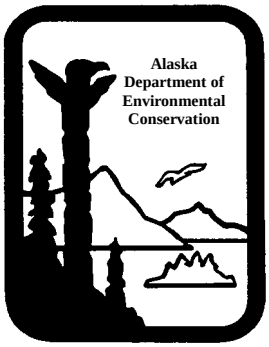

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Remediation Program

PROPOSED PLAN
for the
Alaska Railroad Corporation (ARRC) Gold Creek Site

PURPOSE

The purpose of this document is to evaluate the impacts and propose cleanup options at the ARRC Gold Creek site. The goal is to ensure the contamination resulting from the December 22, 1999 petroleum hydrocarbon fuel release at the Gold Creek site does not pose a risk to human health and the environment. The document is presented for public review and comment until August 31, 2002.

For more information contact Jim Frechione at (907) 269-7658, or via email at jim_frechione@envircon.state.ak.us

Comments may be submitted via email to Jim Frechione, or via postal mail at the following address:

Jim Frechione
Contaminated Sites Program
AK Dept. of Environmental Conservation
555 Cordova St.
Anchorage, AK 99501

Comments must be received by August 31, 2002.

SITE INFORMATION SUMMARY

Site Name, Location and Incident
The ARRC Gold Creek Site is located approximately 40 miles north of Talkeetna at milepost 262 of the Alaska Railroad. The site is located in the southeastern quarter of Section 30, Township 31 North, Range 2 West, Seward Meridian.

On December 22, 1999, a southbound ARRC fuel train derailed at the Gold Creek Siding and released approximately 120,000 gallons of jet-A fuel.

Name and Mailing Address of Responsible Person
Ernie Piper
Alaska Railroad Corporation
P.O. Box 107500
Anchorage, Alaska 99501

Database Record Key
1992730130109

CS File Number
Alaska Railroad Corporation Gold Creek – Spill Site – CS 57.16

Regulatory Authority
Site Cleanup Rules under 18 AAC 75.325 – 18 AAC 75.390

Characteristics of Site
The Gold Creek spill site is in a relatively remote area about 40 miles north of Talkeetna, Alaska. There are no roads in the area. The Susitna River is located approximately 800 feet from the area where fuel was initially released. The railroad tracks appear to lie on a glacial outwash terrace with a surface elevation about 700 feet above sea level. To the east of the spill site, the ground slopes gently upward for a few hundred feet and then rises more steeply up the side slopes of the Talkeetna Mountains. To the west of the spill site, there is a very shallow depression on the outwash terrace and a steep slope down to the active channel of the Susitna River or its floodplain. The active channel lies immediately at the base of the outwash terrace, due west of the spill site. To the southwest of the spill site, a portion of the active floodplain lies at the base of the outwash terrace, at an elevation of about 675 feet.

The Gold Creek Site is vegetated by a birch, cottonwood, and white spruce forest with a few open meadows. Relatively cold winters and warm summers characterize the area. Annual precipitation is about 22 inches per year.

A United States Geological Survey gauging station located on the Susitna River at Gold Creek has recorded the river discharge and elevation fluctuations for the last 50 years. Based on this information, the Susitna River typically declines throughout the winter, reaching an

annual low in late April or early May. During spring breakup, the river level rises rapidly to its average annual high water level in late June. From the late June high, the river level tends to decline into autumn. The river level may show several late summer or early autumn peaks related to precipitation events. Groundwater hydrographs for the Gold Creek site tend to follow the Susitna River hydrograph.

The soil sampling program conducted in 2001 confirmed that the Gold Creek site lies on a glaciofluvial outwash terrace and shows the presence of two primary soil layers. From the ground surface and down to approximately 6 feet on the west side of the railroad track, a silt layer is overlain by an organic layer a few inches thick. Underlying the silt and extending to depths of at least 58 feet, there is a course grained, glaciofluvial outwash, gravel, sand, silt mixture with numerous cobbles and boulders. Analysis of this layer, below the silt, consistently shows 40-65 percent gravel, 30-50 percent sand, and 5-10 percent silt.

Groundwater at the site, depending on the time of year, is encountered typically 30 feet or more below the ground surface, in areas near the source area, and less then 10 feet below the ground surface in areas closest to the Susitna River. Groundwater elevations vary as much as 10 to 13 feet from low water during late fall, winter and early spring to high water during late spring and summer.

Description of Contaminants and Media Impacted

The contaminants of concern at the site are diesel range organics (DRO), gasoline range organics (GRO), benzene, toluene, ethylbenzene and xylenes (BTEX) in the soil and groundwater. The soil contaminant levels exceed regulatory levels in the area of the spill site and impacts are from the surface down to the groundwater table. There is also free phase and dissolved phase contamination in the groundwater defined in the investigative reports. The surface water samples collected from the Susitna River did not detect any violation of water quality standards.

Current and Expected Future Land Use

The ARRC owns and manages the land 100 feet on either side of the railroad tracks for railroad purposes. The property outside the railroad corridor on the west side of the railroad tracks is owned by the State of Alaska and is designated public recreation land within Denali State Park. The land on the east side of the tracks is privately owned and has private residence(s) located within approximately ¼ mile of the site. No drinking water wells are known to exist within 10 miles of the site.

SITE CHARACTERIZATION HISTORY

The release of approximately 120,000 gallons of jet-A-fuel occurred on December 22, 1999. ARRC and its contractors implemented emergency response actions, with oversight by the ADEC. The response efforts included attempts to recover as much of the spilled fuel product as possible before it infiltrated into the ground. It was estimated that 15,000 to 20,000 gallons of product were recovered. The emergency response action transitioned into a site remediation effort designed to manage the remaining contamination in a manner so that it does not pose a risk to human health or the environment.

Since the area is sparsely populated and primarily within Denali State Park - human health risks are considered minimal based on the nature of use (ie. intermittent, recreational purposes). The primary environmental concerns are associated with possible impacts to the Susitna River in the event contamination was mobilized.

The ARRC hired several environmental consultants following the spill incident to collect soil and groundwater data and install various remedial structures to address the contamination. Soil excavation was not considered practicable at the time due to the depth of infiltration of the fuel product and the proximity to the tracks. An interception trench; a large diameter recovery well; and a soil vapor extraction system were installed. There were also soil borings and groundwater wells installed to document the nature and extent of contamination. The sample results identified soil and groundwater contamination above ADEC cleanup levels but the free phase and dissolved phase plumes are relatively stable and not migrating.

In 2001, ARRC's consultant (Geosphere, Inc.) reviewed the existing data and identified "data gaps" where additional information was needed to clarify site conditions. Additional field work was conducted and new information was collected. A March 2002 Geosphere report addressed the following:

1. an analysis of the hydrogeologic conditions at the site and a description of the hydrocarbon fate and transport processes;
2. an assessment of the current and future extent of the free product and dissolved phase plumes;
3. an assessment of the short-term and long-term human health and environmental risk; and
4. determine the appropriate cleanup actions.

The results of Geosphere's investigation also concluded:

1. approximately 5000 gallons of free product may be present on the groundwater but the plume is fairly stable and has not migrated or increased since April 2000. A computer model corroborated this information and indicated it will not migrate toward the Susitna River;
2. the dissolved phase groundwater plume emanating from the spill source area is currently attenuated to drinking water standards within a few hundred feet of the edge of the source area. The computer model predicts that the dissolved phase plume may expand from is current configuration but, at its maximum extent, the plume will not exceed drinking water standards before reaching the Susitna River;
3. soil in the source area is contaminated above ADEC cleanup levels but natural attenuation and/or hydrocarbon biodegradation processes are occurring, which will ultimately reduce this level to established cleanup levels; and
4. a groundwater monitoring system has been designed to address all directions of groundwater flow throughout the year. It is expected that any dissolved phase or free

product migration emanating from the source area would be identified through monitoring of these wells.

CHEMICALS OF CONCERN

Chemicals of concern include those chemicals found in concentrations greater than the 18 AAC 75.341 Tables B1 and B2, and 18 AAC 75.345 Table C. The chemicals of concern identified at the Gold Creek Spill Site in both the soil and groundwater are DRO, GRO, and BTEX.

Contaminant Concentrations

The soil contaminant levels in the spill area remain above the 18 AAC 75.341 Method Two, Migration to Groundwater levels. However, soil borings installed several hundred feet downgradient from the source area showed no soil contamination above those levels.

The soil borings were developed into groundwater monitoring wells. The April 2002 monitoring data indicated groundwater is not contaminated above ADEC cleanup levels within a few hundred feet of source area. The water samples collected from wells closer to the source area identified only two wells with contaminant concentrations above ADEC cleanup levels. Both of the wells were located within the free product footprint area with concentrations of 25 parts per million (ppm) DRO and 3.5 ppm GRO in one well and 25 ppm DRO and 3.5 ppm GRO in the other. There were no other wells with groundwater contamination above ADEC cleanup levels.

SUMMARY OF RISK

The risk posed to human health or environmental receptors through exposure to a contaminant at a site is evaluated via contaminant migration pathways. An exposure pathway describes the course a chemical may take from its source to an exposed person or animal.

The human health risks posed by the spilled fuel might include consumption of contaminated groundwater, inhalation of fuel vapors, and ingestion of contaminated soil. Based on a review of these exposure pathways it was determined that:

1. The ingestion of groundwater pathway is not complete because there are no domestic drinking water wells on or near the site. An institutional control would be required to ensure that groundwater wells are not installed in the area of contamination;
2. The inhalation pathway may be present but only a small percentage of the fuel in the soil is expected to volatilize and diffuse through soil to the atmosphere. The vapors that may reach ambient air are not considered a risk based on the existing contaminant concentrations; and
3. The ingestion pathway is not considered a human health risk based on the existing contaminant concentrations.

The primary environmental risks posed by contamination are those associated with water quality and ecological impacts to the Susitna River. The contaminant plume (both free phase

and dissolved) appears to be stable (based on monitoring data) and a computer model predicts the contaminant levels will not violate Alaska water quality standards.

PROPOSED CLEANUP LEVELS

Groundwater

The proposed cleanup levels for groundwater at the site are established in Table C of 18 AAC 75.345.

Soil

The soil cleanup levels are those that are protective of the migration to groundwater pathway established in 18 AAC 75.341 Tables B1 and B2. An alternative soil cleanup level may be considered following the results of the groundwater monitoring program and verification that the contaminant plume is stable or decreasing.

CLEANUP ALTERNATIVES

The following cleanup alternatives were considered at this site:

1. No Action
2. Monitored Natural Attenuation and Institutional Controls
3. In-Situ Bioremediation
4. Excavation and On-Site Bioremediation
5. Excavation and On-Site Thermal Desorption
6. Excavation and Off-Site Thermal Desorption

Discussion of the Cleanup Alternatives

1. The No Action alternative was not considered appropriate because the nature and extent of contamination warrants cleanup action.
2. Monitored Natural Attenuation (and Institutional Controls) is an alternative dependent on the natural process of contaminant degradation without enhanced or engineered assistance. The groundwater data indicates that natural attenuation is occurring based on the dissolved oxygen, nitrate and sulfate levels.
3. In-situ bioremediation is a technology that enhances the naturally occurring conditions at a site to more effectively reduce contamination. The contamination migrated to depths greater than 30 feet and this technology may not be practicable, at this time. However, it may be considered in the future based on the effectiveness of natural attenuation and/or results of groundwater monitoring.
4. The excavation cleanup alternatives were not considered practicable at this time because of the vertical depth of contamination and the proximity to the railroad tracks. However, these alternatives might be considered in the future if the other cleanup alternatives are not proven effective and/or there was an immediate health or environmental risk posed by the contamination. In addition, modeling has suggested that the dissolved phase plume will not significantly decrease in the concentration,

size, or longevity in the near future (50 or more years) if even 20 percent of the non-aqueous phase liquid mass that is present in the saturated zone is removed.

The final cleanup alternative(s) will be evaluated under the following criteria:

1. Protectiveness – to ensure the protection of human health, safety, welfare and environment;
2. Practicable – to ensure any corrective action(s) are capable of being designed and implemented in a cost effective manner;
3. Short and Long Term Effectiveness – to ensure any short term corrective action(s) are initiated to reduce the immediate risk and develop a long term strategy to protect human health and the environment;
4. Regulation – to ensure the corrective action(s) comply with the state, federal and local laws;
5. Public Comment – to solicit public comment and input on the proposed actions.

SUMMARY

An ARRC fuel train derailed at the Gold Creek Siding on December 22, 1999 and released approximately 120,000 gallons of jet-A fuel. Approximately 20,000 gallons of the fuel was recovered in the response efforts and further recovery was not considered practicable. The site investigation indicates that the majority of the free phase fuel product is immobile and held in the soil pores while the dissolved phase plume is naturally attenuating.

The groundwater monitoring data indicates that the dissolved phase plume is currently attenuated to drinking water standards within a few hundred feet of the source area. A computer model indicates that efforts to remove any more of the free product (estimated to be 5000 gallons) will not significantly decrease the dissolved phase plume concentration or its longevity. There is no risk to human or ecological receptors at this time. There is a groundwater monitoring plan for the site that has monitoring wells in strategic locations to detect any contaminant migration in time to implement a response effort.

ADEC PROPOSED DECISION

ADEC has reviewed the investigative and response efforts employed at the Gold Creek spill site and consider the soil and groundwater contamination to be in a stable mode. Furthermore, the contamination does not currently pose a risk to human health or the environment.

In order to manage this site in a manner that recognizes the contaminant levels that remain on site and ensure that they do not pose a risk and will decrease in concentration over time, ADEC has prepared this plan with recommended actions.

The cleanup alternative(s) considered for this site may involve one (or more) of the proposed options listed in this document. There are intrusive actions that have been proposed such as excavation and removal of the contaminated soil. However, this may not be practicable at this time and/or it may cause more harm than good. There are also a number of less intrusive actions (in-situ treatment techniques) that might be considered based on the stability of the contamination and any risk that it may pose.

Based on the information presented to date, ADEC proposes that monitored natural attenuation (with institutional controls) be used to address the contamination remaining at the Gold Creek site. In addition to the use of natural attenuation, ADEC will require the ARRC to establish a groundwater monitoring program that identifies a "sentinel" well system to detect any migration of contamination at the site.

The ARRC will be required to prepare a "contingency plan" that would serve to cleanup and/or treat any contamination that is detected at the established point(s) of compliance. The contingency plan(s) must be prepared and approved by ADEC prior to a final decision regarding the environmental status of this project.

There will also be institutional controls required at the site to identify the nature and extent of contamination remaining there and any restrictions that may apply to use of the property. These may include prohibition of any drinking water wells on the site until such time that the contamination in the groundwater meets the established ADEC cleanup levels.

This proposed plan is available for review and comment for a 30 day period. Following review of comments ADEC will prepare a Record of Decision outlining monitoring and institutional control requirements.

ADEC Approval:

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Jim Frechione, Environmental Conservation Manager Date