

DCE/GINR comments and recommendations for updating the “Guidelines for waste handling from temporary work camps”

Scientific note from DCE – Danish Centre for Environment and Energy
& Greenland Institute of Natural Resources (GINR)

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Authors:	Bagger, Anne Mette ¹ , Bach, Lis ¹ , Jørgensen, Christian Juncher ¹ , Jia, Yu ² , Fritt-Rasmussen, Janne ¹ .
Institutions:	¹ Aarhus University, DCE - Danish Centre for Environment and Energy, & ² Greenland Institute of Natural Resources (GINR)
Referee:	Kim Gustavson
Quality assurance, DCE:	Kirsten Bang
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1 Introduction

The Environmental Agency for Mineral Resource Activities (EAMRA) has requested the Danish Centre for Environment and Energy (DCE) and Greenland Institute of Natural Resources (GINR) to provide scientific advice and text-close recommendations for an updated version of the 'Guideline for waste handling at temporary work camps' [ref 1].

The document is structured as follows:

- Chapter 2 presents DCE/GINR's general comments and recommendations relevant to the **current** [ref 1] and a **revised guideline**,
- Chapter 3 provides DCE/GINR's recommended proposal for a new **revised guideline**.

2 General comments and recommendations

From the review of the **current guideline** [ref 1], DCE/GINR recommend a revision of the guideline to reflect the most recent scientific knowledge as well as Best Environmental Practice (BEP).

DCE/GINR recommend that the **revised guideline** apply to all temporary field camps regardless of camp size or duration (i.e., person-days).

DCE/GINR recommend that the waste management guidelines outlined in the *Rules for Field Work* [ref 2] should be updated to reflect the recommendations in the **revised guideline**. Until the *Rules for Field Work* are formally updated accordingly, DCE/GINR recommend that the **revised guideline** temporarily replace the *Rules for Field Work* regarding waste handling.

In the preparation of the recommendations for the **revised guideline**, DCE/GINR have ensured relevant compliance with applicable legal and regulatory frameworks:

- The Greenland Parliament Act on Mineral Activities [ref 3], which regulates all activities related to the exploration and exploitation of mineral resources in Greenland;
- The principles of Best Available Techniques (BAT) and Best Environmental Practice (BEP), which are internationally recognized frameworks for minimizing environmental impacts;
- European Union directives, including the Waste Framework Directive (2008/98/EC) [ref 4], the Industrial Emissions Directive (2010/75/EU) [ref 5] and its amending directive (2024/1785) [ref 6] and the Urban Wastewater Treatment Directive [ref 7], where applicable, serve as reference standards for waste management, waste incineration and the management and discharge of wastewater.

3 DCE/GINR recommended proposal for a revised ‘Guideline for waste handling at temporary mineral exploration field camps’

3.1 Introduction

This guideline applies to waste handling (solid and liquid waste) at temporary mineral exploration field camps in Greenland (referred to as “field camps” in the following).

The guideline sets out minimum requirements for handling, storage, transportation, and disposal of waste generated during the establishment, operation, and decommissioning of temporary field camps.

3.2 Waste handling plan

Before commencing field camp activities, the operator must submit a *Waste Handling Plan*.

The *Waste Handling Plan* should include the following:

- Short description of the planned field activities, details of the camp setup, number of personnel, length of activity, and maps indicating the location of the field camp and waste facilities;
- Site description, including, but not limited to, recipients and potentially affected environmentally sensitive areas;
- Estimation of expected waste quantities. For hazardous waste, a list of specific products, chemicals, etc., should be included;
- Description of solid and liquid waste handling procedures. For each waste fraction, the procedures should include information on sorting, storage, transportation, and final treatment or disposal methods;
- Assignment of responsibilities, including the designation of a waste management responsible person at the camp level, accountable for implementation, inspection, and documentation of waste handling practices;

3.3 General requirements

Field camps must be established and operated in a manner that minimizes surface disturbance, prevents pollution, protects surrounding ecosystems, and ensures safe and hygienic conditions for personnel.

Upon completion of mineral exploration activities, all field camps must be decommissioned and the site restored to a condition that minimizes environmental impact.

All products used in the household, kitchen, sanitary facilities, laundry, etc., are encouraged to be environmentally friendly and, where available in Greenland, carry an eco-label such as EU Ecolabel or equivalent certification.

All waste generated at field camps must be managed in accordance with the *Waste Hierarchy*, as established in the EU Waste Framework Directive

(2008/98/EC; EU, 2008). This hierarchy prioritizes waste management options in the following order:

- **Reduce:** Waste generation should be minimized through careful planning and procurement.
- **Reuse:** Materials and equipment should be reused within the camp wherever feasible before being classified as waste.
- **Recycle:** Waste that cannot be reused should be segregated and collected for recycling in accordance with the applicable waste management regulations.
- **Recover:** When recycling is not possible, waste should be considered for energy or material recovery processes.
- **Disposal:** Disposal of waste should only occur when all other options have been considered or are impractical.

Operators must integrate the *Waste Hierarchy* into all waste-related aspects of camp planning and operations.

3.4 Definition, categorization, and treatment of waste

For this guideline, *waste* is defined as any material or substance that is, or is intended to be, discarded, or is no longer considered useful for the activity for which it was generated.

To ensure implementation of the Best Available Technique (BAT) and Best Environmental Practice (BEP) in waste handling, proper *waste sorting* must be conducted in accordance with the categories specified below.

All personnel must be instructed in correct sorting procedures.

Operators are responsible for selecting appropriate waste-handling methods, which must be clearly described in the *Waste Handling Plan*. Waste may be transported to off-site licensed waste reception facilities or managed on-site in accordance with the categories specified below:

3.4.1 Solid waste

Solid waste includes all non-liquid materials.

Solid waste should not be buried, dispersed on the terrain, or discharged into freshwater bodies (streams, lakes) or into the sea.

Open burning of solid waste must not take place unless prior approval is obtained from EAMRA.

3.4.1.1 Combustible waste

Combustible waste that is non-recyclable and non-hazardous includes household waste, food waste, plain wood, paper, plastic, and cardboard.

All combustible waste must be incinerated in an on-site or off-site incinerator. Incinerators for on-site incineration require approval by EAMRA. Incineration plants must meet EU/US standards and be CE marked (or equivalent). Incineration must be conducted in closed combustion chambers and comply

with applicable EU requirements for combustion temperatures¹ and air emission limit values².

To ensure complete combustion, flue gases must reach a minimum temperature of 850 °C for at least 2 seconds in the presence of at least 6% oxygen in the secondary combustion chamber¹. Incinerators must be operated, maintained, and adjusted according to manufacturer's specifications, and where practicable, operated continuously with as much waste load as possible to ensure efficient combustion.

When in operation, the plant must not produce and emit wastewater and must not cause major dust and odour nuisances to the surrounding area.

Combustion-generated bottom ash and other combustion residues must be managed in accordance with the requirements for hazardous waste (section 3.4.1.2.2).

3.4.1.2 Non-combustible waste

3.4.1.2.1 Recyclable waste

Recyclable waste includes, but is not limited to, metals, glass, and tyres.

Recyclable waste must be collected and stored on-site as described in section '3.5 Waste storage' prior to shipment to an off-site licensed waste reception facility.

3.4.1.2.2 Hazardous waste

Hazardous waste includes solids that contain one or more of the EU-listed hazardous properties³. These include, but are not limited to, empty fuel containers, batteries, electronics, furniture, combustion-generated bottom ash, and other combustion residues.

Hazardous waste must be collected and stored on-site as described in section '3.5 Waste storage' prior to shipment to an off-site licensed waste reception facility.

3.4.2 Liquid waste

A summary of liquid waste handling can be found in Appendix 1.

3.4.2.1 Greywater

Greywater includes wastewater from sinks, showers, kitchen sinks, and other non-toilet sources.

¹ Article 50(2) of Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (2010/75/EU, EU, 2010).

² Air emission limit values for waste incineration plants are listed in Annex VI (part 3) of Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (2010/75/EU, EU, 2010).

³ Properties are listed in Annex III of Commission Regulation (EU) No. 1357/2014 of the Waste Framework Directive (2008/98/EC; EU, 2008)

Greywater must not be discharged to the surface terrain or surface sea. Discharge of *untreated* greywater to sub-terrain and subsea should follow the regulations below and is only permitted upon approval by EAMRA.

Discharge of untreated greywater to the sub-terrain must occur through a fascine or equivalent infiltration structure designed to prevent animal intrusion.

Discharge of untreated greywater to the subsea must occur at sites with sufficient seawater circulation and water exchange to ensure adequate dilution and dispersion. Suitable discharge locations typically include areas with strong tidal currents, open-water conditions, or other areas characterized by regular natural water exchange that prevents the accumulation of contaminants, as demonstrated through hydrodynamic data. EAMRA may require that the recipient is monitored depending on the number of person-days⁴ and the sensitivity of the recipient, as outlined in Appendix 2. Monitoring typically involves measuring wastewater composition of nitrogen (N), phosphorus (P), Biochemical Oxygen Demand (BOD), and Chemical Oxygen Demand (COD), which can be assessed directly using in-situ kit- or probe-based analytical methods or by collecting wastewater samples for subsequent analysis at an accredited laboratory.

Discharge of *treated* greywater to sub-terrain, sea, and freshwater should follow the regulations below and is only permitted upon approval by EAMRA.

Treated refers to greywater that has undergone one or more engineered processes to remove or reduce contaminants before discharge. Greywater treatment methods must comply with EU standards⁵ and be approved by EAMRA.

Discharge of treated greywater to the sub-terrain must occur through a fascine or equivalent infiltration structure designed to prevent animal intrusion.

Discharge of treated greywater to the sea and to freshwater must comply with criteria depending on person-days and the sensitivity of the recipient, outlined in Appendix 2. EAMRA may require that the recipient is monitored depending on the number of person-days⁴ and the sensitivity of the recipient, as outlined in Appendix 2. Monitoring typically involves measuring wastewater composition of N, P, BOD, and COD, which can be assessed directly using in-situ kit- or probe-based analytical methods or by collecting wastewater samples for subsequent analysis at an accredited laboratory.

3.4.2.2 Blackwater

Blackwater includes wastewater containing human excreta from toilets and latrines.

Untreated blackwater must not be discharged to the surface terrain, freshwater, or surface seawater.

⁴ Person-days = Number of people × Number of days spent in the field camp

⁵ Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment (EU, 1991)

For field camps below 300 person-days⁴, discharge of *untreated* blackwater to sub-terrain and subsea is only permitted upon approval by EAMRA and should follow the regulations below.

Discharge of untreated blackwater to sub-terrain must occur through a fascine or equivalent infiltration structure designed to prevent animal intrusion.

Discharge of untreated blackwater to the subsea must occur at sites with sufficient seawater circulation and water exchange to ensure adequate dilution and dispersion. Suitable discharge locations typically include areas with strong tidal currents, open-water conditions, or other areas characterized by regular natural water exchange that prevents the accumulation of contaminants, as demonstrated through hydrodynamic data. EAMRA may require that the recipient is monitored depending on the number of person-days⁴ and the sensitivity of the recipient, as outlined in Appendix 2. Monitoring typically involves measuring N, P, BOD, and COD, which can be assessed directly using in-situ kit- or probe-based analytical methods or by collecting wastewater samples for subsequent analysis at an accredited laboratory.

Treated blackwater must not be discharged to the surface terrain.

Treated refers to blackwater that has undergone one or more engineered processes to remove or reduce contaminants before discharge. Blackwater treatment methods must comply with EU standards⁵ and be approved by EAMRA.

Discharge of treated blackwater to sub-terrain, sea and freshwater should follow the regulations below and is only permitted upon approval by EAMRA.

Discharge of treated blackwater to the sub-terrain must occur through a fascine or equivalent infiltration structure designed to prevent animal intrusion.

Discharge of treated blackwater to the sea and to freshwater must comply with criteria depending on person-days⁴ and the sensitivity of the recipient, outlined in Appendix 2. EAMRA may require that the recipient is monitored depending on the number of person-days⁴ and the sensitivity of the recipient. Monitoring typically involves measuring wastewater composition of N, P, BOD, and COD, which can be assessed directly using in-situ kit- or probe-based analytical methods or by collecting wastewater samples for subsequent analysis at an accredited laboratory.

For field camps above 300 person-days⁴, *untreated* blackwater must not be discharged to sub-terrain and subsea.

Discharge of *treated* blackwater to sub-terrain, sea, and freshwater should follow the regulations below and is only permitted upon approval by EAMRA. Blackwater treatment methods must comply with EU standards⁵ and be approved by EAMRA.

Discharge of treated blackwater to the sub-terrain must occur through a fascine or equivalent infiltration structure designed to prevent animal intrusion.

Discharge of treated blackwater to the sea and to freshwater must comply with criteria depending on person-days⁴ and the sensitivity of the recipient, outlined in Appendix 2. EAMRA may require that the recipient is monitored

depending on the number of person-days⁴ and the sensitivity of the recipient, as outlined in Appendix 2. Monitoring typically involves measuring wastewater composition of N, P, BOD, and COD, which can be assessed directly using in-situ kit- or probe-based analytical methods or by collecting wastewater samples for subsequent analysis at an accredited laboratory.

For moored hotel ships, all blackwater and greywater discharge must comply with criteria outlined in Appendix 2. Alternatively, grey and black water can be stored onboard and transferred to a shore reception facility.

3.4.2.3 Hazardous liquid waste

Hazardous liquid waste includes liquids that contain one or more of the EU-listed hazardous properties⁶. These include, but are not limited to, oil, paints, fuels, chemicals and reagents, and drilling fluids.

Hazardous liquid waste must not be discharged to the terrain, freshwater, or the sea.

Hazardous liquid waste must be collected and stored on-site as described in section '3.5 Waste storage' prior to shipment to an off-site licensed waste reception facility.

3.5 Waste storage

Temporarily stored solid and liquid waste at field camps must be stored in designated, clearly marked storage areas according to waste category. These areas must be maintained in a clean and orderly condition to prevent odours, environmental contamination, and the attraction of wildlife.

Regular inspections must be conducted to ensure compliance, identify risks, and implement mitigating actions when necessary.

The storage area must be located at least 100 m from water bodies (freshwater and sea) in case of leakage.

All waste must be stored in closed, weatherproof, leak-proof, and animal-proof containers that are suitable for the waste type, well-maintained, and clearly labelled.

Hazardous solid and liquid waste, including fuel, must be stored separately in designated areas in sealed containers with appropriate secondary containment measures. Secondary containment may consist of double-walled fuel tanks or non-permeable membranes with raised edges or trays designed to prevent spills from spreading to the surroundings. Fuel storage areas must have a containment capacity of at least 110 % of the volume of the largest container. The storage area or containment tray must have no drainage outlets, and any accumulated rainwater or snowmelt must be removed promptly to maintain full containment capacity.

⁶ Annex III of Commission Regulation (EU) No. 1357/2014 of the Waste Framework Directive (2008/98/EC) (EU, 2008)

Operators must ensure sufficient storage capacity for all waste generated during field activities prior to shipment to an off-site licensed waste reception facility.

3.6 Spill prevention and emergency preparedness

Areas with spill risks, including fuel storage zones, workshops, and hazardous waste storage sites, must be equipped with appropriate spill containment kits and response materials.

Designated personnel must be trained in spill response procedures to ensure prompt and effective action in the event of a release. Any incident must be contained, documented, and reported directly to the Greenland Mineral Resource Authority (GMRA).

3.7 References

BEK, 2016. BEK nr 46 af 12/01/2016. Bekendtgørelse om spildevandstilladelser m.v. efter miljøbeskyttelseslovens kapitel 3 og 4. <https://www.retsinformation.dk/eli/lta/2016/46>

EU, 1991. Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31991L0271>

EU, 2008. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0098>

EU, 2010. Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075>

VEJ, 2018. VEJ nr 9568 af 30/06/2018. Vejledning til bekendtgørelse om spildevandstilladelser m.v. efter miljøbeskyttelseslovens kapitel 3 og 4. <https://www.lovguiden.dk/loven/vejledning-til-bekendtg%C3%B8relse-om-spildevandstilladelser-m-v-efter-milj%C3%B8beskyttelseslovens-kapitel-3-og-4>

Appendix 1

Table 1. Summary of liquid waste handling

	Person-days ^a	No discharge to	Discharge allowed upon EAMRA approval	
			Untreated	Treated ^b
Greywater		Surface terrain	Sub-terrain ^c , subsea ^d	Sub-terrain ^c , sea ^e , freshwater ^e
Blackwater	< 300	Surface terrain	Sub-terrain ^c , subsea ^d	Sub-terrain ^c , sea ^e , freshwater ^e
	> 300	Surface terrain		Sub-terrain ^c , sea ^e , freshwater ^e
Hazardous liquid waste		Surface or sub-terrain, freshwater, sea		

^aPerson-days = Number of people × Number of days spent in the field camp

^bWastewater has undergone one or more engineered processes to remove or reduce contaminants before discharge.

^cThrough a fascine or equivalent infiltration structure designed to prevent animal intrusion.

^dFor example, through pipework.

^eSee appendix 2.

Appendix 2

If grey- or blackwater is discharged to sea or freshwater, the wastewater composition or the treatment facility must comply with the criteria set in Table 2, depending on person-days and the sensitivity of the recipient.

Monitoring can be assessed directly using in-situ kit- or probe-based analytical methods or by collecting wastewater samples for subsequent analysis at an accredited laboratory. The monitoring frequency, parameters, and analytical methods must be determined based on the project characteristics, wastewater quality, discharge volume, and environmental sensitivity of the receiving environment.

Table 2. Criteria to meet for wastewater discharge to sea or freshwater, depending on person-days^a and the sensitivity of the recipient. The discharge limit values are derived from the Danish Executive Order on Wastewater Discharge Permits⁷.

Person-days	Criteria
300-999	No requirements or BOD (15 mg/l), COD (75 mg/l).
1000-9999	BOD (15 mg/l), COD (75 mg/l) or BOD (15 mg/l), COD (75 mg/l), Total-N (8 mg/l), and Total-P (1.5 mg/l).
10 000-100 000	BOD (15 mg/l), COD (75 mg/l), Total-N (8 mg/l), and Total-P (1.5 mg/l) or Requirements for cleaning and discharge are set by EAMRA, depending on location for the discharge to freshwater or sea.
>100 000	Requirements to discharge are set by EAMRA, depending on location for the discharge to freshwater or sea.

BOD=Biological Oxygen Demand,

COD= Chemical Oxygen Demand,

N=Nitrogen,

P=Phosphorous

^aPerson-days = Number of people × Number of days spent in the field camp

⁷ BEK nr 46 af 12/01/2016, Bekendtgørelse om spildevandstilladelser m.v. efter miljøbeskyttelseslovens kapitel 3 og 4 (BEK, 2016), Vejledning til bekendtgørelse om spildevandstilladelser m.v. efter miljøbeskyttelseslovens kapitel 3 og 4 (VEJ, 2018)

4 References to the note

1. The Environment Agency for Mineral Resources Activities, Government of Greenland. Guidelines for Waste Handling from Temporary Work Camps.
2. Government of Greenland, Bureau of Minerals and Petroleum, 2000. Rules for Field Work and reporting regarding mineral resources (excluding hydrocarbons) in Greenland. November 2000.
3. Greenland Parliament, 2024. Greenland Parliament Act of January 1st, 2024, on mineral activities.
4. European Parliament, 2008. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
5. European Parliament, 2010. Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).
6. European Parliament, 2024. DIRECTIVE (EU) 2024/1785 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 April 2024 amending Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) and Council Directive 1999/31/EC on the landfill of waste.
7. European Parliament, 1991. Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment.