



# Integrated Waste Management Plan

Red Dog Mine, Alaska, USA

Prepared By

**Teck Alaska Incorporated**



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## Executive Summary

This Integrated Waste Management Plan (IWMP) describes procedures for managing multiple types of wastes including mill tailings and waste rock, solid waste and hazardous material generated at the Red Dog Mine. This IWMP also includes procedures for reusing and recycling materials wherever possible, which is a priority of Teck Alaska, Inc.'s (TAK) Red Dog Mine.

Decisions that affect the generation of solid wastes are made with consideration to the following order of priorities:

1. Waste source reduction
2. Recycling of materials (including reuse)
3. Waste treatment
4. Waste disposal

Appropriate management begins at the procurement stage, before TAK purchases materials, with a review of Safety Data Sheets (SDS) for new material proposed for use at the mine. The goal is to avoid materials that are considered hazardous or are classified as hazardous waste once the materials can no longer be used for their intended purpose. This is to ensure protection of the workers handling these materials and the environment.

Methods to minimize the production of waste include proper handling and storage of hazardous materials to prevent accidental releases and cross-contamination of materials, providing appropriate secondary containment for hazardous materials to prevent releases and the associated generation of waste materials and spill residues, and the reuse and/or recycling of materials whenever possible. Materials that can be recycled include mill liners, antifreeze, batteries, lamps, tires, cardboard, wood, scrap metal, electronics and used oil.

A Class III (camp) municipal solid waste landfill is permitted at the mine site and located within the Main Waste Dump (MWD). Section 2.1.10 describes the wastes approved for onsite disposal in the landfill.

TAK characterize wastes to determine their appropriate management method. Non-liquid, non-hazardous wastes that cannot be recycled are disposed of at the onsite inert landfill (18 AAC 60.460). Liquids, hazardous wastes, and other materials that cannot be managed onsite are shipped off-site for recycling or disposal; this includes solvents, lamps, batteries, liquid paints, tires and assay lab waste, expired chemicals, and waste that cannot be landfilled onsite.

Water resources and reclamation/closure management information for the onsite solid waste facilities (i.e., Tailing Storage Facility, Waste Rock Dumps, etc.) is provided in Appendix B *Red Dog Mine Tailings and TSF Water Management Plan*, Appendix C *Red Dog Mine Waste Rock Management Plan*, and in the *Red Dog Mine Reclamation and Closure Plan*.

The environmental monitoring plan that incorporates monitoring of all solid waste facilities for the Red Dog Mine during operation and post-closure is in Appendix D *Red Dog Mine Monitoring Plan*.

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Appendix B :	Tailings and TSF Water Management Plan
Appendix C :	Waste Rock Management Plan
Appendix D :	Monitoring Plan

## List of Abbreviations

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADFG	Alaska Department of Fish & Game
ADNR	Alaska Department of Natural Resources
ANFO	ammonium nitrate and fuel oil
APDES	Alaska Pollutant Discharge Elimination System
AS	Alaska Statute
CERCLA	Comprehensive Environmental Responsibility and Compensation Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DMTS	DeLong Mountain Regional Transportation System
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
HAZWOPER	Hazardous Hazardouse Waste Operations and Emergency Response
IAEA	International Atomic Energy Agency
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
IWMP	Integrated Waste Management Plan
LEPC	Local Emergency Planning Committee
LDR	Land Disposal Restriction
LQG	large quantity generatorMSHA
MSHA	Mine Safety and Health Administration
MSWLF	Municipal Solid Waste Landfills
NANA	NANA Regional Corporation, Inc.
NRC	National Response Center
NAB	Northwest Artic Borough
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
RQ	reportable quantity
SOP	Standard Operating Procedures
SDS	Safety Data Sheets
SQG	small quantity generator
TAK	Teck Alaska Incorporated
TDG	Transport Canada's Transportation of Dangerous Goods
TSCA	Toxic Substances Control Act
TSDF	Treatment Storage and Disposal Facility
TSF	Tailings Storage Facility
USCG	United States Coast Guard
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
WIS	Waste Information System (Red Dog exclusive waste database)

MWD Main Waste Dump

## Units of Measure

°C	degrees Celsius
°F	degrees Fahrenheit
g	gallon
kg	kilogram
lb	pound
L	liter
mL	milliliter
ppm	parts per million

# 1 Introduction

## 1.1 Purpose

This Integrated Waste Management Plan (IWMP) describes the required procedures for managing solid wastes<sup>1</sup> and hazardous materials (wastes) generated at the Red Dog Mine facilities. The IWMP also includes procedures for reusing and recycling materials wherever possible, which is a priority of the Red Dog Mine.

This IWMP also includes the following management plans:

- Appendix B - *Tailings and TSF Water Management Plan*
- Appendix C - *Waste Rock Management Plan*
- Appendix D - *Monitoring Plan*

The environmental monitoring program for the Red Dog Mine, which is associated with this IWMP, includes monitoring of surface water, groundwater, seepage, and wildlife, as described in the *Red Dog Mine Monitoring Plan*.

## 1.1 Project Description

Teck Alaska Incorporated's (TAK) Red Dog Mine is in northwestern Alaska, approximately 82 miles north of Kotzebue, and 46 miles inland from the coast of the Chukchi Sea (Figure 1). The mine is located on the Middle Fork of Red Dog Creek in the DeLong Mountains of the western Brooks Range, on private land owned by NANA Regional Corporation, Inc. (NANA). Some of the support facilities are on both State of Alaska and NANA lands. Red Dog Mine is a joint venture between NANA and TAK, whereby TAK is the mine operator and NANA is the landowner.

Figure 1 shows the location of the Red Dog Mine. Figure 2 shows the boundary of the area considered in this plan. The boundary is the limits of the Waste Management Permit #2021DB0001 and coincides with the boundary of the Air Quality Permit #AQ0290TVP02. The boundary encompasses all the areas that are likely to be directly impacted by operations at the site (Appendix A).

The operation consists of an open pit zinc/lead mine, mill, and support facilities. Construction of the mill began in 1988, with the first ore delivered to the mill in November 1989. Conventional drill and blast mining methods are employed. The mineral processing facilities use conventional grinding and sulfide flotation methods to produce zinc and lead concentrates. The concentrates are shipped to markets in North America, Europe, and Asia from the DeLong Mountain Regional Transportation System (DMTS) port facility located on the Chukchi Sea. Access to the Port is via the 52-mile DMTS haul road, owned by the Alaska Industrial Development and Export Authority.

The ore deposits are massive sulfide zinc-lead-silver deposits. The ore and host rocks contain high concentrations of sulfide minerals, and most of the waste rock is acid generating, potentially acid generating, or has potential for metal leaching. Additional information on waste rock management

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<sup>1</sup> AS 46.03.900(26) "solid waste" means garbage, refuse, abandoned, or other discarded solid or semi-solid material, regardless of whether subject to decomposition, originating from any source.



is in Appendix C. Water from the mine operations area, e.g., open pit, ore stockpiles, and waste rock dumps is pre-treated where possible and stored in the tailings storage facility (TSF). During the open water season (May to October), water from the TSF is treated and discharged to the Middle Fork of Red Dog Creek. Further information on water management is provided in Appendix B.

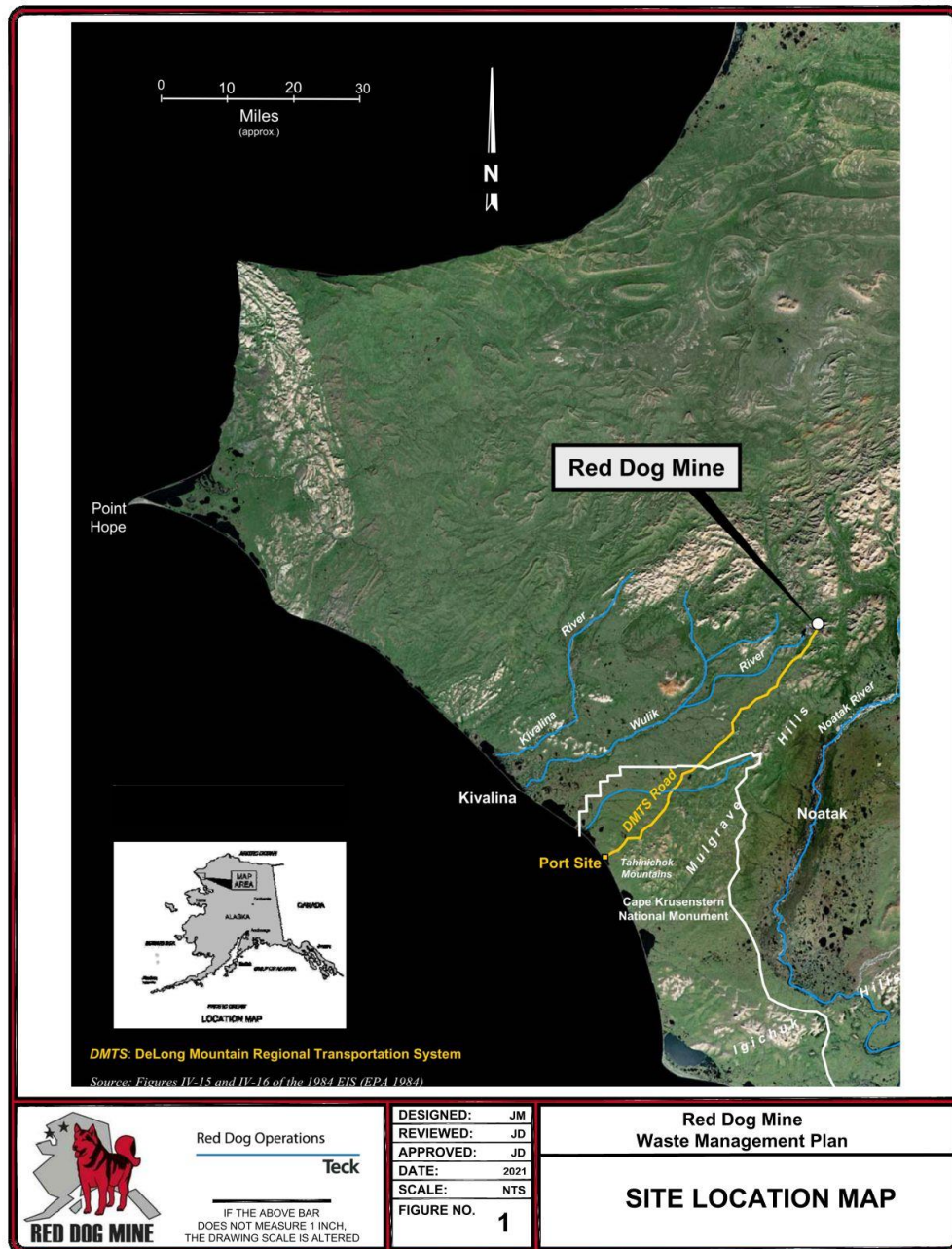


Figure 1: Site Location Map

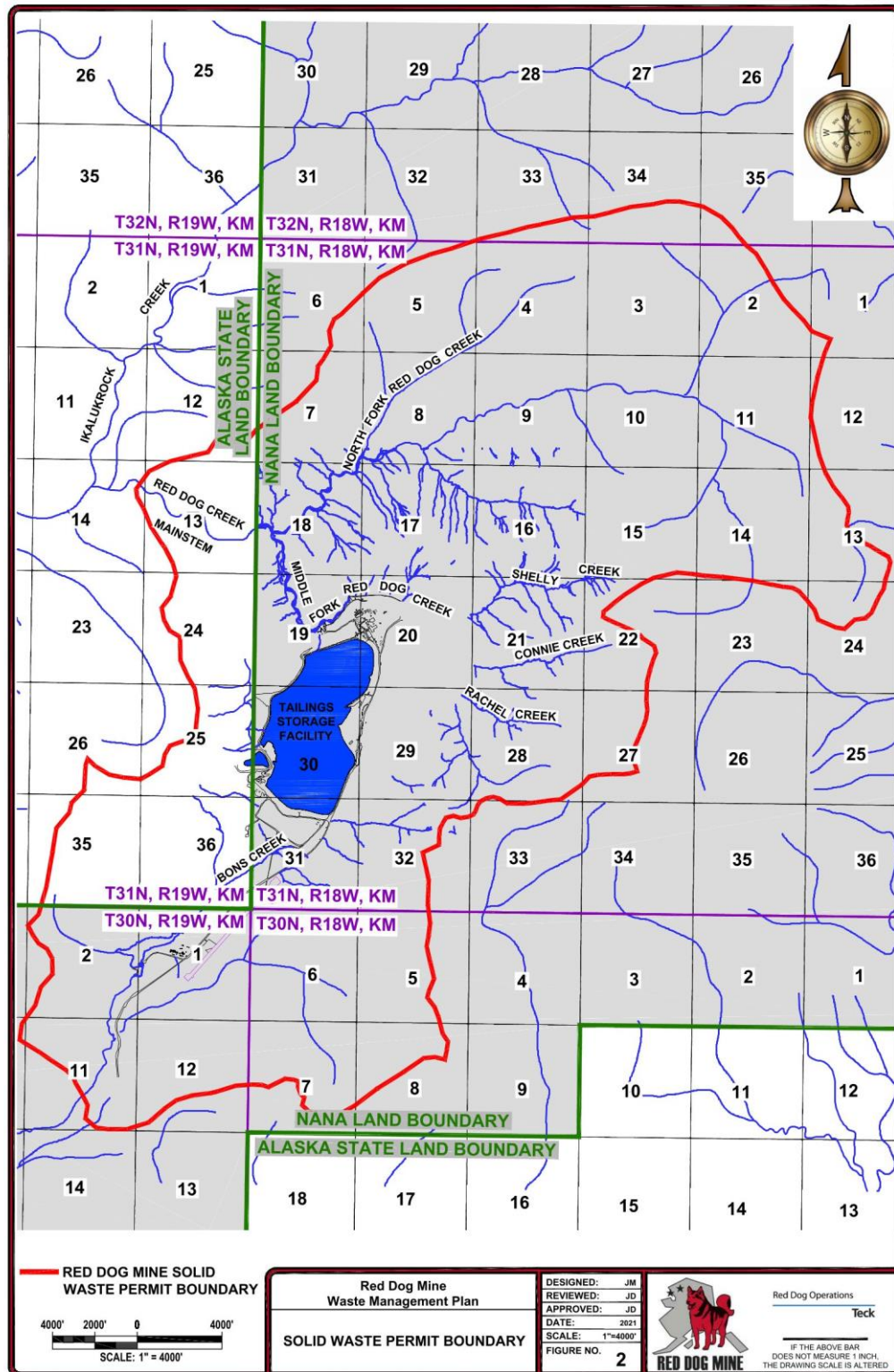


Figure 2: Solid Waste Permit Boundary

## 2 Waste Management Requirements

The following sections provide an overview of the regulatory requirements applicable to the management of solid wastes and the management procedures that are employed at the Red Dog Mine to handle wastes safely and in accordance with all applicable regulations. Key waste management facilities include solid Class III municipal solid waste landfill (located within the Main Waste Dump), the TSF and Waste Rock Dumps (WRD) as illustrated in Figure 3.

Management of wastes at the Red Dog Mine begins before the materials are purchased by evaluating the potential environmental impacts of materials being considered for the project. In general, the Red Dog Mine minimizes the overall generation of waste to the extent practical and minimizes the use of materials regulated as hazardous wastes when they no longer serve their intended purpose. Waste materials are reused and recycled whenever possible. A permitted solid waste landfill is located onsite for the disposal of approved wastes. The Waste Management Permit (2021DB0001) provides a description of allowable waste types that can be disposed of in the landfill and lists other operating and monitoring parameters required by the permit.

Waste materials that cannot be managed onsite, such as liquid wastes, hazardous wastes, certain items to be recycled or reused, and wastes prohibited from disposal in the landfills, are shipped off-site for reuse, recycle, treatment, or disposal at appropriate facilities.

### 2.1 Regulatory Review

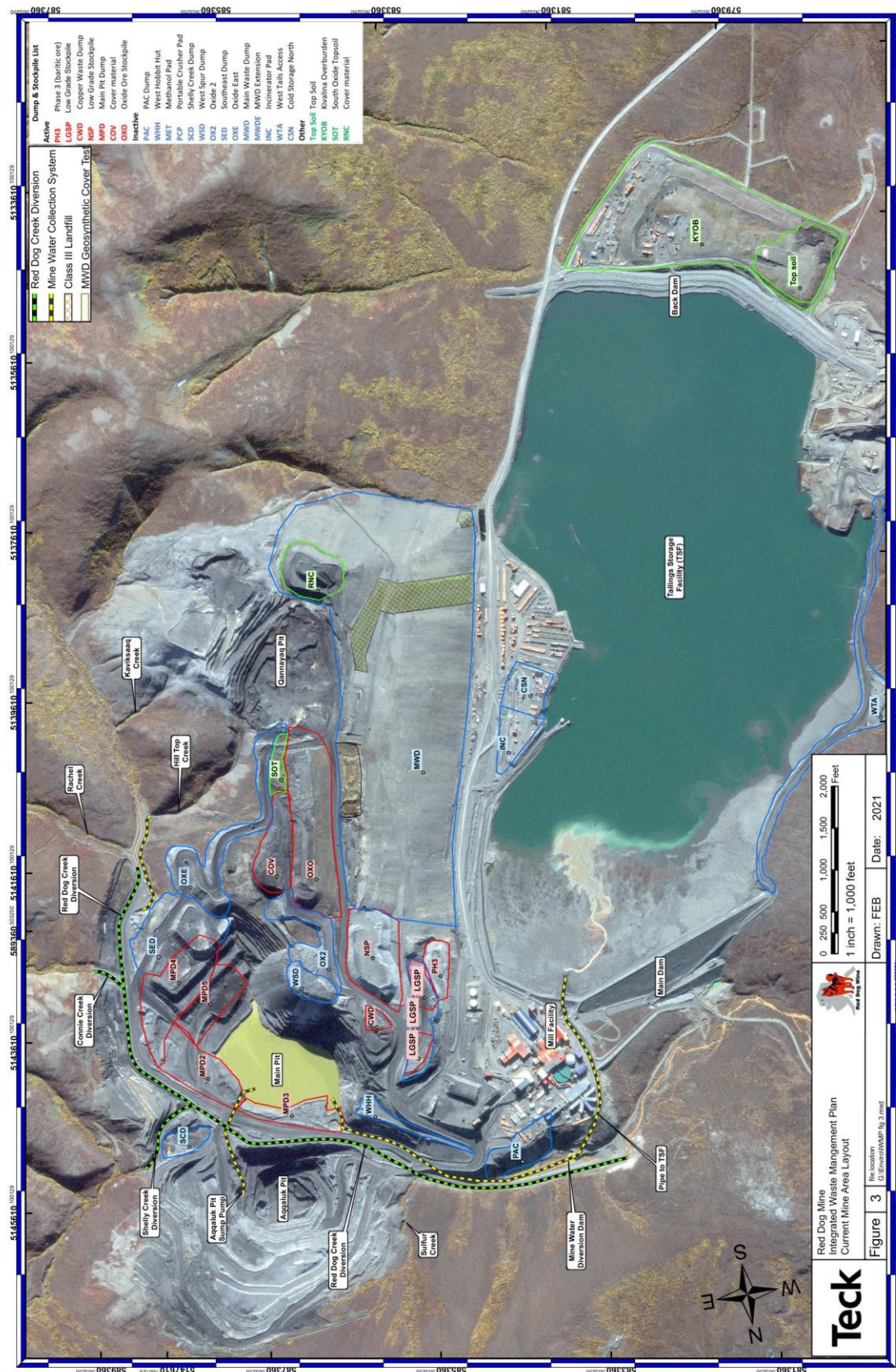
Solid wastes are managed in the State of Alaska under two separate bodies of law:

- The Resource Conservation and Recovery Act (RCRA) federal regulations contained in Title 40 Code of Federal Regulations (CFR), Parts 260 to 279.
- The State of Alaska regulations contained in 18 AAC 60, Solid Waste Management.

Hazardous wastes are regulated by the U.S. Environmental Protection Agency (EPA), Region 10 in Alaska, in accordance with RCRA regulations. Alaska does not have the authority to administer hazardous waste regulations and, therefore, defers to federal regulations. Non-hazardous solid wastes, tailings, and waste rock are mainly managed under the state regulations in 18 AAC 60, which authorize Class III (camp) municipal solid waste landfills.

When a material can no longer be used for its original purpose, or otherwise meets the definition of *solid waste* as defined in Section 2.1.1, a determination must be made as to whether the solid waste is a *hazardous waste* or not as defined in Section 2.1.2. Waste determinations are discussed in Section 2.10. Once a waste determination has been made, the appropriate management method for the waste can be identified.





**Figure 3: Current Mine Area Layout**

### 2.1.1 Definition of Solid Waste

The EPA definition of solid waste found in 40 CFR §261.2. A solid waste is any material, liquid or solid, except for materials excluded from the regulations that are a discarded **material**, meaning a material that is:

- Abandoned:
  - disposed of or
  - burned or incinerated or
  - accumulated, stored, or treated (but not recycled) before, or in lieu of, being abandoned by disposal, burned, or incinerated.
- Recycled or accumulated, stored, or treated before recycling if it is:
  - used in a manner constituting disposal,
  - burned for energy recovery,
  - reclaimed,
  - accumulated speculatively,
- Considered inherently waste-like; or
- A military munition identified as a solid waste in 40 CFR §266.202.

There are several exclusions to the definition of solid waste, as provided in 40 CFR §261.4(a), such as domestic sewage and point source discharges subject to regulation under Section 402 of the Clean Water Act (CWA).

### 2.1.2 Definition of Hazardous Waste

As defined in 40 CFR §261.3, a solid waste is **hazardous** if:

- It is not *excluded* from regulation as a hazardous waste under 40 CFR §261.4(b).
- It is a *characteristic hazardous* waste, i.e., it exhibits one of the characteristics of hazardous waste defined in Subpart C of 40 CFR §261:
  - ignitability
  - corrosivity
  - reactivity
  - toxicity
- It is a *listed hazardous waste*, i.e., a waste listed in Subpart D of 40 CFR §261 and has not been excluded in 40 CFR §260.20 or 260.22.
- It is a *mixture* of solid waste and one or more listed hazardous wastes, and it has not been excluded from regulation as a hazardous waste by an exemption to the regulations.

- *Rebuttable presumption for used oil*, i.e., used oil containing more than 1,000 parts per million (ppm) total halogens is presumed to be a hazardous waste because it has been mixed with halogenated hazardous waste listed in Subpart D of 40 CFR §261. Persons may rebut this presumption by demonstrating that the used oil does not contain hazardous waste.

Solid wastes that are exempt from hazardous waste regulations are listed under 40 CFR §261.4(b). Additionally, several exemptions are also listed in 40 CFR §261.3, which defines a hazardous waste. Some of the important exemptions that apply to the Red Dog Mine include:

- Household waste (e.g., products used for personal use at Personnel Accommodation Complex (PAC)).
- Mining overburden returned to the mine site.
- Solid wastes from the extraction, beneficiation, and processing of ores and minerals, also known as the Bevill Exclusion<sup>2</sup>.
- Non-terne-plated used oil filters that are not mixed with a “listed hazardous waste” and have been gravity hot-drained.
- Exemptions for mixtures that involve De minimis losses of certain hazardous wastes and laboratory wastewater discharged to water treatment systems regulated under an Alaska Pollutant Discharge Elimination System (APDES) permit.

## 2.2 Waste Management Priorities

In accordance with the State of Alaska Statute (AS) 46.06.021, in order to prevent and/or minimize the present and future generation of wastes, management decisions that may affect waste generation at the Red Dog Mine consider the following options, in order of priority:

1. Waste source reduction
2. Recycling (includes reuse)
3. Waste treatment
4. Waste disposal, in accordance with applicable law

To accomplish this, the following procedures are followed:

- Operations that generate wastes are periodically reviewed to identify opportunities for waste reduction and these opportunities are implemented whenever possible.
- The properties of materials are reviewed prior to purchase and every effort is made to minimize the use of hazardous materials and those classified as hazardous wastes once they can no longer be used for their intended purpose.
- Methods for reusing and recycling materials are promoted and implemented whenever possible to reduce waste.

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<sup>2</sup> The “Bevill Exclusion” or “Bevill Exemption” is an amendment to the RCRA, which provides that “mining and mineral processing wastes generated by extraction, beneficiation, and processing activities” are exempt from regulation as hazardous wastes.

- Non-hazardous solid wastes that are permitted for disposal onsite are disposed of at onsite, permitted, solid waste inert landfills, regulated by the ADEC, in accordance with 18 AAC 60.
- Materials that cannot be managed on site are sent off-site to appropriate facilities for recycling, reuse, treatment, and/or disposal.

## **2.3 Purchasing of Materials**

The following procedures are followed when purchasing materials:

- Whenever possible, the Red Dog Mine reduces the generation of hazardous wastes by avoiding the purchase of materials that will be regulated as hazardous wastes once the materials are no longer required for their intended purpose.
- To the extent practical, materials are purchased in containers (e.g., totes or drums) that can be returned to the vendor.
- The Safety Data Sheets (SDSs) for new materials are reviewed prior to purchasing to ascertain if the materials require special management under RCRA, Emergency Planning and Community Right to Know Act (EPCRA), Comprehensive Environmental Responsibility and Compensation Liability Act (CERCLA), Clean Air Act, and Toxic Substances Control Act (TSCA).
- For materials requiring special handling or those classified as a hazardous waste if disposed of, the Red Dog Mine evaluates the material to determine if a suitable substitute is available that is considered "less hazardous." Less hazardous can include a waste not classified as a hazardous waste if disposed of, requires no special handling under the above-noted governing acts, generates less waste when disposed of, can be reused or recycled, or is generally considered to have less of an impact on the environment (e.g., a material with less discharges to the environment when treated and/or disposed).

## **2.4 Waste Minimization**

Efforts to minimize waste begin at the purchasing phase and continue to the recycling and reuse materials such as:

- Use primarily low-toxicity solvents in parts washers wherever possible:
- Use low-mercury, fluorescent lamps ("green end cap") or LED lights where possible.
- Recycle or reuse of materials such as antifreeze, batteries, and reusable light vehicle tires, scrap metal, and used oil, as discussed in Section 2.5 below.
- Return containers to vendors or recycle them as scrap metal, which prevents the need for disposal of containers in landfills.
- Appropriate container management, including the provision of secondary containment and proper labeling:
- Prevention of mixing of hazardous wastes with non-hazardous wastes through waste segregation, established procedures, and personnel training.

## **2.5 Recycling and Reuse of Materials**

Red Dog Mine fully recycles materials whenever practical. Due to the logistics of shipping recycled materials from the mine site by air or barge and the costs associated with recycling materials, the Red Dog Mine evaluates the cost/benefit of their recycling program on a regular basis. Recycling opportunities are based on the need for recycled materials, vendors available to handle recycled materials, costs, economic factors, etc. The Red Dog Mine adjusts its recycling practices to respond to these changes.

## **2.6 Waste Segregation**

Waste management includes appropriate segregation and management of wastes in accordance with applicable regulations and the specific waste handling procedures listed below:

- Wastes destined for the incinerator are placed in incinerator dumpsters. These dumpsters are kept closed to prevent attraction of wildlife.
- Household and approved solid wastes destined for the landfill are either taken directly to a landfill or placed in landfill dumpsters.
- Dumpsters are marked in a manner such that personnel can distinguish between incinerators and landfill dumpsters.
- Hazardous wastes are placed in containers at Satellite Accumulation Areas or placed in containers, appropriately labeled, and then brought directly to a primary Hazardous Waste Central Accumulation Area.
- Universal Wastes are placed in containers at Universal Waste Accumulation Areas according to the procedures outlined in Section 2.11.
- Materials to be recycled are placed in segregated containers designated for the specific type of material and managed as outlined in Section 2.5.
- All containers are appropriately labeled and managed as described in Section 2.7 below.

## **2.7 Waste Container Management**

Waste containers are managed in accordance with all applicable regulations as follows:

- All waste containers are appropriately labeled according to the, Mine Safety & Health Administration (MSHA) hazard communication standards (or EPA regulations).
- Hazardous wastes containers are labeled according to the requirements of RCRA.
- Waste containers of used oil are labeled with the words "Used Oil".
- Used oils are stored within appropriate secondary containment systems.
- Waste containers are kept closed except when adding or removing materials.
- Waste container inspections are conducted as required by the regulations and as needed to manage containers appropriately.
- Appropriate firefighting and/or spill response equipment are available as required.



- The applicable training, inspection, reporting, preparedness, spill prevention, contingency planning, and emergency procedures required by RCRA and ADEC Division of Spill Prevention and Response is implemented.

### 2.7.1 Procedures for Emptying Containers

An empty container is considered non-hazardous waste provided it has been emptied according to the procedures described below. Residues from emptying the containers must be managed according to the hazard classification.

1. A container holding a *compressed gas* is considered empty when the pressure in the container approaches atmospheric pressure.
2. Containers that held an *acutely hazardous waste* [P-code wastes in 40 CFR §261.7 (b) ((3)], such as cyanide, are considered empty when:
  - (a) the container or inner liner has been triple-rinsed using a solvent capable of removing the material.
  - (b) the container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; or
  - (c) in the case of a container equipped with an inner liner that prevented contact of the commercial chemical product with the container when the inner liner has been removed.
3. Containers that held *hazardous waste* are considered empty when:
  - (a) all wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g., pouring, pumping, and aspirating; and
  - (b) no more than 1 inch of residue remains on the bottom of the container or inner liner; or
  - (c) no more than 3% by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 119 gallons in size.
4. Containers that have been appropriately emptied and returned for reuse would be indicated by applying a label or tag, marking the container Empty or MT or placed in an area where signage indicated containers are empty.
5. All plugs or caps are replaced to seal inlets/outlets if the container is to be reused onsite or sent offsite for reuse.
6. Marking, labeling, or placarding required by the U.S. Department of Transportation's (USDOT) hazardous materials regulations are removed or crossed out if the container is to be sent offsite for reuse.

## 2.8 Onsite Waste Management

Solid waste management facilities include inert solid waste landfills, the TSF, and waste rock dumps. These key waste management areas are regulated by ADEC under a waste management permit (2021DB0001) and are discussed in the following sections.

### 2.8.1 Class III (Camp) Municipal Solid Waste Landfill

A Class III (camp) municipal solid waste landfill is located at the mine site for the disposal of inert, non-hazardous, household, or other approved solid wastes. The Class III (camp) municipal landfill is permitted by the ADEC in accordance with 18 AAC 60.300(c)(3)(A).

In general, the Class III (camp) municipal landfill is designed and operated to keep runoff from outside the landfill area separate from the solid wastes, and in such a way as to prevent the attraction of wildlife. Wastes are stored in suitable containers prior to incineration or transfer to the landfill. Windblown litter and littered refuse from the areas around the landfill are collected and returned to the landfill. Visual monitoring is conducted within the landfill to verify compliance with the provisions of the Red Dog Mine Monitoring Plan which serve to satisfy the provisions of 18 AAC 60. The location and volume of waste placed in the Class III (camp) municipal landfill are surveyed and reported annually.

General mine refuse (e.g., wooden packaging, pallets, non-recyclable empty containers, non-putrescible refuse, household, office wastes, etc.) are placed directly into the mine Class III (camp) municipal solid waste landfill. All putrescible materials are incinerated and remaining bottom ash is disposed of in the landfill.

At least annually or when there is a change in the incinerator waste stream, a composite sample of bottom ash must be collected and analyzed it for metals using the Toxicity Characteristic Leaching Procedure. A composite sample consists of ash collected over a three-week period including ash from the incineration of typical quantities of sewage sludge.

Unusable, small vehicle tires that cannot be returned to the vendor may be disposed of in the landfill, though most are collected and shipped offsite. Some large loader and truck tires are utilized in the mine as a barricade wall placed to provide barricades or wall supports.

The mine operates the landfill in accordance with current conditions outlined in the Waste Management Permit 2021DB0001 listed within Section 2.2.

### 2.8.2 Monitoring

The environmental monitoring program for the Red Dog Mine is described in Appendix D, *Red Dog Mine Monitoring Plan*. This includes monitoring and characterization of surface water, groundwater, tailings, waste rock, seepage, and wildlife observation, in addition to visual monitoring of facilities. In addition, the mine has increased operator awareness training and monitoring of oil-containing equipment, including visual inspections, as part of preventive maintenance with the objective of reducing spills that result from equipment (i.e., hose) failures.

### 2.8.3 Reporting and Record Keeping

Regular reporting, as required by the ADEC Integrated Waste Management Permit, is provided on waste management activities and results of environmental monitoring. An operating record is maintained onsite, as specified in 18 AAC 60.

The Red Dog Mine's Waste Information System (WIS) is a web-based system that allows Red Dog Mine employees to identify and manage wastes efficiently in compliance with government regulations, Red Dog Mine policies, and this IWMP. WIS provides identification of different waste types, one-page guidelines, Standard Operating Procedures (SOP) including disposal method, and forms/checklists necessary to accurately maintain records and meet reporting requirements.

## **2.9 Waste Materials Managed Offsite**

In addition to liquid wastes and hazardous wastes, certain materials (wastes) are shipped offsite for recycling or disposal, including some of the recyclable materials listed in Section 2.5. These materials are segregated, as described in Section 2.6 and ultimately delivered to the mine site warehouse for processing as described below.

- All waste materials received at the warehouse are verified for appropriate labeling (e.g., type of material, date waste generated, etc.).
- Containers are assigned a unique container identification number and entered into an inventory.
- Material characterization testing is conducted if required.
- The material is placed in an appropriate accumulation area (e.g., hazardous waste accumulation area).
  - The material is shipped to an appropriate recycling and/or disposal facility depending on the type of material (e.g., solid or hazardous waste). All hazardous wastes are shipped to appropriate facilities (e.g., Treatment Storage and Disposal Facility [TSDF]).

All materials are shipped in accordance with the applicable regulations.

## **2.10 Hazardous Waste Management**

### **2.10.1 Hazard Waste Determinations**

As required by 40 CFR §262.11, hazardous waste determinations are made on all solid wastes generated. Determinations are made by reviewing the regulations, and, if required, testing the waste, or applying generator knowledge.

### **2.10.2 Hazard Waste Accumulation**

The following procedures are followed while hazardous wastes are accumulated:

- In general, hazardous waste is accumulated in satellite accumulation areas. Once containers become full (55 gallons or less), they are delivered to a hazardous waste accumulation area within three days of becoming full.
- Hazardous wastes not accumulated in a satellite accumulation area, such as wastes generated infrequently, are delivered to the hazardous waste accumulation area immediately.
- All wastes are shipped offsite within the required timeframe from their accumulation start date based on the generator status during the month the waste was generated.

- All containers are appropriately labeled as described in Section 2.7 and managed according to the applicable regulations.

### **2.10.3 Satellite Accumulation Areas**

Up to 55 gallons of hazardous waste, or 1 quart of acutely hazardous waste, can be accumulated in satellite accumulation areas, provided the requirements of 40 CFR §262.34(c) are met. Containers must be at or near the point of generation of the wastes; under the control of the operator of the process generating the waste; in good condition; made of, or lined with, materials that are compatible with the waste. Containers are to be kept always closed (except when adding/removing waste); opened, handled, and stored in a manner that prevents ruptures or leaks; and labeled with the words, "Hazardous Waste," or a description of the contents and the hazard class. This allows the accumulation of waste without a time limit until a container becomes full. Once a container in a satellite accumulation area becomes full, the date must be written on the label. Full containers would then be transferred to a central hazardous waste accumulation area within three days of becoming full.

### **2.10.4 Shipments of Hazardous Waste**

Hazardous wastes are shipped offsite to appropriate facilities in accordance with the applicable requirements of USDOT. Additional requirements may apply depending on the mode of shipment, as mandated by the ICAO, IATA, or IMDG code. Shipments will be accompanied by a hazardous waste manifest and the appropriate land disposal restriction (LDR) notification and certification forms where applicable.

## **2.11 Universal Waste Management**

The universal waste regulations (40 CFR §273) are streamlined hazardous waste management regulations that can be applied to the management of batteries, pesticides, mercury-containing equipment, and lamps. Generators of these wastes can choose to manage them as universal waste rather than under the more complex hazardous waste requirements. The intent of the universal waste regulations is to promote and facilitate the recycling and proper handling of these widely generated hazardous wastes.

The main types of universal wastes generated at the Red Dog Mine include batteries, mercury-containing equipment, and lamps.

Universal waste is managed in accordance with the regulations at 40 CFR §273. This includes accumulation in appropriate containers that are labeled as specified in 40 CFR §273.14, using a method that clearly demonstrates the length of time the universal wastes are accumulated from the date it became a waste or was received.

Universal waste is sent offsite to a permitted destination facility<sup>3</sup>, or a foreign destination (consistent with the export requirements of 40 CFR §273) within one year of the accumulation start date. Universal wastes meeting the definition of a hazardous material under the USDOT regulations are

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<sup>3</sup> Destination facility means a facility that treats, disposes of, or recycles a particular category of Universal Waste, with the exception of the management activities described in 40 CFR §273.13 (a) and (c) and 40 CFR §273.33 (a) and (c).

packaged, labeled, marked, and placarded, and appropriate shipping papers are prepared according to the applicable USDOT regulations under 49 CFR Parts 171 through 180.

## **2.12 Used Oil Management**

*Used oil* is defined as “any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities” and is regulated under RCRA 40 CFR §279.

Used oil generated at the Red Dog Mine, which meets the requirements to be regulated as used oil, is burned for energy recovery or shipped offsite for recycling. Used oil that must be regulated as hazardous waste is shipped offsite to an appropriate facility for proper handling and disposal.

The general requirements for managing used oil include:

- Maintaining records of used oil burned onsite and shipped offsite as specified in 40 CFR §279.
- Containers are in good condition and labeled with the words “Used Oil”.
- Any records produced as part of the management of used oil are kept on file for at least three years.
- Containers are provided with secondary containment as required under applicable regulations (40 CFR §112, 40 CFR §279 Subpart D, and 18 AAC 75).

## **2.13 Employee Training**

Red Dog Mine trains its employees in the appropriate management of mine wastes as required by MSHA, RCRA, and/or USDOT based on the duties of the employees.

In addition, the mine has increased operator awareness training and monitoring of oil-containing equipment, including visual inspections, as part of preventive maintenance with the objective of reducing spills that result from equipment (i.e., hose) failures.

Records of training are maintained on file according to the applicable regulations.

## **2.14 Inventory of Waste Materials**

Inventories of all hazardous materials used and stored at the site are maintained with warehouse records. Inventories of the locations of hazardous waste, universal waste, and satellite accumulation areas are maintained in WIS.

## **2.15 Safety Data Sheets**

A list of SDS for each hazardous material is maintained onsite, kept up-to-date, and made readily available to employees and contractors employed at the Red Dog Mine.

## 2.16 Inspections

Inspections of certain waste materials are conducted as required to verify waste materials are handled appropriately, in compliance with all applicable regulations, and in accordance with the inspection requirements of applicable permits and/or plans.

In addition, the mine has increased operator awareness training and monitoring of oil-containing equipment, including visual inspections, as part of preventive maintenance with the objective of reducing spills that result from equipment (i.e. hose) failures.

## 3 Specific Waste Material Handling Methods

The following sections describe the specific management methods that are followed for waste streams and other materials generated at the Red Dog Mine. Adherence to these methods by employees and contractors is essential to operate in compliance with all applicable regulations and permits and to protect the safety of employees, contractors, and the environment.

This IWMP is kept updated as needed, e.g., as new waste streams are added, procedures or processes are changed, or in response to modifications to the applicable regulations.

### 3.1 Absorbents

Absorbents, including absorbent pads, socks and booms; absorbent granules; and floor sweep are commonly used to collect spilled products. The disposal of absorbents is dictated by the material collected on the absorbent:

- Absorbents used to collect petroleum products are considered non-hazardous waste once no free liquid can drain from the absorbent. These absorbents are incinerated onsite or disposed of offsite. Any collected free liquid is managed as used oil.
- Absorbents managed as hazardous waste are those contaminated with a material classified as hazardous waste if disposed of and are shipped offsite to an appropriate facility (e.g., TSDF).
- Absorbents managed as non-hazardous waste are those contaminated with a material classified as a non-hazardous waste if disposed of. These absorbents are either incinerated onsite or shipped off site for disposal.

### 3.2 Antifreeze/Coolant

Ethylene glycol and propylene glycol are commonly referred to as antifreeze or coolants. Ethylene glycol is typically used as a coolant in equipment such as vehicles and generators. Ethylene glycol and propylene glycol are commonly referred to as antifreeze or coolants. Ethylene glycol is typically used as a coolant in equipment such as vehicles and generators. Propylene glycol is commonly used in liquid cooling systems such as heat exchangers. Propylene glycol can be used as de-icing fluid for airplanes.

Used glycol may be recycled onsite or sent offsite for treatment, disposal or recycling.

### 3.3 Asbestos and Lead Based Paint

If over the course of the mine life, facilities constructed off site are relocated to the project, the presence of asbestos or lead-based paint would be determined prior to any demolition or renovation activities. If asbestos or lead-based paint are present, certified, and trained asbestos and lead paint abatement contractors would be used for any required removal and disposal activities.

Asbestos removal and disposal will comply with 40 CFR §61, Subpart M. Any asbestos containing material purchased and brought to site will be documented and tracked.

### 3.4 Batteries

Batteries used onsite may include alkaline, lithium, nickel cadmium, nickel metal hydride, and lead acid batteries. *Non-hazardous waste* batteries are shipped offsite for recycling or landfilled onsite. Batteries that exhibit a toxic characteristic managed as *Universal Waste* and shipped offsite for recycling. Lead-acid batteries are shipped offsite for reclamation.

### 3.5 Building Construction and Demolition Materials

Construction refuse from initial or subsequent facility construction is assessed and appropriately managed for onsite disposal, offsite shipment for disposal, or recycling.

A complete survey of any building or structure to be demolished will be made prior to demolition to assess the potential environmental concerns and to determine appropriate management methods for any wastes or recyclable materials generated. If removal of asbestos is necessary, the material will be managed as described in Section 3.3.

### 3.6 Camp Waste

Camps waste may be broken down into two separate categories, household<sup>4</sup> and food related wastes. Household wastes are generated from employees and contractors at the mine site camp facilities, and office areas. Household waste is incinerated; ash is placed in the landfill. Food waste from the camp facilities is segregated from household wastes. Cafeteria, kitchen, and other food related waste is incinerated onsite. All camp wastes are managed to prevent putrescible wastes from being placed in the onsite landfills and becoming an attractant to wildlife.

#### 3.6.1 Sewage Sludge

Domestic sewage from the mine facilities undergoes primary treatment, which removes solids, and the effluent is pumped to the TSF. Solids are dewatered prior to incineration and the ash from the incinerator is then disposed of in the landfill.

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<sup>4</sup> Household waste definition: from 18 AAC 60.990 (66) "household waste" means solid waste; "household waste" includes garbage, trash, and sanitary waste in septic tanks, derived from a household; for the purposes of this paragraph, "household" includes single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas;

### 3.7 Chemical Reagents

Any spilled or expired chemicals, reagents or wastes are managed on a case-by-case basis and according to both federal and state waste regulations.

### 3.8 Containers/Packaging

All containers and packaging must be emptied appropriately prior to disposal, reuse onsite, or return to vendor, according to the requirements in Section 2.7.1.

### 3.9 Empty Drums

Drums that contained acutely hazardous waste are emptied according to provisions identified in Section 2.7.1, which requires triple rinsing.

### 3.10 Compressed Gas Cylinders

Compressed gas cylinders include those containing oxygen, acetylene, propane, ether, carbon dioxide, argon, and nitrogen. Most large cylinders are returned to the vendor and refilled. Large propane cylinders are refilled onsite whenever possible.

Cylinders are segregated by type and are managed according to safe handling procedures for compressed gas cylinders, which include ensuring they are stored in a secured upright position in a dry, cool, well-ventilated, secure area, protected from the weather, away from combustible materials.

Smaller disposable cylinders such as those containing ether, propane, or calibration gases, with the valve inside the top fitting, are depressurized through use; valve stems are then removed, and the cylinders are then recycled as scrap steel or landfilled.

#### 3.10.1 Aerosol Cans

All aerosol cans are punctured and drained using aerosol can puncturing units.

Cans are punctured with a non-sparking puncture pin, and the liquid is collected in the drum. A filter is attached to the ¾-inch bung on the drum to collect volatile organic compounds. The punctured and drained aerosol cans are considered *non-hazardous waste* and either landfilled or recycled as scrap metal.

Residues and filters from puncturing aerosol cans are tested to determine if they are hazardous waste. Typically, these wastes must be managed as *hazardous wastes* and are shipped to an appropriate facility.

### 3.11 Contaminated Soil

The following sections describe procedures for handling specific types of contaminated soil.

#### 3.11.1 Petroleum-Contaminated Soil

Petroleum-contaminated soil is managed onsite and is considered a *non-hazardous waste*.



### 3.11.2 Caustic / Acid Spills Outside the Mill and Secondary Containment

Where required, caustic and acid spills are neutralized onsite and managed as *non-hazardous waste* either in-situ or by removing the contaminated soil and subsequently neutralizing<sup>5</sup> the material.

## 3.12 Filters

There are a number of filters used onsite, including those from vehicles, buildings, baghouses, glycol recycling units, aerosol can puncture devices, assay lab, refinery, etc. In general, filters classified as non-hazardous waste are landfilled or incinerated. Filters classified as hazardous waste are shipped offsite for recycling.

The following sections describe procedures for managing filters collected throughout the facilities:

- Filters from glycol recycling units would likely be non-hazardous waste, in which case, they are incinerated or landfilled onsite.
- Filters from aerosol can puncturing units are typically hazardous waste and are managed as described in Section 3.10.1.
- Most of the filters from vehicles, equipment, and buildings onsite are non-hazardous waste and are sent offsite for recycling or disposed of in the onsite landfill. Hazardous waste filters are shipped off-site to an appropriate facility.
- Used oil filters include oil filters from vehicles or equipment and fuel filters from diesel equipment:
  - Used oil filters are considered exempt from hazardous waste regulations if they are gravity hot-drained according to one of the methods described below and if they are non-terne-plated:
    - Puncturing the filter anti-drain back valve or the filter dome end and hot-draining (EPA recommends minimum hot-drain time of 12 hours).
    - hot-draining and crushing
    - dismantling and hot-draining

### 3.12.1 Food Waste (Putrescibles)

- To prevent attraction of wildlife, food waste is incinerated onsite and not disposed of in onsite landfills. Inert ash from incineration is placed in the onsite landfill.
- Food wastes are placed in trash cans designated for food waste in the cafeteria and break rooms. All trash bags containing putrescibles are placed in an incinerator dumpster. Incinerator dumpsters are kept closed to prevent the attraction of wildlife.

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<sup>5</sup> For materials meeting the characteristic of corrosivity (40 CFR §261.22), these activities are conducted according to the RCRA requirements for an elementary neutralization unit (40 CFR §260.10)

### 3.13 Lab Waste

- Hazardous wastes generated in the assay laboratory are shipped off-site for disposal or recycled in the appropriate facility. Other non-hazardous wastes are landfilled.
- Assay lab acid or base solutions are neutralized<sup>6</sup> and pumped into the process plant.
- Laboratory sample preparation wastes are returned to the process plant to recover any valuable minerals.
- Personal Protective Equipment (PPE), i.e. gloves, masks, respirator cartridges, etc. are tested<sup>7</sup> to determine if they are hazardous. PPE found to be a hazardous waste are shipped offsite to an appropriate facility. Non-hazardous waste PPE is landfilled onsite.

### 3.14 Light Bulbs/Lamps

Many used bulbs are considered hazardous waste when disposed of and the bulbs can be managed as *universal waste*, if intact (EPA 2006a). Red Dog Mine looks for off-site facilities that recycle bulbs whenever possible. Bulbs classified as hazardous waste that are intentionally broken or crushed must be managed as *hazardous waste*.

#### 3.14.1 Non-Hazardous Lamps

Environmentally friendly, low-mercury, fluorescent lamps (“green end cap”) and light-emitting diodes (LED) are currently available and classified as *non-hazardous waste* when disposed. Red Dog Mine purchases environmentally friendly fluorescent bulbs whenever possible. Halogen lamps are also typically *non-hazardous waste*. Most *non-hazardous* lamps are sent offsite for recycling; minor amounts may be landfilled onsite.

### 3.15 Lubricants/Petroleum Products

#### 3.15.1 Brake Fluid

Brake fluid is managed as used oil and burned for energy recovery or shipped offsite for recycling.

#### 3.15.2 Grease

Grease that cannot be used onsite is shipped offsite for disposal. Grease buckets and other containers with less than 3% residue remaining in the container are considered empty and are crushed and disposed of in the onsite landfill. Grease-contaminated trash is disposed of at the onsite landfill or incinerated once any excess grease has been removed.

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<sup>6</sup> For materials meeting the characteristic of corrosivity (40 CFR §261.22), these activities are conducted according to the RCRA requirements for an elementary neutralization unit (40 CFR §260.10).

<sup>7</sup> Testing for the characteristic of toxicity is conducted according to the Toxicity Characteristic Leaching Procedure (TCLP), EPA test Method 1311 in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW-846.

### 3.15.3 Used Oil

Used oil generated that meets the applicable RCRA regulatory requirements is burned in space heaters and process boilers to recover energy (Section 2.12 addresses use for oil management requirements). Used oil that cannot be used on site is shipped to an offsite facility for recycling.

All used oil containers must be labeled “Used Oil” and contained in appropriate secondary containment. Quantities of used oil generated and burned for energy recovery or shipped off site are logged.

### 3.16 Miscellaneous Materials

- Styrofoam packaging and products are landfilled onsite. Styrofoam peanuts and other small pieces are placed in boxes or bags prior to disposal to maintain confinement to the landfill or dumpster. Fiberglass insulation and plastic materials are placed in the onsite landfill. Hoses are drained to the extent they would not drip any previous contents and landfilled onsite. Rubber products are placed in the onsite landfill, unless contaminated with product. Contaminated rubber is evaluated, a waste determination is made, and the material is handled accordingly.
- Draeger test tubes may be *non-hazardous waste* or *hazardous waste* depending on the type. *Non-hazardous waste* tubes are landfilled onsite. *Hazardous waste* tubes are shipped offsite to an appropriate facility. The manufacturer provides a letter with general comments on disposal requirements (based on chemical reactants).

### 3.17 Oily Waste

Oil- or grease-contaminated rags, pads, gloves, or absorbents are considered non-hazardous used oil. Once the free-flowing used oil has been removed from these materials, they are not considered used oil and are managed as solid waste if they do not exhibit a hazardous waste characteristic. These wastes may be combusted onsite, laundered, and reused onsite, or may be sent offsite for disposal or recycling. Any collected liquid is managed as used oil.

### 3.18 Paints and Paint Thinner

- Any unused water-based, latex, or acrylic paint in solid form or related painting materials (e.g., rags, brushes, rollers), are *non-hazardous waste* and are landfilled onsite; unused paint in liquid form is shipped offsite.
- Oil-based paints in solid form<sup>8</sup>, or related painting materials, are considered *non-hazardous waste* and are landfilled onsite; unused paint in liquid form may be *hazardous waste* and are characterized and managed appropriately.
- Thinners and solvent-based or lead-based paint in liquid or solid form, or related painting materials, may be *hazardous waste* and are characterized and managed appropriately.

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<sup>8</sup> Purposely leaving paint containers that contain hazardous waste paints open to dry to render them non-hazardous is not permitted.

### 3.19 Radioactive Materials

Radioactive materials used onsite include level gauges, scales, analysis equipment and exit signs containing cesium and tritium. These materials are handled by the Radiation Safety Officer according to the applicable regulations of:

- The U.S. Nuclear Regulatory Commission, which regulates the use of source, by-product, and special nuclear material under the authority of the U.S. Atomic Energy Act (10 CFR Parts 1 to 171).
- The USDOT regulations, which establish criteria for the safe transport of radioactive materials in the United States (49 CFR Parts 171 to 178).
- The EPA, which regulates the disposal of low-level radioactive material mixed with hazardous waste (40 CFR §261).

### 3.20 Rags

Rags are washed and reused whenever possible. The disposal of rags is dictated by the material on the rag:

- Rags contaminated with petroleum products are considered non-hazardous waste once no free liquid can drain from the rag and are incinerated or washed onsite. Collected oil is managed as used oil.
- Rags contaminated with other materials are classified based on the classification of the material used on the rag, if the materials were to become a waste.
  - Rags managed as hazardous waste are those contaminated with a material that is a hazardous waste if disposed. These rags are shipped offsite to an appropriate facility.
  - Rags managed as non-hazardous waste are those contaminated with a material that is not a hazardous waste if disposed. Excess liquid is removed from these rags, and they are incinerated, washed onsite, or disposed. Any collected liquid is managed according to the procedures described in this IWMP for the liquid.

### 3.21 Scrap Metal

Scrap metal includes building materials, empty drums, welding rod, compressed gas cylinders, grinding ball chips, mill liners, crusher liners, and copper wire. To the extent practical, scrap metals are recycled. Scrap metal that cannot be recycled is disposed of in the landfill.

### 3.22 Solvents

Eco-friendly, non-toxic, “Green” solvents are primarily used at the Red Dog Mine. These solvents are non-hazardous. Provided they are appropriately managed and not mixed with other wastes or materials, the solvents can be disposed of as non-hazardous waste. The main solvents generated are those from the parts washers. The solvent is reused and must be periodically replaced. Solvents from parts washers are sampled and characterized to determine if they are hazardous waste. Sludge from the parts washers are also sampled and characterized. Parts washer solvents and sludge are shipped off-site to an appropriate facility.

### **3.23 Tires**

Worn out tires are used onsite for a variety of applications e.g., safety berms, bumpers on tugboats, and those that cannot be used are sent offsite for recycling. Minor amounts may be placed in the mine landfill.

### **3.24 Wildlife**

Red Dog Mine handles wildlife mortalities in accordance with the procedures identified in the *Red Dog Mine Monitoring Plan*. Mortalities are normally sent to ADF&G in Kotzebue for evaluation.

### **3.25 Wood, Paper and Cardboard**

Wood, paper, and cardboard products are recycled and whenever this is not economically feasible, they are burned in an incinerator or landfilled. Residue ash and debris from open burning or incineration is landfilled onsite.

### **3.26 Tailings**

Tailings from the Red Dog mill are permanently disposed of in the Tailings Storage Facility. The disposal is authorized under the Integrated Waste Management Permit issued by ADEC. The tailings management plan is included in Appendix B

### **3.27 Waste Rock**

Waste rock is managed in accordance with the Waste Rock Management Plan in Appendix C

## 4 Spill Prevention and Response

The regulations governing spill prevention and response involve multiple agencies, including ADEC, USCG, and EPA.

Table 1 provides a list of required oil spill prevention and response plans, the applicable agency with jurisdiction, and the geographical area. In addition to oil spill response, the Red Dog Mine has multiple fully trained HAZWOPER response personnel trained at the HAZMAT Technician Level and sufficient equipment onsite capable of responding to both petroleum and other hazardous material releases.

**Table 1: Oil Spill Response Plans**

Plan	Application	Jurisdiction	Reference
Spill Prevention, Control, and Countermeasures (SPCC)	Containers of oil/fuel ≥ 55 gallons Port tank farm/fuel transfer facility Mine site oil/fuel storage	EPA	40 CFR 112
State of Alaska Oil Discharge Prevention and Contingency Plan	Port fuel storage/transfer facility piping Vessels and barges Mine site oil/fuel storage	ADEC	18 AAC 75

The spill response plans required by the State of Alaska are contained in TAK's *Oil Discharge Prevention and Contingency Plan*.

### 4.1 Spill Notification and Reporting

Spill notification and reporting may involve several different agencies depending on the substance and quantity spilled, including the EPA, USCG, National Response Center (NRC), LEPC and ADEC-SPAR (per 18 AAC 75.300). In addition, other agency, stakeholder, or landowner notification may be required based on specific conditions outlined within permits, agreements and or plans.

## 5 References

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- Alaska Department of Environmental Conservation 2012. Oil and Other Hazardous Substances Pollution Control, 18 AAC 75, April 8.
- International Air Transport Association 2012. IATA Guidance Document, Transport of Lithium Metal and Lithium Ion Batteries. [https://www.iata.org/whatwedo/cargo/dangerous\\_goods/Documents/Guidance-Lithium-Batteries-Transport-2012.pdf](https://www.iata.org/whatwedo/cargo/dangerous_goods/Documents/Guidance-Lithium-Batteries-Transport-2012.pdf) (accessed March 19, 2012).
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- Red Dog 2021 Mine Waste Rock Management Plan.
- Red Dog Mine 2021 Monitoring Plan.
- Red Dog Mine 2021 Reclamation and Closure Plan.
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U.S. Environmental Protection Agency (2011). Spill Prevention Control and Countermeasure (SPCC) Plan, Rectangular or Square Impoundment Structure, July.

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## Appendices

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Appendix A :      Legal Description of Property

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Appendix B : Tailings and TSF Water Management Plan

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Appendix C : Waste Rock Management Plan

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