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1.0 BACKGROUND

Malmstrom Air Force Base (MAFB), home to the 341st Missile Wing, maintains and operates the Minuteman III intercontinental ballistic missile (ICBM) system. The entire missile complex encompasses approximately 190 miles east to west and 120 miles north to south. This project includes Missile Alert Facilities (MAFs) located in Lewis & Clark, Fergus, Judith Basin, and Teton counties.

Due to an increase in defense posture, the base now has a requirement to refuel helicopters within a 15-minute flight time from anywhere in the Minuteman Missile Complex. Two locations, MAFB and the Lewistown Airport, are the only refueling locations. Distances from many of the MAFs to these two locations exceed the 15-minute refueling timeframe. MAFB is proposing to upgrade seven of the fifteen MAF helipad sites to accommodate rapid refueling operations to meet the 15-minute refueling requirement. The proposed actions would occur at B-01, C-01, E-01, G-01, H-01, L-01, and N-01 MAFs shown below in Figure 1.

Figure 1. Location of Helipad Sites
The Air Force proposes to use Missile Field Expeditionary Refuelers (helo refuelers, also called MFERs) for fuel storage, which would be permanently installed in turnout areas adjacent to helipads at each site. All seven of the sites will have refueling pad turnouts for housing the helo refuelers. Permanent power will have to be brought from the Missile Alert Facility buildings to the turnout areas at all sites. This action would also require fuel delivery to each MAF site every four to six weeks, replacing fuel used from the 1,000-gallon helo refueler tanks due to helicopter usage or out-of-specification fuel. Facility maps, pictures, and descriptions of each MAF can be found in Appendix A.

What is the purpose, and why is this needed?

The purpose of this proposed action is to develop increased missile defense capability for refueling helicopters within a 15-minute flight time anywhere in the missile fields. Currently, refueling can only be done at two locations: the Lewistown, Montana, airport and Malmstrom Air Force Base. Time from several of the missile sites to these locations is greater than 15 minutes.

This proposed action is needed to ensure military readiness due to an increase in defense posture and compliance with Department of Defense 5210.41-M, Nuclear Weapon Security Manual: The DoD Nuclear Weapon Security Program (U). Consequently, the Air Force is proposing to develop the capability and infrastructure for rapid refueling for UH-1N/H-60 helicopters within a 15-minute flight area anywhere in the missile fields.

The proposed action includes enhancing and upgrading the existing seven helicopter pad sites to accommodate refueling operations.

How will this Environmental Assessment be used?

This Environmental Assessment (EA), which is the responsibility of the Air Force, is a concise public document that serves to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI); to aid the Air Force’s compliance with the National Environmental Policy Act (NEPA) when no EIS is necessary; and, facilitate preparation of an EIS if one is necessary.

Based on the analysis contained within this EA, responses from consulting agencies, and public input, the Air Force has determined this proposed project is not a major federal action and will not have a significant effect on the quality of the human environment, individually or cumulatively with other actions in the general area and that a FONSI can be prepared.

This Environmental Assessment is being prepared by the U.S. Air Force in compliance with the National Environmental Policy Act of 1969 (42 U.S. Code [U.S.C.] 4321-4370) and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), as well as 32 CFR Part 989, Environmental Impact Analysis Process (EIAP) for the USAF, and other pertinent environmental statutes, regulations, and compliance requirements. The authorities described will be addressed in various sections throughout this EA when relevant to particular environmental resources and conditions.
Are other agencies or the public consulted about this project?

Multiple agencies have been asked to comment on this project. Government and interested parties were sent a “scoping” letter describing the project and requesting input. Responses were received from the Montana Department of Transportation, the Montana Department of Environmental Quality, and the Montana State Historical Preservation Office. A list of consulted parties and their summarized comments are included in Appendix B.

The Air Force solicited public input for this Proposed Action through multiple public outlets. Advertisements were run in prominent locations in the Great Falls *Tribune* and the Lewistown *NewsArgus*. The draft EA was available at four libraries: Great Fall Public Library, University of Great Falls Library, Lewistown Public Library, and the Conrad Public Library. Nearby land owners (within a one-mile radius of each of the affected MAFs) were notified by mail and invited to review and comment on the proposed action. A website with the draft EA was created with the ability to submit comments online.

Copies of the draft EA were available for a 30-day public comment period from January 26 through February 25, 2016.

Copies of the draft final EA were available for a 15-day public comment period from March 30 through April 14, 2016 along with the draft FONSI. This final EA and the final FONSI will be made available on the website, *MalmstromRapidRefuelingEA.com* for at least 30 days.

Who prepared this document?

This document was developed and compiled by TD&H Engineering a consultant to Malmstrom Air Force Base using information supplied by AFGSC 341 CES/CEIE personnel. Additional information about the preparers can be found in Appendix I.
2.0 PROPOSED ACTION AND ALTERNATIVES

What is the Proposed Action?

The Air Force is proposing to change refueling operations to accommodate helicopter refueling within a 15-minute flight of anywhere in the Minuteman Missile Complex. Currently refueling is only performed at the Lewistown Airport and Malmstrom Air Force Base in Great Falls. This proposed action would affect seven MAFs: B-01, C-01, E-01, G-01, H-01, L-01, and N-01. This proposed action includes changes to refueling operations in addition to new construction and infrastructure at the seven sites.

What are refueling operations?

Refueling operations include purchasing equipment and developing procedures for the helo refuelers, transporting fuel to the helo refuelers, pumping fuel from the tanks to the helicopters, routine maintenance of the tanks and fuel, replacing fuel when necessary, and locating Halon 1211 fire extinguishers on site.

The Air Force will purchase seven Missile Field Expeditionary Refuelers (helo refuelers) for each identified MAF and one additional unit for training purposes to be located at Malmstrom Air Force base (MAFB) in Great Falls. The helo refuelers are enclosed metal structures similar to freight shipping containers that contain a double-walled, 1,000-gallon fuel tank, pumping equipment, and an emergency generator. Moving fuel from the tank to the helicopter is similar to neighborhood gas station pumps where a nozzle on the end of a hose is attached to pumping mechanisms that move the fuel from the tank out the nozzle.

Regular maintenance of the helo refuelers requires that fuel in the tank be routinely recirculated through a filter and tested for water and sediment content. If any fuel tests outside of approved limits, the fuel would be replaced with new. Base personnel generally do not allow fuel to remain unused longer than six months.\(^1\)

Malmstrom personnel anticipate fuel in the tanks will be consumed or replaced every 4-6 weeks. Actual alert refueling would occur when needed. Approximately 200-250 gallons from each tank would be consumed by helicopters per month.\(^2\) Approximately 200 gallons would always be in the tank to keep the pumps primed and operational.\(^3\) Approximately 600 gallons would remain for helicopter use or replacement in the following months.

The Air Force will use a 1,200-gallon, four-wheel drive, tanker truck to make fuel deliveries from MAFB to each of the facilities. It is expected, that each mobile refueler will need about 300 gallons per month. Because of the distance between facilities, the tanker truck will only be able to drive to two of the facilities in one day. It will take the equivalent of four days each month for the tanker truck to deliver fuel to each of the helo refuelers. If any fuel becomes out-of-specification with

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\(^1\) TSgt N. Davidson 11/4/15 personal communication
\(^2\) D. Kwiecinski 11/2/15 personal communication
\(^3\) TSgt N. Davidson 11/4/15 personal communication
Air Force requirements (testing detects water or sediment or it remains longer than six months), additional truck deliveries will be needed to pick up and remove the out-of-specification fuel.

Halon 1211 fire extinguishers are required for helicopter operations (per Air Force Technical Operations 00-25-172) and for making them compliant with National Fire Protection Association standard 418 for heliports. Halon 1211 is an ozone-depleting substance, and its use is heavily regulated. Existing Halon 1211 supplies will have to be reallocated to this project because current law prohibits any new ozone-depleting substances from being created.

*What are the infrastructure changes?*

Six of the seven MAF sites need permanent concrete pads and ground rods for the helo refuelers to be installed. One helipad site, N-01, is on Air Force-owned land and is already equipped with a helo refueler pad. These pads will be approximately 12-ft by 14-ft and located adjacent to the access roads for the helipad sites. Permanent power to all the pads will be needed to operate pumps and for lighting. Current land leases on six of the seven sites will have to be updated to include fuel-handling operations and underground power to the refueling pads.

*What has already been done on this project?*

Previous proposed actions in 2010 to meet Department of Defense 5210.41-M, *Nuclear Weapon Security Manual: The DoD Nuclear Weapon Security Program (U)*, included installing Convault fuel systems (concrete encased above ground storage tanks) at two sites, F-01 and M-01, to allow helicopter refueling. AFI-813, *MAF Refueling*, (AFI stands for Air Force Instruction and is a documented set of instructions) was developed for this proposed action, and found the impacts qualified for a categorical exclusion under Appendix B, section A2.3.7 of CFR 32 Part 989. This project was abandoned because it became too expensive and not feasible.

A proposed action was developed in 2014 to upgrade seven helicopter landing pads as documented in AFI-813, *Update Seven Helicopter Landing Pads to Helicopter Landing and Refueling Pads*. The proposed action qualified as a categorical exclusion under Appendix B, section A2.3.7 of CFR 32 part 989 and is currently underway. Completed sites include: C-01, E-01, L-01, and N-01. Construction began at B-01 and H-01 during the summer of 2015 but will not be completed until summer 2016. The last facility, G-01, is also scheduled to be built summer 2016.

The current proposed action is a refinement of the *MAF Refueling* described above. The upgraded access roads and helipads from *Update Seven Helicopter Landing Pads to Helicopter Landing and Refueling Pads* are necessary to implement the current proposed action.

*What changes from current operations could I expect with the Proposed Action?*

There would be more helicopter usage so additional helicopter flights, additional tanker truck deliveries to each of the MAFs, reallocation of ozone depleting substances (Halon 1211 fire extinguishers) to each of the refueling MAFs, and additional fuel handling operations (fuel transfers from truck to tank, tank to helicopter, fuel testing) could be expected.
What are the other alternatives?

**Alternative A**
The current helicopters are utility/transport-type UH-1N “Huey” helicopters with the UH-60 Sikorsky Black Hawk projected to replace the Hueys in the near future. Upgrading or changing from these to newer, more fuel efficient aircraft, would require fewer refueling helipad sites. This alternative would require a change in the aircraft fleet, enabling helicopters to fly farther in the 15-minute time allotment, thus needing fewer refueling locations. This alternative would require a substantial capital investment in a new fleet of helicopters.

**Alternative B**
This alternative would prepare the identified MAF refueling locations with the infrastructure necessary to provide helo refueling, but would not stock the refuelers with fuel until alert conditions existed. This means placing helo refuelers at each identified MAF, building the necessary infrastructure, altering land leases to include refueling operations (for all MAFs except N-01), training personnel, and having provisions in place to transport fuel from Malmstrom to all the MAFs. This alternative is identical to the Proposed Action except this alternative will delay stocking the helo refuelers with fuel until alert conditions exist. This alternative would not meet the 15-minute flight time requirement, but could provide the capability to do so within 24 hours, and would significantly decrease environmental impacts from increased helicopter usage and fueling operations. This option would only provide training with the helo refuelers located at MAFB, not actual on-site refuelers prior to their use under alert conditions.

**No Action Alternative**
Presently, helicopters are refueled at the Lewistown Airport and MAFB. Distances from H-01, F-01, and G-01 exceed the 15-minute flight time to MAFB; O-01, L-01, K-01, and B-01 distances to the Lewistown Airport also exceed the 15-minute flight time. Consequently, this alternative does not meet the project objective to refuel within 15 minutes anywhere in the missile complex. The “no action” alternative is always included in any environmental analysis as it establishes the baseline to which all other alternatives can be compared.

Were there other alternatives considered but not chosen?

Initial alternatives for the proposed action included developing two refueling MAF sites located in the east and west ends of the missile complex with Convault systems. This alternative would require certified personnel to be on call for refueling, additional truck maintenance and transportation considerations, and additional security measures for the tank systems. Due to environmental, economic, and time constraints, the Air Force did not consider this a viable option.

Several other alternatives to the helo refueling tanks were initially considered, but rejected as outlined below:

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4 9/1/15 Meeting minutes with AF personnel.
5 Email correspondence from J. Palacios, MSgt to D. Delorme 9/24/15.
• Underground petroleum storage tanks rejected due to increased environmental safety requirements.
• Modular Aircraft Refueling Systems (MARS) rejected due to cost, large footprint, and because it would require major construction.
• Forward Area Refueling Equipment (FARE-2) and Advanced Aviation Forward Area Refueling Systems (AAFARS) rejected due to a large footprint, incompatible with extreme weather, a large manpower requirement, and no secondary containment.
• Flex-tank (bladder) rejected due to its limited capacity, incompatibility with extreme weather, large manpower requirement, and no fuel sampling connections.
• Turtle-Pac Roll Drums rejected due to limited capacity, incompatibility with extreme weather, and no sample connections.
• R-13 Refueling truck (3,000 gallons) rejected due to a lack of secondary containment and large support requirements.
• C-301 Refueling truck (1,200 gallons) rejected because it requires modification to be certified for aircraft refueling and no secondary containment.
3.0 AFFECTED ENVIRONMENT AND CONSEQUENCES

How were the environmental effects determined?

This Environmental Assessment is based primarily on two documents: Title 32 CFR Part 989 which contains the Air Force procedures for complying with the National Environmental Policy Act, and “Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations” from the Council on Environmental Quality. Particular care has been taken to make this document readable and concise.

What are the environmental effects?

Table 1 on the following page provides a brief summary of environmental effects for the proposed action and the alternatives. The top row is the type of environmental effect and loosely follows the AF-813 Request for Environmental Impact Analysis. Each environmental attribute is discussed in more detail following the table.

Are there other impacts aside from environmental that should be considered?

Yes, environmental assessments can cover a variety of factors, typically air, water, land, ecology, sound, human, economic, and resources. Environmental assessments are specific to the actions proposed, so not all factors are included in every assessment; only relevant items are analyzed. In this case, the majority of impacts are environmental, but the human category, which encompasses community needs, physiological systems, psychological needs, and lifestyles, is also impacted. Specifically, as a population, citizens have psychological needs for protection. The Proposed Action is a means to increase national security, which positively impacts psychological needs. Citizens of the United States expect their government to protect citizens and the built environment. The Proposed Action is a protection measure, and thus works to satisfy a psychological need for protection against violence and destruction. Alternative A would also provide a positive impact similar to the Proposed Action. Alternative B would provide a positive impact as well, although to a lesser degree since there would be limited training prior to an alert condition.

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6 77 FR 14473, Final Guidance on Improving the Process for Preparing Efficient and Timely Environmental Reviews Under the National Environmental Policy Act
| Table 1. Environmental Effects Compared to the No Action Alternative. |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                 | Land use and socioeconomic conditions | Air quality and climate change | Water resources | Health and safety | Hazardous materials / hazardous waste | Biological resources (plants and animals) | Cultural resources | Geology and soils | Cumulative effects |
| Proposed Action                 | No effect on agricultural land use. | Will not cause a change to air quality status. | No impacts to water usage. | Increased risk to personnel due to fuel handling and increased helicopter usage. | Increased risk from additional fuel handling and risk of fuel spills. | Disturbance to waterfowl and ungulates from increased air traffic. | No impacts. | No impacts. | Existing road traffic will increase with fuel deliveries and additional refueling personnel at each MAF plus additional air traffic effects. |
|                                 | Limited adverse effect on grazing. | | | | | | | | |
|                                 | Limited impact on nearby residences and recreation from increased air traffic. | Increased carbon footprint. | Increased risk at C-01 from fuel spills. | | | | | | |
|                                 | Increased effect for socioeconomic conditions from increased contractor usage. | | | | | | | | |
|                                 | If Halon 1211 is needed for emergency fire protection, it will contribute to reducing ozone layer. | | | | | | | | |
| Alternative A                   | No impacts. | Will not cause a change to air quality status. | No impacts. | Smaller risk to personnel from less fuel handling and decreased helicopter usage. | Smaller risk from less fuel handling. | Smaller disturbance from decreased flight trips. | No impacts. | No impacts. | Smaller effect from more efficient aircraft, less flight time, less personnel time and effort maintaining and refueling aircraft. |
|                                 | | Smaller increase in carbon footprint. | | | | | | | |
|                                 | If Halon 1211 is needed for emergency fire protection, it will contribute to reducing ozone layer. | | | | | | | | |
| Alternative B                   | No change for agriculture and grazing. | No change to air quality status; no change to carbon footprint unless alert conditions are triggered, then same as proposed action. | No impacts unless alert conditions are triggered, then same as proposed action. | No impacts unless alert conditions are triggered, then same as proposed action. | No impacts unless alert conditions are triggered, then same as proposed action. | No impacts unless alert conditions are triggered, then same as proposed action. | No impacts. | No impacts. | Initial increase in MAF operations for equipment setup, then no additional activity unless alert conditions are triggered, then same as proposed action. |
|                                 | No change for socioeconomic conditions unless alert conditions are triggered, then same as proposed action. | | | | | | | | |
**Land Use and Socioeconomic Conditions:** Primary land use in the vicinity of all the MAF sites is agriculture, open grasslands, and to a lesser extent, grazing. Activities from the proposed action or alternatives would not affect agricultural conditions or open grasslands but could, to a limited extent, affect grazing. The increased helicopter activity, landing and taking off, at the helipad sites could temporarily frighten grazing animals if they are near the helipad sites.

All but one helipad site is on leased land. Currently, only the helipad at N-01 is on Air Force-owned land; consequently, the other six sites would require renegotiated land leases to include fuel handling operations and underground power to the pads.

All MAF and helipad sites are located in sparsely populated areas averaging one person per square mile. Additional noise from helicopter takeoff and landing every four to six weeks could be heard by nearby residents, although noise levels are not above occupational protective standards for any hearing loss impacts. Noise maps based on Malmstrom-specific operations are included in Appendix C. The nearest residence is 0.1 miles from N-01. The noise levels would be between 65 and 75 decibels (dB) at that location. Noise levels exceeding 55 dB during the day and 45 dB at night can disturb and annoy some people. For comparison, typical suburban ambient noise is around 35 dB, urban ambient noise is around 52 dB. The next closest residence to all the other sites is at least 0.6 miles, where the noise is below 55 dB. There would be no increased noise from Alternative A or from Alternative B unless alert conditions are triggered. The Air Force proposes to mitigate noise effects by flying primarily during daylight hours and, when practicable, avoiding flight paths near residential areas, horses and other grazing livestock.

Freezeout Lake, a state park, is within four miles of H-01. It is likely noise from takeoff and landing of helicopters at that site could be heard in the state park. Benton Lake National Wildlife Refuge is approximately 10 miles north of Great Falls. Migrating waterfowl may be impacted from the additional helicopter traffic traveling between the northern MAFs and Malmstrom AFB near Great Falls. The Air Force proposes to mitigate these effects by avoiding low flight paths over Freezeout and Benton Lakes.

Although aircraft overflights could potentially impact livestock and wildlife through visual effects or noise, animals would most likely only experience visual impacts for aircraft flights below 1000 feet. To study concerns about overflight effects on livestock, the Air Force in 1993 prepared a handbook for environmental protection that summarizes the literature on impacts of low-altitude flights on livestock, documenting case studies. Although horses notice overflights, no documented injuries or abortions occurred with horses. Mares typically adapted to flyovers over

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7 2010 Census. *Population per square mile.*

8 Miller, J. D., *Effects of Noise on People*, USEPA, Dec 31, 1971, PB 206723

9 *NOISE EFFECTS HANDBOOK*, USEPA, Office of Noise Abatement and Control, October 1979, Revised July 1981, EPA 500-9-82-106


a month’s time. Documented negative effects were few. Animals tended to adapt to aircraft overflight disturbance, with few, if any, long term effects. One study demonstrated cattle typically do not injure themselves by running in response to overflight. In a report to Congress, the U.S. Forest Service concluded that the evidence shows that the risks of damage are small. Both field and laboratory data on large, wild herbivores demonstrate effects are short duration, transient and suggest the animals habituate to repeated aircraft noise with few discernible negative effects.

There would be some economic gain from the Proposed Action because there would be a need for additional fuel deliveries which are contracted through private parties. Alternative A would require a new fleet of helicopters which would create a substantial economic benefit to private helicopter companies, which could reasonably lead to increased jobs associated with private helicopter companies. Alternative B would have an economic gain if alert conditions were triggered that would be similar to the Proposed Action. Until alert conditions, the economic gain would be neutral. The No Action alternative does not have any economic effect. No changes in MAF staffing are anticipated for the Proposed Action or any of the Alternatives.

Air quality and climate change: All of the MAF sites are located in air quality attainment areas. There would be an increase in air emissions from the combustion of aviation fuel by the helicopters (carbon monoxide, nitrogen oxides, and sulfur oxides primarily), as well as organic emissions from the venting of fuel from the mobile refueling tanks; however, the emissions would not trigger any air quality permit requirements. Emission Inventory estimates for criteria pollutants are: 1.462 tons/year carbon monoxide (CO), 2.943 tons/year sulfur dioxide (SO₂), 0.205 tons/year oxides of nitrogen (NOx), and 0.113 tons/year volatile organic compounds (VOCs). Methodology for determining these emissions can be found in Appendix D.

Because helicopter engine emissions contain carbon dioxide which is a greenhouse gas, there is a contribution to global warming from the Proposed Action. Total carbon emissions from helicopter usage and tank venting are 157 tons of CO₂ per year. Carbon calculations can be found in Appendix D.

There would be a lesser contribution to air emissions and greenhouse gases from Alternative A, due to the efficiency in fuel usage by the newer helicopter models. Air emissions from Alternative B would not increase air emissions unless alert conditions were triggered; then, the impacts would be the same as described for the Proposed Action.

**Water Resources:** Neither the Proposed Action, nor any of the alternatives, would have an impact on current water usage.

Depth to ground water at the MAFs ranges from 3 feet to 356 feet.\(^{20}\) Table 2 shows facility well static water levels or, if no static water level was listed for the MAF well, nearby well static water levels were used.

<table>
<thead>
<tr>
<th>MAF</th>
<th>Static Water Level (feet from ground level)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-01</td>
<td>50.2</td>
<td>Data from MAFB well log</td>
</tr>
<tr>
<td>N-01</td>
<td>76</td>
<td>Data from MAFB well log</td>
</tr>
<tr>
<td>E-01</td>
<td>356</td>
<td>Bureau of Land Management well located near property</td>
</tr>
<tr>
<td>C-01</td>
<td>27-33</td>
<td>Data from MAFB borehole logs</td>
</tr>
<tr>
<td>B-01</td>
<td>3</td>
<td>Data from MAFB well log</td>
</tr>
<tr>
<td>H-01</td>
<td>4</td>
<td>Static water level not listed on well logs, located nearest well approximately 3,000 feet southwest of facility</td>
</tr>
<tr>
<td>G-01</td>
<td>116</td>
<td>Data from MAFB well log</td>
</tr>
</tbody>
</table>

Most MAFs are located at least a mile from the nearest “Waters of the United States.” By definition, “Waters of the United States” do not include sewage lagoons or ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands. The Clean Water Rule was published on June 29, 2015, in the Federal Register (80 FR 37054). The final rule became effective on August 28, 2015, and is contained in 40 CFR 230.3. Table 3 shows distances to nearest water and waterbody information. All creeks listed in Table 3 are defined in USGS databases as second- or third-order streams, which are usually very small streams located in headwaters.\(^{21}\)

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There is a risk to water resources from petroleum spills with the Proposed Action at C-01 because a small spring being used as a watering trough supply is located down gradient, approximately 40 feet from the helipad. Spills could range from two cups (residual dripping from the hose\textsuperscript{22}) to 13 gallons (volume contained in the pumping hose). The helipad is level, so spillage would pool until enough collected to pour off from the pad. At that point, the topography would likely direct the spill toward the spring. Spill risks are described further in the hazardous materials/hazardous waste section.

Alternative A would not have an impact on current water usage, nor would it contribute to an increased risk to petroleum spills to water bodies because additional refueling MAF sites would not be necessary. Alternative B would not have impacts either unless alert conditions arose; then the impacts would be the same as the Proposed Action. There is no risk from the No Action Alternative.

**Health and Safety:** There is additional risk from helicopter crashes for the Proposed Action due to the additional helicopter travel between MAF sites and Malmstrom Air Force base from current operations. A conservative estimate of the potential for additional fatalities and crashes for the Proposed Action is 0.001868 fatalities per year and 0.010424 crashes per year (see Appendix E for Helicopter Crash Methodology).

No additional helicopter crashes or fatalities from Alternative A are estimated because the flight patterns will not be increased nor will additional flight hours be required due to the increased efficiencies for the newer helicopter models.

No additional helicopter crashes or fatalities from Alternative B are assumed unless alert conditions are triggered, then the estimates would be the same as the Proposed Action. Likewise, no additional crashes or fatalities from the No Action alternative would be realized.

There is a potential for fuel transportation-related accidents. Based on Montana crash and fatality statistics, there is an increased risk of about 0.00116 injury accidents per year and an additional 0.000179 fatalities per year due to fuel delivery (see Appendix F for Highway Fatality and Crash Methodology). The potential for transportation-related injuries or fatalities for Alternative A and the No Action Alternative would not change nor would it change under Alternative B unless alert conditions are triggered.

\textsuperscript{22} 11/9/15 Email from TSgt N. Davidson

### Table 3. Distances from MAFs to Waters of the United States.

<table>
<thead>
<tr>
<th>MAF</th>
<th>Distance (miles)</th>
<th>Waterbody</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-01</td>
<td>2</td>
<td>Ross Fork Creek</td>
</tr>
<tr>
<td>N-01</td>
<td>1.4</td>
<td>Ross Fork Creek</td>
</tr>
<tr>
<td>E-01</td>
<td>2.9</td>
<td>Dog Creek</td>
</tr>
<tr>
<td>C-01</td>
<td>0.0076</td>
<td>Unnamed spring</td>
</tr>
<tr>
<td>B-01</td>
<td>1.8</td>
<td>Arrow Creek</td>
</tr>
<tr>
<td>H-01</td>
<td>0.2</td>
<td>Tributary to Muddy Creek</td>
</tr>
<tr>
<td>G-01</td>
<td>1.6</td>
<td>Flat Creek</td>
</tr>
</tbody>
</table>

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**Helicopter Landing and Refueling Project NZAS 30-0152**

**Affected Environment and Environmental Consequences**

15-190

April 2016
There is the potential for rotor wash effects (turbulence caused by a helicopter rotor) to automobiles traveling near the MAFs. However, distances from nearby public highways and the landing sites are greater than 200 feet, which is the threshold distance for damage to automotive vehicles traveling on nearby highways (see Appendix G for rotor wash estimates and information). The potential for transportation-related injuries or fatalities for Alternative A and the No Action Alternative would not change nor would it change under Alternative B unless alert conditions are triggered.

**Hazardous materials / hazardous waste:** Additional fuel handling is required for the Proposed Action which increases the risk for hazardous materials released to the environment. Fuel handling activities include transporting jet fuel to (and possibly from) MAF sites and filling the helicopters with fuel when they land at the MAF sites. Additionally, maintenance on the seven mobile refuelers will produce small quantities of hazardous or petroleum waste from petroleum products and lubricants that will have to be properly managed.

The Air Force will mitigate the risk of fuel spills by including the helo refuelers in the base spill prevention, control, and countermeasure (SPCC) plan and handling fuels through Air Force Instruction AFI 23-201 (Fuels Management), AFI 23-502 (Recoverable and Unusable Liquid Petroleum Products), and the base’s hazardous material emergency planning and response plan (HAZMAT plan) which addresses federal, state, and local spill prevention and response requirements.

Halon 1211 fire extinguishers are required at heliports per National Fire Protection Association (NFPA) 418. Halon 1211 is an ozone depleting substance, and new material cannot be legally created. Existing supplies will have to be reallocated to each MAF and tracked. Existing protocols for handling, tracking, and usage of ozone depleting substances will mitigate this risk and are outlined in AFI 32-7086, Ozone Management Plan March 2015.

In addition to the increased fatality risk from fuel deliveries, it is possible that fuel could spill from a tanker truck if it is involved in a fatality or crash. The Air Force proposed to reduce this risk by using a smaller four-wheel-drive delivery truck. Typical tanker delivery trucks are generally larger than 2,000 gallons. The Air Force will be using a 1,200-gallon tanker truck so risk of crash due to icy and snowy roads is reduced and the maximum amount of fuel that could be spilled would be 1,200 gallons. Typical travel patterns to and from the MAFs are on rural roads and highways with minimal opportunity for a fuel spill to reach a waterbody. Based on Montana fatality and crash statistics from the past five years, spillage of about 0.38 gallons per year could be estimated due to fuel transportation crashes. A map showing major roads and waterways is in Appendix H.

During helicopter refueling, potential exists for fuel spills due to residual dripping from the hose. Based on Malmstrom experience, approximately two cups could trickle out. Assuming there are nine refueling events per year at each of the MAF sites, this equates to approximately 7 x 9 x 2 cups = 126 cups or 7.9 gallons per year.

---

23 11/2/15 Phone conversation with D. Kwiecinski.

24 11/9/15 Email from TSgt N. Davidson.
The helo refuelers present a risk of fuel spills from a hose burst or other malfunction. There is a 150-foot fuel hose capacity (although current plans specify a hose length of 100 feet) on the helo refueler that would be pulled a minimum of 60 feet to the helicopter. During extreme weather, it is possible the hose could burst. The Air Force would mitigate this by following AFI 32-201, Fuels Management, which requires a regular preventative maintenance program and regular inspections. The Air Force would mitigate this risk by specifying hose material standards that meet American Petroleum Industry Standard 1529 (Aviation Fueling Hose and Hose Assemblies), specifications for burst force resistance under local climate conditions. A spill kit would be provided that could accommodate clean-up of a minimum spill of 13 gallons, the amount of product potentially available in a 150-foot, 1.5-inch diameter hose. Additionally, an emergency pump stop button or valve would be included on the helo refueler.

The risk of hazardous materials or waste releases would not be increased from Alternative A since there would not be the need for additional refueling at MAFs. No risk from Alternative B would be realized unless alert conditions occurred. At that point, the environmental effects would be the same as the Proposed Action. There are no hazardous material or waste environmental effects from the No Action Alternative.

**Biological Resources (plants, animals, and wetlands):** All of the Proposed Action MAFs are located within Montana’s Fish, Wildlife, and Parks (FWP) Region 4 area. FWP Region 4 supports 64 of Montana's 89 fish species, 75 of Montana's 109 mammals, and 338 of the state's 389 birds. The region is currently managing populations of all ten of the state's common big game animals. There is known Greater Sage Grouse (GSG) habitat and associated leks within the missile complex.¹²⁵ Air Force personnel have conducted surveys of Greater Sage Grouse habitat throughout the missile complex, and none of the MAFs in this Proposed Action contain Greater Sage Grouse habitat or leks; however, N-01 is within five miles of a surveyed lek. There are no known threatened or endangered plants near any of the MAFs.

Mitigation for Greater Sage Grouse protection includes limiting helicopter activity at N-01 from 1 April -15 May, and 15 June - 30 July. To minimize disturbances to leks, flights at N-01 should occur well above 500 feet (i.e. ideally at 1,000 feet or higher) for as long as possible, with landings made as close to the landing facility as physically possible.²⁶

There is an increased risk of waterfowl/aircraft collisions when flying near wetland areas. The closest major wetland is Freezeout Lake, three miles west from H-01. These types of collisions can be reduced by flying as far away from these wetlands as possible. The small sewage lagoons located at all the MAF sites are considered a “freshwater pond” according to the National Wetlands Inventory Mapper website. However, these areas were not considered wetlands for the distances calculated from the helipads at each MAF to the nearest wetland area. Table 4 details nearest wetland distances identified by the wetland mapper, but are all very small (less than .25 acres).

---

²⁵ Dr. E. Pierce, CIV USAF AFGSC 341 CES/CEIE, personal communication
²⁶ Dr. E. Pierce, CIV USAF AFGSC 341 CES/CEIE, personal communication
Table 4. Distances from MAFs to Nearest Wetland.

<table>
<thead>
<tr>
<th>MAF</th>
<th>Distance (miles)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-01</td>
<td>0.6</td>
<td>South of helipad</td>
</tr>
<tr>
<td>C-01</td>
<td>0.6</td>
<td>South of helipad</td>
</tr>
<tr>
<td>E-01</td>
<td>0.37</td>
<td>East of helipad</td>
</tr>
<tr>
<td>G-01</td>
<td>0.8</td>
<td>North of helipad</td>
</tr>
<tr>
<td>H-01</td>
<td>0.17</td>
<td>Southwest of helipad</td>
</tr>
<tr>
<td>L-01</td>
<td>0.15</td>
<td>East of helipad</td>
</tr>
<tr>
<td>N-01</td>
<td>0.14</td>
<td>North and south of helipad</td>
</tr>
</tbody>
</table>

Maps of MAFs and wetlands are located in Appendix C.

Typical vegetation at the MAF sites\(^{27}\) includes introduced and semi-natural, shrub/grassland, and agricultural vegetation. There are no known threatened or endangered plants in the area.

The biological environmental effects from Alternative A would be much lower than the Proposed Action because the helicopters could fly farther and would not need to refuel in areas where the potential for waterfowl collisions increases or around GSG habitat. Similarly, there would be no increased effect from Alternative B unless alert conditions occurred; then, the effects would be similar to the Proposed Action. There is no biological environmental impact from the No Action Alternative.

**Cultural resources:** The Proposed Action is occurring on previously built sites. There is no potential to affect historical properties or cultural resources due to this project\(^{28}\) for the Proposed Action or any of the alternatives. Consultation with the State Historical Preservation Office concurred with the finding of“no potential effect.” A copy of the letter is included in Appendix B.

**Geology and soils:** There are no known constraints due to soils, geology, or topography for this project.\(^{29}\) There were minimal soil and topographical disturbances due to the concrete replacement of the asphalt helicopter pad and access roads. The soils around the MAF sites are well drained and range in texture from loam to silty clay loam which would not be prohibitive for fuel handling and are not highly impacted if there were spills typical of fuel handling operations. Consequently, there is no environmental impact for the Proposed Action or any of the alternatives.

**Cumulative effects:** Cumulative effects are “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.”\(^{30}\)

\(^{28}\) MT SHPO Concurrence letter, 1/21/16 (see Appendix B).
\(^{30}\) 40 CFR 1508.7
Helicopter refueling activities are in addition to current activities that include one to three helicopter landings per year at each MAF due to other military activities. Under the Proposed Action, helicopter activity at each site would increase. If the Proposed Action occurs, helicopters will likely land at each MAF once every four to six weeks. Cumulative helicopter landing and takeoffs at each MAF could be expected to increase to 9 - 15 times per year.

Current fuel deliveries at MAFs for unleaded and diesel occur as needed throughout the year. Under the Proposed Action there would be 9 - 12 more fuel deliveries to each MAF in addition to current deliveries.

MAFs are currently manned 24 hours a day, every day of the year. This Proposed Action would not change the current staffing at the MAFs. Additional personnel would come on site during refueling, but would not remain on site longer than required.

Additional construction will occur at each MAF for the remaining helo refueler pads. This will add approximately 168 ft$^2$ of hard surface to the existing (approximate) 45,000 ft$^2$ which increases hard surfaces at each MAF by approximately 0.37%. The aggregate increase in hard surface (all of the MAF refueler pads) would be 1,176 ft$^2$. The other construction (upgrade helicopter pads and access roads) did not increase the amount of impervious area as the infrastructure was already in place, although there was additional ground disturbance due to the construction and storage piles near the site. Disturbed area at each MAF was regraded after construction to allow natural vegetation to regrow. An approximate 1,200 ft$^2$ area at each MAF (for a total of about 8,400 ft$^2$ for all sites combined) will be disturbed if trenches are dug to lay permanent power lines to the helo refueler pads at each site. Disturbed ground would be graded, and natural vegetation would be allowed to regrow.
4.0  REFERENCE LIST


Miller, J. D., *Effects of Noise on People*, USEPA, Dec 31, 1971, PB 206723


40 CFR § 1508.7 Cumulative impact.


Fuel considerations at MAFB. (N. Davidson, personal communication, 11/4/15).

Fuel usage at MAFB. (D. Kwiecinski, personal communication, 11/2/15).

Alternatives considered for rapid refueling project. (J. Palacios, personal communication, 9/24/15).

Concurrence with no cultural impacts. (J. Bush, personal communication, 1/21/16).

Fuel spillage during refueling operations. (N. Davidson, personal communication, 11/9/15).

Fuel delivery at MAFB. (D. Kwiecinski, personal communication, 11/2/15).

Sage Grouse at MAFB. (E. Pierce, personal communication, GSE internal memo).

Number of helicopter trips. (N. Davidson, personal communication 11/5/15).

Malmstrom Air Force Base kickoff meeting for Rapid Refueling EA. Meeting minutes, September, 1, 2015.


According to the Montana Cadastral website, the historical land use around the B-01 MAF is grazing and summer fallow; currently the land use is open grassland. This MAF is located in Judith Basin County which has a population of 2,072 people. The closest residence is approximately 0.9 miles to the west of the MAF. The census tract has a population density of 1.1 people per square mile. All census data in this section are from 2014 TGER census data. Median household income is below the US median of $52,000. 22.5% of population is 65 or older.
Historical land use around C-01 MAF is grazing, summer fallow, and non-irrigated hay land. Currently, there is open grassland and grazing. This site is also located in the Judith Basin County census area with a population of 2,072 people. The census tract located to the south has a population of 13 people. The closest residence to the MAF is approximately 0.6 miles to the northwest. C-01 is in the same census tract as B-01 which has 1.1 people per square mile. Median household income is below US median of $52,000. 22.5% of the population is 65 or older.
E-01 MAF is located in Fergus County (population 11,442) with a census block population of 11 people. Current landuse for this MAF is farming on all sides. According to Montana Cadastral, land use is grazing, summer fallow, and non-irrigated hay land. The closest residence is approximately 0.6 miles to the southwest of the MAF. The census tract has a population density of 1.2 people per square mile. Median household income is below US median of $52,000. 23% of the population is 65 or older.
G-01 MAF is located in Lewis and Clark County which has a population of 63,000 people. The census tract has a population of 2,132 people. Montana Cadastral identifies the surrounding land use as grazing, which is the current use. The nearest residence is located approximately 1.5 miles to the south. The census tract has a population density of 1.1 people per square mile. Median household income is below US median of $52,000. 16.2% of the population is 65 or older.
According to Montana Cadastral, land use around the H-01 MAF is summer fallow and grazing. Currently open grassland surrounds this MAF. Located in Teton County, the closest residence is approximately 0.6 miles to the southwest. The population of the census block is 1,819 people and the density of the census tract is 6.4 people per square mile. Median household income is below US median of $52,000. 22% of population is 65 or older.
According to Montana Cadastral, land south of L-01 MAF is non-irrigated hay land and grazing, to the north is public land. Open grassland currently surrounds L-01. The census block that contains L-01 has a population of 3 people and 1.2 people per square mile. L-01 is located in Judith Basin County which has a population of 2,072 people. Median household income is below US median of $52,000. 22.5% of the population is 65 or older.
Currently, there is open grassland around MAF N-01. According to Montana Cadastral data, there is grazing and non-irrigated hay land in the area. The census block where N-01 is located has a population of 11 people and a population density of 1.2 people per square mile. Fergus County has a total of 11,442 people. The nearest residence is located roughly 0.1 miles to the northeast. Median household income is below US median of $52,000. 23% of the population is 65 or older.
N-01 Missile Alert Facility

Concrete Access Road
Helipad Site
Refueling Tank
Tank Pad

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

9/7/15
J. Light, TDH Engineering
Helo Landing & Refueling EA
Page 14 of 14
## APPENDIX B
### CONSULTED AGENCIES AND RESPONSES

<table>
<thead>
<tr>
<th>Agency</th>
<th>Comment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Aviation Administration</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>US Fish and Wildlife Service</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>Department of Environmental Quality</td>
<td>Email 11/10/15 informing AF that MTDEQ has no permitting requirements; letter was forwarded to MDOT and EPA for SPCC comment</td>
<td>Response from MDOT (see below), no response from EPA.</td>
</tr>
<tr>
<td>Department of Natural Resource Conservation</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>Fish Wildlife and Parks Headquarters</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>Montana Historical Society State Historic Preservation Office</td>
<td>No comment – follow-up phone call 12/3/15; concurrence request letter sent 1/19/16</td>
<td>SHPO concurrence with No Effect, 1/21/16 letter on following page.</td>
</tr>
<tr>
<td>Montana Transportation Department</td>
<td>Email 11/24/15 Secondary containment; roto wash effects on highway vehicles</td>
<td>Included in land use section</td>
</tr>
<tr>
<td>Teton County</td>
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<td></td>
</tr>
<tr>
<td>Lewis and Clark County</td>
<td>Email sent 11/24/15 - no comments on project</td>
<td></td>
</tr>
<tr>
<td>Fergus County</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>Judith Basin County</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>Teton County Conservation District</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>Lewis &amp; Clark County Conservation District</td>
<td>No response</td>
<td></td>
</tr>
<tr>
<td>Fergus County Conservation District</td>
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<td></td>
</tr>
<tr>
<td>Judith Basin County Conservation District</td>
<td>No response</td>
<td></td>
</tr>
</tbody>
</table>
January 21, 2016

Mr. Donald DeLorme
341st CES/CEIE
39 78th Street North
Malmstrom AFB, MT 59402-7536

Re: UH-1/N/H-60 Helicopter Rapid Refueling
Montana

Dear Mr. DeLorme:

Thank you for the letter and additional information (received January 19, 2016) regarding the UH-1/N/H-60 Helicopter Rapid Refueling project in Montana. We concur that this undertaking will have No Effect on Historic Properties.

If any questions or concerns arise, do not hesitate to contact me at (406)444-0388 or JBush2@mt.gov.

Sincerely,

Jessica Bush
Jessica Bush, M.A.
Review and Compliance Officer
Montana State Historic Preservation Office

File: DGD/Air Force – 2016 – 2016011920
APPENDIX C
NOISE AND NEARBY WETLAND MAPS

B-01 Decibel Levels, Wetlands, and Streams

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
C-01 Decibel Levels, Wetlands, and Streams
E-01 Decibel Levels, Wetlands, and Streams

APPENDIX C
NOISE AND NEARBY WETLAND MAPS

J. Light, TD&H, 3/10/16
Data: USFSW, MAFB, USGS

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX,
Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
H-01 Decibel Levels, Wetlands, and Streams
L-01 Decibel Levels, Wetlands, and Streams

APPENDIX C
NOISE AND NEARBY WETLAND MAPS

- 65dB
- 75dB
- 80dB
- Sewage Lagoon
- Wetlands
- Streams

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

J. Light, TD&H, 3/10/16
Data: USFSW, MAFB, USGS
APPENDIX C
NOISE AND NEARBY WETLAND MAPS

N-01 Decibel Levels, Wetlands, and Streams
APPENDIX D
CARBON AND CRITERIA POLLUTANT CALCULATIONS

Greenhouse Gas Emission Estimates:

19.2 lbs CO$_2$ per gallon fuel combusted (IPCC, Exxon Mobil, and EPA emission factor)  
Using 225 gallons (average use per AF estimate) every five weeks at seven MAF sites:  
225 gal/5weeks x 52 weeks/year = 2340 gallons/year  
7 MAF x 2340 gallons/year = 16380 gallons for all facilities/year  
19.2 lbs CO$_2$ x 16380 gallons = **314,496 lbs CO$_2$** for all facilities per year or 157.25 tons CO$_2$

CO$_2$ emissions from venting and refueling operations are a much smaller portion and were not estimated; however, methane emissions are more likely but more difficult to estimate. For informational purposes, the following estimates of fugitive fuel emissions from tank venting are shown here (but are not included in overall emissions estimates in EA).

Venting (average 800 gallons in tank):  
Tank dimensions from engineeringtoolbox.com for 1,000-gal tank  
http://www.engineeringtoolbox.com/fuel-oil-storage-tanks-dimensions-d_1585.html  
from EPA tanks program using JP-4 (Jet Naphtha) (http://www3.epa.gov/ttnchie1/ap42/ch07/)  
working loss = 4.25 lbs/year  
breathing loss = 22.2 lbs/year  
total losses = 26.49 lbs/year  
7 MAF x 26.49 lbs/yr = 185.5 lbs for all mobile refuelers/year

Other references:


Estimates for Criteria Pollutants (VOC, CO, NOx, SO2):

Emission factor (pounds pollutant per thousand pounds fuel) eq 5-11, p. 189, Section 5.2.5, Emission Inventory Procedures, EPA 1992

\[ EF = TIM \times \left( \frac{FF}{1000} \right) \times E \times NE \]

Where:
- \( EF \) = total emissions of pollutant per thousand pounds fuel for one LTO cycle
- \( TIM \) = time in Takeoff or Landing mode
- \( FF \) = fuel flow for LTO mode in pounds per minute
- \( E \) = emission index for pollutant in pounds of pollutant per 1,000 pounds fuel
- \( NE \) = number of engines (one engine for UH-1)

Emission Rates (Table 5.7, p. 198)

<table>
<thead>
<tr>
<th>Fuel Flow</th>
<th>HC</th>
<th>CO</th>
<th>NOx</th>
<th>SO2</th>
<th>PM</th>
<th>VOC*</th>
<th>LTO cycle: Time takeoff</th>
<th>Time Land</th>
<th>total min</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5</td>
<td>0.27</td>
<td>3.85</td>
<td>7.75</td>
<td>0.54</td>
<td>0</td>
<td>0.298242</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

* Convert HC to VOC (per equation 5-15)

HC \times 1.1046

EF Calculation per 1000 pounds fuel for one LTO

Note: estimate with one LTO cycle per MAF per month (actual 1 per 5 weeks)

<table>
<thead>
<tr>
<th>HC</th>
<th>CO</th>
<th>NOx</th>
<th>SO2</th>
<th>VOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>( 0.00002484 )</td>
<td>( 0.0003542 )</td>
<td>( 0.000713 )</td>
<td>( 0.00004968 )</td>
<td>( 2.74383E-05 )</td>
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</tbody>
</table>

Number of LTO cycles per MAF = once per month x 12 months = 12 times per year

Total LTO for all MAF = 7 MAF x 12 times per year = 84 LTO

<table>
<thead>
<tr>
<th>HC (total yr)</th>
<th>CO (total yr)</th>
<th>NOx (total yr)</th>
<th>SO2 (total yr)</th>
<th>VOC (total yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( 0.00208656 )</td>
<td>( 0.0297528 )</td>
<td>( 0.059892 )</td>
<td>( 0.00417312 )</td>
<td>( 0.002304814 )</td>
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</table>
225 gallons (average use per AF estimate) every five weeks at seven MAF sites:
225 gal/5 weeks x 52 weeks/year = 2340 gallons/year
7 MAF x 2340 gallons/year = 16380 gallons for all facilities/year

16380 gallons per year
98280 pounds/year 1 gallon aviation fuel weighs 6 pounds
98.28 pounds per year/1000 pounds of fuel

Pounds of pollutant per year per 1000 pounds fuel for all MAF:

<table>
<thead>
<tr>
<th></th>
<th>CO</th>
<th>NOx</th>
<th>SO2</th>
<th>VOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>pounds</td>
<td>2.924105184</td>
<td>5.88618576</td>
<td>0.410134234</td>
<td>0.226517137</td>
</tr>
<tr>
<td>tons</td>
<td>1.462</td>
<td>2.943</td>
<td>0.205</td>
<td>0.113</td>
</tr>
</tbody>
</table>
There would be approximately 10-12 additional helicopter trips to each MAF per year from current operations with the Proposed Action equates to an estimated average of 70-90 total trips per year to the MAFs.

Roughly estimating time in the air based on gallons of fuel used and fuel efficiency\(^1\) per year equates to 16,380 gallons/year x 1 hour flight time/67 gallons = 244.5 flight hours/year.

Average fatality based on the last 10 years is 0.764 fatalities/100,000 hours flight\(^2\). Average crash (non-fatality) based on previous 10 years is 4.26 crashes/100,000 hours of flight\(^3\). Of both of these statistics, training/instruction accounted for 20% and private/personal accounted for another 20%.

A conservative estimate of the potential for additional fatalities and crashes for the Proposed Action is 0.001868 fatalities per year and 0.010424 crashes per year.

---

\(^1\) Email communication 11/5/15 from N. Davison  
\(^2\) International Helicopter Safety Team report, U.S. Rotorcraft Accident Data and Statistics, reported to Federal Aviation Administration, Oct 2015  
\(^3\) IHST, Oct 2015 (same report as above)
APPENDIX F
HIGHWAY FATALITY AND CRASH METHODOLOGY

Fuel deliveries are expected every six weeks to each of the MAFs. It is likely the most efficient route would deliver to two or three facilities in a trip. A conservative average trip would be around 300 miles (from Great Falls to MAFs and back). Two of the MAFs are west of Great Falls, and the remaining facilities are east.

Assuming three trips each six-week interval, approximately 900 additional miles would be driven by a refueling truck during each interval.

There are 8.7 “intervals” in a year equating to 7830 miles per year.

According to the National Highway Traffic Safety Administration, Montana has a five-year average (2009-2013) of 2.286 transportation fatalities per 100 million vehicle miles traveled on rural roads.¹

The additional fuel tanker miles would equate to 7830 miles x 2.286 fatalities/100,000,000 miles = 0.000179 fatalities per year.

According to the Montana Department of Transportation, the total number of crashes in Montana from 2009-2013 amounted to 217,956 crashes. A total of 1,069 of these were fatal.²

The ratio of total crashes to fatal crashes in Montana for 2009-2013 is 217,956 total crashes ÷ 1,069 fatal crashes = 203.9 total crashes for every fatality. The total crashes resulting in injury (including fatality) per year would come to 203.9 total crashes per fatality.

Injury accidents per year = 0.000179 fatalities per year x 6,921 injury accidents per 217,956 total accidents x 203.9 total accidents per fatality. This results in 0.00116 injury accidents per year.

Assuming conservatively that total accident rates are the same for the fuel truck as the average for all motor vehicles, and that half of the injury accidents result in a fuel leak, the maximum number of leaks per year would be 0.00116 ÷ 2 = 0.00058. Assuming that, on average, half of the fuel is spilled in each accident would result in 1,200 gallons ÷ 2 x 0.00058 = 0.35 gallons per year.

Roto wash is the turbulence caused by a helicopter roto. Helicopter roto wash occurs during approach, landing, and take off. Greatest velocities at ground level occur when the aircraft is hovering near the ground. This summary includes roto wash information and nearest distances from MAF sites to highways.

Several reports from the US Department of Transportation, Federal Aviation Administration have estimated the ground velocities of typical helicopter and tilt-wing craft. For purposes of this analysis, the general findings are summarized here.

**US DOT, FAA, Roto Wash Handbook Vol 1, 1994:** Mishaps from roto wash can be minimized by keeping roto wash below a threshold of 30 – 40 knots. This means that a wide enough separation should be maintained from people, structures, and vehicles so the roto wash is not above threshold levels.

**Forest Service, Roto Wash, User Information, 1/26/05,** MTDC asuter@fs.fed.us 406-829-6772: The following graph shows the drop speed and height of a Black Hawk Helicopter and the roto wash generated at ground-level. The red curve, labeled 30, represents the combination of height and speed which will most likely produce a 30 mph rotor wash effect.

US Army Material Command, 1974, Downwash Data: Data tables for roto wash for multiple activities (approach, take-off, hover, etc.) and methodology description for experimental values. Values similar to above reference.
Distances from MAF helicopter landing sites to nearest highways:

<table>
<thead>
<tr>
<th>MAF</th>
<th>Distance (miles)</th>
<th>Distance (ft)</th>
<th>Highway</th>
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</thead>
<tbody>
<tr>
<td>H-01</td>
<td>3.4</td>
<td>17,952</td>
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<td>528</td>
<td>MT 200</td>
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<tr>
<td>B-01</td>
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<td>C-01</td>
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<td>264</td>
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<td>E-01</td>
<td>14.2</td>
<td>74,976</td>
<td>US 191</td>
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<tr>
<td>L-01</td>
<td>0.1</td>
<td>528</td>
<td>US 191</td>
</tr>
<tr>
<td>N-01</td>
<td>0.18</td>
<td>950</td>
<td>US 87</td>
</tr>
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</table>

Based on the above references and known distances between public highways and landing sites, distances are greater than 200 feet so landing, hovering, and takeoff will not likely reach threshold velocities for damage from roto wash based on modeled and calculated references.

Because of the proximity of G-01, C-01, L-01, and N-01, incoming and outgoing helicopter pathways will need to be over 160 feet when crossing airspace above nearby highways to keep roto wash below 30 miles per hour.
APPENDIX I
LIST OF PREPARERS

This document was developed and compiled by TD&H Engineering a consultant to Malmstrom Air Force Base using information supplied by base personnel.

TD&H Engineering, 1800 River Drive North, Great Falls, MT 59401

**Project Lead:**
Chris Ward, P.E., B.S. Civil Engineering, 1996; has over 21 years of experience with engineering project management, transportation, and road design.

**Technical Lead:**
Jenni Light, Ph.D., B.S. (1992) M.S. (1999) & PhD (2006) Environmental Engineering; has over 20 years of experience working with municipalities, government agencies and industry with environmental permitting, (air, water, solid and hazardous waste), SPCC plans, stormwater and erosion control plans, environmental assessments and audits, emission inventories as well as GIS mapping and modeling in addition to teaching engineering at a local college.

**Quality Assurance/Quality Control Lead:**
Peter Klevberg, P.E., BS Engineering Science, 1988; has over 25 years of experience in remediation, hazardous waste, asbestos abatement, geology and hydrogeology environmental projects.

**Support Staff:**
Katie Rediske, BS Land Rehabilitation & Soil Science, 2007; has nine years of experience with land reclamation, SPCC, Phase I site assessments, and construction materials testing.

Cindy Wojciechowski, AS Accounting, 1986; has over 10 years of industrial hygiene and environmental experience as well as providing administrative support compiling environmental data spreadsheets and assisting with quality assurance and data checks.
FROM: Levine Ranch Co
9487 Montana Hwy 200
Wolf Creek, Mt 59648
406-562-3585
levine@3rivers.net

TO: Mr. Don Delorme
341 CES/CEIE
39 78th St. North
Malmstrom AFB, MT 59402-7536

February 17, 2016

COMMENT ON HELICOPTER LANDING AND REFUELING PROJECT – G-01 SITE

I am writing to state my opposition to the Rapid Refueling Project at G-01 on Hwy 200 approximately 45 miles South and West of Great Falls. I oppose the project because of the high risk of scattering livestock. Horses and cattle are very sensitive to the sight and sound of low flying helicopters. Startled livestock can easily run through fences or step on young calves resulting in serious injury.

Levine Ranch headquarters and corrals are located approximately 1 1/2 miles from the G-01 Missile Alert Facility. Horses and cattle are present in this area year-around. Over the years, we have complained several times that low flying helicopters were scaring livestock, scaring horses when someone is riding them, or harassing wildlife.

For these reasons I am opposed to the Helicopter Landing and Refueling Project at G-01.

Sincerely,

Dan Levine, president
Levine Ranch Co