

[Client name and country]

[Type of acquisition] Seismic Acquisition

PD-08 WASTE MANAGEMENT PLAN

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REVISION HISTORY				
Revision History	Date of Issue	Reason for Update	Issued by	Approved by (client)

DISTRIBUTION LIST			
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Table of Contents

1. INTRODUCTION 4
1.1. PURPOSE 4
1.2. OBJECTIVE 4
2. DEFINITIONS 4
3. APPLICABLE LEGAL AND OTHER REQUIREMENTS 5
4. ROLES AND RESPONSIBILITIES 5
5. STAKEHOLDERS 7
6. ESTIMATED WASTE GENERATION 8
7. RISK ASSESSMENT AND CONTROL 9
8. MITIGATION MEASURES 11
8.1. WASTE TYPES, HANDLING AND DISPOSAL ROUTES 11
8.2. WASTE STORAGE AREAS 14
8.3. EMISSION TO AIR 14
8.3.1 Engines/Fuel 14
8.3.2 Refrigerants 14
8.3.3 Incinerators 15
8.4. ANTI-FOULING PAINTS 15
8.5. TRANSFER OF SOLID WASTE TO SHORE 16
8.6. TRANSFER OF LIQUID WASTE TO SHORE 16
8.7. TRANSFER OF LIQUID WASTE BETWEEN VESSELS 16
8.8. WASTE CONSIGNEE NOTE 16
8.9. WASTE MINIMIZATION EFFORTS 16
9. WASTE MANAGEMENT CONTRACTOR 16
10. VESSEL SPECIFIC 17
10.1. VESSEL SPECIFIC PLANS AND PROCEDURES 17
10.2. OIL RECORD BOOK 17
10.3. GARBAGE RECORD BOOK 17
11. WASTE AND EMISSIONS MONITORING 17
12. INCIDENT INVESTIGATIONS 17
13. LEARNING 17
14. REFERENCES 17
[ADD CLIENT'S EIA/ESIA/HSEIA REFERENCE] 18

1. INTRODUCTION

This Waste Management Plan (WMP) has been developed to support the Project HSSE Plan for the **[client name]** in **[country].** It has been complied based on BGPO-MP-046 Waste Management Plan and applies to all vessels within the Seismic Survey Fleet (SSF).

- The Waste Management Plan covers the following areas:
  - Onboard Waste Management (solid waste, effluents and emissions)
  - Transportation of waste to shore
  - Onshore Waste Management

1.1. PURPOSE

The purpose of this document is to enable all stakeholders within the project to:

- Identify the roles, responsibilities and authority of key personnel within the plan
- Understand client and legal requirements related to waste management
- Understand the types of treatment done with each type of waste onboard and onshore
- Understand mandatory records and data keeping requirements.

1.2. OBJECTIVE

The objectives of this plan are to ensure that during the mobilisation, operations and de-mobilisation phases of this project:

- All discharges to sea are compliant to the appropriate; International, National and Industrial conventions, standards, regulations and guidelines
- All discharges to land are compliant to national standards and regulations
- All waste and discharges comply with contractual obligations

2. DEFINITIONS

IMO: International Maritime Organization

IOGP: International Oil and Gas Producers

IOPP: International Oil Pollution Prevention

MARPOL: International Convention for the Prevention of Pollution from Ships

MEPC: Marine Environment Protection Committee

PMS: Preventative Maintenance System

SEEMP: Ship Energy Efficiency Management Plan

SSF: Seismic Survey Fleet

WMP: Waste Management Plan

[ADD OR CHANGE DEFINITIONS]

3. APPLICABLE LEGAL AND OTHER REQUIREMENTS

Data can be obtained from the client's

ISSUE (topic e.g. water resources, waste management etc)	APPLICABLE LEGAL AND OTHER REQUIREMENTS Legislation number and title)

Table 1 Applicable legal and other requirements

4. ROLES AND RESPONSIBILITIES

It is the duty of all personnel detailed below to understand their role, responsibilities and authority and to ensure that all personnel in their direct line of management are aware of their role, responsibilities and authority throughout the lifecycle of the project.

The responsibility of each role involved in this plan is detailed below:

Environmental and Sustainability Manager is responsible for:

- Preparing this plan
- Identifying legal and other requirements applicable to waste management
- Providing Leadership in all environmental matters related to the management of projects
- Allocating resources to enable the implementation of this plan on all BGPO's facilities within the projects.
- Providing options and ideas for waste minimization.
- Reviewing the vessels performance towards waste management and ensure pollution control is maintained.
- Ensuring the best possible alternative for waste disposal have been chosen for each type of waste.
- Ensuring waste management company have been properly audited and selected.

Project Manager is responsible for:

- The coordination of resources and the effective execution of this plan
- Collecting project data, statistics and analyzing data to be used in reporting on a weekly, monthly and annual basis as required by BGPO
- Managing any client feedback or audit findings that present opportunities for improvements

Project QHSSE Lead is responsible for:

- Assisting with identifying waste management options available in country
- Assisting with waste management facility audits and ensuring all records of such audits are in FLAG
- Assisting with waste minimization alternatives.
- Checking waste records periodically in FLAG to ensure quality and accuracy.
- Ensure reports are compiled, when required.

Logistics Manager is responsible for:

- The coordination of resources and the effective execution of plan
- The identification of an appropriate onshore waste facility that complies to BGPO standards, client's requirements and host nation legal obligations
- Coordinating waste transfers from offshore facilities to onshore facilities.

Party Chief is responsible for:

- Demonstrating leadership in Environmental Preservation by leading by example
- The daily management, supervision and implementation of this plan
- Waste management at the work site; identification and mitigation of operational impact to environment in close cooperation with the master

QHSSE Advisors are responsible for:

- Leading by example
- Monitoring their location's compliance with this plan
- Provide guidance on any waste management issues that may arise in cooperation with Environmental and Sustainability Manager

Vessel Masters are responsible for:

- Demonstrating leadership in Environmental Preservation by leading by example
- Ensuring all necessary documentation are adhered to, and completed in support of this plan
- Coordinating training drills for the Maritime crew and Seismic team

Chief Officer is responsible for:

- Implementing this Waste Management Plan
- Liaising with shore authorities for port reception facilities
- Signing the waste record book as required by regulations
- Ensuring the designated waste handling personnel wear the correct personal protective equipment at all time during waste handling
- Implementing the vessel specific Garbage Management Plan
- Monitoring correct practices contained in the vessel garbage management are implemented.
- Ensuring placards are displayed in appropriate areas of the vessel
- Training & familiarization of Shipboard personnel to facilitate compliance to the Garbage Management Plan.
- Ensure Officers and Crew on-board comply with the Ship's Garbage Management Strategy & MARPOL 73/78 Annex V.

Chief Engineer is responsible for:

- Implementing this Waste Management Plan
- Signing the waste record book as required by regulations

Health Care Professional(s) is responsible for:

- Ensuring all clinical waste is handled and disposed of in accordance with this Waste Management Plan and the vessel Garbage Management Plan
- Liaising with the Chief Officer on the disposal of all clinical waste onshore

5. STAKEHOLDERS

The following stakeholders have been identified as well as their respective needs and expectations:

Shall be revised from project to project

Stakeholder	**Needs and Expectations**
Local Government	Compliance with applicable law
Local Community	No pollution from project's solid waste, effluent discharges and emission
Customer	High level of HSE Keep good reputation Follow local legislation and internal customer requirements
Waste Management contractor	Business opportunities Communication and project management Clear instructions on the requirements for this project
Vessel owners/Operators	Clear instructions on requirements Follow this plan and applicable regulatory requirements
NGOs/environmental groups	Good environmental stewardship Conservation of quality of air, water and soil
Staff	High levels of QHSE Company's reputation No environmental impacts

Table 2 Stakeholders needs and expectations

6. ESTIMATED WASTE GENERATION

The estimate waste and volume and method of treatment for the seismic vessel can be found in table 3.

Waste General Category	Specific Classification		Estimated volume per day (m^3)					
			[vessel name 1]	[vessel name 2]	[vessel name 3]	[vessel name 4]	[vessel name 5]	[vessel name 6]
Non- Hazardous waste		Food Waste						
		Plastic						
	Domestic waste	paper						
		Glass						
		Aluminium cans						
		Wood						
		Incinerator Ashes						
		Cooking oil						
Hazardous wastes	Operational waste	Oily waste (Rags/filters）						
		Fluorescent tubes						
		Medical waste						
		Aerosol Cans						
		Hazardous waste (Oily waste, etc.)						
		Waste oil/ Sludge						
		E-Waste						

Table 3 Estimated waste generation per vessel/day (m3)

7. RISK ASSESSMENT AND CONTROL

The following table identifies the specific environmental risks that where identified for the project, a

more detailed evaluation of these risks plus their mitigations are contained within the Project Risk Assessment.

All risks are evaluated according to BGPO's risk matrix.

Ranking	Risks	Risk Rating
1	Discharge to Sea Discharge to sea of untreated waste Discharge to sea of treated waste in environmentally restricted area Discharge to sea of treated waste within restricted areas Discharge to sea of restricted waste Wash off from deck cleaning Potential Outcome: Environment - Short lasting marine pollutants Financial - Fines Caused By Defective treatment plant Defective plant alarms Use of cleaning solutions containing marine pollutants Human error during discharge Human error during waste segregation Failure to identify restricted areas prior to discharge	L
2	Discharge to Air Incompletely burnt engine fuel Potential Outcome: Environmental - Short lasting local air pollutants Environmental - Greenhouse gases Caused by Poor quality fuel Poor power management of engines and compressors	L
3	Discharge to Air Release of ozone depleting substances Potential Outcome:	L

Ranking	Risks	Risk Rating
	Environmental - Short term environmental damage Caused by Human error release of refrigerant during maintenance and repair of plant Failure of plant refrigerant system	
4	Discharge to Land Incorrect management of waste stream Potential Outcome: People - Injuries up to medical treatment case Environmental - Short term pollutant Financial - Fines Caused by Human error during waste segregation and packaging Human error in completion of Waste Consignee Note Illegal dumping by waste management company	L

Table 4 Waste management risk assessment

8. MITIGATION MEASURES

8.1. WASTE TYPES, HANDLING AND DISPOSAL ROUTES

Guidance: To choose disposal routes, take into account client's requirements, country legal requirements (including permit requirements) and disposal methods available in country. Choose always the best possible option e.g. recycling the most possible, avoiding landfills, choosing best treatment for hazardous waste.

Waste Category	Main Constituents	Handling and Disposal Routes	Final Destination
Non-hazardous Waste			
Recyclable (non-combustible)	Plastic	Segregated and compacted waste is stored onboard for disposal at suitable facilities onshore	Recycling
	Glass		Recycling/Landfill
	Paper		Recycling
	Aluminum cans		Recycling

	Wood	Stored onboard	Landfill
Domestic (non-recyclable)	Domestic, contaminated with food	Segregated and compacted waste is stored onboard for disposal at suitable facilities onshore	Landfill
Food waste	Organic nutrients	Ground and disposed overboard per MARPOL	Or Landfill
Used cooking oil	From galley	Stored in drums	Treatment facility
Hazardous Waste			
Infirmary waste	Contaminated with bodily fluids, plastic, glass, medicines, needles	Segregated and stored separately for disposal	Incinerator
Chemicals	Solvents, degreasers and thinners, Water-based liquid paints and oil/solvent based liquid epoxy resin paints, lacquers and varnishes, Acids (substances and mixtures with a pH less than 7), Solvent based adhesives, including rags used with the above chemicals	Segregated and stored separately to be transferred to shore for safe disposal	Incinerator
Used oils	Used refined petroleum distillates incl. engine lubrication oil, motor oil, transmission oil and hydraulic fluid. Diesel from generators etc. that cannot be reused.		Treatment facility
Contaminated with oil	Oily filters, oily rags etc.		
Batteries	General purpose batteries		Incineration
Seismic Batteries	Ion-lithium battery polymer lithium batteries		
Fluorescent bulbs		Stored in a box separated from other waste	Crushed and sent out of Brunei
Incinerator Ash		Stored in metal drums to prevent fire risk	Landfill

T	Effluents			
	Bilge water (i)	Water contaminated with residual hydrocarbons and inorganic substances	Use of type approved oily water separator and discharge *en route* and < 15ppm (except in special areas).	Distillation/Incineration
5 W a s t e	**Sludge (ii)**	Oil residue from tanks	Either incinerated onboard using an IMO approved incinerator (> 12nm offshore), when allowed, or stored onboard and transferred onshore for treatment and disposal at licensed waste facilities.	Incineration
	Grey water	Water originated from showers and sinks	Discharge sewage treated in an IMO approved plant discharged *en route* (at least 4knots), at least three nautical miles from the nearest land.	N/A
n a n d	**Black water (iii)**	Sewage water		N/A

ling, management and final disposal

8.1.1 Bilge

The Oily Water separator on all vessels is type approved and will be used as per requirements of MARPOL discharging <15ppm and vessel proceeding *en route.*

The master is responsible for recording and maintaining the Oil Record book and a vessel's logbook.

Guidance: In areas such as the Caspian Sea Oily water Separators are not allowed to be used. Check legal requirements before.

8.1.2 Sludge

Guidance: Local and client requirements shall be checked to define the best management for sludge.

The master is responsible for recording and maintaining the Oil Record book and a vessel's logbook.

8.1.3 Sewage Water

Guidance: Check local and client regulation for Sewage Water (e.g. Marpol Special Areas.)

All vessels comply to Regulation 11, MARPOL 73/78 and shall only discharge treated sewage waste between at least three nautical miles from the nearest land, at a moderate rate with the vessel proceeding *en route*.

Vessels have a sewage treatment plant that is type approved and conforms to Sewage Treatment Plant IMO Resolution MEPC 159(55) and MARPOL Annex IV and an International Sewage Pollution Prevention Certificate (ISPPC).

8.1.4 Others

Guidance: Check local and client requirements (e.g. Marpol Special Areas)

All Ballasting activities will comply with the International Convention for the Control and Management of Ships' Ballast Water and Sediments.

Food waste discharges will comply with MARPOL Annex V requirements (discharges of ground food (using macerators) always more than 3 nm from the coast and while navigating).

8.2. WASTE STORAGE AREAS

All vessels have appropriate storage areas that prevents the unintentional discharge of waste and prevents the cross contamination of hazardous waste with non-hazardous waste.

8.3. EMISSION TO AIR

8.3.1 Engines/Fuel

The main source of atmospheric emissions during the seismic acquisition program will be from the burning of fuel (marine diesel oil) to power the engines, compressors and electrical generators onboard survey and support vessels. Gases emitted from the fuel combustion processes comprise:

- Carbon dioxide (CO_2);
- Nitrogen oxides (NOx);
- Sulphur oxides (SOx);
- Methane (CH_4);
- Volatile organic compounds (VOC);
- Carbon monoxide (CO), and
- Particulate matter.

8.3.2 Refrigerants

In order to reduce the impact of potential discharges to air of ozone depleting chemicals used within air-conditioning systems and refrigeration plants the vessels use the following refrigerants:

Vessel	Type
[vessel name]	R407C / R404A / R134A
[vessel name]	[add refrigerant type]
[vessel name]	[add refrigerant type]
[vessel name]	[add refrigerant type]
[vessel name]	[add refrigerant type]
[vessel name]	[add refrigerant type]

Table 6 Refrigerant type

8.3.3 Incinerators

Guidance: The use of incinerators may be prohibited in some countries and by some clients. Please check local legal requirements, EIA and client's standards.

Incinerators shall not be used whilst in port or within the 500m exclusion zone surrounding an oil field installation.

All vessels incinerators are type approved in accordance with MEPC.93(46).

The below mitigations are planned to decrease these impacts to as low as reasonably practicable:

- All shipboard emissions will be in compliance with MARPOL 73/78 Regulations for the prevention of air pollution from ships (Annex VI), aiming to reduce global emissions of SOx, NOx and particulate matter.
- When applicable, engines and generators shall be used in accordance with the vessels Ship's Energy Efficiency Management Plan (SEEMP) and vessels must present their International Air Pollution Prevention Certificates. *Ensure all SEEMP, when available are gathered and saved in the location certificates.
- In order to reduce the emissions, all fuel supplies will be strictly qualitied controlled and all vessels engines, diesel generators and compressors are to be maintained in accordance with the manufacturer's guidance and the vessels Preventative Maintenance Systems (PMS).
- Engines and equipment are to be switched off when not in use.
- Use of low-sulphur MGO, maximum sulphur content as per MARPOL.
- All vessel incinerators are class approved.

8.4. ANTI-FOULING PAINTS

Anti-fouling paints are used to coat the bottoms of ships to prevent sea life, such as algae and molluscs, attaching themselves to the hull and thereby slowing down the ship and increasing fuel consumption.

In the early days of sailing ships, lime and later arsenic were used to coat ships' hulls, until the modern chemicals industry developed effective anti-fouling paints using metallic

compounds.

These compounds slowly "leach" into the sea water, killing barnacles and other marine life that have attached to the ship. But the studies have shown that these compounds persist in the water, killing sea life, harming the environment and possibly entering the food chain. One of the most effective anti-fouling paints, developed in the 1960s, contains the organotin tributylin (TBT), which has been proven to cause deformations in oysters and sex changes in whelks.

All vessels carry a statement of compliance (Anti-fouling Certificate) in regard to anti-foul used on the vessels hull in accordance with the IMO Resolution MEPC 195(61), and the International Convention on the Control of Harmful Anti-Fouling Systems on Ships (2001).

*Ensure all certificates are gathered and stored in FLAG under Location Certificates.

8.5. TRANSFER OF SOLID WASTE TO SHORE

All waste sent to shore will be coordinated between the Project Manager, the Party Chief and the vessels Masters. In addition to the vessel's Garbage Management Plan and Garbage Record Book a Waste Consignee Note shall be produced.

8.6. TRANSFER OF LIQUID WASTE TO SHORE

The transfer of waste from a vessel to shore facilities shall be carried out in accordance with vessels specific plans and risk assessments.

8.7. TRANSFER OF LIQUID WASTE BETWEEN VESSELS

The transfer of waste between vessels for onward transit to shore shall be carried out in accordance with vessels specific plans and risk assessments.

8.8. WASTE CONSIGNEE NOTE

Waste shall be segregated, packaged and marked in accordance the requirements prior to sending ashore. The Waste Consignee Note shall be used for all waste sent to shore for disposal and recycling.

8.9. WASTE MINIMIZATION EFFORTS

Add efforts for minimizing waste in this project

9. WASTE MANAGEMENT CONTRACTOR

*waste management contractor shall be audited before approved as a supplier

*audit shall be entered in FLAG under the Project Page

[a contractor summary shall be added here]

10. VESSEL SPECIFIC

10.1. VESSEL SPECIFIC PLANS AND PROCEDURES

This Waste Management Plan is supported by the following plans held by each vessel and approved in accordance with MEPC and MARPOL 73/78 requirements:

- Shipboard Oil Pollution Emergency Plan (SOPEP)
- Shipboard Sewage Management Plan
- Garbage Management Plan
- Ship Energy Efficiency Management Plan (SEEMP)
- Preventative Maintenance Plan

*Ensure vessel's plans are uploaded to FLAG under the location certificates

10.2. OIL RECORD BOOK

The Oil Record Book is accurately maintained onboard as per Regulation 17, Annex I of MARPOL 73/78, and is kept in such a place as to be readily available for inspection at all reasonable times. It shall be preserved for a period of three years after the last entry has been made.

10.3. GARBAGE RECORD BOOK

The Garbage Record Book is accurately maintained onboard as per Regulation 10, Annex V of MARPOL 73/78 wherein all garbage disposals, discharges or even accidental losses are recorded.

11. WASTE AND EMISSIONS MONITORING

Waste and emissions monitoring are done through FLAG. An assigned person will be responsible for adding information daily (emissions) or during waste transfers on the location page under the Waste and Emissions monitoring tab.

12. INCIDENT INVESTIGATIONS

All non-compliances shall be logged in FLAG and when applicable, will be investigated in accordance with BGPO-SP-008 Incident Management.

13. LEARNING

All lessons learnt and identified shall be logged and maintained within FLAG and where appropriate SMART (Specific, Measurable, Achievable, Realistic and Time-bound) actions assigned as further defined in the BGPO-SP-012 Performance Management.

14. REFERENCES

OGP 413 Guidelines for Waste Management with Special Focus on Areas with Limited Infrastructure

The International Safety Management Code (ISM)

OGP 317 HSE Aspects in a Contracting Environment for Geophysical Operations

OGP 423 HSE Management Guidelines for Working Together in a Contract Environment

[ADD CLIENT'S EIA/ESIA/HSEIA REFERENCE]

[ADD OR CHANGE REFERENCE AS NEEDED]