Eielson Air Force Base Interim Proposed Plan for Long Term Water Supply

# Community of Moose Creek, Alaska

April 2018

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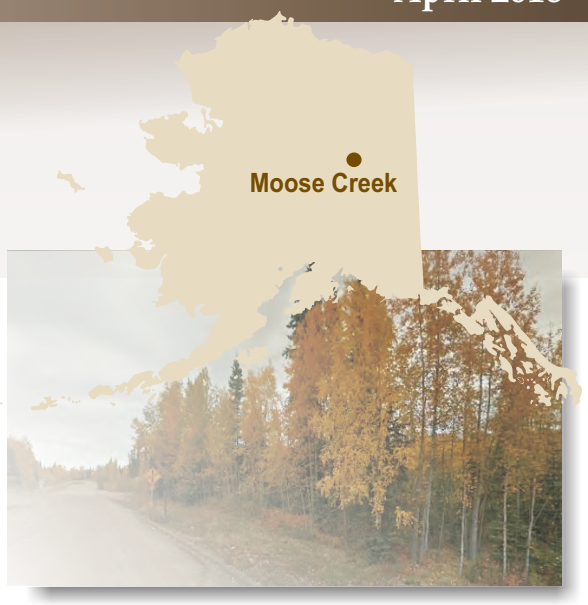



## INTRODUCTION

This Interim **Proposed Plan** follows the process and standards of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** of 1980 and **National Contingency Plan (NCP)** requirements, and presents the alternatives proposed by the United States Air Force (USAF) as the lead agency and the United States Environmental Protection Agency (EPA) as regulatory lead agency, supported by the Alaska Department of Environmental Conservation (ADEC) to replace contaminated **groundwater** supplies and provide a long-term alternative drinking water supply at Moose Creek, Alaska (Figure 1).

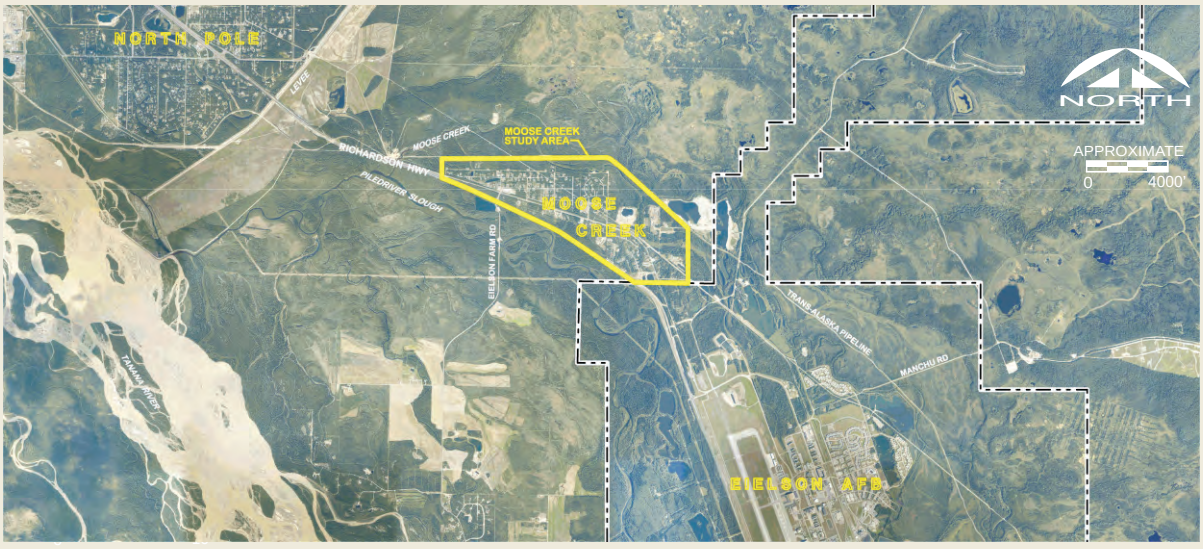


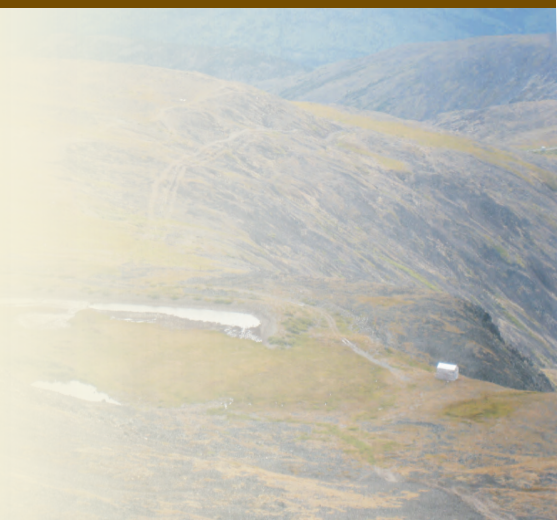

Figure 1 Site Location Map

## Summary of the Preferred Remedial Alternative

The alternative in this Interim Proposed Plan, addresses only the provision of drinking water to the Community of Moose Creek.

The **preferred remedial alternative** for drinking water at the site is Alternative 1, the installation of a new water main from the City of North Pole Water Treatment Plant to the community of Moose Creek and a water distribution system within the community. **Land use controls (LUCs)** would be put in place to prevent use of contaminated groundwater.

This alternative was selected over the other alternatives since it eliminates the human health threat posed by the identified contaminants in the drinking water and was assessed as having the highest rating for long term effectivness and permanence for the provision of safe drinking water.



The purpose of this Interim Proposed Plan is to:

- Provide background information and describe current environmental conditions.
- Describe the alternatives considered.
- Present the preferred alternative and the rationale for its selection.
- Solicit public comment on the preferred alternative.
- Provide information on how the public can participate in the remedy selection process.

As part of the regulatory process, this Interim Proposed Plan documents the lead agency's proposed selection of an alternative for drinking water only. It fulfills the requirements of CERCLA Section 117(a) and the NCP at 40 Code of Federal Regulations (CFR) 300.430(f)(2). The USAF is soliciting review and comments from the public on this Interim Proposed Plan, and a final decision on the preferred alternative for drinking water will be made after comments submitted during the 30-day public comment period are reviewed and considered. The preferred alternative may be modified if public comments or additional data indicate that such changes will result in a more appropriate solution.

The USAF will prepare an Interim **Record of Decision (ROD)** applicable only to drinking water to document the alternative selected and summarize responses to public comments **(Responsiveness Summary)**.

## REGULATORY PROCESS

The USAF manages contaminated sites under the Department of Defense (DoD) **Environmental Restoration Program (ERP).** The USAF, EPA, and ADEC entered into a Federal Facility Agreement (FFA) for Eielson Air Force Base (EAFB), which became effective in May 1991. The FFA established the procedural framework and schedule for developing, implementing, and monitoring CERCLA response actions.


Figure 2 CERCLA Process

Although perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), the two contaminants of concern at Moose Creek, are not CERCLA-listed hazardous substances, they are pollutants or contaminants. As such, the USAF will follow the CERCLA process to remove exposure and prevent future health risks.

The CERCLA process involves a series of actions, as shown on Figure 2. The USAF has developed an Interim Feasibility Study (FS) (Step 4) as part of the process, and this Interim Proposed Plan summarizes the results of that study and proposes a preferred alternative for public comment. Additional information is available in the Interim FS (AFCEC, 2017) and the administrative record for this project. The information is available both at EAFB and on-line, see Additional Information (page 16).

The alternatives listed in this Interim Proposed Plan only address the provision of alternative water supplies. The alternatives do not address the larger issue of aquifer and soil remediation, which will be addressed at a later time.

# SITE BACKGROUND

EAFB has used aqueous film-forming foam (AFFF) firefighting agents containing perfluorochemicals (PFCs) in both training exercises and to extinguish petroleum fires on base. AFFF formulations may contain PFOS, as well as some PFC-based AFFF constituents that may further degrade into PFOA. Releases of AFFF to the environment have occurred during fire training, equipment maintenance, and storage.

PFOS and PFOA were included on the EPA's third Contaminant Candidate List (CCL) in 2009. This is a list of drinking water contaminants that are known or anticipated to occur in public water systems and are not currently subject to EPA drinking water regulations. This indicated the EPA's concern that these compounds have the potential to present health risks through drinking water exposure.

## Basis for Taking Action

**It is the lead agency's current judgement that the Preferred Alternative identified in this Interim Proposed Plan, or one of the other active measures considered in the Interim Proposed Plan, is necessary to protect public health or welfare from actual or threatened releases of pollutants or contaminants from this site which may present an imminent and substantial endangerment to public health or welfare.**

In 2014, the USAF conducted site inspections at various installations, including EAFB, to determine the presence of PFCs and their relative concentrations. The site inspection report associated with that work was finalized in February 2015 (USACE, 2015a) and documented both PFOA and PFOS at concentrations in the groundwater above their respective EPA provisional health advisory (PHA) levels that were in place at that time.

In January 2015, EPA Region 10 requested that EAFB test the drinking water wells on base to determine if PFOA or PFOS was present. Sampling by the USAF found both chemicals in drinking water wells, with PFOS exceeding the PHA level that was in place at the time. Since PFCs are water soluble and there is the potential for migration, an additional site inspection was conducted to determine whether contaminants had migrated, in the groundwater, towards the northern base boundary and the nearby community of Moose Creek. In April 2015, the USAF tested the groundwater at the northern boundary which abuts the Community of Moose Creek. PFOS levels exceeding the PHA were identified near the base boundary. As a result, the USAF coordinated with the community of Moose Creek to test private drinking water wells, starting in July 2015 (USACE, 2015b).

This testing showed that the majority of private drinking water wells in the community of Moose Creek have water that exceeds the current EPA Lifetime Health Advisory Level (LHA) issued in May 2016 for PFOS and the combined PFOS+PFOA, as well as the less stringent PHA for PFOS that was previously in place (USEPA, 2016).

As a result of these findings, the USAF conducted an emergency removal action to provide bottled drinking water, followed by a time-critical removal action (TCRA) (AFCEC, 2015) to mitigate the health threat posed by the PFOS and PFOA in the drinking water. This TCRA included the delivery of bottled water and installation of potable water tanks or granular activated carbon (GAC) filter systems at the affected private properties.

Since the discovery of PFOS/ PFOA in the community of Moose Creek, the USAF has held eight meetings to inform the residents on the status and progress of their response action.

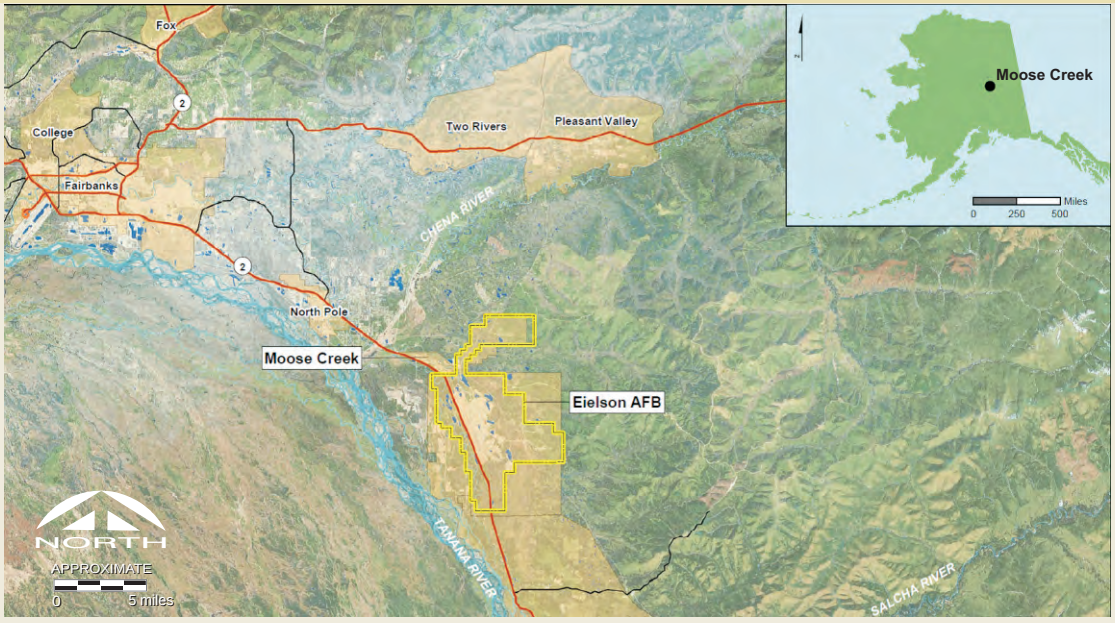



Figure 3 Vicinity Map

# SITE CHARACTERISTICS

## LOCATION

The community of Moose Creek is located adjacent to the northern edge of EAFB, east of Fairbanks, Alaska (Figure 3). The Community of Moose Creek lies approximately 120 miles south of the Arctic Circle, 21 miles southeast of Fairbanks, and 7 miles southeast of the city of North Pole. The Richardson Highway (Highway 2) passes south of Moose Creek.

## ENVIRONMENTAL SETTING

EAFB and Moose Creek are located in the Tanana River Valley along the river's northern bank on a low, relatively flat, floodplain terrace approximately 2 miles from the active river channel. The climate is typical of interior Alaska, and is characterized by large diurnal and annual temperature variations, low precipitation, and low humidity. Moist maritime air masses are blocked in the south by the Alaska Range and in the north by the Brooks Range, creating a semiarid climate. Large annual variations in temperature and solar radiation occur because of the high latitude. Average temperatures range between 44 and 61 degrees Fahrenheit (°F) during the summer season and between -15°F and -10°F during the winter season. Extreme temperatures recorded between 1944 and 1984 at EAFB were 93°F for July and -63°F for January. Annual precipitation in this area averages 14 inches, which includes 72 inches of snow. Average monthly precipitation ranges from 0.5 inch to 2.5 inches, with rainfall generally highest in July and August. The evaporation rate is approximately 14 inches per year, which equals the mean annual precipitation.

Moose Creek is located within an area regionally characterized by discontinuous permafrost; therefore, permafrost may be present in the subsurface. Data regarding the distribution of permafrost within the community is limited and what is available is biased to the shallow subsurface, between 40 and 100 feet below ground level. Residential well logs on file at the Alaska Department of Natural Resources do not document the presence of permafrost in the community. Two recent, deeper boring wells installed during a USAF environmental investigation did not encounter permafrost.

## HISTORICAL, CURRENT, AND FUTURE LAND USE

Approximately 750 people live in the Community of Moose Creek, and land use includes both residential and commercial activities. Nearby EAFB is an active military installation that has been used for military operations since its establishment in 1944. The community of Moose Creek was originally settled as a result of the growth of EAFB and the nearby community of North Pole, and remains a primarily residential community. Drinking water in the community has historically been supplied by shallow wells located on the individual properties. Future land use is expected to be primarily residential in nature.

## NATURE AND EXTENT OF CONTAMINATION

The full extent of the contamination resulting from the use of AFFF at EAFB has not yet been fully characterized. The USAF has, however, sampled all drinking water wells for PFOS and PFOA, both on base and in the vicinity, to identify the extent of water supply wells contaminated with PFOS and PFOA. The sampling program for the private drinking wells in the community of Moose Creek confirmed that the majority have water that exceeds the LHA for PFOS+PFOA of 0.070 micrograms per liter (µg/L), as shown on Figure 4.

The groundwater flow in the vicinity of Moose Creek and EAFB is approximately from south-east to north-west. The private wells in the community of Moose Creek are typically 50 feet deep; a deep well was drilled and found the PFOS/PFOA contaminated ground water was present to a depth of less than 200 feet. The Community of Moose Creek lies approximately 5 miles upgradient of Flint Hills Resources, so the groundwater has not been impacted by the sulfolane discharge from that facility.

# SCOPE AND ROLE OF REMEDIAL ACTION

The Remedial Alternative proposed in this Interim Proposed Plan is part of the USAF response to the presence of PFOS/ PFOA in the groundwater drinking water source resulting from its past use at EAFB. The USAF will be conducting a further Remedial Investigation (RI) that will sample groundwater to determine the full nature and extent of PFOS and PFOA. The findings of that investigation and resulting decisions will be discussed with the public in a separate Feasibility Study, Proposed Plan, and ROD.

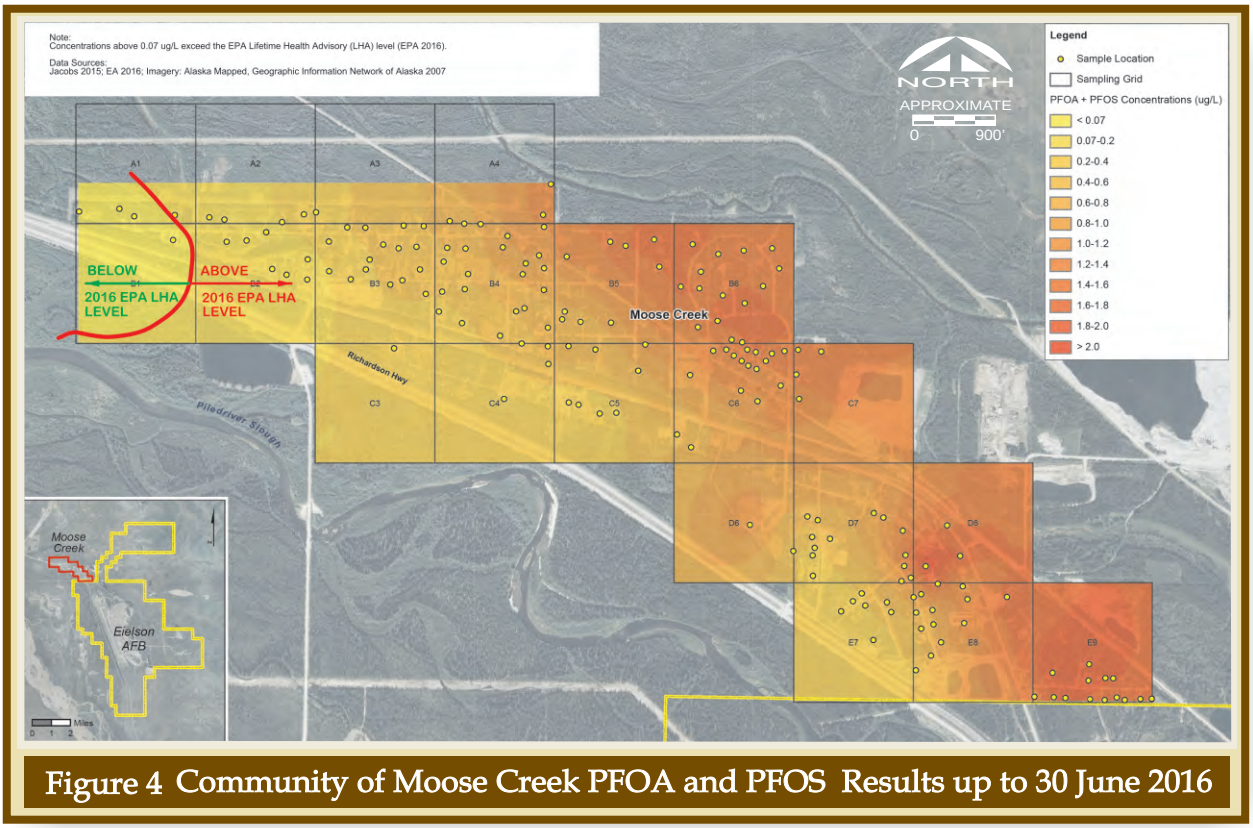



Figure 4 Community of Moose Creek PFOA and PFOS Results up to 30 June 2016

# SUMMARY OF SITE RISKS

PFCs are a class of emerging contaminants, which means they have been identified as being a potential environmental or public health risk. Neither PFOS nor PFOA are listed CERCLA hazardous substances (40 CFR Part 302, Table 302.4). ADEC has listed both PFOS and PFOA as State of Alaska hazardous substances, each has a groundwater **cleanup level** of 0.40 µg/L (ADEC, 2017). Both the USAF and regulators have determined that PFOS and PFOA are 'contaminants', as defined by CERCLA (42 United States Code [USC] § 9601(33).

As an emerging contaminant, the human and ecological effects from PFOS and PFOA are not yet fully understood and continue to be studied. As the science advances our understanding of the risks imposed by these compounds, government policy and regulations are being revised. The EPA and the Agency for Toxic Substances and Disease Registry (ATSDR) have reviewed the large toxicity databases for both PFOA and PFOS, summarizing the adverse effects to animals and humans following exposure. The EPA Office of Water concluded there is ample evidence of adverse effects, particularly in animals. The EPA issued a Fact Sheet, *PFOA & PFOS Drinking Water Health Advisory* EPA-800-16-003, establishing a 0.07 µg/L drinking water LHA for PFOA and PFOS (USEPA, 2016).

The USAF issued a Memorandum in 2016 (USAF, 2016) regarding the safety and well-being of its personnel and the general public, both on and off installations, stating:

> *"Consistent with on-going efforts, if the Air Force releases PFOA/PFOS into the environment, and has a reasonable basis to believe there is the potential for unacceptable risk to human health and the environment, we will take action under applicable Federal or state law, in cooperation with the appropriate regulatory agencies, to protect our personnel and the public."*

ADEC has listed both PFOS and PFOA as hazardous substances under 18 Alaska Administrative Code (AAC) 75, both of which have a groundwater cleanup level of 0.40 µg/L. This prevents the use of water above this concentration without treatment.

Based on the current sampling data and the site inspection report (USACE, 2015a), routes of potential exposure in the Community of Moose Creek area were limited to groundwater ingestion. To mitigate this risk, the USAF undertook emergency and TCRA responses in the community, installing GAC filter systems and a tanked water delivery system.

Soil exposures are not believed to be a concern for the following reasons:

1) The soil impacted would be below the groundwater level.
2) Dermal contact, ingestion, or inhalation of PFC-contaminated soil is not a pathway of concern.
3) Soils exposed to groundwater at current maximum concentrations would not result in a soil exceeding the EPA PFOS soil screening level of 6 milligrams per kilogram (mg/kg) (USEPA, 2009), or the Alaska direct contact cleanup level of 1.6 mg/kg.

In November 2016, ADEC promulgated a human health risk-based soil cleanup level for PFOS and PFOA of

## Regulatory Basis

**This Interim Proposed Plan follows the format and process of the of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, at 42 USC § 9601 et. Seq.), and the National Contingency Plan (NCP, at 40 CFR Part 300). The Environmental Restoration Program is the program the USAF uses to take CERCLA response actions and satisfy its CERCLA lead agency functions as delegated by Executive Order 12580. This Interim Proposed Plan also meets requirements of Alaska State law and regulations including, but not limited to, Title 46 of the Alaska Statutes and the regulations promulgated thereunder. This Interim Proposed Plan is a document that the USAF is required to issue to fulfill the requirements of CERCLA § 117(a) and NCP § 300.430 (f)(2).**

1.6 mg/kg (ADEC, 2017a). This does not change the above reasoning, because PFC contamination could only impact sub-surface soils below the groundwater table.

The ecological risk profile of PFCs is not yet known, because they are emerging contaminants. There is insufficient PFC impact data available at this time to perform a quantitative ecological risk assessment. The effects of PFOS on human health have shown associations between PFOS exposure and high cholesterol and reproductive and developmental effects, such as reduced fertility and low birth weights.

ADEC regulations prohibit the discharge of contaminated groundwater to the environment. This limits the use of groundwater, because the use of PFC-contaminated water for non-potable uses such as watering the garden and car washing would be prohibited.

# REMEDIAL ACTION OBJECTIVE

The Remedial Action Objective (RAO) for Moose Creek is to protect human health by preventing human ingestion of PFOS or PFOA contaminated groundwater that exceeds the 2016 LHA value of 0.07 µg/L and ADEC groundwater clean-up levels of 0.40 µg/L.

Seven alternatives, described on the following pages, have been developed to meet the RAO for the site.

# REMEDIAL ALTERNATIVES

The water supply alternatives are listed in Table 1. All identified alternatives include the implementation of land use controls (LUCs) to prevent use of untreated contaminated groundwater, which may include the purchase of water rights from the property owners and having deed restrictions filed for the affected properties to prevent further water extraction.

## BASELINE – NO ACTION

This option is included as required by the CERCLA process. It assumes no further work will be conducted to maintain the water supply systems installed as part of the TCRA.

**Table 1** Summary of Remedial Alternatives

| Alternative | Name | Description |
|---|---|---|
| **Baseline** | No Action | No further action will be taken. |
| **1** | North Pole Water Line | Water Supply from North Pole WTP and local distribution system within Moose Creek. |
| **2** | Eielson AFB Water Line | Water Supply from Eielson AFB WTP and local distribution system within Moose Creek. |
| **3** | Individual Water Tanks | Install water tanks at each of the properties in the Community of Moose Creek, and potable water delivery by road tanker. |
| **4** | Individual Deep Wells | Install new 250-foot deep wells at each property. |
| **5** | Community Deep Well | Water Supply from a new deep well in Moose Creek and local distribution system within Moose Creek. |
| **6** | Individual GAC Systems | Install GAC water treatment at each of the properties in the Community of Moose Creek, to treat water from existing shallow wells. |
| **7** | Status Quo | Retain the solution implemented as part of the TCRA, which is a composite implementation of Alternative 3 and Alternative 6. |

## ALTERNATIVE 1 – WATER SUPPLY FROM NORTH POLE WTP

This is the preferred alternative. Potable water will be supplied by the Municipality of North Pole Water Treatment Plant (WTP) located in North Pole. A new water main will carry water to the Community of Moose Creek as per Figure 5. The North Pole water supply is located approximately 5 miles downgradient of Moose Creek and has been shown to be free of PFOS/PFOA at concentrations above the LHA. Routine sampling indicates that the North Pole water supply meets all Federal and State requirements and Sulfolane has not been detected (North Pole, 2016). http://northpolealaska.com/sites/default/files/fileattachments/page/3701/2016 water quality report.pdf.

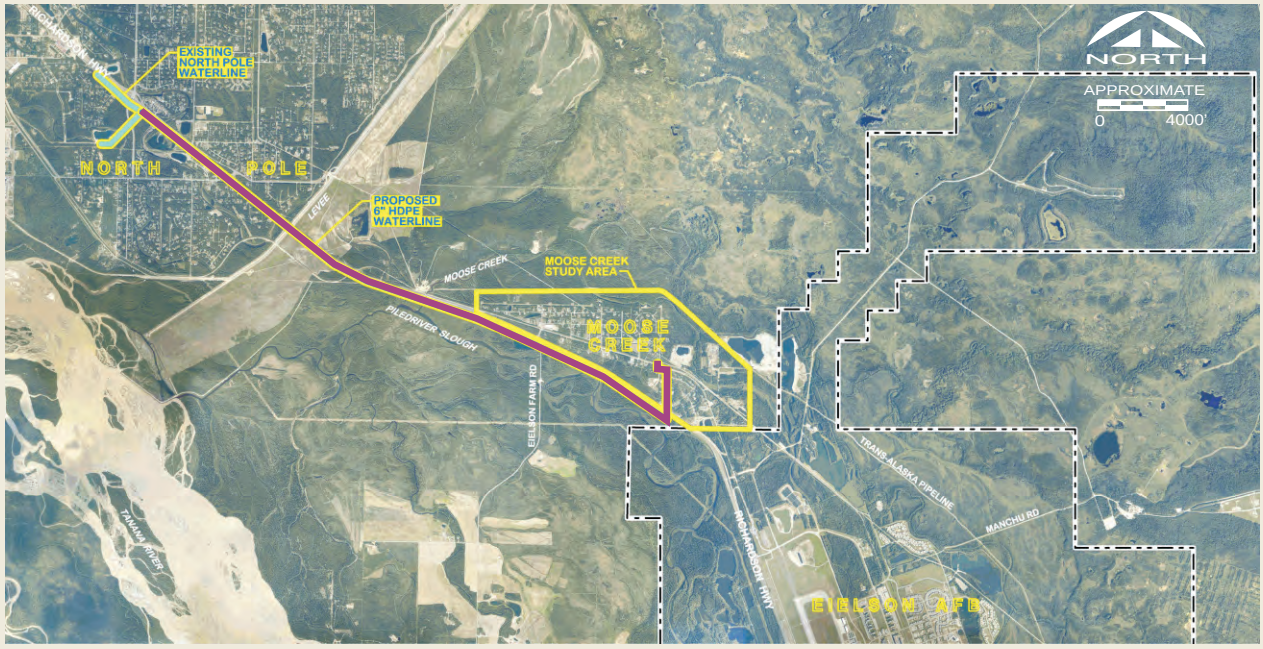



Figure 5 Water Supply Main From North Pole WTP

Figure 6 shows the proposed local distribution system, holding tank, and circulation pumping station. The new holding tank will allow balancing of local demands on the existing North Pole WTP. The local distribution system will need to be pressurized and circulated with heat input to prevent freezing during winter. Local connections will be made to properties in the Community of Moose Creek.

LUCs would be required to prevent use of groundwater, and the existing wells would be decommissioned by the USAF to prevent continued use of groundwater within the area. LUCs will be enforced by USAF under their CERCLA authority.

The new system will be maintained and operated by the North Pole Municipality, who would collect water charges from property owners and operate and maintain the system for the residents of Moose Creek. The 30-year operating costs, used to compare alternatives, is based on the design standard of 90 gallons per person per day. Current household usage is anticipated to be less than this amount (ADEC, 2017b), resulting in an estimated household cost of between $40 and $85/ month/ household.

| | |
|---|---|
| Capital Costs | $25,168,000 |
| Time to Implement | 2 - 3 years |
| 30-yr Operating Cost | $14,436,000 |
| Life Time Cost | $39,604,000 |

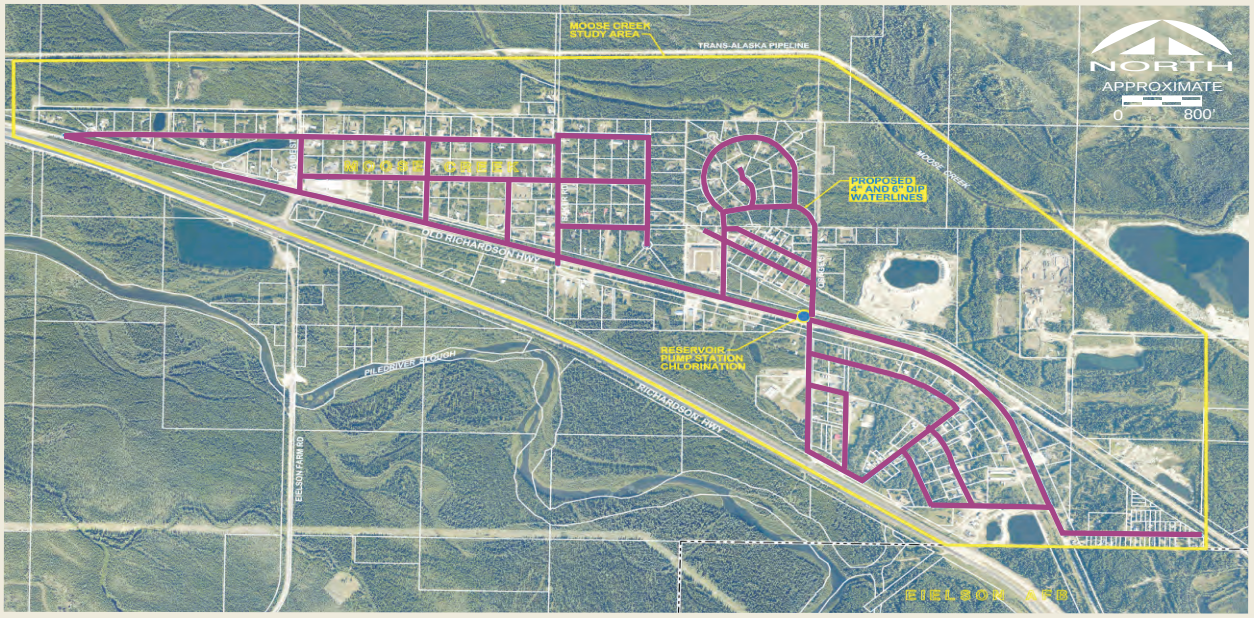



Figure 6 Local Distribution System Concept

## ALTERNATIVE 2 – WATER SUPPLY FROM EAFB WTP

Potable water will be supplied by the USAF from their WTP located on EAFB. A new water main would carry water to the Community of Moose Creek, as shown on Figure 7, where it would be distributed via a local distribution system.

The proposed local distribution system, shown on Figure 6, would be essentially the same as Alternative 1, including a holding tank and circulation pumping station. The new holding tank will allow balancing of local demands on the existing Eielson WTP. The local distribution system will need to be pressurized and circulated with heat input to prevent freezing during winter. Local connections will be made to all properties in the community.

LUCs would be required to prevent use of groundwater, and the existing wells would be decommissioned by the USAF to prevent continued use of groundwater within the area. LUCs will be enforced by USAF under their CERCLA authority.

A new operating authority would collect water charges from property owners and operate and maintain the system for the residents of Moose Creek. The 30-year operating costs, used to compare alternatives, is based on the design standard of 90 gallons per person per day. Current household usage is anticipated to be less than this amount (ADEC, 2017b), resulting in an estimated household cost of between $40 and $85/ month/ household.

| | |
|---|---|
| Capital Costs | $21,683,000 |
| Time to Implement | 2 - 3 years |
| 30-yr Operating Cost | $14,436,000 |
| Life Time Cost | $36,119,000 |

## ALTERNATIVE 3 – INDIVIDUAL PROPERTY WATER TANKS

Currently, approximately 100 properties have water tanks and 75 have GAC water filters installed. For this alternative, it is assumed that the 75 GAC water filters will be removed and water tanks installed at those and an additional 25 properties, to allow for future population growth. Because ADEC regulations prohibit the discharge of contaminated groundwater to the environment, the existing 100 water tanks at each property would be required to have sufficient capacity and ability to supply both potable and non-potable water to its respective property. Water deliveries would be by road tanker when the water tank level has dropped sufficiently to allow a delivery.

LUCs would be required to prevent use of groundwater, and the existing wells would be decommissioned by the USAF to prevent continued use of groundwater. LUCs will be enforced by USAF under their CERCLA authority.

The USAF would continue to monitor and maintain the systems and supply water to the Community of Moose Creek.

| | |
|---|---|
| Capital Costs | $2,146,000 |
| Time to Implement | 1 - 2 years |
| 30-yr Operating Cost | $39,614,000 |
| Life Time Cost | $41,760,000 |

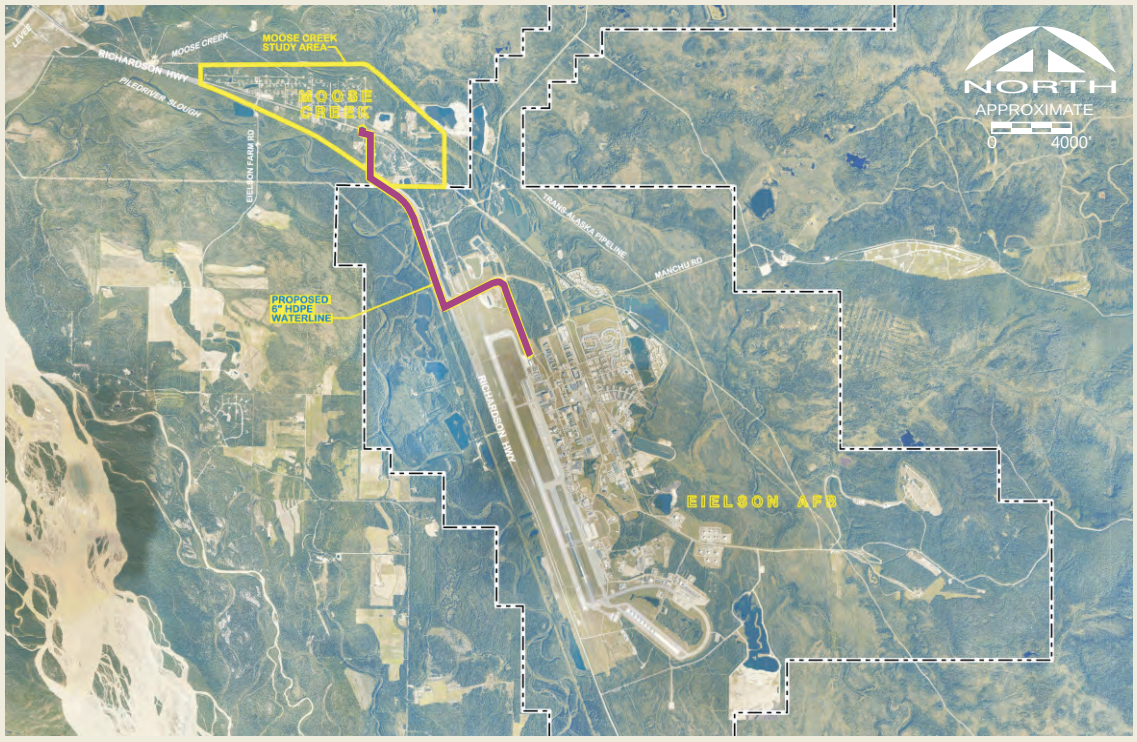



Figure 7 Water Supply Main from Eielson AFB WTP

## ALTERNATIVE 4 – INDIVIDUAL PROPERTY DEEP WELLS

Currently, all residences in the Community of Moose Creek have wells that are approximately 50 feet deep. A test well has shown that water below 200 feet is uncontaminated with PFCs, so this alternative will replace all the shallow wells at each property with a well 250 feet deep. A new pump will be required, but all other piping should be reused to supply potable and non-potable use. Iron and manganese removal is not included for wells serving individual properties.

LUCs would be required to prevent use of groundwater from shallow wells and the existing shallow wells would be decommissioned by the USAF. LUCs will be enforced by USAF under their CERCLA authority.

The property owners would be responsible for monitoring and maintaining the water supply systems once installation is complete.

| | |
|---|---|
| Capital Costs | $26,905,000 |
| Time to Implement | 1 - 2 years |
| 30-yr Operating Cost | $5,721,000 |
| Life Time Cost | $32,626,000 |

## ALTERNATIVE 5 – WATER SUPPLY FROM COMMUNITY DEEP WELL

A new, 250-foot deep well will be provided to supply water from below the PFC plume, as shown on Figure 8. The water from the new well would then be treated to remove manganese and iron and discharged into a local supply reservoir. A local distribution system will have to be pressurized and circulated with heat input to prevent freezing during winter, same as for Alternatives 1 and 2.

LUCs would be required to prevent use of groundwater, the existing wells would be decommissioned by the USAF, to prevent continued use of groundwater within the area. LUCs will be enforced by USAF under their CERCLA authority.

The new system will be maintained and operated by a new operating authority, who would collect water charges from property owners and operate and maintain the system for the residents of Moose Creek. The 30-year operating costs, used to compare alternatives, is based on the design standard of 90 gallons per person per day. Current household usage is anticipated to be less than this amount (ADEC, 2017b) resulting in an estimated household cost of between $45 and $95/ month/ household.

| | |
|---|---|
| Capital Costs | $22,025,000 |
| Time to Implement | 2 - 3 years |
| 30-yr Operating Cost | $15,880,000 |
| Life Time Cost | $37,905,000 |

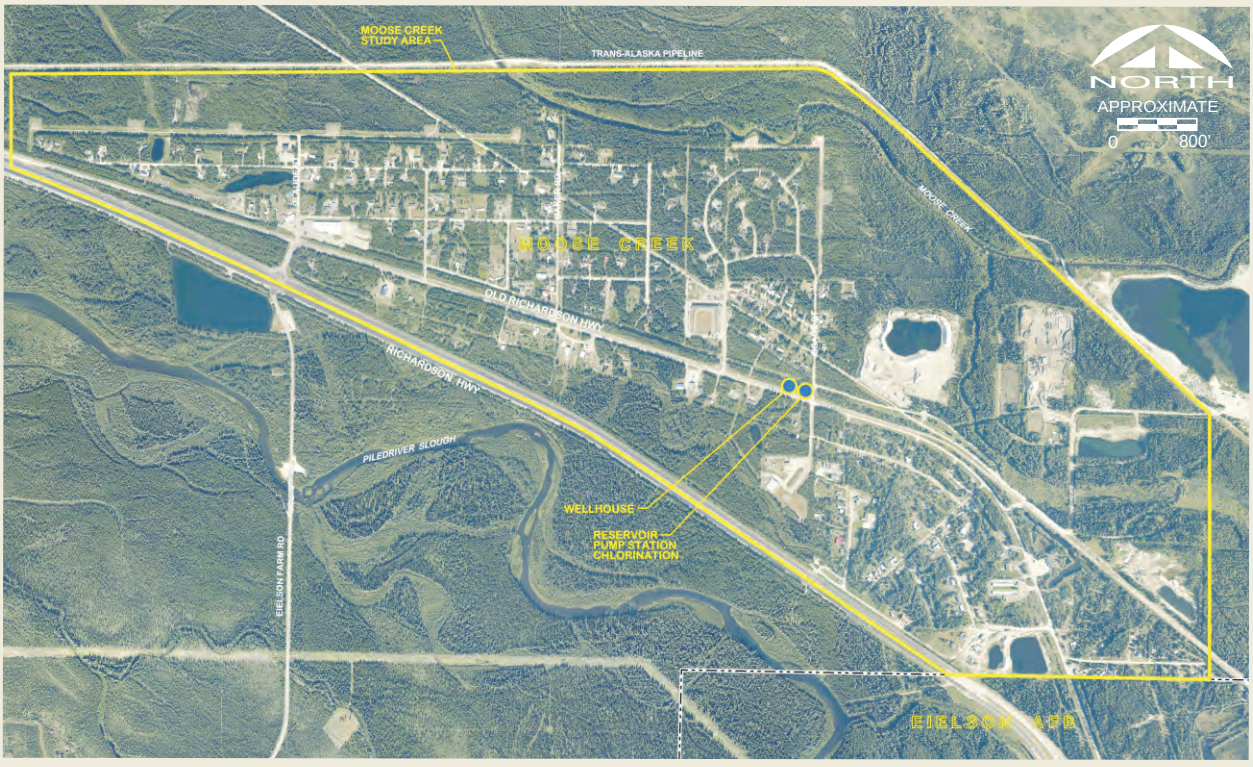



Figure 8 Community Deep Well Concept

## ALTERNATIVE 6 – INDIVIDUAL PROPERTY GAC TREATMENT

Currently, approximately 75 properties have GAC water filters installed and 100 have water tanks. For this alternative, the 100 water tanks will be removed and GAC filters installed at those properties and an additional 25 properties to cover future population growth. Because ADEC regulations prohibit the discharge of contaminated groundwater to the environment, the water distribution system at each property would require modification to ensure both potable and non-potable water is treated.

LUCs would be required to prevent any use of groundwater without GAC treatment. LUCs will be enforced by USAF under their CERCLA authority.

The USAF would continue to monitor and sample water and be responsible for maintenance of installed systems.

| | |
|---|---|
| Capital Costs | $1,753,000 |
| Time to Implement | 1 - 2 years |
| 30-yr Operating Cost | $65,670,000 |
| Life Time Cost | $67,423,000 |

## ALTERNATIVE 7 – STATUS QUO

Currently, approximately 75 properties have GAC water filters installed and 100 have water tanks. An additional 25 properties to cover future population growth will also have one of these solutions installed. Groundwater that exceeds State groundwater cleanup levels should not continue to be used for both potable or non-potable purposes. ADEC regulations prohibit the discharge of contaminated groundwater to the environment, so existing systems would require modification to ensure that only delivered water or GAC-treated water is used for both potable and non-potable uses.

LUCs would be required to prevent any use of groundwater without GAC treatment. LUCs will be enforced by USAF under their CERCLA authority.

The USAF would continue to monitor and sample water and be responsible for maintenance of installed systems.

| | |
|---|---|
| Capital Costs | $904,000 |
| Time to Implement | 1 year |
| 30-yr Operating Cost | $48,734,000 |
| Life Time Cost | $49,638,000 |

# EVALUATION OF WATER SUPPLY ALTERNATIVES

The seven alternatives were evaluated individually and against each other based on the nine criteria identified in CERCLA Section 121(b) and the NCP Section 300.430(f)(5)(i). These criteria provide grounds for comparison of the relative performance of the alternatives and identify their advantages and disadvantages. Evaluating against the nine criteria provides sufficient information to adequately compare the alternatives and to eventually select the most appropriate approach for a site.

The nine criteria are divided into three groups: threshold, balancing, and modifying criteria. Threshold criteria must be met by a particular alternative for it to be eligible for selection. Balancing and modifying criteria are then used to establish the rationale for choosing the most appropriate alternative.

The results of this evaluation are used to identify a **Preferred Alternative**. The relative performance of each alternative, when compared to the nine criteria, and how it compares to the other alternatives under consideration are discussed below.

A detailed analysis of alternatives can be found in the Interim FS, which serves as a basis for this Interim Proposed Plan. **Table 2** of this Interim Proposed Plan presents the alternatives for the community of Moose Creek using the evaluation criteria.

**Table 2** Potable Water Supply Alternatives Comparative Evaluation

| Item | Alternative | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Baseline | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | No Action | Water Supply from North Pole WTP | Water Supply from EAFB WTP | Individual Property Water Tanks | Individual Property Deep Wells | Water Supply from Community Deep Well | Individual Property GAC Treatment | Status Quo |
| **THRESHOLD CRITERIA** | | | | | | | | |
| Protection of Human Health and Environment | Fail | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** |
| Compliance with ARARs/TBCs | Fail | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** |
| **PRIMARY BALANCING CRITERIA** | | | | | | | | |
| Long-Term Effectiveness and Permanence | Low | **High** | **High** | Medium | Medium | Medium | Medium | Medium |
| Reduction in Toxicity, Mobility, or Volume through Treatment | None | None | Low | None | None | None | Low | Low |
| Short-Term Effectiveness | Low | Medium | Medium | **High** | Medium | Medium | **High** | **High** |
| Implementability | **High** | Medium | Medium | **High** | Medium | **High** | Medium | **High** |
| **MODIFYING CRITERIA** | | | | | | | | |
| State/Support Agency Acceptance | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| Community Acceptance | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| **ESTIMATED COSTS** | | | | | | | | |
| Capital Costs | $0 | $25,168,000 | $21,683,000 | $2,146,000 | $26,905,000 | $22,025,000 | $1,753,000 | $904,000 |
| NPV of Recurring Cost at 0.7% | $0 | $14,436,000 | $14,436,000 | $39,614,000 | $5,721,000 | $15,880,000 | $65,670,000 | $48,734,000 |
| Total NPV at 0.7% | $0 | $39,604,000 | $36,119,000 | $41,760,000 | $32,626,000 | $37,905,000 | $67,423,000 | $49,638,000 |

Key:
ARARs - applicable or relevant and appropriate requirements
EAFB - Eielson Air Force Base
GAC - Granulated Activated Carbon
NPV - Net Present Value
TBC - To Be Considered
TBD - To Be Determined
WTP - Water Treatment Plant

## THRESHOLD CRITERIA

**Overall Protection of Human Health and the Environment** – determines whether an alternative eliminates, reduces, or controls threats to public health and the environment.

All of the alternatives, except for No Action, would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment and/or LUCs.

**Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** – evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified. The full list of ARARs is given in the Interim FS; however, the key ARAR's are:

- For drinking water protection - EPA-800-F-16-003. This establishes the LHA for PFOS and PFOA in drinking water.
- For soil and groundwater protection - ADEC 18 AAC 75. This prevents the discharge of water above stated concentrations without treatment.

***GAC Installation***

All of the alternatives, except for No Action, would meet their respective state and federal ARARs.

Because the No Action alternative is not protective of human health and the environment, or meet respective ARARs, it was eliminated from consideration under the remaining criteria.

## PRIMARY BALANCING CRITERIA

**Long-Term Effectiveness and Permanence** – considers the ability of an alternative to maintain protection of human health and the environment over time.

Alternatives 1 and 2 use existing, known water sources that comply with all drinking water requirements, the water would be distributed to the residents by a permanent piped system. As a result, these alternatives are rated High.

Alternative 3 requires a high level of frequent water deliveries. Frequent water tank deliveries will cause additional wear and tear on roads. If further residential construction occurs in the Moose Creek community, these issues will increase. As a result, this alternative is rated Medium.

Alternatives 4 and 5 require new deep wells. There is concern that PFOS and PFOA could be drawn down to the lower aquifer, resulting in similar contamination issues as experienced by the current shallow wells. Alternative 5 would also result in an isolated residential water supply system, close to an existing system, which is unlikely to present as a reliable water supply option as Alternatives 1 and 2. As a result, these alternatives are rated Medium.

Alternatives 6 and 7 require high levels of frequent maintenance and testing. ADEC regulations prohibit the discharge of contaminated groundwater to the environment, so existing systems would require modification to ensure that only delivered water or GAC-treated water is used for both potable and non-potable uses. Preventing discharges would be difficult with the numerous separate systems in the individual properties in Moose Creek. As a result, these alternatives are rated Medium.

**Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** – evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Alternatives 2, 6, and 7 rate as Low due to the fact that there will be some pumping and treatment of the groundwater through the use of GAC systems.

Alternatives 1, 3, 4, and 5 do not provide treatment, and are rated None.

**Short Term Effectiveness** – considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Alternatives 3, 6, and 7 have already demonstrated that, where they can be implemented, they can be done in a short time with no risk to residents, workers, or the environment. As a result, these alternatives are rated High.

Alternatives 1, 2, 4, and 5 require design and interaction with authorities for permits before they can be implemented. Implementation is anticipated to take up to 2 years once it commences. As a result, these alternatives are rated Medium.

**Implementability** – considers the technical and administrative feasibility of implementing an alternative, including factors such as the relative availability of goods and services.

Alternatives 3 and 7 have already been implemented or, for water tanks, no major issues were identified; however, LUC's would still be required to fully implement this alternative. As a result, these alternatives are rated High.

Alternative 5 will require a location for the deep well and storage tank to be identified, but within the community boundary this should not be too difficult. As a result, this alternative is rated High.

Alternative 1 will require a water supply from North Pole, this will have to cross the Chena Flood protection area, requiring additional engineering. Alternative 2 will require a water supply from EAFB, which will require the USAF to take on responsibilities outside its core mission. As a result, these alternatives are rated Medium.

Alternatives 4 and 6 will require additional design and investigation. During the implementation of the TCRA, the GAC systems could not be easily installed at all locations. Installing deep well at all residences could be problematic, because very little data is available on the aquifer and it may not be accessible in every location. As a result, these alternatives are rated Medium.

**Cost** – includes estimated capital and annual operations and maintenance costs, as well as net present value. Net present value is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

Alternative 1, 2, 3, and 5 are all within a 10% range of $40 million, the median 30-year Net Present Value. Alternative 4 is less expensive and Alternatives 6 and 7 are more expensive.

## MODIFYING CRITERIA

**State Acceptance** – considers whether the State agrees with the preferred alternative identified in the Interim Proposed Plan.

Support agencies included the EPA and ADEC. Both agencies have participated in the development of this Interim Proposed Plan and support it. Their final support of the decision will be evaluated following the public comment period.

**Community Acceptance** – considers whether the local community agrees with the preferred alternative identified in the Interim Proposed Plan. Comments received on the Interim Proposed Plan are an important indicator of community acceptance.

Community acceptance of the preferred alternatives will be evaluated after the public comment period ends. Community comments and responses will be included in the Interim ROD.

***Above Ground Water Tank***

# PREFERRED ALTERNATIVE

The Preferred Alternative is presented below.

**ALTERNATIVE 1 – WATER SUPPLIED FROM NORTH POLE MUNICIPAL WTP.**

The preffered remedial alternative for drinking water at the site is Alternative 1, the installation of a new water main from the City of North Pole WTP to the community of Moose Creek and a water distribution system within the community. LUCs would be put in place to prevent use of contaminated groundwater.

This alternative was selected over the other alternatives since it eliminates the human health threat posed by the identified contaminants in the drinking water and was assessed as having the highest rating for long-term effectivness and permanence for the provision of safe drinking water.

Based on information currently available, the USAF believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The USAF expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA & 121 (b):

1) Be protective of human health and the environment.
2) Comply with ARARs.
3) Be cost-effective.
4) Utilize permanent solutions and treatment technologies.
5) Satisfy the preference for treatment; however, this is only an interim solution specifically for the Moose Creek drinking water supply.

## Additional Information

Additional information can be found at:

Moose Creek PFC Contamination Information Repository

http://alaskacollection.library.uaf.edu/eafbsc/cd0/Moose%20Creek%20PFCs%20Contamination%20Information%20Repository/

and The Air Force Administrative Record

http://afcec.publicadmin-record.us.af.min/

These locations include additional source material for readers who want more detailed information than is presented in this Interim Proposed Plan.

Documents can be found at:
2310 Central Avenue
Suite 213
Eielson AFB, 99702
Contact No: (907) 377-1666

The Preferred Alternative is based on current information that it could change in response to public comment or new information.

*View of Moose Creek Street*

# PUBLIC PARTICIPATION REQUEST

The USAF would like the public to review and comment on the recommendations in this Interim Proposed Plan. The final decision for the Community of Moose Creek will be made after the end of the comment period. The water supply alternative selected can change in response to public comments or new information presented during the public participation period.

After consideration of comments, the USAF will document the decision for the Community of Moose Creek in an Interim ROD. All comments received by the USAF will be summarized in the Responsiveness Summary section of the Interim ROD. You can send comments in writing or by email. Comments may also be presented at the public meeting.

## PUBLIC MEETING

A public meeting is scheduled from 6:00 p.m. to 8:00 p.m. on Monday April 23, 2018, at the Moose Creek Fire Station. The Interim Proposed Plan will be discussed and questions taken.

## PUBLIC COMMENT PERIOD

You are encouraged to comment on this Interim Proposed Plan.

The public comment period begins on April 15, 2018, and ends on May 15, 2018. Comments postmarked by May 15, 2018, will be addressed.

## Contact for Questions

**If you have any questions about the information provided in this Proposed Plan,**

**or if you would like to be added to or deleted from the mailing list, please contact:**

**354th Fighter Wing Public Affairs**
**354 Broadway Street, Unit 15A**
**Eielson Air Force Base, Alaska, 99702-1895**
**Telephone: (907) 377-2116**

**354fw.pa.publicaffairs@us.af.mil**
**or**
**Gary Fink, USAF Remedial Project Manager, (907) 552-8757, gary.fink@us.af.mil**

**Dustan Bott, EPA Remedial Project Manager, (206) 553-5502, bott.dustan@epa.gov**

**Monte Garroutte, ADEC RPM, (907) 451-2131, monte.garroutte@alaska.gov**

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- USEPA. 1988c. Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites. Document EPA/540/G-88/003. December.
- USEPA. 2009, Soil Screening Levels for PFOA and PFOS. Memorandum. EPA Region 4, November.
- USEPA. 2016. Fact Sheet. PFOA & PFOS Drinking Water Health Advisories. Document EPA-800-F-16-003. November.

# Glossary of Terms

**Applicable, Relevant, or Appropriate Requirements (ARARs):** State and federal laws and regulations that must be met or considered in development and implementation of cleanup alternatives at a site. These include cleanup standards, standards of control, and other substantive environmental protection requirements, factors, or limitations under federal or state environmental or facility-siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site.

**Cleanup Levels:** the maximum concentration or amount of a chemical permitted to remain in the environment. Levels are prescribed by state and federal regulations and have been determined to be protective of human health and the environment.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** Federal statute established in 1980, modified in 1986, also known as "Superfund", that establishes a comprehensive framework to identify, investigate, and clean up releases or threatened releases of hazardous substances, pollutants, or contaminants into the environment. CERCLA provides the statutory authority for cleanup of hazardous substances, pollutants, or contaminants that could endanger public health, welfare, or the environment (42 USC § 9601 et. seq.).

**Environmental Restoration Program (ERP):** The comprehensive program designed to address restoration of the environment affected by USAF activities.

**Groundwater: W**ater contained within the pore spaces of sand, gravel, or organic material, or within cracks in fractured bedrock.

**Land Use Controls (LUC):** Any type of physical, legal, proprietary, or administrative mechanism that restricts the use of, or limits access to, real property to prevent or reduce risks to human health and the environment. Physical mechanisms (i.e., engineering controls) encompass a variety of engineered remedies to contain or reduce contamination and physical barriers to limit access to property, such as landfill caps, fences, or signs. The legal, proprietary, or administrative mechanisms used for LUCs are generally the same as those used for Institutional Controls (ICs), as discussed in the NCP. Examples of ICs include: deed notices; IC registries, property easements and covenants; installation administrative controls, such as construction and work request review and approval processes; and administrative orders and cleanup agreements.

**National Contingency Plan (NCP):** The National Oil and Hazardous Substances Pollution Contingency Plan, commonly referred to as the NCP, 40 CFR Part 300, is a set of regulations setting forth procedures that lead agencies must follow when implementing CERCLA and similar response authorities under the Clean Water Act.

**Preferred Remedial Alternatives: A**ppropriate cleanup or site management options that ensure protection of human health and the environment.

**Proposed Plan:** A document required by Section 117(a) of CERCLA that informs the public about contaminated sites, alternatives that are being considered for cleaning up the sites, and which identifies the preferred alternatives. This document encourages public comment on all alternatives.

**Record of Decision (ROD):** The document required by CERCLA containing the final decision and statutory determinations of the lead agency concerning selection of the remedial action at a site(s). This includes any preliminary phase of a remedial action, such as an interim remedial action, which would require an interim ROD.

**Responsiveness Summary:** A summary of oral and written public comments received during the comment period and the responses to those comments. The responsiveness summary is part of the ROD.