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HAZARDOUS MATERIALS MANAGEMENT PLAN


3	18/08/2016	Updated based on changes to project configuration and response to MM EPAP (Action Item #14)			
2	22/04/2015	Response LSP's Comments	ERM	See attachment of reviewer's signature	
1	23/02/2015	Response LSP's Comments	ERM	See attachment of reviewer's signature	
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ATTACHMENT OF REVIEWER'S SIGNATURE


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ACRONYMS


ASP	Air Separation Plant
BOC	Balance of Complex
CTU	Central Utility Plant
EHS	Environmental, Health and Safety
ESIA	Environmental and Social Impact Assessment
HDPE	High Density Polyethylene
HSE	Health, Safety and Environment
HSSE	Health, Safety, Security and Environment
IFC	International Finance Corporation
LLDPE	Linear Low Density Polyethylene
LSP	Long Son Petrochemical
MP	Management Plan
PP	Polypropylene
QCVN	National Technical Regulation
TCVN	Vietnamese Standards

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DISCLAIMER

It is upon the Contractor to solicit, acquire and comply with all information, laws, rules, regulations, and Applicable Standards which is/are necessary and/or required for and applicable to the Contractor's performances of the works hereunder.

The Contractor hereby agrees and acknowledges that the Employer makes no representation or warranty, express or implied, regarding the accuracy or completeness of any or all information, laws, rules, regulations, and Applicable Standards which is/are necessary and/or required for and applicable to the Contractor's performances of the works hereunder. THE EMPLOYER HEREBY EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ALL RESPECTS, and the Contractor agrees that neither the Employer nor any of its affiliate(s), director(s), officer(s), employee(s), consultant(s), professional advisor(s), and duly authorised representative(s) shall have any liability to the Contractor or any of its affiliate(s), director(s), officer(s), employee(s), consultant(s), professional advisor(s), and duly authorised representative(s) in any way relating to those information, laws, rules, regulations, and Applicable Standards which is/are necessary and/or required for and applicable to the Contractor's performances of the works hereunder or the Contractor's or its affiliate(s)', director(s)', officer(s)', employee(s)', consultant(s)', professional advisor(s)', and duly authorised representative(s)' reliance thereupon and/or use thereof.

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1 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this Hazardous Materials Management Plan (MP) is to set out *[insert contractor name here]* approach to manage and mitigate the residual impacts of hazardous materials that they have control over, as identified in Chapter 9 and 12 of the project's Environmental and Social Impact Assessment (ESIA) and the Long Son Petrochemical's (LSP) Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

It should be noted the information in this Hazardous Materials MP is based on relevant regulations, guidelines and standards at the time of writing of the ESIA dated December 2014. Should the contractors activities change or new regulations, guidelines or standards apply the contractor will review, amend and resubmit this Hazardous Materials MP to LSP.

[Note to contractor: If your onsite activities are not associated with hazardous materials, you do not need to complete this template but you will need to provide justification as to why it is not applicable, e.g., you will not be undertaking activities associated with the potential impacts of hazardous materials detailed in Section 1.3]

1.2 PROJECT OVERVIEW


The Long Son Petrochemicals Complex Project is located in Hamlet 2 and Rach Gia Hamlet, Long Son Commune, Vung Tau City, Ba Ria – Vung Tau Province, Vietnam. The Complex is spread over 464 ha, including area for its future expansion.

The Project will be comprised of two (2) main components:

1) The Petrochemical Plant, which consists of the following plants and units:

- Main Production Plants
 - Olefins Plant
 - High Density Polyethylene (HDPE) Plant
 - Linear Low Density Polyethylene (LLDPE) Plant
 - Polypropylene (PP) Plant
- Supporting Units
 - Central Utility Plant (CTU) (contains a Steam Generation Unit and Water Plant)
 - Tank Farm
 - Common Infrastructure

2) The Seaport, which consists of the following components:

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- Hydrocarbon Jetty - to transfer feedstock and product for the Petrochemical Plant
- Construction Jetty - to import construction materials, including heavy lift modules.

The total land area that will be acquired for the Project is 464 ha, consisting of 398 ha for the Complex, and 66 ha for the specific port. In addition, there is a total water surface area of 194 ha that will be acquired for the seaport.

1.3 SOURCES OF HAZARDOUS MATERIALS IMPACTS

Various hazardous materials will be utilized during the construction phase (see Chapter 2 of the ESIA), including the following:

- All fuels used for machinery and vehicles;
- 195 tons of explosive material will be used for rock blasting;
- Radioactive materials will be used as part of the radiographic testing.

All types of hazardous materials will need to be identified by each EPC contractor and notified to LSP. This management plan will need to be updated accordingly (prior to commencement of construction activities) with all the specific types of hazardous materials that will be utilized are identified.


The potential sources of impacts from hazardous materials during construction are associated with the following:

- Inappropriate storage of hazardous materials;
- Accidental spill of hazardous materials;
- Uncontrolled reactions or conditions of explosive materials resulting in fire or explosion;
- Leaks and loss of containment of hazardous materials;
- Exposure by workers to radioactive materials.

The construction schedule for the sources of impacts from hazardous materials during construction is shown in Annex A.


[Note to contractor: Contractor to insert Gantt chart of construction schedule in Microsoft Project Office format in Annex A, which should include a breakdown of the tasks that give rise to the potential sources of impacts from hazardous materials, as noted above]

1.4 APPLICABLE STANDARDS

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The applicable standards for: the storage of; and impacts from, hazardous materials during construction are as follows and are provided in Annex B:

- National technical regulation QCVN 09-MT:2015/BTNMT on ground water quality;
- Vietnamese Standard TCVN 5525:1995 General requirements for protection of groundwater;
- National technical regulation QCVN 03-MT:2015/BTNMT on the allowable limits of heavy metals in soil;
- QCVN 40:2011/BTNMT: National Technical Regulation on Industrial Wastewater;
- IFC General EHS Guidelines: Hazardous Materials Management (1.5) (April 2007);
- IFC General EHS Guidelines: Environmental Wastewater and Ambient Water Quality (April 2007);
- IFC General EHS Guidelines: Water Conservation (April 2007);
- IFC General EHS Guidelines: Construction and Decommissioning (April 2007);
- IFC General Environmental, Health, and Safety (EHS) Guidelines (1.8 and 4.1): Contaminated land;
- IFC EHS Guidelines for Large Volume Petroleum-based Organic Chemicals Manufacturing (April 2007); and
- IFC EHS Guidelines for Thermal Power Plants (December 2008), as it applies to the boiler.

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2 ROLES AND RESPONSIBILITIES

2.1 INTRODUCTION

Having an appropriate organisational structure in place, with all people having defined roles and responsibilities, is essential to ensuring the overall success of this Hazardous Materials MP. This section provides details of LSP's and the contractor's organisational structure with regards to onsite delivery of the LSP project, and the various roles and responsibilities of those people in relation to delivering the clients EHS expectations, including meeting the requirements of the Construction Health, Safety and Environment Management Plan.

2.2 LSP CONSTRUCTION HSSE TEAM

LSP's health, safety, security and environmental (HSSE) team will lead the management of HSSE issues concerned with hazardous materials. The LSP organisational chart to implement the requirements of this Hazardous Materials MP is shown in the figure below. The specific roles and responsibilities are shown in Chapter 5 of the LSP Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).



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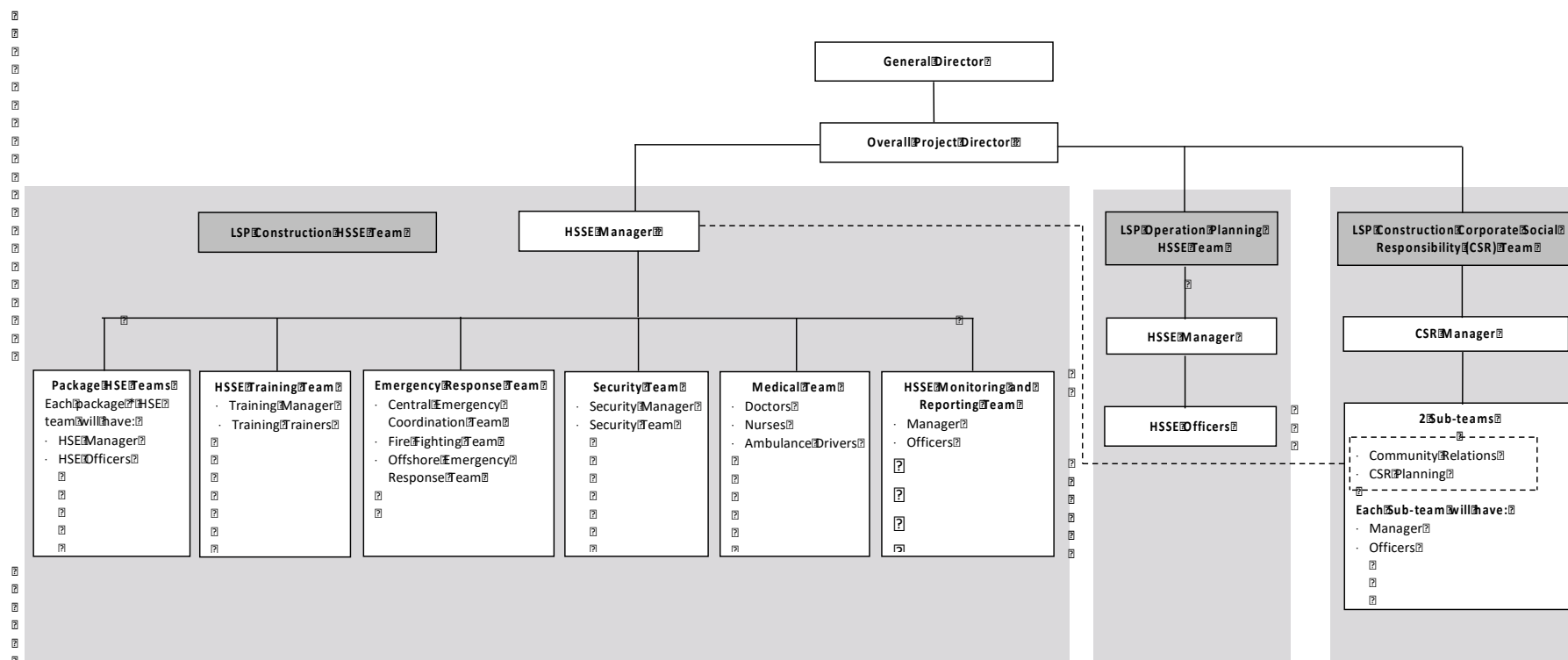
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Note:

Package A: Onshore Plant, Tank Farm, Complex Interconnecting Pipelines/pipe racks, Land development in tank farm area, topside facilities in hydrocarbon jetties, Complex Wastewater Treatment Unit and H P Flare/LP Flare System

Package B/C/D: Polyolefins Plant (HDPE/PP/LLDPE)


Package F: Sea Port (excluding topside in the hydrocarbon jetties and construction jetty which are under the scope of the Contractor Package A and Package E respectively)

Package G: Central Utility Plant (including Steam Generation Unit and Water Plant)

Package H: Common Infrastructure in the Complex (including Administration Building, Laboratory Building, Canteen Building, Emergency Center, First Aid Center and Polyolefins Product Warehouse)

Package I: Complex Road including Drainage, Street Lighting, CCTV, Green Area, Topside for construction jetty, Complex truck scale, and Down Film System

Package L: Land development work in the whole complex except tank farm area

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2.3 *CONTRACTORS HSSE TEAM*

The contractors HSSE team has established this Hazardous Materials MP in accordance with the applicable standards. The contractors HSSE team will manage their contractors and suppliers in accordance with this Hazardous Materials MP and liaise with the appropriate personnel within LSP's HSSE to ensure compliance with the overall aims of LSP's Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

The contractors onsite organisational chart to implement the requirements of this Hazardous Materials MP is shown in the figure below.

[Note to contractor: Contractor to insert organisational chart for onsite team].

2.4 *DESCRIPTION OF ROLES AND RESPONSIBILITIES*

The contractor has committed to providing the necessary human resources to ensure that the organisational structure noted above can work to implement this Hazardous Materials MP and achieve compliance with all relevant standards. A description of the key roles and their responsibilities are provided in the *Table 2.1*, including the primary communication channel between LSP and contractor HSE teams. Employee contact details for each role associated with this Hazardous Materials MP are provided in Annex C.



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Table 2.1 *EHS Roles and Responsibilities within Contractor's Project Team*

Role	Responsibilities
General Manager (Contractor)	
Senior Site Engineer (Contractor)	
Site Supervisor / Foreman (Contractor)	
Site EHS Officer (Contractor)	
Emergency Response Co-ordinator (Contractor)	
[Other]	
[Other]	

[Note to Contractor: Insert a description of the responsibilities of each role, with regards to the management of EHS and hazardous materials. Delete roles that are not appropriate. Include additional roles where required.]

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3 MITIGATION / MANAGEMENT PROCEDURES

The mitigation / management procedures noted in this section provide the approach to managing the potential hazardous materials impacts during construction. The contractor is committed to implementing the identified mitigation / management procedures in order to not cause exceedance of the applicable standards, and to avoid impacts on the local community. The general mitigation / management procedures described in this section will need to be updated as required based on the final quantities and types of hazardous materials as identified by the EPC contractor (and LSP has been notified).

The mitigation / management measures that are relevant to *[insert contractors name here]* onsite activities are shown in *Table 3.1*.

The mitigation / management procedures were identified within the ESIA as being appropriate for the environmental impacts resulting from the anticipated construction activities. The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use.

Should hazardous materials impacts arise from the contractors activities, following the implementation of the procedures noted in *Table 3.1*, the contractor will review the need for additional measures to be taken and update this Hazardous Materials MP accordingly.

Note to contractor: Delete mitigation / management measures which are not applicable or outside of your control. Insert the name of the responsible party from Table 2-1 for each mitigation / management measure.




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Table 3.1 Mitigation / Management Procedures


Aspect, Potential Impact / Issue	Mitigation Reference	Mitigation and / or Management Procedures	Contractors Responsibility	Related Plans
General Hazardous Materials Management: Hazard Assessment	1.1	<ul style="list-style-type: none"> - Information on each hazardous material needs to be recorded, including: <ul style="list-style-type: none"> o Name and description (e.g., composition of a mixture) of the Hazmat o Classification (e.g., code, class or division) of the Hazmat o Internationally accepted regulatory reporting threshold quantity or national equivalent of the Hazmat o Quantity of Hazmat used per month o Characteristic(s) that make(s) the Hazmat hazardous (e.g., flammability, toxicity) - Identification of locations of hazardous materials and associated activities on an emergency plan site map - Documentation of availability of specific personal protective equipment and training needed to respond to an emergency 		
Impacts on soil, groundwater and Marine Water Quality from Accidental Spills, leaks and loss of containment	1.2	Regular maintenance of storage tanks, treatment plants, pipes and components (seals, connectors and valves) will be carried out, including daily inspection of fuelling equipment (including fuel pump systems, pipes, hoses, valves, etc.) to ensure they are in a satisfactory condition.		-
	1.3	All construction plants and machinery (e.g., bulldozers, trucks and ships) will be maintained in good working order to avoid leakage or spillage of contaminants.		-
	1.4	The Emergency Response Plan will include provisions relating to spills and leaks. This includes: emergency plans in case of storage tank breakdown, pipeline leakage, leaks from marine vessels; the means to undertake the repair of leaks; and the containment/collection of any spilt material and/or resulting contamination.		Emergency Response Plan (ref: LSP-1S01-0002)
	1.5	Appropriate and adequate spill response equipment will be kept close to sources of potential leaks and spills, including (but not limited to) fuel facilities, bowzers and hazardous material stores.		-

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Aspect, Potential Impact / Issue	Mitigation Reference	Mitigation and / or Management Procedures	Contractors Responsibility	Related Plans
	1.6	Regular spill response training will be provided to those that will have to, or are likely to, clean up spills and leaks.		Worker Training Management Plan (ref: LSP-1S01-0003)
	1.7	Fuel, oil and hazardous materials stores will be sited away from the site drainage system and surface waters (including the shoreline).		-
	1.8	Fuel, oil and hazardous materials stores will be kept away from vehicle access routes to prevent collisions.		-
	1.9	Fuel, oil and hazardous materials will be covered and will be located on hardstanding.		-
	1.10	All refuelling of plant and machinery and/or refilling/decanting of hazardous materials will take place in designated areas, covered by hardstanding.		-
	1.11	An impermeable bund will be constructed around any fuel storage tanks, oil filled transformers, oil pumps, generators and/or chemical storage facilities to prevent pollution from fuel leaks and spillage and to exclude surface water run-off from entering the contained area. The volume of the bunded area will be 110 % of the largest tank or 25% percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 liters. This includes any temporary fuel storage areas.		-
	1.12	All ancillary refuelling equipment (e.g., valves, hoses) should be contained securely within the bund when not in use.		-
	1.13	Secondary containment bunds will be provided with appropriate drainage connection and/or provision for the removal of spilled liquids.		-
	1.14	The bunds will be kept free of spilt materials or rain water to ensure the capacity of the bund is not compromised.		-
	1.15	Water spraying systems to cool down permanent fuel storage tanks on the hot days will be installed and used.		-
	1.16	Any fuel storage tanks or bowsers will be designed to meet the high safety standards.		-
	1.17	All fuel storage tanks will be equipped with devices that prevent spills and overfills, including drip trays around the fill pipes.		-

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Aspect, Potential Impact / Issue	Mitigation Reference	Mitigation and / or Management Procedures	Contractors Responsibility	Related Plans
Potential risks from explosive and radioactive materials storage and handling	1.18	Corrosion protection will be used in steel tanks and piping that contain hazardous materials, if required.		-
	1.19	The Project Sponsor will collaborate with the authorities in checking, prevention and detecting incidents of oil leakage and spillage. The equipment can be only used at the time the Project gets the agreement for the safety from the Safety Inspection Organization.		-
	1.20	The integrity of all fuel oil storage tanks will be checked daily by visual means		
	1.21	Where there is damage to a tank or it is unsafe to continue to use it, its contents will be removed as soon as practically to do so, in a manner that will not give rise to pollution or safety risks. The tank will then be replaced or repaired to a satisfactory condition.		-
	1.22	Spill or drip trays will be used to contain spills and leaks from mobile equipment.		-
	1.23	Storage of incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) in separate areas, and with containment facilities separating material storage areas. Prohibition of all sources of ignition from areas near flammable storage tanks or explosive materials		
	1.24	Use of flame arresting devices on vents from flammable storage containers according to local or internationally accepted regulatory. Clearly designate and signal areas where explosive materials are stored.		
	1.25	Limit the handling and management of radioactive material to authorized personnel and avoid contact with and exposure of other workers to this material. Clearly designate and signal areas where radioactive materials are stored (avoid access of all non-authorized personnel to these areas)		

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4 MONITORING

4.1 LSP HSSE TEAM

An emission/discharge monitoring plan has been developed to track the effectiveness of the mitigation measures during construction. Details of LSP's emission/discharge monitoring plan are provided in Chapter 7 of LSP's Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

LSP may request additional monitoring if the monitoring programme records exceedences of the surface water standards.

4.2 CONTRACTORS TEAM

In order to assess the effectiveness of the mitigation / management measures and identify the need for further action, the contractors hazardous materials monitoring programme outlined in *Table 4.1* will be followed.

Should the monitoring programme note any non-compliances with the MP, corrective action will be taken to ensure the relevant activity returns to compliance in a timely manner and that any corrective action is appropriate and effective. Any corrective actions undertaken must be recorded on the daily report against the relevant activity.

Note to contractor: Delete rows that are not applicable or outside of your control and, in the second column, only include the reference to relevant mitigation / management measures. Insert the name of the responsible party from Table 2-1 for each of the separate monitoring requirements.




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Table 4.1 Monitoring Programme

Aspect, Potential Impact / Issue	Reference of Relevant Mitigation Measure *	Sampling Location	Sampling Parameters	Sampling Frequency	Applicable Standards	Responsibility	Reporting
General management	1.1	Documentation of hazardous materials (quantities, types, etc.)	Written record	Weekly	N/A – Visual inspection		Weekly
Impacts on soil, groundwater and Marine Water Quality from Accidental Spills, leaks and loss of containment	1.2, 1.3, 1.10	Fuelling equipment, construction plant and machinery under contractors control	Visual inspection	Daily	N/A – Visual inspection		Daily (refer to example Daily Reporting form in Annex D)
	1.4	Emergency response requirements under contractors control	Visual inspection	Daily	N/A – Visual inspection		Daily (refer to example Daily Reporting form in Annex D)
	1.5	Fuel facilities, bowzers and hazardous	Visual inspection	Daily	N/A – Visual inspection		Daily (refer to example Daily Reporting form in Annex D)


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Aspect, Potential Impact / Issue	Reference of Relevant Mitigation Measure *	Sampling Location	Sampling Parameters	Sampling Frequency	Applicable Standards	Responsibility	Reporting
		materials stores under contractors control					Annex D)
	1.6	Employers under contractors control	Spill response training	Employers who will be responsible for the clean up of spills and leaks	N/A		Spill response training register
	1.7, 1.8, 1.9	Fuel, oil and hazardous materials / stores	Visual inspection	Daily	N/A – Visual inspection		Daily (refer to example Daily Reporting form in Annex D)
	1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21	Fuel storage tanks, oil filled transformers, oil pumps, generators and/or chemical storage facilities under contractors control	Visual inspection	Daily	N/A – Visual inspection		Daily (refer to example Daily Reporting form in Annex D)
	1.22	Mobile equipment	Visual inspection	Daily	N/A – Visual inspection		Daily (refer to example Daily

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Aspect, Potential Impact / Issue	Reference of Relevant Mitigation Measure *	Sampling Location	Sampling Parameters	Sampling Frequency	Applicable Standards	Responsibility	Reporting
		under contractors control					Reporting form in Annex D)
Potential risks from explosive and radioactive materials storage and handling	1.23, 1.24	Control of explosive materials	Visual inspection	Daily	N/A – Visual inspection		Reporting form in Annex D)
	1.25	Control of handling of radioactive material	Visual inspection	Daily	N/A – Visual inspection		Reporting form in Annex D)

* See Table 3-1 for mitigation measure.

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5 AUDITING AND REPORTING

An Auditing and Reporting Programme is required to ensure that the mitigation / management measures are appropriate in controlling the identified hazardous materials impacts.

5.1 LSP HSSE TEAM

To ensure compliance with the requirements of this Hazardous Materials MP, internal inspections and audits will be undertaken by LSP. The LSP auditing and reporting programme is shown in Chapter 9 of the LSP Construction Health, Safety and Environment Management Plan (ref: LSP-1S01-005).

5.2 CONTRACTORS TEAM

The programme will comprise of the following:

- Internal Audit and Reporting Programme to be undertaken by the contractor's EHS Officer; and
- External Audit and Reporting Programme, to be conducted by the LSP's representative.

The scope of the internal auditing and reporting programme to be undertaken by the contractor is shown in *Table 5.1*.

Note to contractor: In the second column, only include the reference to relevant mitigation / management measures. Ensure the job title for the responsible party is correct for your organisation.



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Table 5.1 Auditing and Reporting Programme

Inspection / Auditing Interval	Reference of Relevant Mitigation Measure*	Responsibility	Scope of Inspection / Audit	Report Submission / Record Keeping
Daily Inspection (Internal)	1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.25	Contractor's Onsite EHS Officer	Review the submitted daily monitoring reports, spill response training register and tank testing specialist contractor report (if applicable) to assess the compliance status of relevant operations that may give rise to hazardous materials impacts and provide support to identifying appropriate corrective actions and ensuring they are: introduced in a timely manner; appropriate; and effective	Archive Daily Monitoring Report, Spill Response Training Register and Tank Testing Contractor Report (if applicable) in an orderly manner for external auditing All reports are to be maintained at the project site for as long as the Contractor is working at the site
Weekly Review of Daily Inspection Reports (Internal)	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.24, 1.25	Contractor's General Manager	A weekly report is to be provided to the Contractor's Onsite General Manager, which is to include: the compliance status of relevant operations that may give rise to hazardous materials impacts; identifying any non-compliances that have arisen over the previous weeks monitoring program; detailing the corrective actions that have been taken when a failure has	Archive Weekly Report in an orderly manner for external auditing All reports are to be maintained at the project site for as long as the Contractor is working at the site


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Inspection / Auditing Interval	Reference of Relevant Mitigation Measure*	Responsibility	Scope of Inspection / Audit	Report Submission / Record Keeping
Biannual Inspection (External)	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 1.25	LSP's Representative	<p>been noted; and noting the appropriateness and effectiveness of any corrective actions</p> <p>LSP's Representative will review the Contractor's onsite activities to assess compliance with the management plan and review all records of the Contractor's internal audit programme to review historic compliance and the use of appropriate corrective actions</p>	<p>A copy of the External Audit Report is to be provided to the Contractor for reference and, where necessary, implementation of any identified corrective actions</p> <p>All reports are to be maintained at the project site for as long as the Contractor is working at the site</p>


* See Table 3-1 for mitigation measure.

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ANNEX A – CONSTRUCTION SCHEDULE FOR THE SOURCES OF HAZARDOUS MATERIALS IMPACTS

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[Note to contractor: Contractor to insert Gantt chart of construction schedule in Microsoft Project Office format in Annex A]

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ANNEX B – APPLICABLE STANDARDS


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QCVN 09-MT: 2015 – Applicable Standards for Ground water Quality

National technical regulation on ground water quality

No.	Parameter and pollutant	Unit	Limitation Value
1	pH value	-	5.5 - 8.5
2	Permanganate index	mg/l	4
3	Total dissolved solids (TDS)	mg/l	1500
4	Total hardness (as CaCO ₃)	mg/l	500
5	Ammonium (NH ₄ ⁺ as N)	mg/l	1
6	Nitrite (NO ₂ ⁻ as N)	mg/l	1
7	Nitrate (NO ₃ ⁻ as N)	mg/l	15
8	Chloride (Cl ⁻)	mg/l	250
9	Fluoride (F ⁻)	mg/l	1
10	Sulfate (SO ₄ ²⁻)	mg/l	400
11	Cyanide (CN ⁻)	mg/l	0.01
12	Arsenic (As)	mg/l	0.05
13	Cadmium (Cd)	mg/l	0.005
14	Lead (Pb)	mg/l	0.01
15	Chromium VI (Cr ⁶⁺)	mg/l	0.05
16	Copper (Cu)	mg/l	1
17	Zinc (Zn)	mg/l	3
18	Nickel (Ni)	mg/l	0.02
19	Manganese (Mn)	mg/l	0.5
20	Mercury (Hg)	mg/l	0.001
21	Iron (Fe)	mg/l	5
22	Selenium (Se)	mg/l	0.01
23	Aldrin	µg/l	0.1
24	Benzene hexachloride (BHC)	µg/l	0.02
25	Dieldrin	µg/l	0.1
26	Total Dichloro diphenyl trichloroethane (DDTs)	µg/l	1
27	Heptachlor & Heptachlor epoxide	µg/l	0.2
28	Total Phenol	mg/l	0.001
29	Gross alpha activity	Bq/l	0.1
30	Gross beta activity	Bq/l	1
31	Coliform	MPN or CFU/100ml	3
32	E.Coli	MPN or CFU/100ml	Not detected

For groundwater contamination parameters that are not available in the Vietnamese standards, applicable international standards/guidelines (such as USEPA guidelines and Dutch standards will be used for reference).

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QCVN 03-MT:2015/BTNMT National Technical Regulation on the allowable limits of heavy metals in the soils (mg/kg dry soil)

Pollutant	Agricultural land	Forestry land	Residential land	Industrial land	Commercial land
Arsenic (As)	15	20	15	25	20
Cadmium (Cd)	1,5	3	2	10	5
Lead (Pb)	70	100	70	300	200
Crom (Cr)					
Copper (Cu)	100	150	100	300	200
Zinc (Zn)	200	200	200	300	300


For soil contamination parameters that are not available in the Vietnamese standards, applicable international standards/guidelines (such as USEPA guidelines and Dutch standards will be used for reference).

Applicable Wastewater Standards

Parameter	Unit	Vietnamese Standards ¹	IFC LVOC Effluent Guideline ²	IFC Thermal Power Plant Effluent Guideline ³	Project Standards for Treated Wastewater ⁴
Temperature	°C	40	Temperature increase ≤ 3	Site specific requirement to be established by the EA.	Temperature ≤ 40 and Temperature increase ≤ 3
Colour	Pt/Co	150	-	-	150
pH	-	5.5 to 9	6-9	6-9	6-9
BOD ₅ (20°C)	mg/l	58.50	25	-	25
COD	mg/l	175.50	150	-	150
Total Suspended Solids	mg/l	117.0	30	50	30
Arsenic	mg/l	0.1170	-	0.5	0.117
Mercury	mg/l	0.01170	0.01	0.005	0.005
Lead	mg/l	0.5850	0.5	0.5	0.5
Cadmium	mg/l	0.1170	0.1	0.1	0.1
Chromium (total)	mg/l	-	0.5	0.5	0.5
Chromium (VI)	mg/l	0.1170	0.1	-	0.1

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Parameter	Unit	Vietnamese Standards ¹	IFC LVOC Effluent Guideline ²	IFC Thermal Power Plant Effluent Guideline ³	Project Standards for Treated Wastewater ⁴
Chromium (III)	mg/l	1.170	-	-	1.170
Copper	mg/l	2.340	0.5	0.5	0.5
Zinc	mg/l	3.510	2	1	1
Nickel	mg/l	0.5850	0.5	-	0.5
Manganese	mg/l	1.170	-	-	1.170
Iron	mg/l	5.850	-	1	1
Total cyanide	mg/l	0.1170	-	-	0.1170
Total phenol	mg/l	0.5850	0.5	-	0.1170
Oil&Grease	mg/l	11.70	10	10	10
Sulphide	mg/l	0.5850	1	-	0.5850
Fluoride	mg/l	11.70	-	-	11.70
Ammonium (as N)	mg/l	11.70	-	-	11.70
Total nitrogen	mg/l	46.80	10	-	10
Total phosphorus (as P)	mg/l	7.020	2	-	2
Residual Chlorine	mg/l	2.340	-	0.2	0.2
Total organochlorine pesticides	mg/l	0.1170	-	-	0.1170
Total organophosphorus pesticides	mg/l	1.170	-	-	1.170
Total PCB	mg/l	0.01170	-	-	0.01170
Benzene	mg/l	-	0.05	-	0.05
Vinyl Chloride (VCM)	mg/l	-	0.05	-	0.05
1,2 Dichloroethane (EDC)	mg/l	-	1	-	1
Adsorbable Organic Halogens (AOX)	mg/l	-	1	-	1
Coliform	bacteria/100ml	5000	-	-	5000

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Parameter	Unit	Vietnamese Standards ¹	IFC LVOC Effluent Guideline ²	IFC Thermal Power Plant Effluent Guideline ³	Project Standards for Treated Wastewater ⁴
Gross α activity	Bq/l	0.1	-	-	0.1
Gross β activity	Bq/l	1	-	-	1

Note: ¹ Vietnamese Standards from QCVN 40:2011/BTNMT National Technical Regulation on Industrial Wastewater Quality. With a discharge flow of 743 m³/hr, the discharge wastewater factor Kf=0.9; and with discharge to Ganh Rai Bay, the receiving water body factor Kq=1.3. The factors are not applicable to Vietnamese Standards from QCVN 40:2011/BTNMT National Technical Regulation on Industrial Wastewater Quality. With a discharge flow of 743 m³/hr, the discharge wastewater factor Kf=0.9; and with temperature, pH, colour, coliform, gross α activity and gross β activity. Ganh Rai Bay is characterised as a coastal water body used for aquatic life protection.


² According to Environmental, Health and Safety (EHS) Guidelines for Large Volume Petroleum- based Organic Chemicals Manufacturing.

³ According to Environmental, Health and Safety (EHS) Guidelines for Thermal Power Plants.

⁴ The more stringent value between QCVN 40:2011/BTNMT and IFC Standards.

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ANNEX C – EMPLOYEE CONTACT DETAILS ASSOCIATED WITH MANAGEMENT PLAN

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Role	Responsibilities	Contact Details*
General Manager (Contractor)		Mobile Number: Email:
Senior Site Engineer (Contractor)		Mobile Number: Email:
Site Supervisor / Foreman (Contractor)		Mobile Number: Email:
Site EHS Officer (Contractor)		Mobile Number: Email:
Emergency Response Co-ordinator (Contractor)		Mobile Number: Email:
[Other]		
[Other]		

*Any change in respect to employees, the contact details will need to be amended as soon as the role has been reassigned.

[Note to Contractor: Insert a description of the responsibilities of each role, with regards to the management of EHS and hazardous materials. Delete roles that are not appropriate. Include additional roles where required.]

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ANNEX D– DAILY REPORTING FORM

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[Note to contractor: The below table provides an example of the details to be included on a Daily Reporting Form.]

Date of Observation	Contact Details / Role of Individual Undertaking Hazardous Materials Monitoring	Details of Observation / Location	Mitigation Action to be Taken	Date Mitigation Action was Implemented