



Orano Canada Inc.

Waste Management Plan

Exploration Department
Kiggavik Project

Version 9


November 2019

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History of Revisions

Version	Revision	Date	Details of Revision
1	0	March 2007	Original submission
2	0	October 2007	Update to reflect changes in field activities/capabilities and goals of continual improvement
3	0	January 2009	Update to reflect changes in field activities/capabilities and goals of continual improvement
4	0	January 2010	Update to reflect changes in field activities/capabilities and goals of continual improvement
5	0	May 2011	Update to reflect changes in field activities/capabilities and goals of continual improvement
5	1	May 2012	Updated to reflect personnel changes
5	2	May 2013	Updated to reflect personnel changes
6	0	January 2015	Updated references, formatting, and minor edits
7	0	January 2017	Updated to reflect transition to Care and Maintenance phase
8	0	January 2019	Updated to reflect corporate name change and title changes
9	0	November 2019	Updated to reflect personnel change

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Acronyms and Abbreviations

Term	Definition
Orano	Orano Resources Canada Inc.
SHEQ	Safety Health Environment and Quality

1 Introduction

The Kiggavik Project is currently in a care and maintenance phase. The Waste Management Plan (Plan) will be kept in this state, but is considered not applicable during the care and maintenance phase. Any waste produced during the current phase will be limited to daily domestic waste and will be hauled to Baker Lake daily. This Plan will be updated prior to a change in project phase to reflect the most recent information.

The Orano Canada Inc. (Orano) Waste Management Plan applies to the Kiggavik Project (Project) located approximately 80 km west of Baker Lake, Nunavut. Orano is committed to ensuring that all wastes generated by the Kiggavik Project are collected, stored, transported, and disposed of in a safe, efficient and compliant manner.

1.1 Purpose and Scope

The Waste Management Plan is fulfilled by using proven strategies and applying modern technologies to ensure materials are used efficiently and disposed of in an environmentally conscious manner. General strategies include the following:

- The implementation of a waste manifesting system to enable waste identification and tracking.
- The most environmentally suitable materials, equipment, and products are used where practical.
- Procurement procedures consider product substitution for materials that are hazardous to handle, generate hazardous wastes, or create an environmental liability.
- All site personnel attend an orientation, which addresses waste management and handling of hazardous goods, prior to being exposed to the worksite. The site orientation for short-term visitors includes a waste management component.
- Proper sorting, disposal, storage and handling of all waste streams.

1.2 Revision to Plan

During the active exploration phase the Plan is reviewed regularly and updated as required to keep the information current and consistent with regulatory and procedural changes. A History of Revisions can be found at the beginning of this Plan.

1.3 Responsibilities

The Manager – New Projects is responsible to ensure this Plan is implemented with the assistance of the following personnel:

- Project Geologist

- Facility and Logistics Coordinator, Kiggavik
- Coordinator, SHEQ Exploration
- Or designates

The Vice President, Exploration is ultimately responsible for any activity being carried out by Kiggavik Project personnel.

2 Waste Reduction, Reuse and Recycling

2.1 Waste Reduction

Efforts to, wherever practical, reduce waste at source, for example:

- refillable pump bottles instead of aerosol cans;
- reduction of paper consumption by promoting the use of electronic mail, voice messaging, electronic transmittals, etc.;
- reduction of disposable cups and containers by encouraging use/re-use of refillable mugs for beverages; and
- storage of bulk liquids in large containers and dispensing the liquids into smaller, refillable bottles and containers, instead of several smaller containers.
- Means of reducing the volume of waste generated continue to be developed as the project progresses.

2.2 Waste Reuse

Waste is reused to the furthest practical extent. Examples of waste reuse include but are not limited to the following:

- Reuse of packaging from shipping of materials and equipment
- 45 gallon drums for waste materials
- Sea containers for backhauling of wastes or equipment

2.3 Waste Recycling

Waste is recycled where practical. Materials that may offer recycling opportunities in the future are investigated on an on-going basis during operations to reduce waste. For example, Orano may store materials such as tires, fluorescent lamp ballasts, batteries, used oils, and other chemicals on-site for future shipment off-site for recycling.

3 Waste Sources

The most common sources and types of wastes that are generated are presented in Table 3.1.

Table 3.1 Sources of Waste Generation

Source of Waste	Types of Waste
Chemical handling and storage operations	waste petroleum products, used chemicals
Sewage	biological sludge
Equipment maintenance	used batteries, engine oil, oil filters, tires, scrap metals, <i>etc.</i>
Building maintenance	used transformers, fluorescent lighting ballasts/tubes, glycol, construction scraps (wood, piping <i>etc.</i>)
Domestic waste from: - camp and drill sites - offices - kitchen facilities	domestic garbage, food wastes, paper, cardboard
Inert waste from camp and drill sites	cement, sand, used industrial materials, metals, pipe, glass, insulation <i>etc.</i>
Biological waste from first aid facility	biological waste, blood, gauze pads <i>etc.</i>
Drilling	clean or contaminated (mineralized) drill cuttings

4 Identification, Treatment and Disposal Plan

Table 4.1 presents treatment strategies and disposal plans for wastes during the exploration program.

Table 4.1 Treatment Strategies and Disposal

Waste Type	Treatment Strategy	Disposal Plan
Petroleum based		
Used oil	Dispose or recycle off-site	Collect in bunged drums. Store in lined/bermed storage area. Ship off-site
Used hydraulic fluid	Dispose or recycle off-site	Collect in bunged drums. Store in lined/bermed area. Ship off-site
Oil filters	Recycle/recover	Collect in ring lidded drums. Store in lined/bermed storage area. Store for shipment off-site.
Contaminated soils	Excavate	Store for shipment off-site or land farming (upon approval)
Waste batteries	Recycle off-site	Drain (if required) and neutralize acid. Store for shipment off-site
Aerosol cans	Reduce/recycle	Puncture, drain, and collect in ringed drums for shipment off-site.
Paint	Dispose off-site	Collect and store cans in drums for shipment off-site
Chemicals		
Glycol	Dispose or recycle off-site	Collect in bunged drums. Store for shipment off-site
Solvents	Reduce/dispose off-site	Use non-toxic solvents where possible. Store in drums for shipment off-site
Domestic wastes		
Food	Incinerate	Collect and store in designated containers. Incinerate daily.
Paper/cardboard	Reuse/incinerate	Reuse where possible or incinerate
Plastics	reuse/dispose off-site	Reuse where possible
General camp wastes	Incinerate	Sort to retrieve non-burnable. Incinerate.
Inert Bulk Wastes		
Buildings/bulk debris	Reuse off-site/dispose off-site	Store for future shipment off-site
Wood	Incinerate, dispose	Sort wood, incinerate non-treated wood, ship treated wood off-site to approved disposal facility
Incinerator ash	Dispose off-site	Collect in drums for shipment off-site
Scrap metal	Dispose off-site	Store for shipment off-site
Organic Wastes		

Waste Type	Treatment Strategy	Disposal Plan
Sewage sludge	Incinerate	Bag and incinerate solid waste from pacto toilets; liquid waste is directed with greywater
Biological wastes	Incinerate/dispose off-site	Store in special waste receptacles. Incinerate/ship off-site
Clean drill cuttings		Disposed in a low lying area in the receiving environment; Potentially used for reclaiming sink holes
Contaminated drilling cuttings		Collected at the drill site in totes and stored in the radioactive storage compound for future handling, or shipped to an existing mining operation if the current exploration project does not proceed to development

5 Waste Management

5.1 Sorting

Waste must be sorted at the source before it can be disposed or transported to specific designated areas to ensure proper disposal. Measures that are implemented for sorting include, but are not be limited to, the following:

- Containers are available for the collection of burnable, non-burnable, and recyclable wastes, such as scrap metal, timber, unsalvageable equipment, etc. The contents of the containers are sorted and stored for future handling, which consists of incineration, off-site disposal, or recycling.
- Stored wastes are kept in a neat and tidy fashion and are transported off-site during the winter haul season in accordance with the Winter Road Plan.
- The waste manifest tracking will be updated upon removal of waste items from site.

5.2 Waste Storage

5.2.1 Containers

Containers used for storage of waste are selected based on physical and regulatory requirements prevention of wildlife attraction (i.e., steel or heavy duty plastic containers with positive clamping lids) and transport requirements (helicopter, truck, forklift, etc.). All containers are properly labelled to identify only those wastes for which the containers are being used to collect.

5.2.2 Waste Storage-Areas

All waste(s) collected in drums that are susceptible to damage which may lead to a leak or spill are stored in lined/bermed areas (arctic berms) for future handling and removal from site. The lined/bermed areas (arctic berms) have been identified as the location in which used or generated hazardous materials are to be stored prior to off-site shipment.

5.2.3 Incinerator

An incinerator is used on a daily basis for the incineration of non-hazardous, combustible waste materials, which includes paper, food waste, sewage and non-treated wood. Incinerator ash is collected regularly (frequency depending on ash loading) in sealed, wildlife resistant containers and transported off-site for disposal. Refer to *EXP-775, Operation of the Kiggavik Waste Incinerator* for proper handling instructions and operation of the incinerator. Proper waste segregation and incinerator operation ensures maximum combustion.

5.3 Food Waste Handling

Food wastes are collected from the camp, drills and other facilities as required, and immediately placed in plastic bags. The bagged waste is then transported directly to the incinerator which is located within 50 m of the kitchen. Typically, food wastes are incinerated daily to avoid potential wildlife attraction. Food wastes are not stored outside the incinerator area.

To prevent wildlife attraction, food, beverages and their containers are not disposed of outdoors. Designated snack and break areas for personnel are provided to prevent food and wastes from being generated uncontrollably around the site.

5.4 Non-Food Waste Handling

5.4.1 Sewage

When pecto-toilets are used, the sewage removed from the washrooms is collected in bags and immediately incinerated. Liquid sewage from the urinals is currently mixed with the camp grey water for discharge into a designated low-lying area, which is at minimum 30 m south of camp. The grey water from the kitchen and washroom facilities is diverted to the grey water collection sump area. The grey water sump consists of a barrel that was punctured with drainage holes and buried to allow drainage and filtration of the water.

5.4.2 Chemicals

Chemicals are collected in appropriate containers, and stored in a lined/bermed area for future shipment off site for disposal or recycling at an approved facility.

5.4.3 Waste Oil

Waste oil is collected in bunged drums and stored in the lined/bermed area for future shipment off-site for handling at an approved facility.

5.4.4 Domestic Wastes

Non-toxic, non-food solid wastes is sorted into recyclable, reusable, combustible, and non-combustible categories. Combustible items are burned in the incinerator, while non-combustible items are stored until they are shipped off-site for recycling. Aerosol cans are punctured and drained prior to being shipped off-site. Toxic materials are to be stored in sealed, steel or plastic drums in a lined/bermed area and shipped off-site for proper disposal.

5.4.5 Inert Bulk Wastes

Inert bulk wastes that cannot be readily recycled or reused, such as chemically treated wood, general debris, incinerator ash, tires, etc. are stored and appropriately labelled prior to shipment off-site to an approved facility.

5.4.6 Hazardous Wastes

Other hazardous, non-combustible waste and contaminated materials not identified above are temporarily stored in appropriate containers and shipped off-site for disposal or recycling.

During normal operations, hazardous materials are stored in other various locations associated with their intended use to minimize site transport and handling requirements. These materials and locations are as follows:

- oils and greases are stored in drums, pails, and bottles in the maintenance shop or drill laydown area
- batteries of all types are stored in a storage area;
- ethylene glycol is stored in drums in the lined/bermed area

5.4.7 Drill Cuttings

When drilling in non-mineralized zones, drill mud solids or cuttings are deposited in designated low-lying areas. When mineralized core, greater than 0.05% uranium, is intercepted, all drill mud and cuttings are disposed of down hole where possible or collected in appropriate containers and stored in the radioactive storage area. This is in accordance with *EXP-740-05, Management and Disposition of Radioactive Drill Cuttings* and the Abandonment and Restoration Plan.

6 References

Orano Canada Inc. 2015. *Abandonment and Restoration Plan*. January 2015

Orano Canada Inc. 2011. *Winter Road Plan*. May 2011.

Canadian Council of Ministers of the Environment (CCME). 2001. *Canada-Wide Standards for Dioxins and Furans Emissions from Waste Incinerators and Coastal Pulp and Paper Boilers*. 2001.

Environment Canada. 2010. *Technical Document for Batch Waste Incineration*. January 2010.

EXP-740-05, Management and Disposition of Radioactive Drill Cuttings

EXP-775, Operation of the Kiggavik Waste Incinerator

Government of Nunavut Department of Environment. 2010. *Environmental Guideline for the General Management of Hazardous Waste*. October 2010.

Government of Nunavut Department of Environment. Environmental 2012. *Guideline for the Burning and Incineration of Solid Waste*. January 2012.