



Brian Schweitzer, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • www.deq.mt.gov

May 17, 2006

Todd Everts
Environmental Quality Council
Capitol Complex
Helena, MT 59620

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LEGISLATIVE ENVIRONMENTAL
POLICY OFFICE

Subject: Final Environmental Assessment for Malmstrom Air Force Base, Great Falls, Montana

Dear Mr. Everts:

Enclosed is the final Environmental Assessment for the above-referenced facility. You should have received a copy of the draft EA in late February. If you have any questions, please contact me at 406/444-2876 or the e-mail address listed below.

Sincerely,

Rebecca Holmes

Rebecca Holmes
Environmental Science Specialist
Waste and Underground Tank Management Bureau
Permitting and Compliance Division
e-mail: rholmes@mt.gov

Enclosure

cc: HW facility file: MAFB – Public Participation #1 (w/o enclosure)

Montana Department of Environmental Quality
Permitting and Compliance Division
Waste and Underground Tank Management Bureau
P.O. Box 200901
Helena, Montana 59620-0901

Final Environmental Assessment

Montana Hazardous Waste Permit Number: MTHWP-01-01

Issued to: Malmstrom Air Force Base
39 78th Street North
Malmstrom AFB, Montana 59402-7536

Legal Description: Sections 1, 2, 3, 10-15, Township 20 North, Range 4 East; and Sections 6 and 7, Township 20 North, Range 5 East, Cascade County

Issued by: Hazardous Waste Section
Waste and Underground Storage Tank Management Bureau
Permitting and Compliance Division
Montana Department of Environmental Quality

Purpose of the Environmental Assessment

The Montana Department of Environmental Quality (MDEQ) is required under the Montana Environmental Policy Act (MEPA) to conduct an environmental assessment (EA) on the proposed permit action described in this document. An EA details: 1) all reasonable alternatives to MDEQ's action; and 2) outlines the potential impacts to the human environment resulting from MDEQ's permitting action and reasonable alternatives to that action.

Based on the impact analysis and professional judgment, MDEQ makes a decision on the proposed permit action and summarizes the decision in the EA. If the decision significantly impacts the human environment, a more detailed environmental review, called an environmental impact statement, must be conducted by MDEQ.

Rules administering hazardous waste management in Montana are set forth in the Administrative Rules of Montana (ARM), Title 17, Chapter 53, Sub-Chapters 1 through 12. Federal regulations for hazardous waste management are set forth in the Code of Federal Regulations (CFR), Parts 124 and 260 through 279, and are incorporated by reference in ARM. For ease of reading this document, when federal regulations under Title 40 of the CFR have been incorporated by reference into ARM, only the federal citation is used.

Public Comment Period

The public including interested citizens, DEQ, EPA, other governmental agencies, and the applicant were given thirty (30) days to comment on the draft EA. The comment period extended from March 1 to April

14, 2006. MDEQ received no comments on the draft EA; however, comments were received on the Statement of Basis issued concurrently with the draft EA.

MDEQ has changed the final EA in response to comments. Changes made to this document include updating the term "Montana Circular WQB-7" to "Montana Circular DEQ-7" to reflect a name change implemented by MDEQ in February 2006. Alternative 7 has also been changed to reflect comments received by the United States Department of the Air Force on the Statement of Basis.

Description of Project

MDEQ is modifying the hazardous waste permit issued to Malmstrom Air Force Base (Malmstrom) in Great Falls, Montana. The modification is the approval of a cleanup remedy for shallow groundwater contamination at LF-19, a closed landfill located on the Malmstrom facility.

Malmstrom Air Force Base is located on the eastern city limits of Great Falls, Montana. The base was established in 1942 and encompasses 3,500 acres. The Missouri River is approximately one mile north of the base. The State of Montana issued a hazardous waste permit to Malmstrom in 1989 to allow storage of hazardous waste in an on-site storage building. In addition, the Environmental Protection Agency (EPA) issued Malmstrom a permit under the Hazardous and Solid Waste Amendments to the federal law for management of hazardous waste, the Resource Conservation and Recovery Act (RCRA). The EPA permit required that Malmstrom conduct remedial investigation and cleanup of contaminated areas throughout the facility. Hazardous waste permits (both state and federal) are issued for a ten-year period and may be renewed at the end of that period. Because MDEQ was given oversight authority for facility-wide cleanup by EPA, the Malmstrom hazardous waste permit was reissued in 2001 to include requirements for both the operation of the on-site storage building and for facility-wide cleanup.

Malmstrom has identified 26 potentially contaminated areas which require some degree of investigation and cleanup. The areas are designated as Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs). Twenty-five of these areas have been either remediated or referred to MDEQ's Petroleum Site Response Program for further action. The last SWMU requiring cleanup, SWMU #SW-3 (LF-19), is the subject of this EA.

Sample results indicate elevated levels of chlorinated volatile organic compounds (CVOCs) are present in both shallow groundwater and, when present, surface water in a coulee adjacent to LF-19. In addition, shallow groundwater contamination has been detected in monitoring wells outside the LF-19 boundary. No contamination has been detected in the deep groundwater aquifer. Concentrations of CVOCs in shallow groundwater exceed Montana's numeric water quality standards, as published in Circular DEQ-7.

MDEQ is approving a remedy for LF-19 that will include enhanced in-situ bioremediation, monitored natural attenuation, and institutional controls to address shallow groundwater contamination at the site. Enhanced reductive dechlorination (ERD) will be used as a biological treatment barrier to degrade chlorinated volatile organic compounds present in shallow groundwater. Groundwater will be monitored to determine effectiveness of the barrier system and to track natural attenuation of contaminants. Institutional controls will be put in place

limiting or restricting land and water use to prevent potential exposure to contaminants in impacted areas.

Objectives of Proposed MDEQ Action

The objective of the MDEQ action (selecting a remedy for LF-19 and modifying the permit to include the remedy) is to comply with the provisions of the Malmstrom hazardous waste permit, and the Administrative Rules of Montana, which incorporate the Federal Code of Regulations by reference. As stated in 40 CFR 264.101, Malmstrom is required to institute corrective measures for all releases of hazardous waste or constituents from SWMUs at the facility. In addition, corrective action must be implemented for contamination found outside the facility boundary. Condition III.G. of the Malmstrom hazardous waste permit states that MDEQ will select remedial measures to be taken for areas of contamination at the facility, document the selected remedy in a Statement of Basis, and initiate a permit modification as set forth in 40 CFR 270.41 to incorporate the selected remedy into the hazardous waste permit.

Alternatives Considered

Alternative 1: No Action

The No Action alternative provides a baseline from which to analyze other alternatives. It does not include any active remediation or monitoring. Alternative 1 does not comply with Montana's hazardous waste laws and regulations which require corrective action for off-site contamination, or with Montana's water quality regulations, which require that surface and groundwater meet water quality standards under Circular DEQ-7. Therefore, this alternative is not reasonable and not considered further.

Alternative 2: Institutional Controls (ICs)

Under this alternative, institutional controls would be implemented to prevent use of, or exposure to, contaminated shallow groundwater both on- and off-base. Environmental institutional controls are legal or administrative restrictions used to prevent and/or limit potential exposure to contaminants in impacted areas. Legal and/or administrative controls and physical restrictions would be applied to the LF-19 site to control or prevent present and future on-base and off-base use and access to contaminated shallow groundwater.

For on-base controls, Malmstrom's General Plan consolidates plans and programs related to management and development of Air Force lands, facilities, and resources. The General Plan is used to guide future growth and development of on-base activities. Updates to the General Plan would be made to incorporate institutional controls to prohibit current and future use of ground and surface water, and to restrict land use of LF-19. Off-base institutional controls would include easements and administrative agreements with adjacent landowners. Malmstrom currently has a perpetual easement for off-base properties within 1,000 feet of the base boundary that precludes human habitation and building for human occupancy.

Alternative 2 does not comply with Montana's hazardous waste laws and regulations which require corrective action for off-site contamination, or with Montana's water quality regulations, which require that surface and groundwater meet water quality standards under Circular DEQ-7. Therefore, this alternative is not reasonable and not considered further.

Alternative 3: Monitored Natural Attenuation (MNA) with ICs

Under this alternative, routine groundwater monitoring would be conducted to evaluate progress towards meeting cleanup goals through natural attenuation processes. Institutional controls would also be implemented to prevent use of, or exposure to, contaminated shallow groundwater both on- and off-base.

Natural attenuation is the reduction in mass or concentration of a chemical compound in soil or groundwater over time or distance from the source due to naturally-occurring physical, chemical or biological processes. Monitored natural attenuation (MNA) refers to the use of natural attenuation processes within the context of a carefully controlled and monitored site cleanup approach. To measure whether natural attenuation of compounds is occurring, a monitoring program must be designed to 1) demonstrate natural attenuation is occurring according to expectations, 2) detect changes in environmental and contaminant conditions, and 3) verify the contaminant plume is not expanding.

Reductive dechlorination is a natural attenuation process by which anaerobic microbes systematically reduce CVOCs to benign end products such as ethane and ethene. Malmstrom would monitor the existing groundwater monitoring system in areas where CVOC concentrations are above Circular DEQ-7 standards. In addition, up to six additional monitoring wells would be installed and included in the monitoring program. Groundwater samples would be collected and analyzed for CVOCs, as well as geochemical parameters associated with natural attenuation. The data would be evaluated to ensure natural attenuation of the contaminants is occurring. MNA would end when concentrations of contaminants meet cleanup standards and remediation objectives.

Alternative 4: Enhanced Reductive Dechlorination (ERD) with MNA and ICs

Under this alternative, naturally occurring reductive dechlorination of CVOCs in shallow groundwater would be stimulated through the injection of substrates designed to further promote degradation. MNA and ICs would also be used in tandem with ERD.

Subsurface treatment barriers such as ERD form a zone where contaminants migrating in groundwater are intercepted and degraded or transformed into harmless end products. ERD involves addition of compounds to the subsurface that enhance the naturally-occurring reductive dechlorination of CVOCs. The ERD biological barrier would be installed along the northwestern edge of LF-19, perpendicular to the contaminant groundwater plume. To form the barrier, an organic substrate would be added to the subsurface through soil borings or a shallow trench. The installation of the treatment barrier at the leading edge of the contaminant plume is designed to stop continued migration of CVOCs dissolved in the groundwater and to enhance degradation of the contaminants.

Malmstrom would install new monitoring wells within and downgradient of the contaminant plume to verify reduction of CVOCs in groundwater and monitor whether further substrate injections are necessary.

Alternative 5 – Proposed Remedy: Source Control, ERD, MNA, and ICs

Malmstrom evaluated each alternative and recommended Alternative 4 as having the highest potential to meet the cleanup standards and corrective action objectives. MDEQ reviewed the results of the Corrective Measures Study (CMS) and agreed in general with Malmstrom's evaluation and recommendation. However, MDEQ believed the recommended alternative did not adequately address source control within the waste trenches. Therefore, MDEQ proposed to include further on-site investigation of the waste trenches in the remedy to determine the most appropriate method for source control of hazardous constituents that are migrating or may migrate from the trenches to ground and surface water.

MDEQ proposed a shallow groundwater remedy that would include a subsurface treatment barrier, monitored natural attenuation, and institutional controls, as outlined in Alternative 4. In addition, further investigation of the waste trenches was proposed to develop an on-site source control technology.

As a response to comments received during the public comment period, MDEQ will require further investigation of the waste trenches; however, the investigation will be conducted independent from implementation of the surface and ground water remedy. The focus of the waste trenches investigation will be to determine whether specific sources can be located, as well as to provide information necessary to select, design, and build a source control system. Upon completion of the trench investigation, source control remedies will be evaluated in a CMS. The removal of the waste trench investigation requirement from Alternative 5 effectively makes Alternative 5 identical to Alternative 4. Therefore, Alternative 5 will not be considered further in this EA.

Stipulations and Controls

As part of implementing the remedy for the LF-19 landfill, the Malmstrom hazardous waste permit requires that Malmstrom submit work plans, progress reports, and completion reports to MDEQ. Work plans will detail engineering requirements for treatment technologies and monitoring well installation, safety procedures, and quality assurance for sampling and analysis. Progress reports will include evaluation of progress towards meeting cleanup standards, as well as the efficacy of the remedy. All work plans and reports will be subject to MDEQ's review and approval. MDEQ has regulatory and permitting authority to require changes to the remedy, if necessary.

Analysis of Regulatory Impacts on Private Property Rights

A Private Property Assessment Act Checklist was completed for MDEQ's proposed action on the remedy selection. The checklist is on file with MDEQ's Permitting and Compliance Division, Waste and Underground Tank Management Bureau. MDEQ determined that no taking or damaging implications exist requiring a further impact assessment.

Summary of Impacts

The potential human environmental impacts from the implementation of remedial action through Alternative 3 or 4 are rated in Tables 1 and 2. The human environment includes those attributes, such as biological, physical, social, economic, cultural, and aesthetic factors, that interrelate to

form the environment. Impacts may be adverse, beneficial, or both. The following criteria are used to rate the impacts:

- ◆ The severity, duration, geographic extent, and frequency of occurrence;
- ◆ The probability the impact will occur if the proposed action occurs;
- ◆ Growth-inducing or growth-inhibiting aspects of the impact;
- ◆ The quantity and quality of each environmental resource or value effected;
- ◆ The importance to the State and society of each environmental resource or value effected;
- ◆ Any precedent set as a result of an impact from the proposed action that would commit MDEQ to future actions with significant impacts or a decision in principle about such future actions; and
- ◆ Potential conflict with local, state, or federal laws, requirements, or formal plans.

The following are definitions for major, moderate, minor, none, and unknown impacts on the human environment:

Major: A significant change from the present conditions of the human environment. Major impacts are serious enough to warrant preparing an environmental impact statement (EIS).

Moderate: Not a major or minor change from the present condition of the human environment. A single moderate impact may not warrant preparing an EIS; however, when considered with other impacts, an EIS may be required.

Minor: A slight change from the present condition of the human environment. Minor impacts are not serious enough to warrant preparing an EIS.

None: No change from the present conditions of the human environment.

Unknown: An EIS must be conducted to determine the effects on the human environment if impacts are unknown.

Table 1. Potential Impacts on Physical and Biological Environment

Alternative 3 = ■

Alternative 4 = ◆

Resources		Major	Moderate	Minor	None	Unknown	Discussion Attached
A.	Air Quality				■ ◆		X
B.	Water Quality, Quantity, and Distribution			■ ◆			X
C.	Geology and Soil Quality, Stability, and Moisture			◆	■		X
D.	Historical and Archaeological Sites				■ ◆		
E.	Aesthetics				■ ◆		
F.	Terrestrial and Aquatic Life and Habitats				■ ◆		X
G.	Vegetation Cover, Quantity, and Quality			■ ◆			X
H.	Unique, Endangered, Fragile, or Limited Environmental Resources				■ ◆		
I.	Demands on Environmental Resource of Water, Air, and Energy				■ ◆		
J.	Cumulative and Secondary Impacts				■ ◆		

B. Water Quality, Quantity, and Distribution

Both alternatives would have positive impacts on water quality. Biodegradation of contaminants in shallow groundwater would improve water quality in both surface and groundwater. The primary differences between the alternatives are timeframes for attaining cleanup standards; reduction in toxicity, mobility, and volume of contaminants; and source control. Of the two alternatives, Alternative 4 has the greater potential to attain cleanup standards and corrective action goals.

C. Geology and Soil Quality, Stability, and Moisture

Both alternatives would require soil disturbance during installation of the ERD system (Alternative 4) and groundwater monitoring wells (Alternatives 3 and 4). However, Malmstrom would be required to grade and revegetate the ground surface following construction of the remedy technology. Therefore, impacts on soil quality and stability would be minor.

D. Vegetation Cover, Quantity, and Quality

The current vegetation cover would be disturbed during installation of monitoring wells (Alternatives 3 and 4) and the ERD system (Alternative 4 only). However, Malmstrom would be

required to grade and revegetate the ground surface following field investigations and construction of the remedy technology. Therefore, impacts on vegetation cover, quality and quantity would be minor.

F. Terrestrial and Aquatic Life and Habitats

Malmstrom conducted a risk assessment to determine whether contaminants in shallow groundwater and surface water posed a risk to terrestrial and aquatic life/habitat. Conclusions of the risk assessment indicated that the risk to ecological receptors is at an acceptable level and no exposure pathway exists from contaminants to receptors.

Table 2. Potential Impacts on Social, Economic, and Cultural Environment

Alternative 3 = ■

Alternative 4 = ◆

Resources		Major	Moderate	Minor	None	Unknown	Discussion Attached
A.	Social Structures and Mores				■ ◆		
B.	Cultural Uniqueness and Diversity				■ ◆		
C.	Local and State Tax Base and Tax Revenue				■ ◆		
D.	Agricultural or Industrial Production				■ ◆		
E.	Human Health				■ ◆		X
F.	Access to and Quality of Recreational and Wilderness Activities				■ ◆		
G.	Quantity and Distribution of Employment				■ ◆		
H.	Distribution of Population				■ ◆		
I.	Demands for Governmental Services			■ ◆			X
J.	Industrial and Commercial Activity			■ ◆			X
K.	Locally Adopted Environmental Plans and Goals			■ ◆			X
L.	Cumulative and Secondary Impacts				■ ◆		

E. Human Health

Malmstrom conducted a risk assessment to determine whether contaminants in shallow groundwater and surface water posed a risk to human health. Conclusions of the risk assessment indicated that the risk to human health is at an acceptable level and no exposure pathway exists from contaminants to receptors.

I. Demands for Governmental Services

The Malmstrom permit requires submittal of work plans, reports and completion certification documentation when a remedy is implemented. These submittals would be reviewed by MDEQ. Therefore, a minor impact to government services is anticipated. This impact would be the same for Alternatives 3 and 4.

Industrial and Commercial Activity

Impacts on industrial and commercial activity would increase from those generated by the current permit. Malmstrom would hire environmental consulting firms to implement the remedy, sampling, technical evaluations, and work plan and report development. Samples for analytical evaluation would be sent to an external analytical laboratory for analysis. These impacts would be the same for Alternatives 3 and 4.

K. Locally Adopted Environmental Plans and Goals

Alternatives 3 and 4 require institutional controls to control or prevent present and future on-base and off-base use and access to contaminated shallow groundwater. For on-base controls, Malmstrom's General Plan consolidates plans and programs related to management and development of Air Force lands, facilities, and resources. The plan would be updated to incorporate institutional controls to prohibit current and future use of ground and surface water, and restrict land use of LF-19. Malmstrom currently has a perpetual easement for off-base properties within 1,000 feet of the base boundary that precludes human habitation and building for human occupancy. Further off-base institutional controls may be required, including easements and administrative agreements with adjacent landowners. Changes to the Malmstrom General Plan and agreements with adjacent landowners are expected to have minor impacts on local environmental plans and goals.

Individuals or Groups Contributing to EA

Montana Department of Environmental Quality
Malmstrom Air Force Base

Draft EA Prepared

Rebecca Holmes
February 24, 2006

Final EA Prepared

Rebecca Holmes
May 17, 2006

Recommendation

Based on the EA analysis, MDEQ recommends Alternative 4 as the remedy for the LF-19 landfill. Analysis of the remedial investigation conducted by Malmstrom, Montana hazardous waste and water quality regulations indicate this Alternative would best meet requirements for off-site corrective action and progress for attainment of water quality standards. To ensure protection of human health and the environment, the permit includes conditions which mitigate impacts of the remedy through departmental oversight and review of work plans and reports. MDEQ's final remedy decision has taken into account all comments received during the public comment period.

The EA is an adequate level of environmental review; an EIS is not required. The EA analysis demonstrates that this State action will not be a major action significantly affecting the quality of the human environment.