Final Report (URS, 2004), has been replaced with "USEPA Region 9 PRGs for residential soil".

Comment 14: Voluntary removal and disposal action (RDA) – Include a paragraph or two to describe what an RDA entails: what is the anticipated process for design and monitoring, what is the authorizing tool, what is an approximate schedule for completing the work, what are factors in meeting that schedule (funding, e.g.). Please specify how the cleanup levels will be selected and how achieving the levels will be verified (confirmation sampling) and documented. I expect that this information will be referenced in the anticipated ROD amendment or an ESD, to close the question from a CERCLA standpoint, so consistency with the ROD objectives will be essential.

Response: The level of detail requested in the comment for describing RDA activities will be provided in a work plan, scope of work, etc., and not in the five-year review report.

A discussion addressing voluntary RDA activities has been inserted into the introduction of Section 9; see response to Comment #90:

Comment 15: The sentence: "Remove Site X from the Base's list of active or potential sites" – EPA cannot agree to this language without a clear picture of what

this list of active or potential sites means and how it is used. Is it more accurate to say something like "remove Site X from the list of sites for which Base ERP approval is needed for access, construction, or other use"? I expect that until the AFB is deleted from the NPL, individual sites will still require some measure of CERCLA tracking in the five year reviews.

Response: *The sentence has been deleted from Table ES-1 and in Section 9, Recommendations, and replaced with the following sentence for sites where the NFA is recommended in this review: "Site X meets the criteria of UU/UE, therefore the site does not require re-evaluation during future five-year reviews."*

Note: a construction waiver isn't required for an ERP site that meets the criteria for UU/UE.

Specific Sites:

Comment 16: LF-01 – "very low detections" – of what? Define "very low" relative to PRG or RBC (and risk level/land use).

Response: *The following recommendation bullet listed under LF-01 has been revised as follows: "Remove monitoring well MW7-2 …. and has a history of only sporadic very low detections of VOCs below MCLs."*

Comment 17: LF-02 – No need to do so here, but FFA team will need to define goals for the ICs and inspections.

Response: *Goals for LF-01 ICs and inspections will be defined in the ESD.*

Comment 18: LF-03 – Were we not planning to add ICs for this site? I would like to better understand why this site is exempt from groundwater monitoring under RCRA—or delete this sentence. If we monitor it under CERCLA, the exemption is not affected, in any case.

Response: *ICs are currently in place for the active asbestos cell. The remaining two active cells consist of municipal solid waste and scrap metal/wood. If the AF decided to close the site, controls on land use would be established at that time. Only the landfill cells closed prior to 1984 are ERP sites. No hazardous materials have been, or are currently, placed in the landfill and the landfill is operated under a Conditional Use Permit issued by Elmore County. Since LF-03 meets the conditions for exemption in 40 CFR 258.1 (Criteria for Municipal Solid Waste Landfills) groundwater monitoring is not required, as stated in the Central District Health Department letter to Mountain Home AFB regarding the Status of Mountain Home AFB Landfills (October 28, 1994).*

Comment 19: RW-14 – Why is this site NFA with LTM. All the others are NRA or Limited Action.

Response: *The selected remedy is NRA with LTM; the text has been edited accordingly.*

Comment 20: ST-11 – Under current status, revise fifth bullet: An ESD was completed in 2004 to clarify and enhance the ICs for the site. Under Recommendations, omit fifth bullet reference to MCLs as remedial target levels in perched groundwater, unless use of the MCL is a proposed change to the current remedy. For fuel management, add a bullet "summarize results of leak detection system with annual groundwater results."

Response: *The fifth bullet under the Current Status for ST-11 has been revised in accordance with comment.*

The fifth bullet reference to MCLs as remedial target levels in perched groundwater has been deleted under Recommendations.

The suggested bullet has been added under Recommendations for the Fuel Management Program.

Comment 21: DP-9 and OT-10 – NFA versus NRA: is there a difference? 2001 Five Year Review did not recommend a change to the NRA decision. In the absence of new information, this site does not require re-evaluation.

Response: *NFA was the recommendation listed for some of the sites evaluated during the 2001 five-year review and NRA is the selected remedy stated in the ROD. The comment is correct, neither of these sites require re-evaluation during this or subsequent five-year reviews. To clarify this issue, the previous recommendations have been replaced with "None" .*

Comment 22: ST-13 – Recommendation should include further characterization. Given the theory that this may be a one-time, one-well problem, qualify the recommendation for a ROD amendment "if indicated following characterization"

Response: *Further evaluation of the product removal system is proposed prior to determining that there is insufficient information to warrant additional characterization of the source at this time.*

Comment 23: ST-22 – Strange that this site has such high TCE levels. I don't think we want to remove this site from our scope until we have all the data we're going to get.

Response: *The passive soil gas survey indicated no abnormally high detections of shallow soil VOC gases at ST-22 and the results of the ST22-R-1 borehole indicate no contamination present from surface to 50 feet bgs. The soil samples collected from the six soil borings drilled in the vicinity of the four USTs during the 1991 LFI study did not report VOC results above the 2000 EPA Region 9 residential PRGs for residential soil. Based on findings reported in the Final 2004 Annual LTM Report, the Air Force recommends that ST-22 be considered fully characterized and that no further action is required.*

Comment 24: **Five Year Review Summary Form** –Before this is finalized, review for consistency with the rest of the five-year review. The EPA ID is 2B. The Lead Agency is Other Federal Agency (AFB), not EPA or Idaho Department of Environmental Quality (IDEQ). Reuse: Check NO box next to "has site been put into reuse?" – but include a note "active base" in the space next to it. WASTELAN indicates that the triggering action date is June **27**, 2001. Due Date is thus June 27, 2006. Issues: Why the focus on LF-01? There are other sites requiring ICs. Also, ST-11 continues to threaten the regional groundwater, and the vapor plume also has a potential effect (not affect) on future protectiveness. Recommendations and Follow-up Actions heading: For FT-08, ST-11, and SD-24, suggest "A ROD amendment for active remediation is recommended following a pilot study, RI/BRA amendment, and FFS." Need to add mention of vapor intrusion assessment. Protectiveness Statement heading: The discussion of ST-13 is odd. Is it protective? No, that's why we added the product removal. Will continue to assess ST-13 nature and extent and document product removal or other remedial action in ROD.

Response: *The requested changes have been made to the Five-Year Review Summary Form with the following exceptions or comments.*

Issues: The "Issues" presented in the Summary Form have been revised to include all issues that currently prevent the remedy from being protective, or may do so in the future. See response to Comment #88 for details of the issues identified in Section 8.

Protectiveness Statement: The ST-13 protectiveness discussion has been revised as follows: "Since free-product has been encountered at MW24, the selected remedy at ST-13 (no remedial action with long-term monitoring) is no longer considered protective."

Comment 25: Page E-2 – Technical Memorandum (URS 2005B) regarding ST-11 field activities – Was this provided to EPA?

Response: *Yes, the Technical Memorandum (URS 2005B) was provided to the EPA.*

Comment 26: Page E-2 – 366 Fighter Wing (FS) Plan 3202 – 05 Integrated contingency plan for oil spill prevention and response. Has EPA received and approved this?

Response: *Tom Shinault with EPA Region 10 verbally approved the final version of the ICP after he received the final copy in May 2005.*

Comment 27: Page E-3 - Evaluation of protectiveness:

Page 3-2 bottom and 3-3 – top. Hydrogeologic discussion. The perched groundwater discussion focuses on ST-11. It should include mention of other perched areas, such as at the POL yard. ST-11 discussion should consider the inclusion of USGS work regarding connectivity and water sources or should reference the section of the five year review where these studies are discussed.

Response: *The following text has been inserted into Section 3.2.1: "An assessment of water-level change in PZMW7 and sources of recharge to ST-11 was completed by USGS in March 2002. Findings from the 2002 study are summarized in Section 6.4.1, ST-11 Data Review."*

A discussion of the perched groundwater encountered at the POL yard (ST-38) has also been inserted into the Hydrogeology section as follows:

"In addition to ST-11, perched groundwater has also been observed at the POL Yard (ST-38) in the vicinity of Tank 1 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 aerial extent (Weston, 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 the Base POL Yard between October 2001 and June 2002. "

SECTION ONE

Comment 28: Page 1-1 – Bullets – Is it LF-03 or LF-3? Also, clarify OU-3 as follows: Base-wide regional groundwater and perched groundwater at ST-11. (LTM isn't part of an operable unit--it's an action)

Response: *The landfill site ID should be LF-03; edit has been made accordingly. The OU-3 bullet has been revised per comment.*

Comment 29: Paragraph below bullets: Add three additional NFA sites (so the math works). Second sentence would be clearer if revised. Suggest: "The first

five year review didn't recommend changes to the No Remedial Action remedy for the following ten sites" Delete statement "therefore these sites are exempt from this review, as well as future five-year reviews…." In the absence of new information, these sites can be briefly referenced in future five year reviews as protective.

Response: *The second paragraph of Section 1.1 was revised so that the number of sites referenced would correctly reflect the total number of sites that were evaluated during this review and those sites that did not require further review. This paragraph has been modified as follows:*

"A summary of ERP sites is…Twenty of the 33 ERP sites, including OU-3, reviewed during the 2001 five-year remedy review required evaluation during this review. During the 2001 five-year review, no further action was recommended for the following twelve 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. The No Remedial Action remedy remains protective for all these sites, in which NFA was previously recommended, except ST-13. ST-13 was one of the twenty ERP sites evaluated during this five-year remedy review due to new site information (indicating the presence of free-product) since the previous review. Although institutional controls were recommended for the remaining…"

Comment 30: RCRA closure for ST-31 and 32 is stated as the reason re-evaluation is not being performed in this Five Year Review. Was RCRA clean closure achieved and documented? The ROD discussed these sites, and the 2001 Five Year Review recommended institutional controls. If clean closure was achieved, include this information. If not, EPA needs to review a rationale for not now recommending further characterization or institutional controls in an ESD.

Response: *A closure report was prepared for the USTs removed from ST-31; clean closure was documented on July 23, 1996. The ST-31 closure report was filed with IDEQ in August 1996.*

There is no formal closure report for any USTs removed in 1992 at Building 1113 at ST-32. ST-32 will be added to this five-year review to evaluate whether institutional controls are warranted for this site, as recommended in the previous five-year review, or whether the site can be considered protective based on site-specific conditions, nature of COCs, or other rationale that would support UU/UE for ST-32.

SECTION TWO

Comment 31: Table 2-1 –

a) Was it really just 2 cubic feet of soil removed in August 1992?

b) October 1992, what was the RCRA permit for?

c) January 1993, what is the computer modeling OF?

d) October 1994—No unacceptable risks to whom from what?

e) October 1995, clarify ROD description (it looks like the requirements are all for ST-11): institutional controls, maybe, rather than deed restrictions (language is "notice of restriction" but ICs are broad enough to include access control). Clarify long-term monitoring of regional and perched groundwater.

f) Omit "FINAL" from the document titles and RODs.

g) Add ESD, March 2004.

h) Add 2001 LTM Report?

i) Add Oil-Water Separator work?

j) NPL is National Priorities List

Response: *a) No, it was two cubic yards of soil; correction to Table 2-1 has been made.*

b) The October 1992 RCRA Permit covered the TSDF at the DRMO, which was closed in 2002, and the SWMUs associated with the 1990 RFA, most of which became ERP sites, and the post closure at the UST removal site at building 1307, which we know as ST-13. The RCRA Part B Permit (ID3572124557) was renewed in 2003 and only included corrective action for ST-13 with the stipulation that it will become active if post closure isn't adequately address under the FFA. The SWMUs are mentioned in the new permit as being inactive. Brief details of the 1992 RCRA permit and the renewal of the RCRA Part B Permit has been inserted into Table 2-1.

c) The computer modeling referenced in Table 2-1 is the groundwater contaminant fate and transport modeling completed for the OU-3 BRA. Details have been inserted into the table.

d) The following text has been inserted into the table: "No unacceptable risks to human health or the environment under current use scenarios based on an acceptable carcinogenic risk range of 1 x 10-6 to 1 x 10-4."

e) The details for the 1995 ROD have been replaced with the following: "The selected remedies consist of No Remedial Action, which includes a minimum of annual LTM for regional groundwater at the Base, and the Limited Action alternative for ST-11, which includes a notice of restriction, leak detection program, and perched groundwater monitoring."

f) "Final" has been deleted from the document titles and RODs.

g) The ESD dated March 2004 has been added to table.

h) There is no annual 2001 LTM Report; however, there is a technical memorandum for both the May and October 2001 sampling events. The 2001 technical memorandums have been added to Table 2-1.

i) Information pertaining to the Oil-Water Separator Investigation performed in the summer of 2001 was inserted into Table 2-1, which consisted of resampling and characterizing 11 OWS sites.

j) Edit has been made per comment.

Comment 32: TABLE 2-2 – Add RODs, abandonment of wells at ST-11, recent fuel spills. Under OU-3, add reference to bioslime at MW-24. Posit why bio-slime is an issue at this well only.

Response: *Selected remedies and dates of signed RODs are already included in Table 2-2. The ST-11 well abandonment performed in 1995 has been inserted into Table 2-2. There are no recent fuel spills other than the Tank 1A release, which is currently listed in Table 2-2 under ST-38. A reference to the bioslime present in MW-24 has been inserted under ST-13 in Table 2-2. The presence of bioslime at MW-24 is most likely associated with an increase in oxygen in the well due to the absence of a well cap on the well as a result of the pump configuration and the presence of fuel.*

SECTION 3

Comment 33: In section 3, the sites and the risk assessment results are briefly touched on. This section needs to define LFI (limited field investigation) and make clearer reference to the timing of studies. For many of the sites the discussion concludes that "the no further action alternative was recommended … during the LFI study." Rather than verify that someone recommended NFA in a LFI report, the simplest way to state this accurately is to state that the no further action was selected in the ROD.

Response: *LFI is previously defined in Section 1.0. The dates in which the RIs, risk assessments, and LFIs were completed have been inserted into the paragraph under Section 3.4. The discussion presented in Section 3.4*

summarizes the findings from these pre-ROD site investigations, which provided the basis for selecting the remedy at each site. The findings summarized in Section 3.4 were taken directly from the previous five-year review, which consisted of a review of the LFI studies, as well as other pre-ROD activities. In addition to referencing the NFA recommendation presented in the pre-ROD reports, text has been inserted, where appropriate, to state that the NFA was also selected in the ROD.

Comment 34: References to the "protectiveness goal at the time of 10E-4 excess cancer risk" need to include the assumed land use at the base (industrial). If you have clear language from the ROD, that would be helpful.

Response: *"for industrial use" has been inserted following references to "protectiveness goal at the time of 1 x 10^{-4} excess cancer risk" throughout Section 3.4.*

Comment 35: Page 3-4 – Top paragraph: The site was presumably scored under the Hazard Ranking System. Rather than summarize the particular drivers (which would need verification), it would be simplest to remove the rest of the sentence after "August 1990."

Response: *The suggested text has been deleted from the last sentence of the second paragraph of Section 3.3.*

Comment 36: Page 3-4 – Basis for Taking Action/Selected Remedy

First sentence: The Pre-ROD activities didn't actually determine what action was warranted. The RODs documented the determination, considering information and recommendations developed through pre-ROD activities. Second sentence: The "however" in the middle of the sentence creates an opposition that is not necessary. (Editorial: the term "applicable" is also inaccurate. The 10E-4 protectiveness goal for industrial uses was selected from a range).

Response: *The first sentence of Section 3.4, Basis for Taking Action/Selected Remedy, has been deleted per comment. The second sentence has been modified, per comment, as follows: "Conclusions derived from pre-ROD investigations provided the basis for selecting the remedy at each site based on protectiveness goals for industrial use."*

Comment 37: This section should include some introductory discussion about what the ROD protectiveness goals were at the time. A key point is that, though the pre-ROD activities considered residential RBCs and hypothetical residential risks at various sites, site decisions were based on an assumption that there would be no residential use of the site and that workers at the site should be protected at the 10E-4 risk level. As a result,

a clearly stated protectiveness goal for unrestricted uses is not provided in the ROD.

Response: *The first paragraph in Section 4.1 has been revised and moved to the first paragraph of Section 3.4 to address the suggested discussion per comment, which now reads as follows: "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 MCLs for exposure to groundwater. Decisions made on human health risk screening results were based on comparisons of site concentrations to RBCs applicable at the time, and included either EPA Region 3 or EPA Region 10 RBCs for residential soil exposure. Human health protectiveness goals 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 x 10^{-6} to 1 x 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 that workers at the site should be protected at the 1 x 10^{-4} risk level. As a result, a clearly stated protectiveness goal for unrestricted uses is not provided in the ROD.*

Comment 38: It appears that the sites discussed under individual headings in this section relate only to RODs based on soil exposure pathways, not groundwater. This should be clarified in the introduction.

Response: *Groundwater exposure pathways are addressed under Section 3.4.20, OU-3.*

Comment 39: Spell out LFI, if you haven't previously.

Response: *LFI is previously spelled out in Section 1.0.*

Comment 40: In the site-specific sections that follow, the phrase "the no further action alternative was recommended" is used frequently. Unless the pre-ROD documents included recommendations, it would be more accurate to simply state that the no further action alternative was selected in the ROD.

Response: *No further action alternatives were specified in the pre-ROD documents, as stated in the previous five-year review. In addition to referencing the NFA recommendation presented in the pre-ROD reports, text has been inserted, where appropriate, to state that the NFA alternative was also selected in the ROD.*

Comment 41: Where risk is discussed, please ensure that the assumed land use and the risk goal (not the range, but the level that would trigger action: in this

case, 10E-4) are clearly articulated. A 10E-4 risk for industrial uses is probably not protective for residential uses. Where there is information about residential risks (or where data were compared to residential RBCs), please include (still specifying whether the RBC was based on 10E-4 or 10E-6. Note, if you state in the introduction what risk level and land use the RBCs used were based on, you can avoid repetition). Similarly, where the "protectiveness goal at the time" of 10E-4 is referenced, please clarify that that was for industrial land uses. The protectiveness goal hasn't changed for industrial uses, but the expectation of permanent industrial use has changed. If such a use is to be permanent, ICs are necessary. If ICs are not desirable, then a clearly stated protectiveness goal for unrestricted use is needed.

Response: *The introduction of Section 3 has been revised per comment to clearly state the land use and risk goal (not the range) used for site decisions determined in the RODs. References to "based on an acceptable carcinogenic risk range of 1 x 10-6 to 1 x 10-4" are based on language taken from the RI/BRA. "for industrial use" has been inserted following references to "protectiveness goal at the time of 1 x 10^{-4} excess cancer risk".*

The intent of this section is to present a brief summary of the overall conclusions of the pre-ROD investigations, which provided the basis for selecting the remedies in the RODs, and not a discussion of the results (i.e., calculated cancer risks, comparison of data with RBCs), which is already provided in the previous five-year review as stated in the introduction paragraph of Section 3: "The results from the pre-ROD investigations, including risk assessment, are summarized in the 2001 Five-Year Remedy Review Report (FEC, 2001)."

Since the protectiveness goal in the RODs were based on an assumed industrial use (1 x 10^{-4}), information specific to residential risks is really not pertinent in this section, which again, is intended to provide the basis for selected remedy relative to a protectiveness goal for industrial use.

Comment 42: Page 3-4, Section 3.4.1 – LF-01 – "no unacceptable risk" needs to be clarified. Again, if this was based on industrial use at the 10E-4 level, what are the risks for unrestricted use, and do land use restrictions need to be established? Clarify sentence regarding arsenic: it could be interpreted that the concentrations were below background or that the RBCs were below background. Either one requires some explanation of background: was it a 95% UTL of background samples?

Response: *The first sentence of Section 3.4.1. defines the basis for determining "no unacceptable risk" as follows: "…based on an acceptable excess cancer risk range of 1 x 10^{-6} to 1 x 10^{-4}, an unlikely future residential use*

scenario, and a concern that the ecological risk was overestimated." Again, this section does not address risks for UU/UE; see rationale presented in response to previous comment.

The sentence regarding arsenic has been modified as follows: "However, arsenic was the only analyte detected…near the lagoons above the risk-based concentrations (RBCs), but at concentrations below the range for arsenic background concentrations."

According to the summary provided in the previous five-year review (Section 3.1.2, Pre-ROD Activities) for LF-01, a range for arsenic background concentrations (3 to 18 µg/L) was referenced and not a 95% UTL of background samples.

Comment 43: Page 3-4 3.4.2 LF-02 – Again, no unacceptable risks need clarification. If it means less than 10E-6 risk for unrestricted use, great. Probable future use is undefined, but if it was assumed to be industrial use with a protectiveness goal of 10E-4, then the risk for unrestricted use is unclear.

Response: *The sentence referring to current and probable future use scenarios has been replaced with the following text: "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 x 10-6 to 1 x 10-4. However, the excess cancer risk calculated for future on-site residential scenario exceeded 1 x 10-6."*

Comment 44: Page 3-5 Section 3.4.3 FT-04: This section is short but confusing. Suggest reordering it as follows:

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 No Further Action was **selected in the ROD.**

Response: *Suggested changes to Section 3.4.3 have been made per comment.*

Comment 45: Page 3-5, Section 3.4.4 FT-05 – Reorganize similarly to previous section.

Response: *Suggested changes to Section 3.4.4 have been made per comment.*

Comment 46: Page 3-5, Section 3.4.7, FT-08 – Add "unacceptable" before "excess cancer risks." Clarify whether the RME was for residential or industrial use, and delete "EPA's target risk range of 1 X 10E-6 to".

Response: *"Unacceptable" has been inserted into text as suggested. The reference to RMEs has been modified as follows: "The results of the risk assessment*

indicated that 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 [HI] less than 1.0) 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 should be noted that the RME excess cancer risk for the hypothetical on-site resident (for an adult) was 3.9E-05."

Comment 47: Page 3-7, Section 3.4.13, Section LF-23 – Why is there no rationale provided here?

Response: *The following rationale has been inserted into Section 3.4.13: "The extent of contamination detected during the excavation of 12 test pits at LF-23 in August 1991 was confined to the bottom portion of the trenches in an area around one test pit (10B), and 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 no further action alternative was recommended for LF-23 during the 1991 LFI."*

Comment 48: Page 3-9 – 3.4.20 OU-3 – This section needs a short introduction to state that the forgoing (19) sites (and others, yes?) were evaluated in light of their potential contribution to groundwater contamination. Also, please explain the "model-estimated peak 30-year average."

Response: *The following paragraph has been inserted as part of the OU-3 introduction in Section 3.4.20:*

"OU-3 represented the final operable unit investigated at the Base and addressed known or suspected fuel releases at five 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 base-wide groundwater investigation. The initial OU-3 groundwater investigation was documented in the Final RI report (Woodward-Clyde, 1995) submitted in May 1995."

The following text regarding the "model-estimated peak 30-year average" has been inserted under the "Note:" listed beneath bullets of Section 3.4.20.

"The peak 30-year average concentration is based on results of fate and transport modeling performed as part of the OU-3 RI/BRA. 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."

Comment 49: The current introduction states that metals were "below levels of concern (i.e., EPA MCLs)." Please modify to read "below EPA MCLs."

Response: Requested change has been made per comment.

Comment 50: Fifth bullet: This bullet doesn't make sense or add value. Please delete.

Response: The fifth bullet has been deleted per comment.

Comment 51: Sixth bullet: Note that the cumulative risk for the groundwater pathway would typically be added to the risk for other pathways, for a total site risk. TCE alone poses 10-6 risk at 1.6 ug/l, and somewhat higher risk at the MCL. For this reason, a target risk level of 10E-4 for soil exposure pathways only may result in risks above 10E-4.

Response: Only the cumulative risks for the groundwater pathway were calculated during the fate and transport modeling completed for the OU-3 RI/BRA.

Comment 52: It would be helpful for the record to develop and include a table that shows the 1994 EPA Region 3 RBCs, the R10 RBCs occasionally used, and the current Region 9 PRGs for site soil and groundwater contaminants. At the least, if they were listed in the RI or another document, a clear reference to the tables would be helpful.

Response: The 1994 EPA Region III RBCs are provided in pre-ROD documents (such as the OU3 RI Report dated March 1995) for detected compounds, and therefore do not require repeating in this five-year review. Furthermore, what would be gained by developing a table that shows both 1994 RBCs and current Region 9 PRGs, when current decisions regarding the status of ROD determinations are based on data comparisons to current Region 9 PRGs.

Comment 53: Figure 3-1 – Editorial: Above scale, the word "corrected" is misspelled.

Response: "Corrcted" has been corrected.

Comment 54: Figures 3-1 and 3-2 – Perhaps the non-mapped wells should be shown in a gray shade.

Response: The suggested change has been made to Figures 3-1 and 3-2.

SECTION 4

Comment 55: Page 4-1 – Section 4.1: Remedy Selection

This section needs to include mention of anticipated land use. A cleanup objective is selected within the risk range for a given land use. If this objective is not also protective of unrestricted land use, then the ROD must establish institutional controls.

No text change is required, but the term NRA with LTM is still No Action. LTM is generally required under any remedy (No Action or active remediation) where contaminants remain above health based levels. The scope may vary among sites and may change over time, depending on available information.

Response: *The first paragraph of Section 4.1 has been revised according to the suggested discussion in Comment #37 and moved to the first paragraph of Section 3.4, Basis for Taking Action/Selected Remedy, which is a more appropriately section to addresses what the ROD protectiveness goals were at the time, as well as the anticipated land use. Please see response to Comment #37 for related text inserted into Section 3.4.*

Comment 56: Page 4-2 – This discussion references attachment B of the ESD. I believe that the signed ESD does not include such an attachment and that the language adopted may be different from what is shown here. Objectives and IC requirements would be better represented by quoting from or attaching the ESD itself.

Response: *Attachment B was provided in a previous version of the ESD; RMC was provided a copy of the final ESD on March 6, 2006. The IC objectives and requirements listed as bullets on page 4-2 are not consistent with the language of the final ESD and have therefore been deleted from the text. The last paragraph of Section 4.1, which references Attachment B, has been deleted and the following sentence has been inserted at the end of the second to last paragraph of this section: "The revised site-specific ICs for ST-11 are listed in Section III.C of the ESD."*

Comment 57: Page 4-3 – First paragraph, 1st sentence: The sentence rambles a bit. Groundwater monitoring was required by the ROD and ESD, not "by the NRA alternative". How about, "The limited action remedy for ST-11 has been implemented in accordance with the OU-3 ROD and ESD. Base-wide groundwater monitoring required by the OU-3 ROD has been implemented in accordance with Long Term Monitoring work plans reviewed and approved by the FFA team."

Response: *The first sentence of Section 4.2 has been replaced with the suggested sentences provided in the comment above.*

Comment 58: 2nd paragraph: Please delete: "However, the 1995 ROD has not been amended to include LTM of vapors." Have we determined that the ROD must be amended for this purpose? If vapors are a potential key to the persistent groundwater contamination, then it is a reasonable modification to LTM plans, or (more appropriately) to supporting a RI/BRA amendment and focused feasibility study to address the vapor source term.

Response: *The sentence has been deleted per comment.*

Comment 59: Section 4.3 – System Operation/Operation and Maintenance.

This section is intended for the description of O&M associated with selected remedial actions. I don't believe that the LTM and MW-24 NAPL removal belong under this heading. This information might fit better under Progress Since Last Five-Year Review. The progress made is in obtaining new information about the extent of contamination.

Response: *The MW24 LNAPL removal discussion has been deleted from Section 4.3 per comment, however, the LTM discussion will remain in this section since LTM of groundwater is part of the No Remedial Action selected remedy. Furthermore, LTM activities and costs are included in the O&M discussion of the Sample Five-Year Review Report provided as Appendix F of EPA's Five-Year Review Guidance. Information pertaining to the MW24 product removal system is already included under Section 5.0, Progress Since Last Five-Year Review and Section 6.4.3, Data Review for OU-3.*

Comment 60: Page 4-4 – 2nd paragraph: I suggest the following modification: Delete the first sentence. Then, "Active remediation was not believed necessary for OU-3 at the time that the 1995 ROD was completed. However, LNAPL was identified in the regional groundwater at MW-24 in 2004, and in December 2004 a product recovery system was installed at this well for the removal of the LNAPL product (JP-4) associated with ST-13." The remainder of the paragraph (and page) seem unnecessarily detailed.

This states that an ESD is warranted for the product recovery system for MW-24. This may not be the right course of action. Rather further information should be gathered and incorporated into the RI/BRA amendment, FFS, and possible ROD amendment.

Response: *The MW24 discussion has been deleted from Section 4.3 per Comment 59.*

SECTION 5

Comment 61: In a quick effort to compare the 2001 and current 5-year reviews, I noticed some discrepancies in the listed recommendations. It would be clearer to have a separate column for the recommendations of 2001 and include "follow-up actions" with the "results of implemented actions" column. I believe the initial intent of the "results of implemented actions" is to assess the status and results of active remediation or implementation of ICs. Since most of the sites are No Action sites, this column heading would otherwise be empty. There is also a discrepancy between sites included on ES-1 and 5-1, which could easily be resolved by listing the sites omitted from Table 5-1 but including text "no changes to No Action remedy recommended in 5-year review" for clarity and completeness.

Response: *A comparison was made between the Recommendations listed in Table 10-1 of the 2001 five-year review and the Status of Previous Recommendations/Follow-up Actions listed in Table 5-1. Several recommendations made in Table 10-1 during the previous review were omitted from Table 5-1 of this report. The status of those recommendations has been inserted into Table 5-1 to eliminate any discrepancies, as noted in the comment.*

The columns presented in Table 5-1 are consistent with the Progress Since the Last Review Checklist provided in Section V of Appendix E, Five-Year Review Report Template, of the Five-Year Review Guidance (EPA, 2001). Although the initial intent of the "Results of Implemented Actions" may have been to assess the status and results of active remediation or implementation of ICs, as the comment suggests, this table is the most appropriate place to summarize all relevant site activities and findings since the previous review that provide a basis for the information used to answer Question A in Section 7.0, Technical Assessment, and determine the recommendations and protectiveness statements presented in Sections 9.0 and 10.0, respectively.

The executive summary table ES-1 presents a summary of all 33 ERP sites, whereas the tables provided throughout the remainder of the report only present the twenty sites evaluated during this five-year review. The Executive Summary has been revised to clearly state the sites in which the No Remedial Action remedy remains protective and do not require evaluation during this review. See response to comment #29 for additional explanation.

SECTION 6

Comment 62: Section 6.2 - Community Involvement: By "Results of this five-year remedy review are made available" to you mean, the FINAL WILL be made available? Or that the draft IS CURRENTLY available.

Response: *Only the Final Five-Year Remedy Review Report will be made available to the public.*

Comment 63: Section 6.4.1 – Include a brief discussion of the vacuum radius of influence test done at ST-11. The discussion of the leak inspection process is helpful. It would be helpful to see an example of the quarterly tracer tightness leak test reports and to consider whether they should be included with the annual LTM report. Certainly, it is important to review and summarize the results in the annual LTM report.

Response: *The following discussion regarding the vacuum radius of influence test completed at ST-11 has been inserted into Section 6.4.1: "An 8-hour vapor extraction pilot test was completed in August 2002 at ST-11. The vapor extraction pilot test consisted of two vapor extraction wells (VEW-1 and VEW-4) to extract air from and four vapor monitoring wells (VEW-2, -3, -5, and -6) to monitor vacuum pressure responses during three steps each at different vacuum rates. VEWs 1, 2, and 3 are screened in the soil horizon and VEWs 4, 5, and 6 are screened in the shallow bedrock. The 8-hour vapor extraction pilot test revealed that vacuum responses occurred quickly in outlying wells and across the soil-basalt contact, and recommended longer term constant rate tests to establish a basis for extrapolation of contaminant removal rates."*

The annual Tracer tightness leak test report for 2005 has been included as an Appendix to the Final 2005 Annual LTM Report and future Tracer test reports will be included in subsequent LTM reports.

Comment 64: Section 6.4.3 – Was the JP-4 determination shared with EPA? I expect so, but if it isn't included in a report (the LTM report, for example), it lacks context. Can it be included in the 5-year review?

Response: *LNAPL at MW24 was sampled and typed as a weathered JP-4, as documented in the 2004 Annual LTM Report.*

Comment 65: Page 6-5 last line: typo: "though GAC" should be "through GAC."

Response: *Typo has been corrected.*

Comment 66: Page 6-6 – 2nd paragraph: "..benzene has dramatically been reduced" suggests a permanent outcome resulting from an action. It seems there is room for concluding that the slime layer, the change in water elevation,

and the removal of volumes of water may have caused a temporary reduction. Please use the simple past and say "…benzene declined …"

Response: *The requested edit has been made per comment.*

Comment 67: Page 6-6, last 2 lines: The primary factor during vapor sampling… This sounds like something we may need to consider in the future. Is it being addressed currently, and how?

Response: *Yes, this is addressed in the SOPs for vapor sampling, as outlined in the Basewide Work Plan (URS, 2006).*

Comment 68: Page 6-8 – Please include the questions asked in the interviews as an appendix.

Response: *Questions regarding the fuel management program have been included as Appendix A.*

Comment 69: Table 6-3 – This is a helpful table, but a darker vertical line to separate data sets from different wells would make it easier to read. Also, please add "continued…" at the top, as this table covers numerous pages. Please clarify why only 7 metals are listed under RCRA 8 metals. If the 8th metal hasn't been detected, list MRL. If it hasn't been analyzed, note.

Response: *The suggested edits have been made to Table 6-3. The eighth RCRA metal, silver, was erroneously omitted from Table 6-3. Silver has been added to Table 6-3; all silver results have been reported as non-detects.*

Comment 70: Table 6-4 – Blanks left under the maximum concentration (for ug/mE3) should be explained or filled. My understanding is that it can be readily calculated through a mathematical conversion, but as it was not reported by the labs, it wasn't included.

Response: *Blanks under the maximum concentration (for ug/mE3) have been calculated and inserted into Table 6-4.*

SECTION 7

Comment 71: **Question A:** This question doesn't really apply to No Action sites. A more complete discussion of the protectiveness of No Action sites is appropriately addressed under Question B or Question C. You can answer this question with respect to ST-11. I suggest deleting "Selected remedies for most sites are currently functioning as intended by the ROD or are expected to once their existing RODs have been modified by an ESD to..." The answer can be brief: The ROD selected No Action for all sites other

than ST-11. As described in the 2001 Five Year Review, No Action is not protective for some of the sites, however. Based on current land uses, the sites are protective at this time. The AF is taking the following action to ensure protectiveness for unrestricted use and unlimited exposure: ….."

Response: *The first sentence and associated bullets under Question A have been deleted per comment. Table 7-1 and any references to this table have been deleted as well, and replaced by a brief discussion of the answers to Question A for ST-11 and the remaining 32 ERP sites, as suggested in comment. However, the statement "Based on current land uses, the sites are protective at this time." in the above comment was omitted from the discussion, since there are exceptions to this for some sites (LF-01, ST-13, and SD-24). The following discussion has been inserted within the second paragraph under Question A:*

"The site-specific remedies have been implemented for all sites in accordance with the RODs. The selected remedy, NRA with LTM, for the 32 ERP sites continues to function as designed, except for those sites where the selected remedy is no longer considered protective under current, near term, and/or long term uses (UU/UE). The selected remedy for ST-11 (Limited Action) is currently functioning as intended by the ROD, since institutional controls have been implemented pursuant to the ROD, as modified by the ESD. Although, institutional controls already implemented at ST-11 will ensure long-term protectiveness with respect to human exposure to the perched groundwater at ST-11, the Limited Action alternative is not protective with respect to potential releases of contamination from the perched aquifer to the regional aquifer. Protectiveness determinations for each site are presented in Section 10.0. The Air Force is taking the following action to achieve protectiveness goals for both current land use and UU/UE: source removal of contamination, implementation of a remedial system, and/or the implementation of institutional controls."

The remainder of the second paragraph regarding the ST-11 RAOs and optimization of the RA-O program has been broken out into a separate paragraph immediately following the above discussion.

Comment 72: Second bullet: editorial: should start with a verb for parallel construction.

Response: *This bullet has been deleted in accordance with Comment #71.*

Comment 73: Note that the objectives for the RA-O program for OU-3 are not defined. Delete reference or provide a context. Break out a new paragraph for discussion of Opportunities for optimization of the RA-O program.

Response: *The reference to the objectives for the OU-3 RA-O program has been deleted from the sentence. The remainder of this sentence, which references ST-11 RAOs, and the discussion regarding the optimization of the RA-O program have been broken out into a separate paragraph.*

Comment 74: Page 7-1 - Update bullets at bottom of page to reflect agreed on changes to LTM.

Response: *Bullets have been updated to reflect recent changes to the RA-O program, as agreed upon by the FFA team.*

Comment 75: **Question B:** Exposure assumptions have changed as the FFA team has recognized that future industrial land uses assumed in the RODs are not assured. Thus, the short answer to question B is no. Land use (and hence exposure) assumptions are not still valid. While the TCE toxicity issue is not currently resolved, for transparency to the public, please acknowledge that TCE toxicity is under review and may be revisited in a future five year review.

Response: *The following text has been inserted at the end of the second paragraph under Question B: "However, unacceptable risks determined in the RODs were based on an assumption that future residential use of the sites would be unlikely. Since then, the FFA team has recognized that future industrial land uses assumed in the RODs are not assured, and therefore land use (and hence exposure) assumptions used at the time of remedy selection are no longer valid."*

Text has been inserted to state that TCE toxicity is currently being evaluated by EPA and others. TCE toxicity data will be revisited in a future five-year review.

Comment 76: Page 7-1 – "Due to changes in the protectiveness goals" and "However, none of the revised objectives for the LTM program have been formalized through ROD amendments" – I'm repeating myself here, but I don't believe the objectives have necessarily changed. The protectiveness goals in the ROD were based on an **assumed** industrial use. We haven't changed the protectiveness goal for that use. Some No Action sites were screened against the 10E-6 residential RBC, but No Action was also selected for some sites with up to and greater than 10E-4 residential risk or with concentrations greater than the 10E-4 RBC for residential exposures. Please be clear that most of the changes we're evaluating have to do with new information about the nature and extent of contamination and a belated recognition that land uses can and will change. If they changed to a less restricted use at some of these No Action sites, the conditions might lead to unacceptable risk or unacceptable uncertainty about the risks for potential unrestricted use.

Response: *The protectiveness goal discussion under Question B on Page 7-2 (not Page 7-1) has been modified so that it states that protectiveness goals are based on 1 x 10-4 for current use and 1 x 10-6 for UU/UE; all references to changes in the protectiveness goals have been deleted. The modification of LTM objectives (which now include, source removal of contamination, implementation of a remedial system, and/or implementation of ICs) is warranted with respect to UU/UE, since the protectiveness goals in the RODs were based on an assumed industrial use. Associated text has been revised to clarify this issue (i.e., protectiveness goals haven't changed for industrial use and LTM objectives are specific to UU/UE).*

Comment 77: Question C: The answer references information provided in answers to questions A and B. I don't see that A and B addressed post-ROD discoveries related to ST-11 or to the extensive vapor plume. If they're in Table 7-1, perhaps the table should be referenced.

Response: *The protectiveness of the selected remedy for ST-11, which was previously stated in Table 7-1, is now discussed in the text under Question A (see response to Comment #71). The inhalation of vadose zone vapors, which is a potential exposure pathway that could affect the protectiveness of the remedy, is discussed in the first paragraph under Question B. However, there is no existing discussion regarding the vapor plume and its potential impact to regional groundwater. As a result, the following discussion has been inserted under Question C.*

"The discovery of VOCs in vadose zone vapors with the installation of MW20 in May 2002 has led to the installation of 42 vapor monitoring ports at 15 locations at the base. The presence of significant vadose zone VOC vapors (of primary concern TCE) 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, which could compromise the protectiveness of the selected remedy for OU-3 (regional groundwater)."

Comment 78: Table 7-1 – Editorial: (Include the text of Question A in table title or header, so "YES" and "NO" have context.)

Response: *Table 7-1 has been deleted as suggested in Comment #71, which recommends a brief answer for NFA sites, rather than in the table format, since Question A is not really applicable for NFA sites.*

Comment 79: LF-01 and others: "exceeds the protectiveness goal for future unrestricted use (a carcinogenic risk range not to exceed 1 X 10E-4." Again, this goal

has not been agreed to or documented. Note throughout whether the protectiveness goal is for all pathways or just for soil.

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 80: FT-04 – This implies that exceedance of background for arsenic is the only problem. It wouldn't be a problem if background were not above acceptable risk levels. Clarify this and include reference to a risk level or screening level (exposure assumption and risk level).

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 81: FT-05 and others: ~~conservative~~ risk-based residential screening concentrations. Again, somewhere the risk level needs to be stated.

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 82: FT-08 – protectiveness goals and screening criteria – adjust per previous comments.

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 83: ST-13. The selected remedy is not protective. A product recovery pilot system has been installed at MW24 for the presence of NAPL pending a possible RI/BRA addendum and ROD amendment.

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 84: SD-24 – "…uncertainties associated with inhalation of vapors…" Cite report date, as this concern arose post-ROD.

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 85: SD-25 and others: "…TCE was only detected at low concentrations…" need to relate to risk levels. This is a case where a site-specific determination about the adequacy of characterization and the type of potential exposures could make acceptance of a 10E-4 risk for unrestricted uses more acceptable. Be clear about whether the TCE and lack of unacceptable risks discussed refers to areas that were NOT excavated.

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 86: SS-30 – The last point (SS-30 does not pose…) should be stated first.

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

Comment 87: ST-38 – Ensure that this is documented as per FFA team agreement.

Acronym list should perhaps include RBCs?

Response: *Table 7-1 has been deleted as suggested in Comment #71, therefore this comment is no longer applicable.*

SECTION 8

Comment 88: Page 8-1 discussion seems strangely limited. Is LF-01 the only issue? Why not LF-02? Also, the sentence starting "potential threats…" needs to be re-constructed for clarity. Editorial: effect (line 3), not affect.

Response: *After additional review of the examples of issues listed under Section 4.4.1 (How should I identify issues?) of the EPA's Comprehensive Five-Year Review Guidance document, the discussion in Section 8 has been replaced with the following text.*

"There are no current site operations, activities, or physical conditions (other than the presence of contaminated media), that currently prevent the remedy from being protective or are considered to have a potential affect on future protectiveness of the remedy for any of the sites evaluated during this five-year remedy review. An issue that currently prevents the remedy (NRA) from being protective is the exceedances of risk-based residential screening criteria and/or current and UU/UE protectiveness goals for calculated cancer risks. Sites in which the selected remedy is not protective currently and/or in the long term are summarized in Section 9, Table 9-1. An additional issue regarding a potential exposure pathway that may exist from the inhalation of vadose zone vapors from the bedrock via ambient air and/or indoor air has been identified, but not confirmed. A Vapor Intrusion Work Plan has been submitted and indoor air, subslab, and background samples will be collected to determine whether there are any human health routes of exposure or receptors with respect to vapors that could affect the protectiveness of the remedy."

Comment 89: I think the issues section may be an opening for a discussion of schedule and process: how will the RI/BRA amendment, pilot studies, soil RDAs,

IC ESDs and ROD amendments fit together? This section is also an opportunity to highlight issues such as probable housing area expansion and other development of base lands.

Response: *A discussion has been inserted into the introduction of Section 9.0, Recommendations and Follow-Up Actions, to address the process of the RI/BRA amendment, FFS, PP, ROD amendment, RDAs, etc.; see response to Comment #90. A schedule of completion dates has also been inserted into Table 9-1 per Comment #96. Section 8 is not really an appropriate section to present a discussion of schedule and process of the items listed in comment, based on the examples of issues presented in Section 4.4.1 (How should I identify issues?) of the EPA's Comprehensive Five-Year Review Guidance document.*

There are currently no threats or issues associated with ERP sites and probable housing area expansion and other development of base lands. However, a potential exposure pathway may exist from the inhalation of vadose zone vapors from the bedrock via ambient air and/or indoor air. This issue is addressed in the response to Comment #88.

SECTION 9

Comment 90: An earlier section gave a concise summary of how many sites needed ESDs, how many would get RDAs, and how many pilot studies and RI/BRA/FFS/ROD sites there were. This would be a helpful introduction to this section. Make it clear that all sites requiring a RI/BRA/FFS/PP/ROD will be addressed together, if possible, for a more effective process. Please also describe the process for undertaking (and funding) RDA work (including soil disposition plans) and specify that RDA work will be documented and referenced in the ROD amendment, to ensure that CERCLA has the complete picture going forward.

Response: *The following introduction has been inserted into Section 9 to address the above comment.*

Recommendations for sites evaluated during this five-year remedy review include no further action, land use controls, remedial actions, and modifications to the RA-O LTM program. These recommendations and follow-up actions are summarized below, and additional requirements and recommendations specified for each site are provided in the following subsections.

- *No further action is recommended for seven sites (SS-30, SD-25, FT-05, FT-06, FT-07, SD-12, and ST-22).*
- *Continue the Tank 1 petroleum, oil and lubricants (POL) comprehensive engineering evaluation and implementation of the corrective action plan for Tank 1A under the Risk Based Corrective Action (RBCA) Evaluation Manual.*
- *Institutional controls are recommended for three sites (LF-01, LF-02, and ST-13) to prevent unacceptable risk due to exposure to potentially contaminated media. Institutional controls are also recommended for site ST-13 to ensure protectiveness of the engineered cap and post leaking underground storage tank (LUST) closure requirements.*
- *Voluntary removal and disposal action is recommended for contaminated soils at five sites (FT-04, OT-16, LF-23, SD-27 and SS-29) to achieve site closure with unrestricted future land use.*
- *The remaining TCE-impacted soil beneath the water line at SD-24 should be evaluated for the need to be removed or treated in place.*
- *Pilot studies to evaluate potential remedial technologies is recommended for three sites (FT-08, ST-11, and SD-24).*
- *A Baseline Risk Assessment (BRA) amendment, focused feasibility study (FFS), and proposed plan (PP) is recommended for ST-11, FT-08, ST-13, and SD-24.*
- *Continue O & M activities for the current product recovery system at ST-13 (MW24) and complete a BRA amendment, FFS, PP, and ROD amendment to evaluate the effectiveness and improve the optimization of the existing product recovery system at ST-13 utilizing MW24.*
- *Modifications to the RA-O LTM program are recommended to optimize resources and increase efficiency of the LTM program.*

The sites requiring an RI/BRA amendment, FFS, PP, and ROD amendment will be addressed together, if possible, under OU-3. The completion of the OU-3RI/BRA amendment, FFS, and PP will be completed for specified sites to consider active remediation of the sites and evaluate potential remedial technologies, or in the case of ST-13, to evaluate the effectiveness and improve the optimization of the existing product recovery system at MW24. A ROD amendment is required to select the remedial technology to be implemented for the sites.

RDA activities will consist of the following tasks: preparation of an RDA work plan amendment to the basewide work plan, completion of a limited assessment at "hotspots", where necessary, followed by removal of impacted soils above screening criteria, collection of confirmation soil samples from the excavation, and proper disposal of excavated soils in

accordance with RCRA criteria. Confirmation soil samples will be analyzed to determine whether cleanup goals have been achieved. The RDA cleanup goals for soil are the IDEQ background criteria for FT-04, where arsenic is the COC, and the EPA Region 9 residential PRGs for sites OT-16, LF-23, SD-27 and SS-29, where PAHs are the COCs. However, a target risk level of 1 x 10^{-5} or less may be an acceptable remedial action objective for UU/UE when it can be either supported by acceptable rationale or a ROD amendment states the protectiveness goal for UU/UE at 1 x 10^{-5}, as accepted by the EPA and the State. RDA activities will be documented and referenced in a ROD amendment. Completion of the RDAs are scheduled for 2006."

Comment 91: Global: "Regulatory acceptance and written agreement…." language should be removed. RCRA term "clean closure" should be avoided unless strictly applicable. Clarify "low concentrations." Update per FFA agreements to LTM changes. Specify when risks are related to soil pathways (versus groundwater or combined soil and groundwater). Given the change in R9 PRGs for TCE, the date of the referenced PRGs should be included.

Response: *The "Regulatory acceptance and written agreement…" language has been deleted from report.*

The term "clean closure" has been deleted from text.

The use of "low concentrations" has been defined with respect to relevant screening criteria, such as "at low concentrations below MCLs".

Recommendations regarding changes to the RA-O LTM program have been updated to reflect recent changes agreed upon by the FFA team during the February 2006 meeting.

The appropriate pathways related to the stated risks have been inserted into the text per comment.

The date of referenced PRGs has been inserted into Section 9.

Comment 92: ST-22 – Despite soil gas data indicating that this area probably isn't a direct source of TCE in groundwater, I expect this site to surprise us some day. A specific action is not recommended at this time, but given the concentrations in groundwater, we should continue to track the site as additional vapor data are collected.

Response: *The recommendation for ST-22 does include continued groundwater and vapor monitoring at MW25 on a semi-annul basis. If changes in vapor concentrations indicate that the site is a potential TCE source to*

groundwater, ST-22 will be re-evaluated as a site posing a threat to the regional groundwater.

Comment 93: 9.14 - SD-24 (page 9-5)

EPA supports removing or otherwise addressing soils above the Region 9 PRGs, assuming these are the residential use soil PRGs at the 10E-6 level.

Second paragraph needs careful editing for sense and style.

…above ~~of~~ the EPA Region 9…

…applicable or relevant AND appropriate requirements …

…and or ambient air ~~limits.~~

It may be enough to say that a pilot study should be completed to evaluate the effectiveness of vapor extraction for the removal of COCs in bedrock.

Response: *The EPA Region 9 PRGs are specified as residential based on a 10E-6 excess cancer risk level.*

The second paragraph has been edited per comment.

The sentence regarding the pilot study has been edited as suggested.

Comment 94: ST-38 – The 2001 five year review had clear recommendations. Per our Seattle meeting, the FFA team needs to clarify CERCLA role. This RCRA site is a threat to the groundwater that must be addressed promptly.

Response: *As stated in the five-year review, ST-38 was transferred from the OU-3 Fuel Sites and reallocated to state authorities prior to the 1995 ROD. This was also stated as follows during the FFA Project Managers meeting (USAF, EPA, and IDEQ) on November 16, 1994, as documented in Administrative Record file number 616: "The parties agree to remove the petroleum release concerns at site ST-38 from the OU-3 RI and the ROD. The site will now be addressed under state authorities." The recommendation listed for ST-38 in this review is sufficient as is, since investigation of this site is not a CERCLA matter (i.e., will be completed under state authorities).*

Comment 95: 9.20 - OU-3

Recommendations are generally on point, but should reflect current views on LTM optimization. The LTM program should be continued (not "extended", as there is no end date for LTM—although the frequency and scope may change). I do not recommend that the AFB continue to view

LTM as a renewable five-year plan: delete "2007 through 2011"). PBC contractors need to be made aware that if contaminants remain on site above levels that allow for unrestricted use and unlimited exposure, some kind of long-term monitoring may be required to support the statutory five-year review.

Response: *Section 9.20 has been revised to reflect current views on LTM optimization per discussions during the February 2006 FFA meeting. References to "extended" with respect to the LTM program have been replaced with "continued", and references to the "2007 through 2011" RA-O program have been deleted. The sentence associated with these edits as been revised as follows: "The LTM RA-O program should be continued for as long as contaminants remain at concentrations that prevent UU/UE, with modifications and additions made per the five-year review."*

Comment 96: The recommendations table must include a column for schedule, under which dates for accomplishing the recommended actions should be provided. EPA will be tracking achievement of the recommended actions.

Response: *The information provided in the Party Responsible and Oversight Agency column has been inserted as a footnote to Table 9-1 to make space for the addition of the Schedule column. The dates for accomplishing the recommended actions have been inserted under this new column; completion dates are those specified in the proposal for the Mountain Home AFB ACC Four-Base PBC.*

Comment 97: I recommend that the FFA team plan to re-evaluate monitoring needs at least every other year (this can be documented in this five year review). Current data collection efforts are extensive, and as vapor plume characterization, source removal, and other processes develop, EPA is willing to consider reducing the effort.

Response: *A recommendation that the FFA team should re-evaluate monitoring needs of the RA-O program at least every other year has been inserted under the recommendations for OU-3, Section 9.20.*

Comment 98: Page 9-7, final bullet – Delete. See comments about LTM above. Even if all soil sources were addressed (including landfills) and the vapor plume removed, contaminant concentration trends in groundwater and uncertainties about vadose zone bedrock will have to be considered in deciding long term monitoring needs.

Response: *Suggested bullet was deleted per comment.*

Comment 99: Page 9-8 – MW24 and ST-13 are not equivalent. ST-13 sources may have affected more groundwater than indicated by a single well. This bullet should acknowledge the need to continue to monitor MW24 for NAPL and to remove NAPL (for compliance with IDAPA), but that further characterization may also be necessary.

Response: *The last bullet in Section 9.20, Page 9-8 has been revised as follows: "Continue to monitor MW24 for LNAPL and continue to operate and maintain the product recovery system as necessary for any LNAPL observed at MW24."*

Further evaluation of the product removal system is needed prior to determining that there is insufficient information to warrant additional characterization of the source at this time.

Comment 100: Table 9-1 – Recommendations should reflect monitoring adjustments agreed to (revised well and vapor ports sampling recommendations) and language changes (regulatory acceptance, clean closure, reference to MCLs as remedial target levels e.g.) and other comments in earlier sections (e.g. in OU-3, remove reference to "3 years of LTM"). The

Response: *The recommendations summarized in Table 9-1 have been revised according to suggested edits above and in other section comments.*

SECTION 10

Comment 101: Although the text of Section 10 and Table 7-1 have different purposes, much is similar—but not always the same. Review for consistency. For example, ST-38 says Not Applicable in Table 7-1. If this means that the selected remedy was No Action (under CERCLA), then N/A might apply to other sites in 7-1.

Response: *Table 7-1 has been deleted per Comment #71. As a side note, there is no selected remedy for ST-38, since this site is not addressed in any of the RODs.*

Comment 102: FT-07 – Last sentence is unnecessary.

Response: *The last sentence of Section 10.6 (FT-07) has been deleted per comment.*

Comment 103: ST-11 – I believe the answer is YES for the perched groundwater itself (both current and long term, because exposure to the perched zone has been addressed), but NO for the regional groundwater (because this site may affect the regional groundwater and those exposed to it).

Response: *The second sentence in Section 10.8 "At this time, a determination cannot be made…" has been replaced with the following sentence: "The Limited Action alternative is not protective with respect to potential releases of contamination from the perched aquifer to the regional aquifer."*

Comment 104: ST-13 – I believe the answer is NO. The selected remedy of No Action is no longer protective.

Response: *The ST-13 discussion in Section 10.10 has been replaced with the following sentence: "The selected remedy is no longer protective due to the presence of LNAPL."*

Comment 105: EPA agrees that ST-38 is not protective. This site poses a threat to groundwater, including potential benzene contamination. In acknowledging that the site is not protective in this document, it must be recognized that CERCLA will continue to track RCRA progress in achieving protectiveness. The five year review should included a recommendation for actions and a timely schedule.

Response: *"of the remedy" has been deleted from the end of the last sentence in Section 10.19, ST-38, since this site is not included in a ROD and therefore a reference to a selected remedy is not appropriate.*

Although this site is still reviewed under the FFA, ST-38 is managed and funded under the RCRA program. Therefore, recommended actions for ST-38 should not be included in the five-year review.

Comment 106: RDA cleanup levels – How will they be established? EPA supports use of the R9 residential PRGs, but if sampling and risk assessment demonstrates achievement of a risk of 10E-5 or less, and a ROD amendment clarifying the protectiveness goal for unrestricted use and unlimited exposre at 10E-5 is concurred on by EPA and the State, the site will be protective.

Response: *EPA Region 9 residential PRGs will be the RDA cleanup goals. However, a target risk level of 1 x 10^{-5} or less may be an acceptable remedial action objective for UU/UE when it can be either supported by acceptable rationale or a ROD amendment states the protectiveness goal for UU/UE at 1 x 10^{-5}, as accepted by the EPA and the State. A discussion of RDA activities and cleanup goals has been inserted into the introduction of Section 9.0, Recommendations and Follow-Up Actions. See response to Comment #90.*

Comment 107: OU-3 – The discussion of groundwater should reference the potential vapor source issue.

Response: *The following discussion addressing the vapor source issue has been inserted into the OU-3 Section 10.20: "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."*

RESPONSES TO COMMENTS

MOUNTAIN HOME AFB DRAFT FINAL FIVE-YEAR REMEDY REVIEW REPORT
MOUNTIAN HOME AFB, IDAHO

Responses to EPA Region 10 comments by Elly Hale received May 30, 2006

EPA comments on the draft final 2006 five year remedy review

Comment 1: The language provided regarding the cleanup objectives (see Page E-4 and elsewhere) needs further modification, which should be carried through the document where it recurs. "Human health protectiveness goals 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 X 10E-6 to 1 X 10E-4. This carcinogenic risk range is expected to be protective of human health and the environment under current and near-term uses because the facility is an active military base, and access and development is restricted." Please modify further for clarity: "Human health protectiveness goals ***in the ROD*** were based on EPA's goals of a non-carcinogenic hazard index not to exceed 1 and a carcinogenic risk range of 10^{-6} to 10^{-4}. ***The ROD goal of risks not exceeding 10^{-4} was based on assumed future uses of the base for industrial purposes.*** This goal is expected to be protective of human health and the environment under current and near-term uses because the facility is an active military base, and access and development is restricted." It is essential to maintain the connection between the ROD cleanup goal (which is not the range—the range is EPA's framework--but is a point within the range) and the expected land uses. Editorial: Pg. E-4 typo – FFA team members recognize…should be *recognized*.

Response: *Language has been modified where applicable in accordance with comment. Typo on Page E-4 has been corrected per comment.*

Comment 2: In accordance with the Five Year Review guidance, please add an ISSUES discussion or table (See page 4-10 and 4-11 of the guidance).

Response: *Table 8-1 has been inserted into Section 8, consistent with Exhibit 4-3: Example Table for Listing Issues provided in EPA's Comprehensive Five-Year Review Guidance document. As a result, the introduction paragraph has been revised so not to repeat information included in Table 8-1.*

Comment 3: In the Recommendations Table, please include "milestone dates" (year and month) for actions. The information is tracked by EPA and reported to Congress.

Response: *Milestone dates have been inserted into Table 9-1 for recommended actions.*

Comment 4: The Recommendations Table is intended to track recommendations that affect protectiveness. The current table includes more. It would be acceptable to break the table into two parts: one for recommendations that affect protectiveness (which will be more closely tracked), and the other to include everything the FFA team needs to keep track of as the project moves forward (for example, a schedule for assessing the monitoring frequency and approving changes, or RAB meetings, or information about sites that will not require a five year review but should not be dropped entirely). Alternatively, the table can be modified to highlight those recommendations that affect protectiveness.

Response: *Recommendations listed in Table 9-1 that affect protectiveness have been highlighted in blue font to stand apart from the remaining project recommendations.*

Comment 5: Please include a narrative description of how ICs are being monitored for effectiveness. The Five Year Review guidance provides a draft checklist for IC reviews (Appendix B). Please provide a discussion of how ICs are implemented with day-to-day administrative procedures at the AFB. Provide some discussion of how this process has been working, noting examples of where it is successful, or unsuccessful.

Response: *The following text has been inserted into Section 4.2, Remedy Implementation, within the current IC discussion:*
"The following summary provides the administrative procedures in place to assure that the potential actions listed do not impact an ERP site with LUCs.

- *All work performed on Air Force property (lands, facilities and appurtenances) requires an approved work request either through completion of an AF Form 332, which is used to request routine work, or AF Form 1391, which is used to request new construction to include MILCON. The AF Form 332 requires coordination with, but not limited to, base environmental and bioenvironmental personnel and can satisfy the National Environmental Policy Act (NEPA) process if a Categorical Exclusion is appropriate. An AF Form 1391 includes an environmental review.*

- *Any work requiring surface excavation or drilling requires a dig permit issued by the CES Site Development Office. Site developers refer to the Base Comprehensive Plan as a part of their dig permit issuing process.*

- *Any lands transferring from or to the Air Force or any change in Air Force land use requires an Environmental Baseline Survey, which determines whether there is an environmental liability associated with the land transfer or change in land use. Any existing ICs would be identified during the Environmental Baseline Survey.*

- *LUCs are addressed in the Base Comprehensive Plan. Site developers are required to refer to the Base Comprehensive Plan during project development.*

- *All federal actions require compliance with the NEPA. Potential ERP impacts are evaluated under the Environmental Impact Analysis process, documented in AF Form 813, as part of the NEPA process.*

- *MHAFB is a controlled access environment with manned entry gates. Access is further restricted on to areas around the flightline, munitions areas, and fuel storage areas where Security Forces perform patrols routinely. Base Environmental Flight personnel perform design reviews on all construction designs at the 35% and 95% design phases, participate in work order review boards and airfield operations boards, and brief environmental requirements at all project kick off meetings. The need for a construction waiver for sanitary sewer line repair adjacent to site ST-13 was identified during a 35% design review. No violations of land use controls have occurred on MHAFB."*

Comment 6: Page E-5 – Voluntary removal and disposal actions. We have discussed the use of CERCLA authorities for the removal actions. Please modify the term used, the narrative, and the schedule to reflect this change. Also, please specify off site disposal, or anticipated disposal requirements.

Response: *The term "voluntary removal and disposal actions" has been replaced with "non-time-critical removal actions" throughout the document. The narrative and schedule regarding the voluntary RDA have been replaced with the following discussion, where appropriate: "A non-time critical removal action under CERCLA is recommended for contaminated soils at five sites to achieve unrestricted future land use. Section 3000.415(b)(4)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires an Engineering Evaluation/Cost Analysis (EE/CA) for all non-time-critical removal actions, prior to implementation. The EE/CA identifies the objectives of the removal action*

and analyzes the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives (EPA, 1993)."

See Response to Comment #90 for further revised RDA discussion.

Comment 7: Page 4-1 – How are the deed notice ICs listed evaluated for the Five Year Review? Is there a system of inspections? Is there a drilling permit process that would ensure potential drillers become aware of the notice of restriction? Please describe.

Response: *Evaluation of the deed notice ICs included a review of the IC procedures established in the Base Comprehensive Plan and information provided by the 366th Environmental Flight on the administrative processes in place to catch those events that might impact an ERP site with LUCs. A request for drilling on Air Force property requires an approved work request through completion of an AF Form 332, which in turn requires coordination with, but not limited to, base environmental and bioenvironmental personnel. Any notices of restriction would be identified during the completion of AF Form 332. Related text has been inserted into Section 4.2, as stated in response to Comment #5.*

Comment 8: Page 6-1 – This describes public notice. Please indicate how the public will be notified when the Five Year Review is completed. (See item 6 on Page A-7 of the guidance)

Response: *The following text has been inserted into Section 6.2: "The Air Force will notify the community of the completion of the five-year remedy review through a notice published in the Base newspaper and the Mountain Home News, and via a letter sent to Restoration Advisory Board (RAB) members.*

Comment 9: The PRGs are referenced on p 7-2, but as time passes, the specific PRG values may be difficult to track. Please provide a table listing the actual PRG values used at various times in the appendix.

Response: *Appendix C has been inserted into the Final Five-Year Remedy Review Report to present PRG, RBC, and MCL tables referenced in the document. Appendix C includes the 2002 and 2004 EPA Region 9 PRGs, the 1994 EPA Region III RBCs, and current MCLs. The EPA Region 10 RBCs used occasionally during the pre-ROD investigations could not be located.*

Comment 10: Regarding reductions in frequency of monitoring, which we tentatively agreed to at our Seattle meeting earlier this year, please do not include the proposed reductions as part of the Five Year Review. The long-term monitoring work plan (or an amendment) is where such matters should be

proposed for formal approval by the FFA team. This may be a change from our earlier comments, but EPA concurrence with the Five Year Review should not be tied to decisions of this nature. It is acceptable to note that the AFB will consult with the FFA team regarding monitoring frequency.

Response: *All recommendations regarding modifications to the RA-O LTM program have been deleted from this document.*

Comment 11: Section 10 –While individual statements of protectiveness can be included for each "site" or operable unit, EPA Five Year Review guidance calls for a single comprehensive site-wide protectiveness statement for sites with construction completion (See Page 4-22 of the guidance, Exhibit 4-7). Unless all of the sites or OUs are protective, the guidance indicates that the site-wide protectiveness determination is that the site (in this case, MHAFB) is not protective. Additional detail about individual sites can be included as it is, as well as in text following the comprehensive statement, as shown in Exhibit 4-7.

Response: *After consultation with AF legal advisors, we as the lead agent have elected to not include a comprehensive site-wide protectiveness statement as called for in the June 2001, US EPA Comprehensive Five-Year Review Guidance Exhibit 4-7.*

Comment 12: Pg. E-6 - Final bullet – do not include LTM recommended changes with review.

Response: *All recommendations regarding modifications to the RA-O LTM program have been deleted from this document.*

Comment 13: Table ES-1 – Include ROD implementation under Recommendations, for any site with an action recommended (e.g. FT-08, ST-11). FT-07 recommendations should specify sampling of groundwater. ST-32 status: was this "clean closure" under RCRA?

Response: *The following bullet has been inserted under Recommendation for sites FT-08, ST-11, and SD-24: "Implement recommended actions in accordance with ROD amendment."*

Comment 14: Pg. 1-1 – Include the RODs that addressed the OUs listed.

Response: *The RODs associated with the listed OUs have been inserted into Section 1.1.*

Comment 15: Pg. 4-1 and 4-2 – Note whether permits or other administrative procedures are part of the IC implementation.

Response: *See response to Comment #5.*

Comment 16: Table 5-1 – LF-01 protectiveness statement is different from LF-02 –did we not reference the need for ICs? For ST-22 "results" column, explain that the groundwater is believed to be from a different source, and support in text. SD-27 "results" are confusing—maybe best to remove the recommendations made in the investigation reports. Note that the removal of soils is not yet completed. Same for SS-29.

Response: *The previous protectiveness statement for LF-01 in the 2001 five-year review did reference the need for ICs; associated text in Table 5-1 has been revised accordingly for LF-01.*

The following text has been inserted under the "results" column for ST-22: "Site ST-22 has been sufficiently characterized to conclusively remove it as a site posing a threat to the regional groundwater."

Text associated with the recommendations provided in the investigation reports for SD-27 have been deleted per comment.

Comment 17: Pg. 6-4 – tank 1 versus 1A – Please review and clarify.

Response: *References to Tank 1A have been changed to Tank 1; both Tank 1 and Tank 1A refer to the same tank.*

Comment 18: Table 6-1 – Grey out the benzene for PZMW-7 and the first lines of PZMW-12 and 13.

Response: *The requested edits have been made to Table 6-1.*

Comment 19: Pg. 7-1 Please remove or modify discussion of changes to LTM plan (ok to replace with "Proposals to modify monitoring plan have been discussed with FFA team and will be documented in an approved plan")

Response: *Text associated with modifications to the RA-O LTM program has been revised according to comment.*

Comment 20: Pg 7-2 – Reference to comparison of data with MCLs. Please add tables documenting the comparison as an appendix and refer to here. Also, in last paragraph: No remedial action with LTM—use capital R and A to avoid confusion.

Response: *Current Federal SDWA MCLs are included in Appendix C. A reference to the tables for soil and groundwater standards provided in Appendix C has also been inserted within the text.*

Suggested grammatical edit to "No remedial action" has been made per comment.

Comment 21: Section 8 – Please insert a table per guidance that sets out the issues site by site. While this may seem redundant with parts of Table 9-1, the "basis for recommendations" column in Table 9-1 isn't a perfect match. In Table 8, the issues of exceedances of UU/UE protective concentrations in media, the lack of controls on future uses of some sites, and the potential human health risk and groundwater contamination sources associated with the vapor plume and MCL exceedances in some wells can be briefly stated. Please check EPA guidance for a model. Note that the text of Section 8 appears to indicate that Table 9-1 is only for sites that are not protective. Is this the case? Editorial: Potential effect (not affect)

Response: *Table 8-1 has been inserted into Section 8 to identify site issues in accordance with Exhibit 4-3: Example Table for Listing Issues provided in EPA's Comprehensive Five-Year Review Guidance document. Reference to Table 9-1 has been deleted from the text of Section 8.*

Comment 22: Table 9-1 – The recommended monitoring changes may be removed or listed here—but if they are retained in the Five Year Review, EPA will have to qualify our concurrence to include recommendations that affect protectiveness. We don't have significant issues with the recommendations themselves.

Response: *Recommended changes to the RA-O LTM program have been removed from Table 9-1 per comments.*

Comment 23: In Section 10, the guidance calls for a base-wide protectiveness statement, given the status of the site as construction complete. EPA will have to enter such a statement in its tracking system.

Response: *After consultation with AF legal advisors, we as the lead agent have elected to not include a comprehensive site-wide protectiveness statement as called for in the June 2001, US EPA Comprehensive Five-Year Review Guidance Exhibit 4-7.*

Comment 24: Appendix A: To be useful, the title should be clear that these were questions ASKED, and by whom, of whom, and when. Are the answers detailed in the text? If not, it would be best to include the answers with the questions.

Response: *The following introduction has been inserted before the list of interview questions provided as Appendix A: "On October 18, 2006, Mr. John Schleicher and Ms. Karen Wilson of the 366th Environmental Flight submitted the following interview questions regarding the fuel*

management program to Stephen Gowin, Chief Master Sergeant, Fuels Manager who in turn contacted Wes Wainwright, Liquid Fuels Manager Supervisor. Information obtained through these interview questions is presented in Section 6.4.2, Fuel Management Program.

Additional Comments related to AFB response to previous EPA comments (numbered as in Appendix B):

Comment #18 – The clarification provided regarding LF-03 should be incorporated into the text.

Response: *The IC discussion provided in the response to Comment #18 for the draft five-year review has been inserted under the "Current Status" for LF-03 in Table ES-1.*

Comment #23 –"ABNORMALLY" high? Please check the Five Year Review and eliminate this term. Based on the fact that the well closest to site ST-22 exceeds the MCL, EPA expects that it should be tracked. At this time, further characterization is not recommended. However, if future evidence points to ST-22 sources, EPA may seek to reopen the question.

Response: *The five-year review does not refer to the term "abnormally" high as stated in the response to Comment #23. The Air Force agrees with this comment regarding the re-evaluation of ST-22 if future evidence points to ST-22 sources.*

Comment #27 – Please check the inserted text in the document: aerial should be areal.

Response: *Text has been edited per comment.*

Comment #30 – ST-32 insert is in Table 5-1 and Table 9-1. We have not reviewed the information behind the determination that UU/UE criteria are met. The recommendation differs from the previous 5-year review recommendation.

Response: *Additional supporting information, including data from the vapor ports and groundwater collected from MW-30 and the half-life of n-hexane, has been inserted into the document to further support the determination that ST-32 meets the criteria for UU/UE. Since the previous five-year review, the FFA team has proposed a target risk level of 1×10^{-5} as an acceptable remedial action objective for UU/UE when supported by acceptable rationale. As a result, the current recommendation for ST-32 differs from the previous five-year review recommendation.*

Comment #41 – The residential risk information developed in the RI/BRA is pertinent to whether the remedy is protective for UU/UE. This may be background information, and it isn't helpful as background if it has been updated based

on more recent data. But to the extent that the AFB is relying on it, it should be included.

Response: *The discussion provided in Section 3.4 is generally consistent with the LFI/RI Conclusions section from the previous five-year review, which provides the basis for selecting the remedies in the RODs. A more detailed summary of the results, including residential risk information, is provided in the previous five-year review, under Pre-ROD Activities. The introduction paragraph of Section 3.4 directs readers to the 2001 Five-Year Remedy Review Report for a summary of results associated with the pre-ROD investigations, so not to repeat all the information provided in the previous review.*

Comment #52 – This comment is re-submitted.

Response: *Appendix C has been inserted into the Five-Year Review to present PRG, RBC, and MCL tables referenced in the document. Appendix C includes the 2002 and 2004 EPA Region 9 PRGs, the 1994 EPA Region III RBCs, and current MCLs. The EPA Region 10 RBCs used occasionally in the pre-ROD investigations could not be located.*

Comment #64 – Ensure that the 2004 annual LTM report is cited in the text as the location for the fuel typing results.

Response: *The reference for the 2004 annual LTM report has been inserted into Section 6.4.3.*

Comment #76 – LTM is long term monitoring, and LTM objectives should be objectives related to monitoring. This may be a terminology issue, but terms are important. The objectives listed (source removal, remedial and removal actions, and ICs) are remedial objectives related to ensuring long-term protectiveness of the remedy under UU/UE.

Response: *LTM has been deleted and replaced with RA-O for references to LTM objectives and the LTM program.*

Comment #88 – The text added to Section 8 reflects some confusion about the VI issue. Samples will not "determine whether there are any human health routes of exposure or receptors with respect to vapors that could affect the protectiveness of the remedy." Samples will determine concentrations which can be used to assess whether the exposure pathway poses an unacceptable risk to receptors. (We know people live there and breathe. The question is what are they breathing?).

Response: *Text has been edited according to comment and inserted into Table 8-1.*

Comment #89 – Response is okay, but keep in mind that new housing development could occur in future, potentially in areas where vapor intrusion could be an issue. If vapor levels are potentially of concern, is there a mechanism for ensuring coordination between the housing development process and vapor extraction.

Response: *All housing at MHAFB is being replaced in phases to comply with quality of life guidelines and will only occupy areas within the general footprint of the existing housing. No additional housing is planned for the installation.*

Comment #90 – Last paragraph of new text in Section 9 talks about the Voluntary RDA process: this discussion should be updated to reflect the CERCLA process for removals.

Response: *The paragraph associated with the voluntary RDA process has been revised as follows: "The Air Force has determined the need for a non-time-critical removal action under CERCLA at select sites in lieu of LUCs, which would restrict and limit use of the site. Section 3000.415(b)(4)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires an Engineering Evaluation/Cost Analysis (EE/CA) for all non-time-critical removal actions, prior to implementation. The EE/CA identifies the objectives of the removal action and analyzes the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives (EPA, 1993).*

If the non-time-critical removal action alternative is selected during the EE/CA, removal action activities will consist of the following tasks: preparation of a removal action work plan amendment to the base-wide work plan, completion of a limited assessment at "hotspots", where necessary, followed by removal of impacted soils above screening criteria, collection of confirmation soil samples from the excavation, and off-site disposal of excavated soils in accordance with RCRA criteria. Confirmation soil samples will be analyzed to determine whether cleanup goals have been achieved."

Comment #94 – Note that the ST-38 decision reflected in the Administrative Record can be revisited if necessary.

Response: *Comment noted.*

Comment #95 – "…made per the five year review." Please delete reference to decisions about monitoring through the five year review.

Response: *All references to recommended modifications to the monitoring program have been deleted.*

Sources: i=IRIS h=HEAST a=HEAST alt. x=W/D from IRIS y=W/D from HEAST e=EPA-ECAO o=Other EPA docs. *Basis of RBC: c=carcinogenic effects n=noncarcinogenic effects.*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Acephate	30560191	4.00E-03 *i*		8.70E-03 *i*			7.7 *c*	0.72 *c*	0.36 *c*	330 *c*	73 *c*
Acetaldehyde	75070		2.57E-03 *i*		7.70E-03 *i*		94 *n*	0.81 *c*			
Acetochlor	34256821	2.00E-02 *i*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Acetone	67641	1.00E-01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Acetone cyanohydrin	75865	7.00E-02 *h*	2.86E-03 *h*				2600 *n*	10 *n*	95 *n*	72000 *n*	5500 *n*
Acetonitrile	75078	6.00E-03 *i*	1.43E-02 *h*				220 *n*	52 *n*	8.1 *n*	6100 *n*	470 *n*
Acetophenone	98862	1.00E-01 *i*	5.71E-06 *w*			***	0.042 *n*	0.021 *n*	140 *n*	100000 *n*	7800 *n*
Acifluorfen	62476599	1.30E-02 *i*					470 *n*	47 *n*	18 *n*	13000 *n*	1000 *n*
Acrolein	107028	2.00E-02 *h*	5.71E-06 *i*				730 *n*	0.021 *n*	27 *n*	20000 *n*	1600 *n*
Acrylamide	79061	2.00E-04 *i*		4.50E+00 *i*	4.55E+00 *i*		0.015 *c*	0.0014 *c*	0.0007 *c*	0.64 *c*	0.14 *c*
Acrylic acid	79107	8.00E-02 *i*	8.57E-05 *i*				2900 *n*	0.31 *n*	110 *n*	82000 *n*	6300 *n*
Acrylonitrile	107131		5.71E-04 *i*	5.40E-01 *i*	2.38E-01 *i*		0.12 *c*	0.026 *c*	0.0058 *c*	5.3 *c*	1.2 *c*
Alachlor	15972608	1.00E-02 *i*		8.00E-02 *h*			0.84 *c*	0.078 *c*	0.039 *c*	36 *c*	8 *c*
Alar	1596845	1.50E-01 *i*					5500 *n*	550 *n*	200 *n*	150000 *n*	12000 *n*
Aldicarb	116063	1.00E-03 *i*					37 *n*	3.7 *n*	1.4 *n*	1000 *n*	78 *n*
Aldicarb sulfone	1646884	1.00E-03 *i*					37 *n*	3.7 *n*	1.4 *n*	1000 *n*	78 *n*
Aldrin	309002	3.00E-05 *i*		1.70E+01 *i*	1.71E+01 *i*		0.004 *c*	0.00037 *c*	0.00019 *c*	0.17 *c*	0.038 *c*
Ally	74223646	2.50E-01 *i*					9100 *n*	910 *n*	340 *n*	260000 *n*	20000 *n*
Allyl alcohol	107186	5.00E-03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Allyl chloride	107051	5.00E-02 *w*	2.86E-04 *i*				1800 *n*	1 *n*	68 *n*	51000 *n*	3900 *n*
Aluminum	7429905	2.90E+00 *o*					110000 *n*	11000 *n*	3900 *n*	1000000 *n*	230000 *n*
Aluminum phosphide	20859738	4.00E-04 *i*					15 *n*	1.5 *n*	0.54 *n*	410 *n*	31 *n*
Amdro	67485294	3.00E-04 *i*					11 *n*	1.1 *n*	0.41 *n*	310 *n*	23 *n*
Ametryn	834128	9.00E-03 *i*					330 *n*	33 *n*	12 *n*	9200 *n*	700 *n*
m-Aminophenol	591275	7.00E-02 *h*					2600 *n*	260 *n*	95 *n*	72000 *n*	5500 *n*
4-Aminopyridine	504245	2.00E-05 *h*					0.73 *n*	0.073 *n*	0.027 *n*	20 *n*	1.6 *n*
Amitraz	33089611	2.50E-03 *i*					91 *n*	9.1 *n*	3.4 *n*	2600 *n*	200 *n*
Ammonia	7664417		2.86E-02 *i*				1000 *n*	100 *n*			
Ammonium sulfamate	7773060	2.00E-01 *i*					7300 *n*	730 *n*	270 *n*	200000 *n*	16000 *n*
Aniline	62533		2.86E-04 *i*	5.70E-03 *i*			10 *n*	1 *n*	0.55 *o*	500 *o*	110 *c*
Antimony and compounds	7440360	4.00E-04 *i*					15 *n*	1.5 *n*	0.54 *n*	410 *n*	31 *n*
Antimony pentoxide	1314609	5.00E-04 *h*					18 *n*	1.8 *n*	0.68 *n*	510 *n*	39 *n*
Antimony potassium tartrate	304610	9.00E-04 *h*					33 *n*	3.3 *n*	1.2 *n*	920 *n*	70 *n*
Antimony tetroxide	1332316	4.00E-04 *h*					15 *n*	1.5 *n*	0.54 *n*	410 *n*	31 *n*
Antimony trioxide	1309644	4.00E-04 *h*					15 *n*	1.5 *n*	0.54 *n*	410 *n*	31 *n*
Apollo	74115245	1.30E-02 *i*					470 *n*	47 *n*	18 *n*	13000 *n*	1000 *n*
Aramite	140578	5.00E-02 *h*		2.50E-02 *i*	2.49E-02 *i*		2.7 *c*	0.25 *c*	0.13 *c*	110 *c*	26 *c*
Arsenic	7440382	3.00E-04 *i*					11 *n*	1.1 *n*	0.41 *n*	310 *n*	23 *n*
Arsenic (as carcinogen)	744032	3.00E-04		1.75E+00 *i*	1.51E+01 *i*		0.038 *c*	0.00041 *c*	0.0018 *c*	1.6 *c*	0.37 *c*
Assure	76578148	9.00E-03 *i*					330 *n*	33 *n*	12 *n*	9200 *n*	700 *n*
Asulam	3337711	5.00E-02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Atrazine	1912249	3.50E-02 *i*		2.22E-01 *h*			0.3 *c*	0.028 *c*	0.014 *c*	13 *c*	2.9 *c*

Sources: i=IRIS h=HEAST a=HEAST alt. x=W/D from IRIS y=W/D from HEAST e=EPA–ECAO o=Other EPA docs. *Basis of RBC: c=carcinogenic effects n=noncarcinogenic effects.*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	V O C	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Avermectin B1	65195553	4.00E–04 i					15 n	1.5 n	0.54 n	410 n	31 n
Azobenzene	103333			1.10E–01 i	1.08E–01 i		0.61 o	0.058 o	0.029 o	26 o	5.8 o
Barium and compounds	7440393	7.00E–02 i	1.43E–04 h				2600 n	0.52 n	95 n	72000 n	5500 n
Baygon	114261	4.00E–03 i					150 n	15 n	5.4 n	4100 n	310 n
Bayleton	43121433	3.00E–02 i					1100 n	110 n	41 n	31000 h	2300 n
Baythroid	68359375	2.50E–02 i					910 n	91 n	34 n	26000 n	2000 n
Benefin	1861401	3.00E–01 i					11000 n	1100 n	410 n	310000 n	23000 n
Benomyl	17804352	5.00E–02 i					1800 n	180 n	68 n	51000 n	3900 n
Bentazon	25057890	2.50E–03 i					91 n	9.1 n	3.4 n	2600 n	200 n
Benzaldehyde	100527	1.00E–01 i				***	610 n	370 n	140 n	100000 n	7800 n
Benzene	71432		1.43E–04 e	2.90E–02 i	2.90E–02 i ***		0.36 c	0.22 c	0.11 c	99 c	22 c
Benzidine	92875	3.00E–03 i		2.30E+02 i	2.35E+02 i		0.00029 c	0.000027 c	0.000014 c	0.012 c	0.0028 c
Benzoic acid	65850	4.00E+00 i					150000 n	15000 n	5400 n	1000000 n	310000 n
Benzotrichloride	98077			1.30E+01 i			0.0052 c	0.00048 c	0.00024 c	0.22 c	0.049 c
Benzyl alcohol	100516	3.00E–01 h					11000 n	1100 n	410 n	310000 n	23000 n
Benzyl chloride	100447			1.70E–01 i		***	0.062 c	0.037 c	0.019 c	17 c	3.8 c
Beryllium and compounds	7440417	5.00E–03 i		4.30E+00 i	8.40E+00 i		0.016 c	0.00075 c	0.00073 c	0.67 c	0.15 c
Bidrin	141662	1.00E–04 i					3.7 n	0.37 n	0.14 n	100 n	7.8 n
Biphenthrin (Talstar)	82657043	1.50E–02 i					550 n	55 n	20 n	15000 n	1200 n
1,1–Biphenyl	92524	5.00E–02 i					1800 n	180 n	68 n	51000 n	3900 n
Bis(2–chloroethyl)ether	111444			1.10E+00 i	1.16E+00 i ***		0.0092 c	0.0054 c	0.0029 c	2.6 c	0.58 c
Bis(2–chloroisopropyl)ether	39638329	4.00E–02 i		7.00E–02 h	3.50E–02 h ***		0.26 c	0.18 c	0.045 c	41 c	9.1 c
Bis(chloromethyl)ether	542881			2.20E+02 i	2.17E+02 i ***		0.000049 c	0.000029 c	0.000014 c	0.013 c	0.0029 c
Bis(2–chloro–1–methylethyl)ether				7.00E–02 w	7.00E–02 w		0.96 c	0.089 c	0.045 c	41 c	9.1 c
Bis(2–ethylhexyl)phthalate (DEHP)	117817	2.00E–02 i		1.40E–02 i			4.8 c	0.45 c	0.23 c	200 c	46 c
Bisphenol A	80057	5.00E–02 i					1800 n	180 n	68 n	51000 n	3900 n
Boron (and borates)	7440428	9.00E–02 i	5.71E–03 h				3300 n	21 n	120 n	92000 n	7000 n
Boron trifluoride	7637072		2.00E–04 h				7.3 n	0.73 n			
Bromodichloromethane	75274	2.00E–02 i		6.20E–02 i		***	0.17 c	0.1 c	0.051 c	46 c	10 c
Bromoethene	593602				1.10E–01 h ***		0.096 c	0.057 c			
Bromoform (tribromomethane)	75252	2.00E–02 i		7.90E–03 i	3.85E–03 i ***		2.4 c	1.6 c	0.4 c	360 c	81 c
Bromomethane	74839	1.40E–03 i	1.43E–03 i			***	8.7 n	5.2 n	1.9 n	1400 n	110 n
4–Bromophenyl phenyl ether	101553	5.80E–02 o					2100 n	210 n	78 n	59000 n	4500 n
Bromophos	2104963	5.00E–03 h					180 n	18 n	6.8 n	5100 n	390 n
Bromoxynil	1689845	2.00E–02 i					730 n	73 n	27 n	20000 n	1600 n
Bromoxynil octanoate	1689992	2.00E–02 i					730 n	73 n	27 n	20000 n	1600 n
1,3–Butadiene	106990				9.80E–01 i ***		0.011 c	0.0064 c			
1–Butanol	71363	1.00E–01 i					3700 n	370 n	140 n	100000 n	7800 n
Butyl benzyl phthalate	85687	2.00E–01 i					7300 n	730 n	270 n	200000 n	16000 n
Butylate	2008415	5.00E–02 i					1800 n	180 n	68 n	51000 n	3900 n
sec–Butylbenzene	135988	1.00E–02 e				***	61 n	37 n	14 n	10000 n	780 n
tert–Butylbenzene	104518	1.00E–02 e				***	61 n	37 n	14 n	10000 n	780 n

Sources: i=IRIS h=HEAST a=HEAST alt. x=W/D from IRIS y=W/D from HEAST e=EPA–ECAO o=Other EPA docs. *Basis of RBC: c=carcinogenic effects n=noncarcinogenic effects.*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	V O C	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Butylphthalyl butylglycolate	85701	1.00E+00 *i*					37000 *n*	3700 *n*	1400 *n*	1000000 *n*	78000 *n*
Cacodylic acid	75605	3.00E–03 *h*					110 *n*	11 *n*	4.1 *n*	3100 *n*	230 *n*
Cadmium and compounds	7440439	5.00E–04 *i*			6.30E+00 *i*		18 *n*	0.00099 *c*	0.68 *n*	510 *n*	39 *n*
Caprolactam	105602	5.00E–01 *i*					18000 *n*	1800 *n*	680 *n*	510000 *n*	39000 *n*
Captafol	2425061	2.00E–03 *i*		8.60E–03 *h*			7.8 *c*	0.73 *c*	0.37 *c*	330 *c*	74 *c*
Captan	133062	1.30E–01 *i*		3.50E–03 *h*			19 *c*	1.8 *c*	0.9 *c*	820 *c*	180 *c*
Carbaryl	63252	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Carbazole	86748			2.00E–02 *h*			3.4 *c*	0.31 *c*	0.16 *c*	140 *c*	32 *c*
Carbofuran	1563662	5.00E–03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Carbon disulfide	75150	1.00E–01 *i*	2.86E–03 *h*			***	21 *n*	10 *n*	140 *n*	100000 *n*	7800 *n*
Carbon tetrachloride	56235	7.00E–04 *i*	5.71E–04 *a*	1.30E–01 *i*	5.25E–02 *i*	***	0.16 *c*	0.12 *c*	0.024 *c*	22 *c*	4.9 *c*
Carbosulfan	55285148	1.00E–02 *i*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
Carboxin	5234684	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Chloral	75876	2.00E–03 *i*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
Chloramben	133904	1.50E–02 *i*					550 *n*	55 *n*	20 *n*	15000 *n*	1200 *n*
Chloranil	118752			4.03E–01 *h*			0.17 *c*	0.016 *c*	0.0078 *c*	7.1 *c*	1.6 *c*
Chlordane	57749	6.00E–05 *i*		1.30E+00 *i*	1.29E+00 *i*		0.052 *c*	0.0049 *c*	0.0024 *c*	2.2 *c*	0.49 *c*
Chlorimuron–ethyl	90982324	2.00E–02 *i*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Chlorine dioxide	10049044		5.71E–05 *i*				2.1 *n*	0.21 *n*			
Chloroacetaldehyde	107200	6.90E–03 *o*					250 *n*	25 *n*	9.3 *n*	7100 *n*	540 *n*
Chloroacetic acid	79118	2.00E–03 *h*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
2–Chloroacetophenone	532274		8.57E–06 *i*				0.31 *n*	0.031 *n*			
4–Chloroaniline	106478	4.00E–03 *i*					150 *n*	15 *n*	5.4 *n*	4100 *n*	310 *n*
Chlorobenzene	108907	2.00E–02 *i*	5.71E–03 *h*			***	39 *n*	21 *n*	27 *n*	20000 *n*	1600 *n*
Chlorobenzilate	510156	2.00E–02 *i*		2.70E–01 *h*	2.70E–01 *h*		0.25 *c*	0.023 *c*	0.012 *c*	11 *c*	2.4 *c*
p–Chlorobenzoic acid	74113	2.00E–01 *h*					7300 *n*	730 *n*	270 *n*	200000 *n*	16000 *n*
4–Chlorobenzotrifluoride	98566	2.00E–02 *h*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
2–Chloro–1,3–butadiene	126998	2.00E–02 *h*	2.00E–03 *h*			***	14 *n*	7.3 *n*	27 *n*	20000 *n*	1600 *n*
1–Chlorobutane	109693	4.00E–01 *h*				***	2400 *n*	1500 *n*	540 *n*	410000 *n*	31000 *n*
Chlorodifluoromethane	75456		1.43e+01 *i*			***	87000 *n*	52000 *n*			
Chloroethane	75003	2.00E–02 *e*	2.86E+00 *i*			***	710 *n*	10000 *n*	27 *n*	20000 *n*	1600 *n*
2–Chloroethyl vinyl ether	110758	2.50E–02 *o*				***	150 *n*	91 *n*	34 *n*	26000 *n*	2000 *n*
Chloroform	67663	1.00E–02 *i*		6.10E–03 *i*	8.05E–02 *i*	***	0.15 *c*	0.078 *c*	0.52 *c*	470 *c*	100 *c*
Chloromethane	74873			1.30E–02 *h*	6.30E–03 *h*	***	1.4 *c*	0.99 *c*	0.24 *c*	220 *c*	49 *c*
4–Chloro–2,2–methylaniline hydrochloride	3165933			4.60E–01 *h*			0.15 *c*	0.014 *c*	0.0069 *c*	6.2 *c*	1.4 *c*
4–Chloro–2–methylaniline	95692			5.80E–01 *h*			0.12 *c*	0.011 *c*	0.0054 *c*	4.9 *c*	1.1 *c*
beta–Chloronaphthalene	91587	8.00E–02 *i*					2900 *n*	290 *n*	110 *n*	82000 *n*	6300 *n*
o–Chloronitrobenzene	88733			2.50E–02 *h*		***	0.42 *c*	0.25 *c*	0.13 *c*	110 *c*	26 *c*
p–Chloronitrobenzene	121733			1.80E–02 *h*		***	0.59 *c*	0.35 *c*	0.18 *c*	160 *c*	35 *c*
2–Chlorophenol	95578	5.00E–03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
2–Chloropropane	75296		2.86E–02 *h*			***	170 *n*	100 *n*			
Chlorothalonil	1897456	1.50E–02 *i*		1.10E–02 *h*			6.1 *c*	0.57 *c*	0.29 *c*	260 *c*	58 *c*

EPA Region III Risk–Based Concentrations: R.L. Smith (07–Jan–94)

Sources: i=IRIS h=HEAST a=HEAST ak. x=W/D from IRIS y=W/D from HEAST e=EPA–ECAO o=Other EPA docs. *Basis of RBC: c=carcinogenic effects n=noncarcinogenic effects.*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
o–Chlorotoluene	95498	2.00E–02 *i*				***	120 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Chlorpropham	101213	2.00E–01 *i*					7300 *n*	730 *n*	270 *n*	200000 *n*	16000 *n*
Chlorpyrifos	2921882	3.00E–03 *i*					110 *n*	11 *n*	4.1 *n*	3100 *n*	230 *n*
Chlorpyrifos–methyl	5598130	1.00E–02 *h*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
Chlorsulfuron	64902723	5.00E–02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Chlorthiophos	60238564	8.00E–04 *h*					29 *n*	2.9 *n*	1.1 *n*	820 *n*	63 *n*
Chromium III and compounds	16065831	1.00E+00 *i*	5.71E–07 *w*				37000 *n*	0.0021 *n*	1400 *n*	1000000 *n*	78000 *n*
Chromium VI and compounds	7440473	5.00E–03 *i*			4.20E+01 *i*		180 *n*	0.00015 *o*	6.8 *n*	5100 *n*	390 *n*
Coal tar	8001589				2.20E+00 *w*			0.0028 *o*			
Coke Oven Emissions	8007452				2.17E+00 *i*			0.0029 *o*			
Copper and compounds	7440508	3.71E–02 *h*					1400 *n*	140 *n*	50 *n*	38000 *n*	2900 *n*
Crotonaldehyde	123739	1.00E–02 *w*		1.90E+00 *h*	1.90E+00 *w*		0.035 *o*	0.0033 *o*	0.0017 *o*	1.5 *o*	0.34 *o*
Cumene	98828	4.00E–02 *i*	2.57E–03 *h*				1500 *n*	9.4 *n*	54 *n*	41000 *n*	3100 *n*
Cyanides:											
Barium cyanide	542621	1.00E–01 *h*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Calcium cyanide	592018	4.00E–02 *i*					1500 *n*	150 *n*	54 *n*	41000 *n*	3100 *n*
Copper cyanide	544923	5.00E–03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Cyanazine	21725462	2.00E–03 *h*		8.40E–01 *h*			0.08 *c*	0.0075 *o*	0.0038 *o*	3.4 *o*	0.76 *o*
Cyanogen	460195	4.00E–02 *i*					1500 *n*	150 *n*	54 *n*	41000 *n*	3100 *n*
Cyanogen bromide	506683	9.00E–02 *i*					3300 *n*	330 *n*	120 *n*	92000 *n*	7000 *n*
Cyanogen chloride	506774	5.00E–02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Free cyanide	57125	2.00E–02 *i*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Hydrogen cyanide	74908	2.00E–02 *i*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Potassium cyanide	151508	5.00E–02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Potassium silver cyanide	506616	2.00E–01 *i*					7300 *n*	730 *n*	270 *n*	200000 *n*	16000 *n*
Silver cyanide	506649	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Sodium cyanide	143339	4.00E–02 *i*					1500 *n*	150 *n*	54 *n*	41000 *n*	3100 *n*
Zinc cyanide	557211	5.00E–02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Cyclohexanone	108941	5.00E+00 *i*				***	30000 *n*	18000 *n*	6800 *n*	1000000 *n*	390000 *n*
Cyclohexlamine	108918	2.00E–01 *i*					7300 *n*	730 *n*	270 *n*	200000 *n*	16000 *n*
Cyhalothrin/Karate	68085858	5.00E–03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Cypermethrin	52315078	1.00E–02 *i*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
Cyromazine	66215278	7.50E–03 *i*					270 *n*	27 *n*	10 *n*	7700 *n*	590 *n*
Dacthal	1861321	5.00E–01 *i*					18000 *n*	1800 *n*	680 *n*	510000 *n*	39000 *n*
Dalapon	75990	3.00E–02 *i*					1100 *n*	110 *n*	41 *n*	31000 *n*	2300 *n*
Danitol	39515418	5.00E–04 *w*					18 *n*	1.8 *n*	0.68 *n*	510 *n*	39 *n*
DDD	72548			2.40E–01 *i*			0.28 *c*	0.026 *o*	0.013 *o*	12 *o*	2.7 *o*
DDE	72559			3.40E–01 *i*			0.2 *c*	0.018 *o*	0.0093 *o*	8.4 *o*	1.9 *o*
DDT	50293	5.00E–04 *i*		3.40E–01 *i*	3.40E–01 *i*	***	0.2 *c*	0.018 *o*	0.0093 *o*	8.4 *o*	1.9 *o*
Decabromodiphenyl ether	1163195	1.00E–02 *i*					61 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
Demeton	8065483	4.00E–05 *i*					1.5 *n*	0.15 *n*	0.054 *n*	41 *n*	3.1 *n*
Diallate	2303164			6.10E–02 *h*		***	0.17 *c*	0.1 *c*	0.052 *c*	47 *c*	10 *c*

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Basis of RBC: c=carcinogenic effects n=noncarcinogenic effects.

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Diazinon	333415	9.00E-04 h					33 n	3.3 n	1.2 n	920 n	70 n
1,4-Dibromobenzene	106376	1.00E-02 i				***	61 n	37 n	14 n	10000 n	780 n
Dibromochloromethane	124481	2.00E-02 i		8.40E-02 i		***	0.13 c	0.075 c	0.038 c	34 c	7.6 c
1,2-Dibromo-3-chloropropane	96128		5.71E-05 i	1.40E+00 h	6.90E-07 h	***	0.048 c	0.21 n	0.0023 c	2 c	0.46 c
1,2-Dibromoethane	106934		5.71E-05 h	8.50E+01 i	7.70E-01 i	***	0.00075 c	0.0081 c	0.000037 c	0.034 c	0.0075 c
Dibutyl phthalate	84742	1.00E-01 i					3700 n	370 n	140 n	100000 n	7800 n
Dicamba	1918009	3.00E-02 i					1100 n	110 n	41 n	31000 n	2300 n
1,2-Dichlorobenzene	95501	9.00E-02 i	5.71E-02 h			***	370 n	210 n	120 n	92000 n	7000 n
1,3-Dichlorobenzene	541731	8.90E-02 o				***	540 n	320 n	120 n	91000 n	7000 n
1,4-Dichlorobenzene	106467		2.29E-01 i	2.40E-02 h		***	0.44 c	0.26 c	0.13 c	120 c	27 c
3,3'-Dichlorobenzidine	91941			4.50E-01 i			0.15 c	0.014 c	0.007 c	6.4 c	1.4 c
1,4-Dichloro-2-butene	764410				9.30E+00 h	***	0.0011 c	0.00067 c			
Dichlorodifluoromethane	75718	2.00E-01 i	5.71E-02 h			***	390 n	210 n	270 n	200000 n	16000 n
1,1-Dichloroethane	75343	1.00E-01 h	1.43E-01 h			***	810 n	520 n	140 n	100000 n	7800 n
1,2-Dichloroethane (EDC)	107062		2.86E-03 e	9.10E-02 i	9.10E-02 i	***	0.12 c	0.069 c	0.035 c	31 c	7 c
1,1-Dichloroethylene	75354	9.00E-03 i		6.00E-01 i	1.75E-01 i	***	0.044 c	0.036 c	0.0053 c	4.8 c	1.1 c
1,2-Dichloroethylene (cis)	156592	1.00E-02 h				***	61 n	37 n	14 n	10000 n	780 n
1,2-Dichloroethylene (trans)	156605	2.00E-02 i				***	120 n	73 n	27 n	20000 n	1600 n
1,2-Dichloroethylene (mixture)	540590	9.00E-03 h				***	55 n	33 n	12 n	9200 n	700 n
2,4-Dichlorophenol	120832	3.00E-03 i					110 n	11 n	4.1 n	3100 n	230 n
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94757	1.00E-02 i				***	61 n	37 n	14 n	10000 n	780 n
4-(2,4-Dichlorophenoxy)butyric Acid	94826	8.00E-03 i					290 n	29 n	11 n	8200 n	630 n
1,2-Dichloropropane	78875		1.14E-03 i	6.80E-02 h		***	0.16 c	0.092 c	0.046 c	42 c	9.4 c
2,3-Dichloropropanol	616239	3.00E-03 i					110 n	11 n	4.1 n	3100 n	230 n
1,3-Dichloropropene	542756	3.00E-04 i	5.71E-03 i	1.80E-01 h	1.30E-01 h	***	0.077 c	0.048 c	0.018 c	16 c	3.5 c
Dichlorvos	62737	5.00E-04 i		2.90E-01 i			0.23 c	0.022 c	0.011 c	9.9 c	2.2 c
Dicofol	115322			4.40E-01 w			0.15 c	0.014 c	0.0072 c	6.5 c	1.5 c
Dicyclopentadiene	77736	3.00E-02 h	5.71E-05 h			***	0.42 n	0.21 n	41 n	31000 n	2300 n
Dieldrin	60571	5.00E-05 i		1.60E+01 i	1.61E+01 i		0.0042 c	0.00039 c	0.0002 c	0.18 c	0.04 c
Diesel emissions			1.43E-03 i				52 n	5.2 n			
Diethyl phthalate	84662	8.00E-01 i					29000 n	2900 n	1100 n	820000 n	63000 n
Diethylene glycol, monobutyl ether	112345		5.71E-03 h				210 n	21 n			
Diethylene glycol, monoethyl ether	111900	2.00E+00 h					73000 n	7300 n	2700 n	1000000 n	160000 n
Diethylformamide	617845	1.10E-02 h					400 n	40 n	15 n	11000 n	860 n
Di(2-ethylhexyl)adipate	103231	6.00E-01 i		1.20E-03 i			56 c	5.2 c	2.6 c	2400 c	530 c
Diethylstilbestrol	56531			4.70E+03 h			0.000014 c	1.30E-06 c	6.70E-07 c	0.00061 c	0.00014 c
Difenzoquat (Avenge)	43222486	8.00E-02 i					2900 n	290 n	110 n	82000 n	6300 n
Diflubenzuron	35367385	2.00E-02 i					730 n	73 n	27 n	20000 n	1600 n
Diisopropyl methylphosphonate (DIMP)	1445756	8.00E-02 i					2900 n	290 n	110 n	82000 n	6300 n
Dimethipin	55290647	2.00E-02 i					730 n	73 n	27 n	20000 n	1600 n
Dimethoate	60515	2.00E-04 i					7.3 n	0.73 n	0.27 n	200 n	16 n
3,3'-Dimethoxybenzidine	119904			1.40E-02 h			4.8 c	0.45 c	0.23 c	200 c	46 c

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Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
Dimethyl phthalate	131113	1.00E+01 h					370000 n	37000 n	14000 n	1000000 n	780000 n
Dimethyl terephthalate	120616	1.00E-01 I					3700 n	370 n	140 n	100000 n	7800 n
Dimethylamine	124403		5.71E-06 w				0.21 n	0.021 n			
2,4-Dimethylaniline hydrochloride	21436964			5.80E-01 h			0.12 c	0.011 c	0.0054 c	4.9 c	1.1 c
2,4-Dimethylaniline	95681			7.50E-01 h			0.09 c	0.0083 c	0.0042 c	3.8 c	0.85 c
N-N-Dimethylaniline	121697	2.00E-03 I					73 n	7.3 n	2.7 n	2000 n	160 n
3,3'-Dimethylbenzidine	119937			9.20E+00 h			0.0073 c	0.00068 c	0.00034 c	0.31 c	0.069 c
N,N-Dimethylformamide	68122	1.00E-01 h	8.57E-03 I				3700 n	31 n	140 n	100000 n	7800 n
1,1-Dimethylhydrazine	57147			2.60E+00 h	3.50E+00 h		0.026 c	0.0018 c	0.0012 c	1.1 c	0.25 c
1,2-Dimethylhydrazine	540738			3.70E+01 w	3.70E+01 w		0.0018 c	0.00017 c	0.000085 c	0.077 c	0.017 c
2,4-Dimethylphenol	105679	2.00E-02 I					730 n	73 n	27 n	20000 n	1600 n
2,6-Dimethylphenol	576261	6.00E-04 I					22 n	2.2 n	0.81 n	610 n	47 n
3,4-Dimethylphenol	95658	1.00E-03 I					37 n	3.7 n	1.4 n	1000 n	78 n
1,2-Dinitrobenzene	528290	4.00E-04 h					15 n	1.5 n	0.54 n	410 n	31 n
1,3-Dinitrobenzene	99650	1.00E-04 I					3.7 n	0.37 n	0.14 n	100 n	7.8 n
1,4-Dinitrobenzene	100254	4.00E-04 h					15 n	1.5 n	0.54 n	410 n	31 n
4,6-Dinitro-o-cyclohexyl phenol	131895	2.00E-03 I					73 n	7.3 n	2.7 n	2000 n	160 n
2,4-Dinitrophenol	51285	2.00E-03 I					73 n	7.3 n	2.7 n	2000 n	160 n
Dinitrotoluene mixture				6.80E-01 I			0.099 c	0.0092 c	0.0046 c	4.2 c	0.94 c
2,4-Dinitrotoluene	121142	2.00E-03 I					73 n	7.3 n	2.7 n	2000 n	160 n
2,6-Dinitrotoluene	606202	1.00E-03 h					37 n	3.7 n	1.4 n	1000 n	78 n
Dinoseb	88857	1.00E-03 I					37 n	3.7 n	1.4 n	1000 n	78 n
di-n-Octyl phthalate	117840	2.00E-02 h					730 n	73 n	27 n	20000 n	1600 n
1,4-Dioxane	123911			1.10E-02 I			6.1 c	0.57 c	0.29 c	260 c	58 c
Diphenamid	957517	3.00E-02 I					1100 n	110 n	41 n	31000 n	2300 n
Diphenylamine	122394	2.50E-02 I					910 n	91 n	34 n	26000 n	2000 n
1,2-Diphenylhydrazine	122667			8.00E-01 I	7.70E-01 I		0.084 c	0.0081 c	0.0039 c	3.6 c	0.8 c
Diquat	85007	2.20E-03 I					80 n	8 n	3 n	2200 n	170 n
Direct black 38	1937377			8.60E+00 h			0.0078 c	0.00073 c	0.00037 c	0.33 c	0.074 c
Direct blue 6	2602462			8.10E+00 h			0.0083 c	0.00077 c	0.00039 c	0.35 c	0.079 c
Direct brown 95	16071866			9.30E+00 h			0.0072 c	0.00067 c	0.00034 c	0.31 c	0.069 c
Disulfoton	298044	4.00E-05 I					1.5 n	0.15 n	0.054 n	41 n	3.1 n
1,4-Dithiane	505293	1.00E-02 I					370 n	37 n	14 n	10000 n	780 n
Diuron	330541	2.00E-03 I					73 n	7.3 n	2.7 n	2000 n	160 n
Dodine	2439103	4.00E-03 I					150 n	15 n	5.4 n	4100 n	310 n
Endosulfan	115297	6.00E-03 h					220 n	22 n	8.1 n	6100 n	470 n
Endothall	145733	2.00E-02 I					730 n	73 n	27 n	20000 n	1600 n
Endrin	72208	3.00E-04 I					11 n	1.1 n	0.41 n	310 n	23 n
Epichlorohydrin	106898	2.00E-03 h	2.86E-04 I	9.90E-03 I	4.20E-03 I		6.8 c	1 n	0.32 c	290 c	65 c
1,2-Epoxybutane	106887		5.71E-03 I				210 n	21 n			
Ethephon (2-chloroethyl phosphonic acid)	16672870	5.00E-03 I					180 n	18 n	6.8 n	5100 n	390 n
Ethion	563122	5.00E-04 I					18 n	1.8 n	0.68 n	510 n	39 n

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Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	V. O C.	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
2–Ethoxyethanol acetate	111159	3.00E–01 h					11000 n	1100 n	410 n	310000 n	23000 n
2–Ethoxyethanol	110805	4.00E–01 h	5.71E–02 i				15000 n	210 n	540 n	410000 n	31000 n
Ethyl acrylate	140885			4.80E–02 h			1.4 c	0.13 c	0.066 c	60 c	13 c
EPTC (S–Ethyl dipropylthiocarbamate)	759944	2.50E–02 i					910 n	91 n	34 n	26000 n	2000 n
Ethyl ether	60297	2.00E–01 i				***	1200 n	730 n	270 n	200000 n	16000 n
Ethyl methacrylate	97632	9.00E–02 h					3300 n	330 n	120 n	92000 n	7000 n
Ethyl acetate	141786	9.00E–01 i					33000 n	3300 n	1200 n	920000 n	70000 n
Ethylbenzene	100414	1.00E–01 i	2.86E–01 i			***	1300 n	1000 n	140 n	100000 n	7800 n
Ethylene cyanohydrin	109784	3.00E–01 h					11000 n	1100 n	410 n	310000 n	23000 n
Ethylene diamine	107153	2.00E–02 h					730 n	73 n	27 n	20000 n	1600 n
Ethylene glycol	107211	2.00E+00 i					73000 n	7300 n	2700 n	1000000 n	160000 n
Ethylene glycol, monobutyl ether	111762		5.71E–03 h				210 n	21 n			
Ethylene oxide	75218			1.02E+00 h	3.50E–01 h		0.066 c	0.018 c	0.0031 c	2.8 c	0.63 c
Ethylene thiourea (ETU)	96457	8.00E–05 i		6.00E–01 h			0.11 c	0.01 c	0.0053 c	4.8 c	1.1 c
Ethyl p–nitrophenyl phenylphosphorothioate	2104645	1.00E–05 i					0.37 n	0.037 n	0.014 n	10 n	0.78 n
Ethylnitrosourea	759739			1.30E+02 w			0.00048 c	0.000045 c	0.000023 c	0.02 c	0.0046 c
Ethylphthalyl ethyl glycolate	84720	3.00E+00 i					110000 n	11000 n	4100 n	1000000 n	230000 n
Express	10120	8.00E–03 i					290 n	29 n	11 n	8200 n	630 n
Fenamiphos	22224926	2.50E–04 i					9.1 n	0.91 n	0.34 n	260 n	20 n
Fluometuron	2164172	1.30E–02 i					470 n	47 n	18 n	13000 n	1000 n
Fluoride	7782414	6.00E–02 i					2200 n	220 n	81 n	61000 n	4700 n
Fluoridone	59756604	8.00E–02 i					2900 n	290 n	110 n	82000 n	6300 n
Flurprimidol	56425913	2.00E–02 i					730 n	73 n	27 n	20000 n	1600 n
Flutolanil	66332965	6.00E–02 i					2200 n	220 n	81 n	61000 n	4700 n
Fluvalinate	69409945	1.00E–02 i					370 n	37 n	14 n	10000 n	780 n
Folpet	133073	1.00E–01 i		3.50E–03 i			19 c	1.8 c	0.9 c	820 c	180 c
Fomesafen	72178020			1.90E–01 i			0.35 c	0.033 c	0.017 c	15 c	3.4 c
Fonofos	944229	2.00E–03 i					73 n	7.3 n	2.7 n	2000 n	160 n
Formaldehyde	50000	2.00E–01 i			4.55E–02 i		7300 n	0.14 c	270 n	200000 n	16000 n
Formic Acid	64186	2.00E+00 h					73000 n	7300 n	2700 n	1000000 n	160000 n
Fosetyl–al	39148248	3.00E+00 i					110000 n	11000 n	4100 n	1000000 n	230000 n
Furan	110009	1.00E–03 i					37 n	3.7 n	1.4 n	1000 n	78 n
Furazolidone	67458			3.80E+00 h			0.018 c	0.0016 c	0.00083 c	0.75 c	0.17 c
Furfural	98011	3.00E–03 i	1.43E–02 h				110 n	52 n	4.1 n	3100 n	230 n
Furium	531828			5.00E+01 h			0.0013 c	0.00013 c	0.000063 c	0.057 c	0.013 c
Furmecyclox	60568050			3.00E–02 i			2.2 c	0.21 c	0.11 c	95 c	21 c
Glufosinate–ammonium	77182822	4.00E–04 i					15 n	1.5 n	0.54 n	410 n	31 n
Glycidaldehyde	765344	4.00E–04 i	2.86E–04 h				15 n	1.4 n	0.54 n	410 n	31 n
Glyphosate	1071836	1.00E–01 i					3700 n	370 n	140 n	100000 n	7800 n
Haloxyfop–methyl	69806402	5.00E–05 i					1.8 n	0.18 n	0.068 n	51 n	3.9 n
Harmony	79277273	1.30E–02 i					470 n	47 n	18 n	13000 n	1000 n
HCH (alpha)	319846			6.30E+00 i	6.30E+00 i		0.011 c	0.00099 c	0.0005 c	0.45 c	0.1 c

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Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	VOC	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
HCH (beta)	319857			1.80E+00 *i*	1.80E+00 *i*		0.037 *c*	0.0035 *c*	0.0018 *c*	1.6 *c*	0.35 *c*
HCH (gamma) Lindane	58899	3.00E–04 *i*		1.30E+00 *h*			0.052 *c*	0.0048 *c*	0.0024 *c*	2.2 *c*	0.49 *c*
HCH–technical	608731			1.80E+00 *i*	1.79E+00 *i*		0.037 *c*	0.0035 *c*	0.0018 *c*	1.6 *c*	0.35 *c*
Heptachlor	76448	5.00E–04 *i*		4.50E+00 *i*	4.55E+00 *i*	***	0.0023 *c*	0.0014 *c*	0.0007 *c*	0.64 *c*	0.14 *c*
Heptachlor epoxide	1024573	1.30E–05 *i*		9.10E+00 *i*	9.10E+00 *i*	***	0.0012 *c*	0.00069 *c*	0.00035 *c*	0.31 *c*	0.07 *c*
Hexabromobenzene	87821	2.00E–03 *i*				***	12 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
Hexachlorobenzene	118741	8.00E–04 *i*		1.60E+00 *i*	1.61E+00 *i*	***	0.0066 *c*	0.0039 *c*	0.002 *c*	1.8 *c*	0.4 *c*
Hexachlorobutadiene	87683	2.00E–04 *h*		7.80E–02 *i*	7.70E–02 *i*	***	0.14 *c*	0.081 *c*	0.04 *c*	37 *c*	8.2 *c*
Hexachlorocyclopentadiene	77474	7.00E–03 *i*	2.00E–05 *h*			***	0.15 *n*	0.073 *n*	9.5 *n*	7200 *n*	550 *n*
Hexachlorodibenzo–p–dioxin mixture	19408743			6.20E+03 *i*	4.55E+03 *i*		0.000011 *c*	1.40E–06 *c*	5.10E–07 *c*	0.00046 *c*	0.0001 *c*
Hexachloroethane	67721	1.00E–03 *i*		1.40E–02 *i*	1.40E–02 *i*	***	0.75 *c*	0.45 *c*	0.23 *c*	200 *c*	46 *c*
Hexachlorophene	70304	3.00E–04 *i*					11 *n*	1.1 *n*	0.41 *n*	310 *n*	23 *n*
Hexahydro–1,3,5–trinitro–1,3,5–triazine	121824	3.00E–03 *i*		1.10E–01 *i*			0.61 *c*	0.057 *c*	0.029 *c*	26 *c*	5.8 *c*
n–Hexane	110543	6.00E–02 *h*	5.71E–02 *i*			***	350 *n*	210 *n*	81 *n*	61000 *n*	4700 *n*
Hexazinone	51235042	3.30E–02 *i*					1200 *n*	120 *n*	45 *n*	34000 *n*	2600 *n*
Hydrazine, hydrazine sulfate	302012			3.00E+00 *i*	1.71E+01 *i*		0.022 *c*	0.00037 *c*	0.0011 *c*	0.95 *c*	0.21 *c*
Hydrogen chloride	7647010		2.00E–03 *i*				73 *n*	7.3 *n*			
Hydrogen sulfide	7783064	3.00E–03 *i*	2.57E–04 *i*				110 *n*	0.94 *n*	4.1 *n*	3100 *n*	230 *n*
Hydroquinone	123319	4.00E–02 *h*					1500 *n*	150 *n*	54 *n*	41000 *n*	3100 *n*
Imazalil	35554440	1.30E–02 *i*					470 *n*	47 *n*	18 *n*	13000 *n*	1000 *n*
Imazaquin	81335377	2.50E–01 *i*					9100 *n*	910 *n*	340 *n*	260000 *n*	20000 *n*
Iprodione	36734197	4.00E–02 *i*					1500 *n*	150 *n*	54 *n*	41000 *n*	3100 *n*
Isobutanol	78831	3.00E–01 *i*				***	1800 *n*	1100 *n*	410 *n*	310000 *n*	23000 *n*
Isophorone	78591	2.00E–01 *i*		9.50E–04 *i*			71 *c*	6.6 *c*	3.3 *c*	3000 *c*	670 *c*
Isopropalin	33820530	1.50E–02 *i*					550 *n*	55 *n*	20 *n*	15000 *n*	1200 *n*
Isopropyl methyl phosphonic acid	1832548	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Isoxaben	82558507	5.00E–02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Kepone	143500			1.80E+01 *e*			0.0037 *c*	0.00035 *c*	0.00018 *c*	0.16 *c*	0.035 *c*
Lactofen	77501634	2.00E–03 *i*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
Lead (tetraethyl)	78002	1.00E–07 *i*					0.0037 *n*	0.00037 *n*	0.00014 *n*	0.1 *n*	0.0078 *n*
Linuron	330552	2.00E–03 *i*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
Lithium	7439932	2.00E–02 *e*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Londax	83056996	2.00E–01 *i*					7300 *n*	730 *n*	270 *n*	200000 *n*	16000 *n*
Malathion	121755	2.00E–02 *i*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Maleic anhydride	108316	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Maleic hydrazide	123331	5.00E–01 *i*					18000 *n*	1800 *n*	680 *n*	510000 *n*	39000 *n*
Malononitrile	109773	2.00E–05 *h*					0.73 *n*	0.073 *n*	0.027 *n*	20 *n*	1.6 *n*
Mancozeb	8018017	3.00E–02 *h*					1100 *n*	110 *n*	41 *n*	31000 *n*	2300 *n*
Maneb	12427382	5.00E–03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Manganese and compounds	7439965	5.00E–03 *i*	1.43e–05 *i*				180 *n*	0.052 *n*	6.8 *n*	5100 *n*	390 *n*
Mephosfolan	950107	9.00E–05 *h*					3.3 *n*	0.33 *n*	0.12 *n*	92 *n*	7 *n*
Mepiquat chloride	24307264	3.00E–02 *i*					1100 *n*	110 *n*	41 *n*	31000 *n*	2300 *n*

Mephosfolan			
Mepiquat chloride	24307264	3.00E−02 *i*	

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Mercury (inorganic)	7439976	3.00E−04 *h*	8.57E−05 *h*				11 *n*	0.31 *n*	0.41 *n*	310 *n*	23 *n*
Mercury (methyl)	22967926	3.00E−04 *i*					11 *n*	1.1 *n*	0.41 *n*	310 *n*	23 *n*
Merphos	150505	3.00E−05 *i*					1.1 *n*	0.11 *n*	0.041 *n*	31 *n*	2.3 *n*
Merphos oxide	78488	3.00E−05 *i*					1.1 *n*	0.11 *n*	0.041 *n*	31 *n*	2.3 *n*
Metalaxyl	57837191	6.00E−02 *i*					2200 *n*	220 *n*	81 *n*	61000 *n*	4700 *n*
Methacrylonitrile	126987	1.00E−04 *i*	2.00E−04 *h*				3.7 *n*	0.73 *n*	0.14 *n*	100 *n*	7.8 *n*
Methamidophos	10265926	5.00E−05 *i*					1.8 *n*	0.18 *n*	0.068 *n*	51 *n*	3.9 *n*
Methanol	67561	5.00E−01 *i*					18000 *n*	1800 *n*	680 *n*	510000 *n*	39000 *n*
Methidathion	950378	1.00E−03 *i*					37 *n*	3.7 *n*	1.4 *n*	1000 *n*	78 *n*
Methomyl	16752775	2.50E−02 *i*					910 *n*	91 *n*	34 *n*	26000 *n*	2000 *n*
Methoxychlor	72435	5.00E−03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
2−Methoxyethanol acetate	110496	2.00E−03 *h*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
2−Methoxyethanol	109864	1.00E−03 *h*	5.71E−03 *i*				37 *n*	21 *n*	1.4 *n*	1000 *n*	78 *n*
2−Methoxy−5−nitroaniline	99592			4.60E−02 *h*			1.5 *o*	0.14 *o*	0.069 *o*	62 *o*	14 *c*
Methyl acetate	79209	1.00E+00 *h*					37000 *n*	3700 *n*	1400 *n*	1000000 *n*	78000 *n*
Methyl acrylate	96333	3.00E−02 *h*					1100 *n*	110 *n*	41 *n*	31000 *n*	2300 *n*
2−Methylaniline hydrochloride	636215			1.80E−01 *h*			0.37 *o*	0.035 *o*	0.018 *o*	16 *o*	3.5 *c*
2−Methylaniline	95534			2.40E−01 *h*			0.28 *c*	0.026 *o*	0.013 *o*	12 *o*	2.7 *c*
Methyl chlorocarbonate	79221	1.00E+00 *w*					37000 *n*	3700 *n*	1400 *n*	1000000 *n*	78000 *n*
4−(2−Methyl−4−chlorophenoxy) butyric acid	94815	1.00E−02 *i*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
2−Methyl−4−chlorophenoxyacetic acid	94746	5.00E−04 *i*					18 *n*	1.8 *n*	0.68 *n*	510 *n*	39 *n*
2−(2−Methyl−14−chlorophenoxy)propionic acid	93652	1.00E−03 *i*					37 *n*	3.7 *n*	1.4 *n*	1000 *n*	78 *n*
Methylcyclohexane	108872		8.57E−01 *h*				31000 *n*	3100 *n*			
Methylene bromide	74953	1.00E−02 *h*				***	61 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
Methylene chloride	75092	6.00E−02 *i*	8.57E−01 *h*	7.50E−03 *i*	1.64E−03 *i*	***	4.1 *o*	3.8 *o*	0.42 *o*	380 *o*	85 *c*
4,4'−Methylene bis(2−chloroaniline)	101144	7.00E−04 *h*		1.30E−01 *h*	1.30E−01 *h*		0.52 *o*	0.048 *o*	0.024 *o*	22 *o*	4.9 *c*
4,4'−Methylenebisbenzeneamine	101779			2.50E−01 *h*			0.27 *o*	0.025 *o*	0.013 *o*	11 *o*	2.6 *c*
4,4'−Methylene bis(N,N'−dimethyl)aniline	101611			4.60E−02 *i*			1.5 *o*	0.14 *o*	0.069 *o*	62 *o*	14 *c*
4,4'−Methylenediphenyl isocyanate	101688		5.71E−06 *h*			***	0.035 *n*	0.021 *n*			
Methyl ethyl ketone	78933	6.00E−01 *i*	2.86E−01 *i*				22000 *n*	1000 *n*	810 *n*	610000 *n*	47000 *n*
Methyl hydrazine	60344			1.10E+00 *h*			0.061 *o*	0.0057 *o*	0.0029 *o*	2.6 *o*	0.58 *c*
Methyl isobutyl ketone	108101	5.00E−02 *h*	2.29E−02 *h*				1800 *n*	84 *n*	68 *n*	51000 *n*	3900 *n*
Methyl methacrylate	80626	8.00E−02 *h*					2900 *n*	290 *n*	110 *n*	82000 *n*	6300 *n*
2−Methyl−5−nitroaniline	99558			3.30E−02 *h*			2 *o*	0.19 *o*	0.096 *o*	87 *o*	19 *c*
Methyl parathion	298000	2.50E−04 *i*					9.1 *n*	0.91 *n*	0.34 *n*	260 *n*	20 *n*
2−Methylphenol (o−cresol)	95487	5.00E−02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
3−Methylphenol (m−cresol)	103394	5.00E−02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
4−Methylphenol (p−cresol)	106445	5.00E−03 *h*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Methyl styrene (mixture)	25013154	6.00E−03 *h*	1.14E−02 *h*			***	60 *n*	42 *n*	8.1 *n*	6100 *n*	470 *n*
Methyl styrene (alpha)	98839	7.00E−02 *h*				***	430 *n*	260 *n*	95 *n*	72000 *n*	5500 *n*
Methyl tertbutyl ether (MTBE)	1634044	5.00E−03 *e*	8.57E−01 *i*			***	180 *n*	3100 *n*	6.8 *n*	5100 *n*	390 *n*
Metolachlor (Dual)	51218452	1.50E−01 *i*					5500 *n*	550 *n*	200 *n*	150000 *n*	12000 *n*

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Metribuzin	21087649	2.50E–02 *i*					910 *n*	91 *n*	34 *n*	26000 *n*	2000 *n*
Mirex	2385855	2.00E–04 *i*		1.80E+00 *h*			0.037 *c*	0.0035 *c*	0.0018 *c*	1.6 *c*	0.35 *c*
Molinate	2212671	2.00E–03 *i*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
Molybdenum	7439987	5.00E–03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Monochloramine	10599903	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Naled	300765	2.00E–03 *i*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
Napropamide	15299997	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Nickel refinery dust					8.40E–01 *i*			0.0075 *c*			
Nickel (soluble salts)	7440020	2.00E–02 *i*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Nickel subsulfide	12035722				1.70E+00 *i*			0.0037 *c*			
Nitrapyrin	1929824	1.50E–03 *w*					55 *n*	5.5 *n*	2 *n*	1500 *n*	120 *n*
Nitrate	14797558	1.60E+00 *i*					58000 *n*	5800 *n*	2200 *n*	1000000 *n*	130000 *n*
Nitric Oxide	10102439	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
Nitrite	14797650	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
2–Nitroaniline	88744	6.00E–05 *w*	5.71E–05 *h*				2.2 *n*	0.21 *n*	0.081 *n*	61 *n*	4.7 *n*
3–Nitroaniline	99092	3.00E–03 *o*					110 *n*	11 *n*	4.1 *n*	3100 *n*	230 *n*
4–Nitroaniline	100016	3.00E–03 *o*					110 *n*	11 *n*	4.1 *n*	3100 *n*	230 *n*
Nitrobenzene	98953	5.00E–04 *i*	5.71E–04 *h*			***	3.4 *n*	2.1 *n*	0.68 *n*	510 *n*	39 *n*
Nitrofurantoin	67209	7.00E–02 *h*					2600 *n*	260 *n*	95 *n*	72000 *n*	5500 *n*
Nitrofurazone	59870			1.50E+00 *h*	9.40E+00 *h*		0.045 *c*	0.00067 *c*	0.0021 *c*	1.9 *c*	0.43 *c*
Nitrogen dioxide	10102440	1.00E+00 *i*					37000 *n*	3700 *n*	1400 *n*	1000000 *n*	78000 *n*
Nitroguanidine	556887	1.00E–01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
4–Nitrophenol	100027	6.20E–02 *o*					2300 *n*	230 *n*	84 *n*	63000 *n*	4800 *n*
2–Nitropropane	79469		5.71E–03 *i*		9.40E+00 *h*		210 *n*	0.00057 *c*			
N–Nitrosodi–n–butylamine	924163			5.40E+00 *i*	5.60E+00 *i*		0.012 *c*	0.0011 *c*	0.00058 *c*	0.53 *c*	0.12 *c*
N–Nitrosodiethanolamine	1116547			2.80E+00 *i*			0.024 *c*	0.0022 *c*	0.0011 *c*	1 *c*	0.23 *c*
N–Nitrosodiethylamine	55185			1.50E+02 *i*	1.51E+02 *i*		0.00045 *c*	0.000041 *c*	0.000021 *c*	0.019 *c*	0.0043 *c*
N–Nitrosodimethylamine	62759			5.10E+01 *i*	4.90E+01 *i*		0.0013 *c*	0.00013 *c*	0.000062 *c*	0.056 *c*	0.013 *c*
N–Nitrosodiphenylamine	86306			4.90E–03 *i*			14 *c*	1.3 *c*	0.64 *c*	580 *c*	130 *c*
N–Nitroso di–n–propylamine	621647			7.00E+00 *i*			0.0096 *c*	0.00089 *c*	0.00045 *c*	0.41 *c*	0.091 *c*
N–Nitroso–N–methylethylamine	10595956			2.20E+01 *i*			0.0031 *c*	0.00028 *c*	0.00014 *c*	0.13 *c*	0.029 *c*
N–Nitrosopyrrolidine	930552			2.10E+00 *i*	2.13E+00 *i*		0.032 *c*	0.0029 *c*	0.0015 *c*	1.4 *c*	0.3 *c*
m–Nitrotoluene	99081	1.00E–02 *h*				***	61 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
o–Nitrotoluene	88722	1.00E–02 *h*				***	61 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
p–Nitrotoluene	99990	1.00E–02 *h*				***	61 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
Norflurazon	27314132	4.00E–02 *i*					1500 *n*	150 *n*	54 *n*	41000 *n*	3100 *n*
NuStar	85509199	7.00E–04 *i*					26 *n*	2.6 *n*	0.95 *n*	720 *n*	55 *n*
Octabromodiphenyl ether	32536520	3.00E–03 *i*					110 *n*	11 *n*	4.1 *n*	3100 *n*	230 *n*
Octahydro–1357–tetranitro–1357–tetrazocine	2691410	5.00E–02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Octamethyl pyrophosphoramide	152169	2.00E–03 *h*					73 *n*	7.3 *n*	2.7 *n*	2000 *n*	160 *n*
Oryzalin	19044883	5.00E–02 *i*					1800 *n*	180 *n*	68 *n*	51000 *n*	3900 *n*
Oxadiazon	19666309	5.00E–03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*

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Oxamyl	23135220	2.50E-02 i					910 n	91 n	34 n	26000 n	2000 n
Oxyfluorfen	42874033	3.00E-03 i					110 n	11 n	4.1 n	3100 n	230 n
Paclobutrazol	76738620	1.30E-02 i					470 n	47 n	18 n	13000 n	1000 n
Paraquat	1910425	4.50E-03 i					160 n	16 n	6.1 n	4600 n	350 n
Parathion	56382	6.00E-03 h					220 n	22 n	8.1 n	6100 n	470 n
Pebulate	1114712	5.00E-02 h					1800 n	180 n	68 n	51000 n	3900 n
Pendimethalin	40487421	4.00E-02 i					1500 n	150 n	54 n	41000 n	3100 n
Pentabromo-6-chloro cyclohexane	87843			2.30E-02 h			2.9 o	0.27 o	0.14 o	120 o	28 c
Pentabromodiphenyl ether	32534819	2.00E-03 i					73 n	7.3 n	2.7 n	2000 n	160 n
Pentachlorobenzene	608935	8.00E-04 i				***	4.9 n	2.9 n	1.1 n	820 n	63 n
Pentachloronitrobenzene	82688	3.00E-03 i		2.60E-01 h		***	0.041 o	0.024 o	0.012 o	11 o	2.5 c
Pentachlorophenol	87865	3.00E-02 i		1.20E-01 i			0.56 o	0.052 o	0.026 o	24 o	5.3 c
Permethrin	52645531	5.00E-02 i					1800 n	180 n	68 n	51000 n	3900 n
Phenmedipham	13684634	2.50E-01 i					9100 n	910 n	340 n	260000 n	20000 n
Phenol	108952	6.00E-01 i					22000 n	2200 n	810 n	610000 n	47000 n
m-Phenylenediamine	108452	6.00E-03 i					220 n	22 n	8.1 n	6100 n	470 n
o-Phenylenediamine	95545	6.00E-03 h					220 n	22 n	8.1 n	6100 n	470 n
p-Phenylenediamine	106503	1.90E-01 h					6900 n	690 n	260 n	190000 n	15000 n
Phenylmercuric acetate	62384	8.00E-05 i					2.9 n	0.29 n	0.11 n	82 n	6.3 n
2-Phenylphenol	90437			1.94E-03 h			35 o	3.2 o	1.6 o	1500 o	330 c
Phorate	298022	2.00E-04 h					7.3 n	0.73 n	0.27 n	200 n	16 n
Phosmet	732116	2.00E-02 i					730 n	73 n	27 n	20000 n	1600 n
Phosphine	7803512	3.00E-04 i	8.57E-06 h				11 n	0.031 n	0.41 n	310 n	23 n
Phosphorus (white)	7723140	2.00E-05 i					0.73 n	0.073 n	0.027 n	20 n	1.6 n
p-Phthalic acid	100210	1.00E+00 h					37000 n	3700 n	1400 n	1000000 n	78000 n
Phthalic anhydride	85449	2.00E+00 i	3.43E-01 h				73000 n	1300 n	2700 n	1000000 n	160000 n
Picloram	1918021	7.00E-02 i					2600 n	260 n	95 n	72000 n	5500 n
Pirimiphos-methyl	29232937	1.00E-02 i					370 n	37 n	14 n	10000 n	780 n
Polybrominated biphenyls		7.00E-06 h		8.90E+00 h			0.0076 o	0.0007 o	0.00035 o	0.32 o	0.072 c
Polychlorinated biphenyls (PCBs)	1336363			7.70E+00 i			0.0087 c	0.00081 o	0.00041 o	0.37 o	0.083 c
Aroclor 1016	12674112	7.00E-05 i					2.6 n	0.26 n	0.095 n	72 n	5.5 n
Polychlorinated terphenyls (PCTs)				4.50E+00 o			0.015 o	0.0014 o	0.0007 o	0.64 o	0.14 c
Polynuclear aromatic hydrocarbons											
Acenaphthene	83329	6.00E-02 i					2200 n	220 n	81 n	61000 n	4700 n
Anthracene	120127	3.00E-01 i					11000 n	1100 n	410 n	310000 n	23000 n
Benzo[a]pyrene	50328			7.30E+00 i	6.10E+00 h		0.0092 o	0.001 o	0.00043 o	0.39 o	0.088 c
Benzo[b]fluoranthene	205992			7.30E-01 o	6.10E-01 o		0.092 o	0.01 o	0.0043 o	3.9 o	0.88 c
Benzo[k]fluoranthene	207089			7.30E-02 o	6.10E-02 o		0.92 o	0.1 o	0.043 o	39 o	8.8 c
Benz[a]anthracene	56553			7.30E-01 o	6.10E-01 o		0.092 o	0.01 o	0.0043 o	3.9 o	0.88 c
Chrysene	218019			7.30E-03 o	6.10E-03 o		9.2 o	1 o	0.43 o	390 o	88 c
Dibenz[ah]anthracene	53703			7.30E+00 o	6.10E+00 o		0.0092 o	0.001 o	0.00043 o	0.39 o	0.088 c
Fluoranthene	206440	4.00E-02 i					1500 n	150 n	54 n	41000 n	3100 n

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Fluorene	86737	4.00E–02 i					1500 n	150 n	54 n	41000 n	3100 n
Indeno[1,2,3–cd]pyrene	193395			7.30E–01 e	6.10E–01 e		0.092 e	0.01 e	0.0043 e	3.9 e	0.88 e
Naphthalene	91203	4.00E–02 w					1500 n	150 n	54 n	41000 n	3100 n
Pyrene	129000	3.00E–02 i					1100 n	110 n	41 n	31000 n	2300 n
Prochloraz	67747095	9.00E–03 i		1.50E–01 i			0.45 e	0.042 e	0.021 e	19 e	4.3 e
Profluralin	26399360	6.00E–03 h					220 n	22 n	8.1 n	6100 n	470 n
Prometon	1610180	1.50E–02 i					550 n	55 n	20 n	15000 n	1200 n
Prometryn	7287196	4.00E–03 i					150 n	15 n	5.4 n	4100 n	310 n
Pronamide	23950585	7.50E–02 i					2700 n	270 n	100 n	77000 n	5900 n
Propachlor	1918167	1.30E–02 i					470 n	47 n	18 n	13000 n	1000 n
Propanil	709988	5.00E–03 i					180 n	18 n	6.8 n	5100 n	390 n
Propargite	2312358	2.00E–02 i					730 n	73 n	27 n	20000 n	1600 n
Propargyl alcohol	107197	2.00E–03 i					73 n	7.3 n	2.7 n	2000 n	160 n
Propazine	139402	2.00E–02 i					730 n	73 n	27 n	20000 n	1600 n
Propham	122429	2.00E–02 i					730 n	73 n	27 n	20000 n	1600 n
Propiconazole	60207901	1.30E–02 i					470 n	47 n	18 n	13000 n	1000 n
Propylene glycol	57556	2.00E+01 h					730000 n	73000 n	27000 n	1000000 n	1000000 n
Propylene glycol, monoethyl ether	52125538	7.00E–01 h					26000 n	2600 n	950 n	720000 n	55000 n
Propylene glycol, monomethyl ether	107982	7.00E–01 h	5.71E–01 i				26000 n	2100 n	950 n	720000 n	55000 n
Propylene oxide	75569		8.57E–03 i	2.40E–01 i	1.29E–02 i		0.28 e	0.49 e	0.013 e	12 e	2.7 e
Pursuit	81335775	2.50E–01 i					9100 n	910 n	340 n	260000 n	20000 n
Pydrin	51630581	2.50E–02 i					910 n	91 n	34 n	26000 n	2000 n
Pyridine	110861	1.00E–03 i					37 n	3.7 n	1.4 n	1000 n	78 n
Quinalphos	13593038	5.00E–04 i					18 n	1.8 n	0.68 n	510 n	39 n
Quinoline	91225			1.20E+01 h			0.0056 e	0.00052 e	0.00026 e	0.24 e	0.053 e
Resmethrin	10453868	3.00E–02 i					1100 n	110 n	41 n	31000 n	2300 n
Ronnel	299843	5.00E–02 h					1800 n	180 n	68 n	51000 n	3900 n
Rotenone	83794	4.00E–03 i					150 n	15 n	5.4 n	4100 n	310 n
Savey	78587050	2.50E–02 i					910 n	91 n	34 n	26000 n	2000 n
Selenious Acid	7783008	5.00E–03 i					180 n	18 n	6.8 n	5100 n	390 n
Selenium	7782492	5.00E–03 i					180 n	18 n	6.8 n	5100 n	390 n
Selenourea	630104	5.00E–03 h					180 n	18 n	6.8 n	5100 n	390 n
Sethoxydim	74051802	9.00E–02 i					3300 n	330 n	120 n	92000 n	7000 n
Silver and compounds	7440224	5.00E–03 i					180 n	18 n	6.8 n	5100 n	390 n
Simazine	122349	5.00E–03 i		1.20E–01 h			0.56 e	0.052 e	0.026 e	24 e	5.3 e
Sodium azide	26628228	4.00E–03 i					150 n	15 n	5.4 n	4100 n	310 n
Sodium diethyldithiocarbamate	148185	3.00E–02 i		2.70E–01 h			0.25 e	0.023 e	0.012 e	11 e	2.4 e
Sodium fluoroacetate	62748	2.00E–05 i					0.73 n	0.073 n	0.027 n	20 n	1.6 n
Sodium metavanadate	13718268	1.00E–03 h					37 n	3.7 n	1.4 n	1000 n	78 n
Strontium, stable	7440246	6.00E–01 i					22000 n	2200 n	810 n	610000 n	47000 n
Strychnine	57249	3.00E–04 i					11 n	1.1 n	0.41 n	310 n	23 n
Styrene	100425	2.00E–01 i	2.86E–01 i			***	1600 n	1000 n	270 n	200000 n	16000 n

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Systhane	88671890	2.50E-02 *i*					910 *n*	91 *n*	34 *n*	26000 *n*	2000 *n*
2,3,7,8-TCDD (dioxin)	1746016			1.50E+05 *h*	1.50E+05 *h*		4.50E-07 *o*	4.20E-08 *o*	2.10E-08 *o*	0.000019 *o*	4.30E-06 *o*
Tebuthiuron	34014181	7.00E-02 *i*					2600 *n*	260 *n*	95 *n*	72000 *n*	5500 *n*
Temephos	3383968	2.00E-02 *h*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Terbacil	5902512	1.30E-02 *i*					470 *n*	47 *n*	18 *n*	13000 *n*	1000 *n*
Terbufos	13071799	2.50E-05 *h*					0.91 *n*	0.091 *n*	0.034 *n*	26 *n*	2 *n*
Terbutryn	886500	1.00E-03 *i*					37 *n*	3.7 *n*	1.4 *n*	1000 *n*	78 *n*
1,2,4,5-Tetrachlorobenzene	95943	3.00E-04 *i*				***	1.8 *n*	1.1 *n*	0.41 *n*	310 *n*	23 *n*
1,1,1,2-Tetrachloroethane	630206	3.00E-02 *i*		2.60E-02 *i*	2.59E-02 *i*	***	0.41 *o*	0.24 *o*	0.12 *o*	110 *o*	25 *o*
1,1,2,2-Tetrachloroethane	630206			2.00E-01 *i*	2.03E-01 *i*	***	0.052 *o*	0.031 *o*	0.016 *o*	14 *o*	3.2 *c*
Tetrachloroethylene (PCE)	127184	1.00E-02 *i*		5.20E-02 *o*	2.03E-03 *o*	***	1.1 *o*	3.1 *o*	0.061 *o*	55 *o*	12 *o*
2,3,4,6-Tetrachlorophenol	58902	3.00E-02 *i*					1100 *n*	110 *n*	41 *n*	31000 *n*	2300 *n*
p,a.a.a-Tetrachlorotoluene	5216251			2.00E+01 *h*		***	0.00053 *o*	0.00031 *o*	0.00016 *o*	0.14 *o*	0.032 *c*
Tetrachlorovinphos	961115	3.00E-02 *i*		2.40E-02 *h*			2.8 *o*	0.26 *o*	0.13 *o*	120 *o*	27 *o*
Tetraethyldithiopyrophosphate	3689245	5.00E-04 *i*					18 *n*	1.8 *n*	0.68 *n*	510 *n*	39 *n*
Thallic oxide	1314325	7.00E-05 *h*					2.6 *n*	0.26 *n*	0.095 *n*	72 *n*	5.5 *n*
Thallium											
Thallium acetate	563688	9.00E-05 *i*					3.3 *n*	0.33 *n*	0.12 *n*	92 *n*	7 *n*
Thallium carbonate	6533739	8.00E-05 *i*					2.9 *n*	0.29 *n*	0.11 *n*	82 *n*	6.3 *n*
Thallium chloride	7791120	8.00E-05 *i*					2.9 *n*	0.29 *n*	0.11 *n*	82 *n*	6.3 *n*
Thallium nitrate	10102451	9.00E-05 *i*					3.3 *n*	0.33 *n*	0.12 *n*	92 *n*	7 *n*
Thallium selenite	12039520	9.00E-05 *w*					3.3 *n*	0.33 *n*	0.12 *n*	92 *n*	7 *n*
Thallium sulfate	7446186	8.00E-05 *i*					2.9 *n*	0.29 *n*	0.11 *n*	82 *n*	6.3 *n*
Thiobencarb	28249776	1.00E-02 *i*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
2-(Thiocyanomethylthio)-benzothiazole	21564170	3.00E-02 *h*					1100 *n*	110 *n*	41 *n*	31000 *n*	2300 *n*
Thiofanox	39196184	3.00E-04 *h*					11 *n*	1.1 *n*	0.41 *n*	310 *n*	23 *n*
Thiophanate-methyl	23564058	8.00E-02 *i*					2900 *n*	290 *n*	110 *n*	82000 *n*	6300 *n*
Thiram	137268	5.00E-03 *i*					180 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Tin and compounds		6.00E-01 *h*					22000 *n*	2200 *n*	810 *n*	610000 *n*	47000 *n*
Toluene	108883	2.00E-01 *i*	1.14E-01 *w*			***	750 *n*	420 *n*	270 *n*	200000 *n*	16000 *n*
Toluene-2,4-diamine	95807			3.20E+00 *h*			0.021 *o*	0.002 *o*	0.00099 *o*	0.89 *o*	0.2 *o*
Toluene-2,5-diamine	95705	6.00E-01 *h*					22000 *n*	2200 *n*	810 *n*	610000 *n*	47000 *n*
Toluene-2,6-diamine	823405	2.00E-01 *h*					7300 *n*	730 *n*	270 *n*	200000 *n*	16000 *n*
p-Toluidine	106490			1.90E-01 *h*			0.35 *o*	0.033 *o*	0.017 *o*	15 *o*	3.4 *c*
Toxaphene	8001352			1.10E+00 *i*	1.12E+00 *i*		0.061 *o*	0.0056 *o*	0.0029 *o*	2.6 *o*	0.58 *c*
Tralomethrin	66841256	7.50E-03 *i*					270 *n*	27 *n*	10 *n*	7700 *n*	590 *n*
Triallate	2303175	1.30E-02 *i*					470 *n*	47 *n*	18 *n*	13000 *n*	1000 *n*
Triasulfuron	82097505	1.00E-02 *i*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
1,2,4-Tribromobenzene	615543	5.00E-03 *i*				***	30 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
Tributyltin oxide (TBTO)	56359	3.00E-05 *i*					1.1 *n*	0.11 *n*	0.041 *n*	31 *n*	2.3 *n*
2,4,6-Trichloroaniline hydrochloride	33663502			2.90E-02 *h*			2.3 *o*	0.22 *o*	0.11 *o*	99 *o*	22 *c*
2,4,6-Trichloroaniline	634935			3.40E-02 *h*			2 *o*	0.18 *o*	0.093 *o*	84 *o*	19 *c*

Sources: i=IRIS h=HEAST a=HEAST alt. x=W/D from IRIS y=W/D from HEAST e=EPA-ECAO o=Other EPA docs. *Basis of RBC: c=carcinogenic effects n=noncarcinogenic effects.*

Contaminant	CAS	RfDo mg/kg/d	RfDi mg/kg/d	CPSo kg•d/mg	CPSi kg•d/mg	V O C	Tap water µg/L	Ambient air µg/m3	Fish mg/kg	Industrial soil mg/kg	Residential soil mg/kg
1,2,4-Trichlorobenzene	120821	1.00E-02 *i*	2.57E-03 *h*			***	18 *n*	9.4 *n*	14 *n*	10000 *n*	780 *n*
1,1,1-Trichloroethane	71556	9.00E-02 *w*	2.86E-01 *w*			***	1300 *n*	1000 *n*	120 *n*	92000 *n*	7000 *n*
1,1,2-Trichloroethane	79005	4.00E-03 *i*		5.70E-02 *i*	5.60E-02 *i*	***	0.19 *o*	0.11 *o*	0.055 *o*	50 *o*	11 *c*
Trichloroethylene (TCE)	79016	6.00E-03 *e*		1.10E-02 *w*	6.00E-03 *e*	***	1.6 *o*	1 *o*	0.29 *o*	260 *o*	58 *c*
Trichlorofluoromethane	75694	3.00E-01 *i*	2.00E-01 *h*			***	1300 *n*	730 *n*	410 *n*	310000 *n*	23000 *n*
2,4,5-Trichlorophenol	95954	1.00E-01 *i*					3700 *n*	370 *n*	140 *n*	100000 *n*	7800 *n*
2,4,6-Trichlorophenol	88062			1.10E-02 *i*	1.09E-02 *i*		6.1 *c*	0.57 *o*	0.29 *o*	260 *c*	58 *c*
2,4,5-Trichlorophenoxyacetic acid	93765	1.00E-02 *i*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
2-(2,4,5-Trichlorophenoxy)propionic acid	93721	8.00E-03 *i*					290 *n*	29 *n*	11 *n*	8200 *n*	630 *n*
1,1,2-Trichloropropane	598776	5.00E-03 *i*				***	30 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
1,2,3-Trichloropropane	96184	6.00E-03 *i*				***	37 *n*	22 *n*	8.1 *n*	6100 *n*	470 *n*
1,2,3-TCP as carcinogen	96184			2.70E+00 *e*		***	0.0039 *o*	0.0023 *o*	0.0012 *o*	1.1 *o*	0.24 *c*
1,2,3-Trichloropropene	96195	5.00E-03 *h*				***	30 *n*	18 *n*	6.8 *n*	5100 *n*	390 *n*
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	3.00E+01 *i*	8.57E+00 *h*			***	59000 *n*	31000 *n*	41000 *n*	1000000 *n*	1000000 *n*
Tridiphane	58138082	3.00E-03 *i*					110 *n*	11 *n*	4.1 *n*	3100 *n*	230 *n*
Triethylamine	121448		2.00E-03 *i*				73 *n*	7.3 *n*			
Trifluralin	1582098	7.50E-03 *i*		7.70E-03 *i*			8.7 *o*	0.81 *o*	0.41 *o*	370 *o*	83 *c*
Trimethyl phosphate	512561			3.70E-02 *h*			1.8 *o*	0.17 *o*	0.085 *o*	77 *o*	17 *c*
1,2,4-Trimethylbenzene	95636	5.00E-04 *e*				***	3 *n*	1.8 *n*	0.68 *n*	510 *n*	39 *n*
1,3,5-Trimethylbenzene	108678	4.00E-04 *e*				***	2.4 *n*	1.5 *n*	0.54 *n*	410 *n*	31 *n*
1,3,5-Trinitrobenzene	99354	5.00E-05 *i*					1.8 *n*	0.18 *n*	0.068 *n*	51 *n*	3.9 *n*
Trinitrophenylmethylnitramine	479458	1.00E-02 *h*					370 *n*	37 *n*	14 *n*	10000 *n*	780 *n*
2,4,6-Trinitrotoluene	118967	5.00E-04 *i*		3.00E-02 *i*			2.2 *o*	0.21 *o*	0.11 *o*	95 *o*	21 *c*
Uranium (soluble salts)	7440611	3.00E-03 *i*					110 *n*	11 *n*	4.1 *n*	3100 *n*	230 *n*
Vanadium	7440622	7.00E-03 *h*					260 *n*	26 *n*	9.5 *n*	7200 *n*	550 *n*
Vanadium pentoxide	1314621	9.00E-03 *i*					330 *n*	33 *n*	12 *n*	9200 *n*	700 *n*
Vanadium sulfate	36907423	2.00E-02 *h*					730 *n*	73 *n*	27 *n*	20000 *n*	1600 *n*
Vernam	1929777	1.00E-03 *i*					37 *n*	3.7 *n*	1.4 *n*	1000 *n*	78 *n*
Vindozolin	50471448	2.50E-02 *i*					910 *n*	91 *n*	34 *n*	26000 *n*	2000 *n*
Vinyl acetate	108054	1.00E+00 *h*	5.71E-02 *i*				37000 *n*	210 *n*	1400 *n*	1000000 *n*	78000 *n*
Vinyl bromide	593602		8.57E-04 *i*			***	5.2 *n*	3.1 *n*			
Vinyl chloride	75014			1.90E+00 *h*	3.00E-01 *h*	***	0.019 *o*	0.021 *o*	0.0017 *o*	1.5 *o*	0.34 *c*
Warfarin	81812	3.00E-04 *i*					11 *n*	1.1 *n*	0.41 *n*	310 *n*	23 *n*
m-Xylene	108323	2.00E+00 *h*	2.00E-01 *w*			***	1400 *n*	730 *n*	2700 *n*	1000000 *n*	160000 *n*
o-Xylene	95476	2.00E+00 *h*	2.00E-01 *w*			***	1400 *n*	730 *n*	2700 *n*	1000000 *n*	160000 *n*
p-Xylene	106423		8.57E-02 *w*			***	520 *n*	310 *n*			

EPA National Primary Drinking Water Standards

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Acrylamide	TT[8]	Nervous system or blood problems;	Added to water during sewage/wastewater increased risk of cancer treatment	zero
OC	Alachlor	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R	Alpha particles	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
IOC	Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006
IOC	Arsenic	0.010 as of 1/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronics production wastes	0
IOC	Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 MFL
OC	Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
IOC	Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC	Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC	Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
IOC	Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004
R	Beta particles and photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	zero
DBP	Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	zero
IOC	Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005
OC	Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC	Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
D	Chloramines (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes	MRDLG=4[1]

LEGEND

- D — Dinsinfectant
- DBP — Disinfection Byproduct
- IOC — Inorganic Chemical
- M — Microorganism
- OC — Organic Chemical
- R — Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	zero
D	Chlorine (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	MRDLG=4[1]
D	Chlorine dioxide (as ClO_2)	MRDL=0.8[1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes	MRDLG=0.8[1]
DBP	Chlorite	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection	0.8
OC	Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	0.1
IOC	Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	0.1
IOC	Copper	TT[7]; Action Level = 1.3	Short term exposure: Gastrointestinal distress. Long term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	1.3
M	*Cryptosporidium*	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
IOC	Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	0.2
OC	2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	0.07
OC	Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	0.2
OC	1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	zero
OC	o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	0.6
OC	p-Dichlorobenzene	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories	0.075
OC	1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	0.007
OC	cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	0.07
OC	trans-1,2-Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	0.1
OC	Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories	zero
OC	1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	Di(2-ethylhexyl) adipate	0.4	Weight loss, live problems, or possible reproductive difficulties	Discharge from chemical factories	0.4
OC	Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	zero
OC	Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	0.007
OC	Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	zero
OC	Diquat	0.02	Cataracts	Runoff from herbicide use	0.02
OC	Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	0.1

LEGEND

D Dinsinfectant

DBP Disinfection Byproduct

IOC Inorganic Chemical

M Microorganism

OC Organic Chemical

R Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Endrin	0.002	Liver problems	Residue of banned insecticide	0.002
OC	Epichlorohydrin	TT[8]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	zero
OC	Ethylbenzene	0.7	Liver or kidneys problems	Discharge from petroleum refineries	0.7
OC	Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	zero
IOC	Fluoride	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	4.0
M	*Giardia lamblia*	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	0.7
DBP	Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	zero
OC	Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	zero
M	Heterotrophic plate count (HPC)	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	n/a
OC	Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	zero
OC	Hexachlorocyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	0.05
IOC	Lead	TT[7]; Action Level = 0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	zero
M	*Legionella*	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	zero
OC	Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens	0.0002
IOC	Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	0.002
OC	Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	0.04
IOC	Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	10
IOC	Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	1

LEGEND

D Dinsinfectant
DBP Disinfection Byproduct
IOC Inorganic Chemical
M Microorganism
OC Organic Chemical
R Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	0.2
OC	Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories	zero
OC	Picloram	0.5	Liver problems	Herbicide runoff	0.5
OC	Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	zero
R	Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	zero
IOC	Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines	0.05
OC	Simazine	0.004	Problems with blood	Herbicide runoff	0.004
OC	Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	0.1
OC	Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	zero
IOC	Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	0.0005
OC	Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	1
M	Total Coliforms (including fecal coliform and *E. coli*)	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Coliforms are naturally present in the environment as well as feces; fecal coliforms and *E. coli* only come from human and animal fecal waste.	zero
DBP	Total Trihalomethanes (TTHMs)	0.10 0.080 after 12/31/03	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	zero
OC	2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	0.05
OC	1,2,4-Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	0.07
OC	1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	0.20
OC	1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	0.003
OC	Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	zero
M	Turbidity	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing micro-organisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	n/a
R	Uranium	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	zero

LEGEND

D Dinsinfectant

DBP Disinfection Byproduct

IOC Inorganic Chemical

M Microorganism

OC Organic Chemical

R Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Vinyl chloride	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	zero
M	Viruses (enteric)	TT3	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Xylenes (total)	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	10

NOTES

1 Definitions

- Maximum Contaminant Level Goal (MCLG)—The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL)—The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG)—The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Maximum Residual Disinfectant Level (MRDL)—The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Treatment Technique (TT)—A required process intended to reduce the level of a contaminant in drinking water.

2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

3 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- *Cryptosporidium* (as of 1/1/02 for systems serving >10,000 and 1/14/05 for systems serving <10,000) 99% removal.
- *Giardia lamblia*: 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- *Legionella:* No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelolometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month. As of January 1, 2002, for systems servicing >10,000, and January 14, 2005, for systems servicing <10,000, turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- HPC: No more than 500 bacterial colonies per milliliter
- Long Term 1 Enhanced Surface Water Treatment (Effective Date: January 14, 2005); Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- Filter Backwash Recycling: The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

4 No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E. coli* fecal coliforms, system has an acute MCL violation.

5 Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

6 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

7 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

8 Each water system must certify, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05% dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent).

LEGEND

D Dinsinfectant
DBP Disinfection Byproduct
IOC Inorganic Chemical
M Microorganism
OC Organic Chemical
R Radionuclides

National Secondary Drinking Water Standards

National Secondary Drinking Water Standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

Office of Water (4606M)
EPA 816-F-03-016
www.epa.gov/safewater
June 2003

EPA Region 9 2002 Soil Preliminary Remediation Goals

Analyte	Screening Criterion		
	Residential Soil PRG (mg/kg)	Industrial Soil PRG (mg/kg)	Soil to GW Screening (DAF=20) (mg/kg)
1,1,1-Trichloroethane	630	1,400	2
1,1,2,2-Tetrachloroethane	0.38	0.9	0.003
1,1,2-Trichloro-1,2,2-trifluoroethane	5,600	5,600	-
1,1,2-Trichloroethane	0.84	1.9	0.020
1,1-Dichloroethane	590	2,100	23
1,1-Dichloroethene	0.054	0.12	0.060
1,2,4-Trichlorobenzene	650	3,000	5
1,2-Dibromo-3-chloropropane	0.45	4	-
1,2-Dibromoethane	0.0069	0.048	-
1,2-Dichlorobenzene	370	370	17
1,2-Dichloroethane	0.35	0.76	0.020
cis-1,2-Dichloroethene	43	150	0.4
trans-1,2-Dichloroethene	63	210	0.7
1,2-Dichloropropane	0.35	0.77	0.030
1,3-Dichlorobenzene	13	52	-
1,4-Dichlorobenzene	3.4	8.1	2
2-Hexanone	-	-	-
4-Methyl-2-pentanone	790	2,900	-
Acetone	1,600	6,200	16
Benzene	0.65	1.5	0.030
Bromodichloromethane	1	2.4	0.6
Bromoform	62	310	0.8
Bromomethane	3.9	13	0.2
Carbon disulfide	360	720	32
Carbon tetrachloride	0.24	0.53	0.07
Chlorobenzene	150	540	1
Chloroethane	3	6.5	-
Chloroform	0.24	0.52	0.6
Chloromethane	1.2	2.7	-
cis-1,3-Dichloropropene	0.7	1.6	0.004
Cyclohexane	140	140	-
Dibromochloromethane	1.1	2.7	0.4
Dichlorodifluoromethane	94	310	-
Ethylbenzene	230	230	13
Isopropylbenzene	160	520	-
Methyl Acetate	22,000	96,000	-
2-Butanone	7,300	28,000	-
Methyl tert-butyl ether	-	-	-
Methylcyclohexane	2,600	8,800	-
Methylene chloride	8.9	21	0.02
Styrene	1,700	1,700	4
Tetrachloroethene	5.7	19	0.06
Toluene	520	520	12
trans-1,3-Dichloropropene	0.7	1.6	0.004
Trichloroethene	2.8	6.1	0.06
Trichlorofluoromethane	390	2,000	-
Vinyl chloride	0.15	0.83	0.01
Xylenes (total)[1]	210	210	210
DRO	-	-	-
GRO	-	-	-
Waste Oil (C25)	-	-	-