Intended for
Sakhalin Energy Investment Company Limited

On behalf of
Sakhalin-2 Phase 2 Project Finance Parties

Date
March 2018

Project Number
UK22-17081

SAKHALIN-2 PHASE 2 LENDERS' INDEPENDENT ENVIRONMENTAL CONSULTANT

LEVEL 1 AUDIT: ONSHORE PROCESSING FACILITY

RAMBOLL ENVIRON

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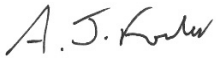
Made by:	
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APPENDICES

LIST OF ABBREVIATIONS

AFFF	Aqueous Film-Forming Foam
AST	Above ground storage tank
BOD	Biological Oxygen Demand
GTT	Gazprom Transgas Tomsk
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
HSE	Health, Safety and Environment
HSESAP	Health, Safety, Environment and Social Action Plan
HSE-SP MS	Health, Safety and Environmental and Social Performance Management System
IBC	Intermediate bulk container
IEC	Independent Environmental Consultant
ISO	International Standards Organisation
JT	Joule-Thomson
LNG	Liquefied Natural Gas
LUN-A	Lunskoye
MEG	Monoethylene glycol
MSDS	Material Safety Data Sheet
NO_x	Oxides of Nitrogen
OET	Oil Export Terminal
OPF	Onshore Processing Facility
PA-A	Piltun-Astokhskoye A (production platform)
PA-B	Piltun Ashtokskoye B (production platform)
PMD	Pipeline Maintenance Depot
Ramboll Environ	Ramboll Environ UK Ltd
RF	Russian Federation
Sakhalin Energy	Sakhalin Energy Investment Company Ltd
SPZ	Sanitary Protection Zone
STP	Sewage Treatment Plant
TSS	Technical Support Services (maintenance contractor)

EXECUTIVE SUMMARY

Ramboll Environ UK Limited (Ramboll Environ) is the Independent Environmental Consultant (IEC) acting on behalf of the Lenders to the Sakhalin-2 Phase 2 project (the 'Project'). Under the Terms of Reference of our engagement, Ramboll Environ undertakes annual monitoring visits and biennial audits of the Project.

This report provides the findings of a Level 1[1] environmental audit of the Sakhalin Energy Investment Company (Sakhalin Energy) Onshore Processing Facility (OPF) undertaken by Ramboll Environ between the 15th and 17th September 2017. It forms Appendix 3 of the main September 2017 Monitoring Report.

Ramboll Environ would like to thank the auditees for their assistance during the audit.

Overall, Ramboll Environ identified that environmental performance at the OPF is very good and that managers, plant operatives and working practices at the site indicated a strong HSE culture.

The following positives are particularly noteworthy:

- HSE communications systems at the OPF are very comprehensive and effectively implemented.
- The standard of waste management at the OPF is generally very high, with secure storage of hazardous and non-hazardous materials, clear labelling and good record keeping. The company has invested considerable effort into building an awareness of good waste management practices.
- The Company continues to implement waste minimisation initiatives, including the installation of additional drinking water treatment systems to allow water from the company's boreholes to be used in the canteen and the use of reusable cups, both reducing plastic waste.

There was a good level of compliance with environmental law and the requirements of the HSESAP with the following exception:

- Six nominally empty 205 litre plastic drums were noted on an area of hardstanding in the waste transit area, near upturned empty drums. At least two of the drums contain a significant amount (estimated at 10-20% of a drum's volume) of liquid, which is presumed to be residual corrosion inhibitor (thioalcohol solution, labelled as an environmentally hazardous substance). The drums are not labelled as waste, which is a non-compliance with Requirement 4 of Appendix 10 (Waste Containers, Labeling and Transport) of the Waste Management Standard.

In addition, a number of Opportunities for Improvement have been highlighted in this audit report:

- To protect the health of facility personnel, all drinking water is provided in plastic bottles. Additional treatment has been installed to the water supply (from Company boreholes) serving the canteen facilities, which reduces the iron content to less than 0.01 mg/l, allowing the water to be used in cooking. It is recommended that Sakhalin Energy investigates the viability of providing additional treatment to ensure that all water from the company boreholes meets applicable drinking water standards. This would avoid the environmental and financial impacts associated with supplying bottled water and disposing of empty plastic bottles.
- Ramboll Environ notes that the temporary hazardous waste store has been used since OPF operations commenced and that upgrades have been made such as improvements to

[1] As defined in the HSESAP "HSE Assurance Standard Overview" document 0000-S-90-04-O-0015-00-E
http://www.sakhalinenergy.ru/media/user/libraryeng/healthsocial/2015/88-0000-S-90-04-O-0015-00-E%20Appendix%201.pdf

ventilation. However, we recommend that a purpose-built hazardous waste storage area is developed to further improve waste containment.

- Three opportunities for improving management of MSDS were observed:
  - At the water treatment plant the MSDS for sodium hypochlorite was only available in Russian, which breaches the Chemicals Management section of the Occupational Health and Hygiene Standard (0000-S-90-04-O-0270-00-E).
  - At the Pipeline Maintenance Depot (PMD) the MSDS for Tellus Oil was only available in Russian. The MSDS for Aqueous Film-Forming Foam (AFFF) Concentrates was not available at the storage location and when a copy was located in the office it was only in Russian.
  - At the chemical warehouse Company personnel had difficulty finding the MSDS for Paroil as it was not listed in the index of the MSDS file.

  It is recommended that the OPF conducts a systematic review to ensure that MSDS for all chemicals and oil products used at the site are available near their point of use in English and Russian.
- It is recommended that Sakhalin Energy develops and implements detailed plans for the replacement of R22 refrigerants in air conditioning systems at the OPF.
- All groundwater quality parameters specified in the HSESAP (section 8.9 of the HSE Monitoring and Reporting Standard, 0000-S-90-04-O-0009-00-E, Appendix 6) are monitored every six months except for organoleptical properties, which are not monitored. It is recommended that organoleptical properties are included in the groundwater monitoring programme.

1. INTRODUCTION

1.1 Background

Ramboll Environ UK Limited (Ramboll Environ) is the Independent Environmental Consultant (IEC) acting on behalf of the Lenders to the Sakhalin-2 Phase 2 Project (the 'Project'). Under the Terms of Reference of our engagement, Ramboll Environ undertakes annual monitoring visits and biennial audits of the Project.

This report provides the findings of a Level 1[2] environmental audit of the Sakhalin Energy Investment Company (Sakhalin Energy) Onshore Processing Facility (OPF) undertaken by Ramboll Environ between the 15th and 17th September 2017. It forms Appendix 3 of the main September 2017 Monitoring Report.

1.2 Audit Scope

Ramboll Environ has conducted an audit in accordance with paragraph 4.6.3 of the Common Terms Agreement which, amongst others, allows for biennial audits of the project facilities. In accordance with the Terms of Reference agreed with Sakhalin Energy in September 2017 "*the audit shall review the Company's compliance with material Environmental Law, Environmental Consents, Project Expansion Environmental Consents and/or Interim Environmental Permissions and the HSESAP*".

The audit was planned and executed in accordance with the requirements of the relevant international standard (Guidelines for Quality and/or Environmental Management Systems Auditing, ISO 19011:2011).

The audit visit comprised the following tasks:

- Site walkover of the following facilities / areas:
  - Process areas and utilities buildings
  - Waste handling and storage area
  - Workshops
  - Warehouses/fuel stores
  - Bulk storage facilities for condensate, monoethylene glycol (MEG) and diesel
  - Water supply wells (1.5 km from the OPF) and on-site potable water treatment facilities
  - Wastewater treatment facilities and discharge points for treated wastewater
  - Pipeline Maintenance Depot (PMD) facilities within the OPF area, including warehouses, workshops, a vehicle refuelling area, a vehicle washing facility, and backup generators.
- Interviews & Records Review:
  - HSE performance and assurance, incidents, training and competence
  - General operational overview, recent achievements and environmental initiatives, current and future challenges
  - Environmental monitoring
  - Emissions to atmosphere
  - Waste management
  - Water supply
  - Wastewater management

[2] As defined in the HSESAP "HSE Assurance Standard Overview" document 0000-S-90-04-O-0015-00-E
http://www.sakhalinenergy.ru/media/user/libraryeng/healthsocial/2015/88-0000-S-90-04-O-0015-00-E%20Appendix%201.pdf

- Storage of hazardous materials.

2. ONSHORE PRODUCTION FACILITY

2.1 Location

The OPF is located in the Nogliki District of Sakhalin Oblast of the Russian Federation, 7 km inland from the Sea of Okhotsk shoreline and approximately 200 km south of the Piltun-Astokhskoye license area (Figure 1). The nearest residential area is the village of Nysh (approximately 87 km north-west of the asset). The district capital Nogliki and the Nysh railway station are, respectively, 130 km and 80 km to the north-west. The location of the OPF is shown in Figure 1.

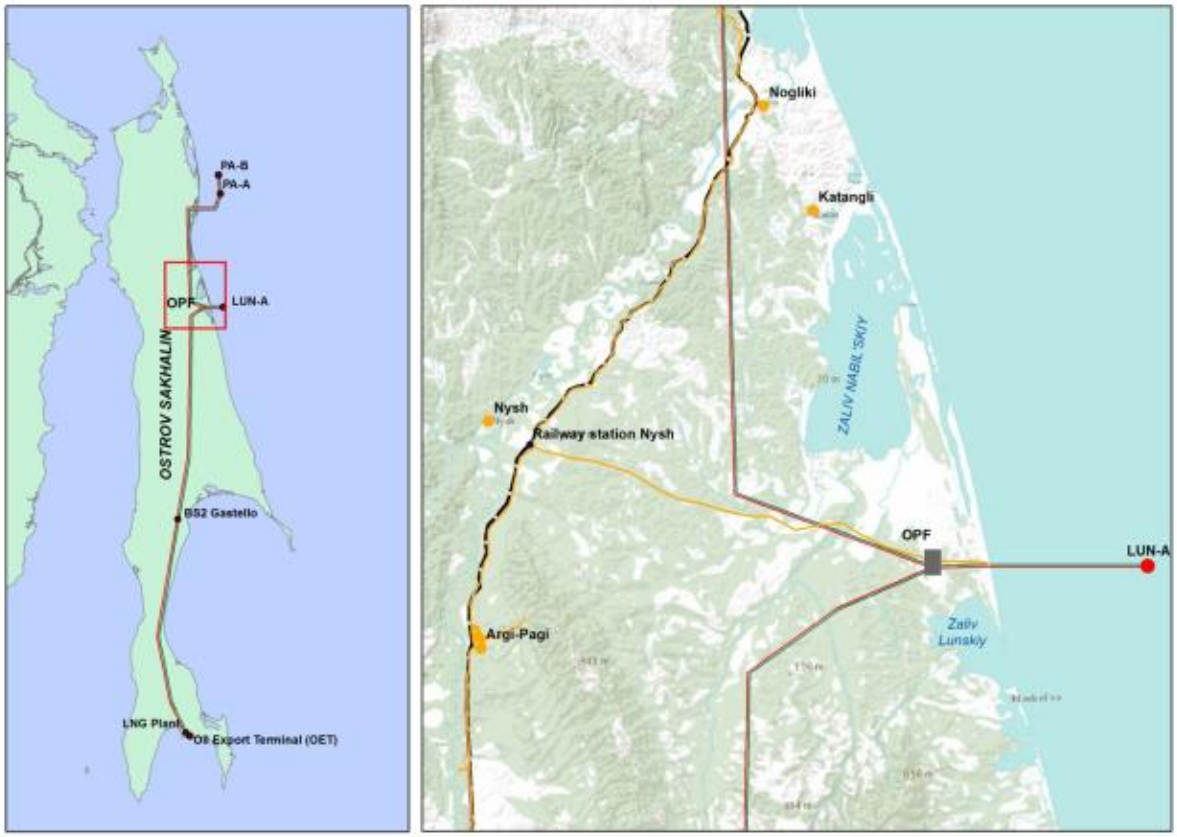

Figure 1 – Location of the OPF

2.2 Environmental Setting

The OPF is surrounded by forest. Large forest areas northward and eastward from the OPF were destroyed by fires before the main OPF was constructed. These areas are now covered with grass and shrubs.

The major primary forest areas are located southward and westward from the OPF, where the terrain changes from plain to low mountains. No logging activities are carried out within 10 km of the OPF.

The project area is not used for traditional management of natural resources by Sakhalin indigenous minorities.

The nearest specially protected natural site is the natural sanctuary Lunsky Bay of regional significance located at a distance of 2.2 km southward from the OPF.

The main watercourses in the vicinity of the OPF are the Vatung River and its tributaries (nameless streams) that discharge into Vatung Lake and then into Stary Nabil Bay and Bolotny Creek, which discharges into Nabil Bay in the Sea of Okhotsk. Some of the land around the

facility is occupied by an oligotrophic (raised) bog with the peat ranging from 0.5 m to 1.9 m deep.

The area occupied by the OPF is classified as a potentially seismic active zone. In this area, an earthquake can occur with a magnitude of 9 once every 1,000 years.

In the next few years, as part of the Sakhalin-3 development, Gazprom intends to build a gas treatment facility 8 km north-westward from the OPF to process gas for pipeline transportation.

There is a formal Sanitary Protection Zone (SPZ) around the OPF site, as illustrated in Figure 2. It is understood that accommodation camps used for personnel working on rotations are permitted with an SPZ. At the OPF most accommodation and administrative buildings are located outside the SPZ but two one-storey buildings for accommodation of OPF maintenance contractor personnel (TSS camp) are located within the SPZ boundary.

Figure 2 - Sanitary Protection Zone around the OPF

2.3 Process Overview

Crude oil and associated gas are produced by two offshore production platforms, PA-A (Molikpaq) and PA-B, operating in the Piltun-Astokhskoye license area in the Sea of Okhotsk (see Figure 1). Upon treatment, the stabilised oil and associated gas are transported via two 508 mm single-phase pipelines to gas-compressor units and crude oil booster pumps at the OPF.

The bulk of the feed gas for LNG production is produced from the Lunskoye gas and condensate field by the LUN-A offshore platform, which is approximately 27 km east of the OPF (see Figure 1). MEG is added to the gas-and-condensate mixture at LUN-A to prevent the formation of hydrates and the mixture is pumped to the OPF via two 762 mm multi-phase pipelines.

The OPF is the main facility to process the liquid and gaseous hydrocarbons coming from the LUN-A platform and to prepare these for transportation. The stabilised oil and associated gas from the Piltun-Astokhskoye field are mixed at the OPF with the hydrocarbons received from LUN–A, and are transported via the Company's main onshore pipelines to the Prigorodnoye Production Complex (LNG facility and oil export terminal (OET)) in the south of the Island.

The OPF production facilities consist of two process trains. Each process train includes:

- receiving separation unit (separator);
- dew point control unit (low temperature separator);
- condensate stabilisation unit; and
- gas stabilisation compression unit and booster compression unit (booster compressors) used by both trains.

The receiving separation unit divides the multi-phase flow into gas, hydrocarbon condensate and water-saturated MEG solution.

The gas flow is then routed to the dew point control unit, where it is prepared for transportation by the low temperature separation method (throttling on Joule-Thomson valve).

MEG is injected into the gas flow to prevent the formation of hydrates. Dehydrated gas ready for transportation (stripped of water and liquid hydrocarbons) is compressed by booster compressors and delivered to the pipeline for transportation to the LNG Plant at the Prigorodnoye Production Complex.

A combined flow of the hydrocarbon condensate and water-saturated MEG is supplied to the condensate stabilisation unit which separates the high-moisture MEG from the condensate and feeds it into the MEG regeneration system. The regenerated MEG is pumped back to LUN-A via a pipeline or used for suppression of hydrates in the gas flowing into the dew point control unit. Part of the regenerated MEG is sent to the MEG regeneration unit to remove ballast minerals.

The removed hydrocarbons are flared at the LP flare unit and the water is pumped to an on-site disposal well following treatment.

The unstable hydrocarbon condensate is stabilised by the rectification method and fed into the oil flow for transportation to the OET.

The stabilised gas is compressed in the gas compressor and added to the feed gas flow at the inlet of the dew point control unit.

Figure 3 shows the layout of the OPF site.

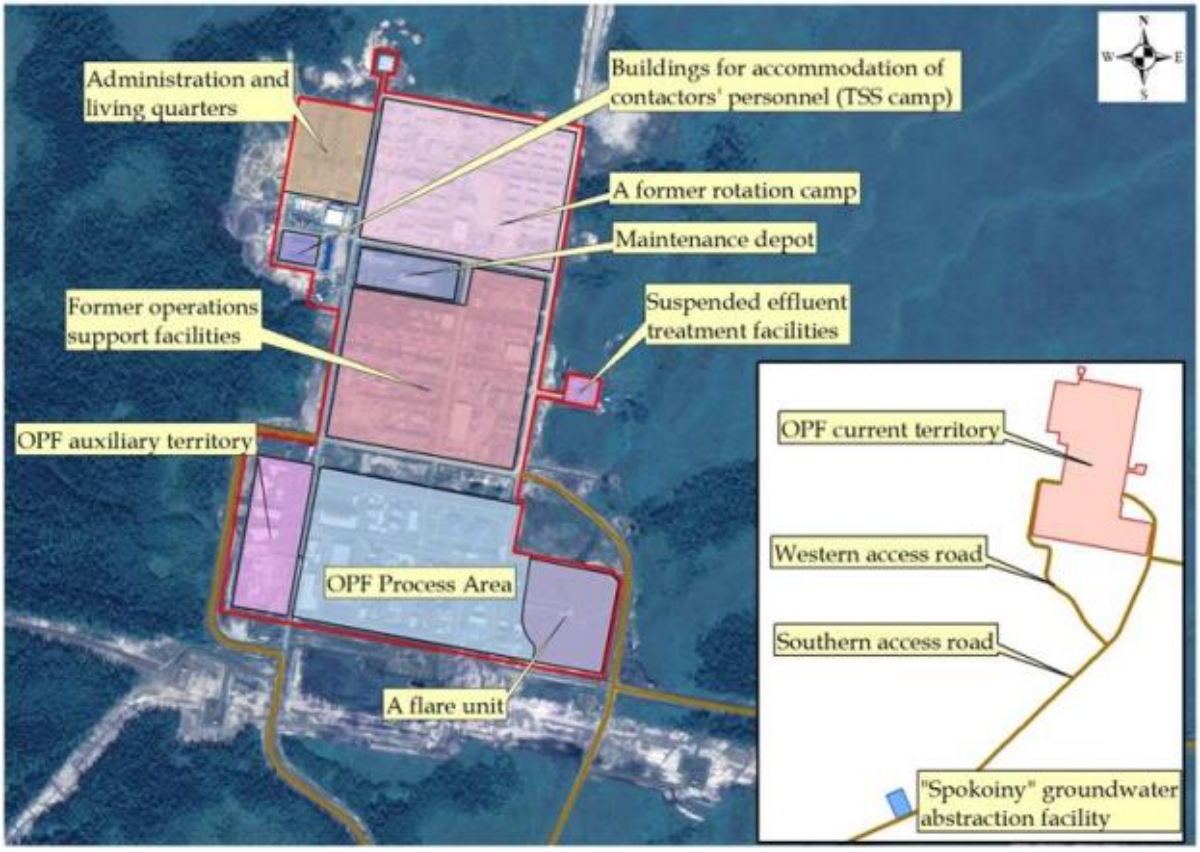

Figure 3 - Layout of Onshore Processing Facility

3. AUDIT FINDINGS

3.1 HSE Management Systems

The Sakhalin Energy Health, Safety, Environment and Social Performance Management System (HSE-SP MS) applies to all operations and facilities including the OPF. It provides an effective tool for ensuring compliance with the company's Health, Safety, Environment and Social requirements, including:

- Russian Federation (RF) legal obligations;
- Lender HSE requirements, as summarised in the Health, Safety, Environment and Social Action Plan (HSESAP); and
- commitments relating to the company's certification to
  - International Standards Organisation standard ISO 14001:2004, "Environmental Management Systems Requirements with Guidance for Use"; and
  - Occupational Health and Safety Assessment Series standard OHSAS 18001:2007, "Occupational Health and Safety Systems Requirements".

All contractors working at the OPF are required to implement a HSE management system that meet's Sakhalin Energy requirements.

Procedures and work instructions are used to implement the HSE-SP MS at the OPF.

Ramboll Environ concluded that the HSE-SP MS is a mature and well implemented system. No deficiencies were identified.

3.1.1 Communication, Training and Competency

HSE communications systems at the OPF are very comprehensive and effectively implemented.

Each day the Sakhalin Energy OPF Head of HSE meets the HSE or Safety Engineer from each of the main contractors to discuss issues:

- Gazprom Transgas Tomsk (GTT): Maintenance contractor
- Cape: Scaffolding contractor
- Intra: Corrosion under insulation contract
- Global: Catering and housekeeping.

In addition, the same group has a weekly meeting together with the Onshore Installation Manager.

The OPF Environmental Engineer has weekly meetings with all staff to discuss and raise awareness of environmental issues. It is understood that waste segregation has been an ongoing issue at the facility, especially for waste paper, which has recently started to be segregated to facilitate its recycling.

The Environmental Engineer also raises awareness of environmental issues through a comprehensive HSE induction briefing for all personnel, including visitors. Additional training is provided where necessary such as chemical handling training for emergency response personnel via a contractor (Ecospass).

Further communication on environmental issues is provided via posters, e-mail distribution lists (e.g. for new regulatory requirements), and observation cards (rewards are given for the best observations).

3.1.2 Compliance Assurance Systems

The OPF is subject to different levels of audit and inspection as defined in the HSE Assurance Standard Overview (0000-S-90-04-O-0015-00-E), including internal and external audits.

The Environmental Engineer conducts daily and monthly inspections of different parts of the OPF site and collates environmental monitoring data. Any issues detected through inspections or environmental monitoring are investigated and the management team is informed. The main issues identified in recent inspections relate to waste segregation and drip trays filling with rainwater when chemical and oil drums are not stored under cover.

It was reported that recent quarterly HSE inspections by the central Sakhalin Energy HSE department have not identified any significant issues.

3.1.3 Incidents and Breaches

No significant environmental incidents or breaches have reportedly occurred at the OPF in 2016-2017. A review of the Fountain incident and non-conformity system showed that only minor environmental incidents have occurred (e.g. very small spills and gas leaks), all of which were thoroughly investigated and corrective and preventive actions implemented. No concerns have been identified by the IEC.

3.2 Water and Wastewater Management

3.2.1 Water Supply

Water is supplied to the OPF via a pipeline from five boreholes, located at the Spokoiny water abstraction facility, approximately 1.5 km south west of the OPF. Each borehole is housed in a small building, which provides good protection from potential sources of contamination. The standard of construction and maintenance is excellent and the water supply facility appears to fully meet relevant requirements of the HSESAP.

Water quality is tested at one of the five wells quarterly. Data from the last two years indicates that the iron content consistently exceeds the drinking water limit of 0.3 mg/l (for example, a concentration of 5.9 mg/l was measured in June 2016 and 0.64 mg/l in June 2017). The volume of water abstracted is substantially below the permitted limit.

Opportunity for Improvement: To protect the health of facility personnel, all drinking water is provided in plastic bottles. Additional treatment has been installed to the water supply serving the canteen facilities, which reduces the iron content to less than 0.01 mg/l, allowing the water to be used in cooking. It is recommended that Sakhalin Energy investigates the viability of providing additional treatment to ensure that all water from the company boreholes meets applicable drinking water standards. This would avoid the environmental and financial impacts associated with supplying bottled water and disposing of empty plastic bottles.

3.2.2 Sewage Treatment Plant

The OPF's Sewage Treatment Plant (STP) has had problems meeting permitted discharge limits for several years and was becoming corroded so a new STP was commissioned for start-up during Autumn 2017. The new facility has the following process steps:

- screening of coarse solids;
- biological activated sludge treatment, in which a chemical coagulant is added;
- disinfection using an ultraviolet lamp; and
- sludge dewatering.

Pressed sludge is double bagged then securely stored before disposal at the Nogliki landfill.

Treated sewage effluent is discharged to ground outside of the site boundary (Photo 1). It is understood that Sakhalin Energy is assessing options for discharging to a surface watercourse as there is no longer a legal basis for permits to be issued for discharges to the ground. This issue has already been reported to lenders (Finding WATER.08) and is also discussed in the main IEC monitoring report (section 9.2.4).

Follow-up Item: Ramboll Environ has requested and received treated effluent monitoring data following replacement of the OPF STP and will review these against HSESAP requirements as part of a separate follow-up item.

3.2.3 Stormwater Management

Stormwater from the OPF site (including water pumped from bunds around ASTs containing condensate, diesel and MEG) drains to underground tanks, where suspended solids settle. Water from bunded areas and diesel tanker delivery points passes through an oil interceptor before draining to a holding tank.

After settlement of suspended solids stormwater is discharged to the ground outside of the site boundary (Photo 2) or mixed with process wastewater and disposed of to an injection well (see section 3.2.4, below). No evidence of contamination was observed during an inspection of the primary discharge point near the administration building.

The discharges are monitored monthly between May and October for a range of parameters. Monitoring data show that both discharges are generally compliant with specified limits but that breaches of limits for suspended solids and MEG have occurred in 2017.

3.2.4 Process Wastewater Disposal

Process water (water removed from the LUN-A hydrocarbons) is filtered to remove suspended solids. Oxygen scavenger and biocide is then added before injection into an on-site disposal well.

As recently reported in the HSESAP 2017 H1 Half-Year Report and Q1-2 Quarterly Report, Sakhalin Energy is working with the research contractor TymenNIIGiprogaz to manage the facility's ongoing inability to meet the permitted level of 10 mg/l of hydrocarbons in process water pumped into the disposal well. The level of 10 mg/l was established during the design stage of the OPF but the specified technology did not meet expectations as it was designed to remove crude oil rather than condensate. The facility currently discharges around 300 m^3 per day of process water with an average hydrocarbon content of 50 mg/l. This process water is currently diluted with stormwater to reduce the hydrocarbon level to 20 – 30 mg/l.

A new Subsurface Use Licence (ЮСХ 14609 ЭЭ) has been issued for pilot injection of wastewater containing ca. 50 mg/l of petroleum products at the rate of 300 m^3/day. The State Reserves Committee has recommended additional study of Sakhalin Energy's proposals for a realistic new limit, and a decision is expected towards the end of 2018.

This issue is already known to and being addressed by Sakhalin Energy and it is therefore not considered necessary to raise as a new Finding.

3.3 Waste Management

In general, the standard of waste management at the OPF is very high, with secure storage of hazardous and non-hazardous materials, clear labelling and good record keeping. The Company has invested considerable effort into building an awareness of good waste management practices.

3.3.1 Waste Storage

Waste generated at the OPF is collected in local containers (typically wheeled or static plastic or metal bins) and then transferred to the central Waste Transit Area. Most non-hazardous waste is stored in three segregated bays on a concrete hardstanding, with adequate protection from the weather (Photo 3). These bays are used for temporary storage of:

- general waste (disposed of in the Sakhalin Energy cell at the Nogliki landfill site);
- wood (recycled off-site); and
- scrap metal (recycled on the mainland).

Cardboard and paper waste is baled and plastic drinking water bottles are bagged in a separate building. Empty drums and disused, empty above ground storage tanks (ASTs) are stored on a concrete hardstanding area. Hazardous waste, including waste oil and oil rags, is securely stored in shipping containers before off-site disposal.

Copies of recent monthly waste accumulation area inspection reports completed by the Environmental Engineer were inspected and no significant issues noted.

All waste is removed from the OPF at least twice each month by the approved contractor, ETNO.

Hazardous waste is stored in shipping containers adjacent to the non-hazardous waste storage area (Photo 4). It is understood that the room designed for hazardous waste storage has been redesignated for another purpose.

FINDING: Six nominally empty 205 litre plastic drums were noted on the hardstanding, near upturned empty drums (Photo 5). Upon closer inspection it became apparent that at least two of the drums contain a significant amount (estimated at 10-20% of a drum's volume) of liquid, which is presumed to be residual corrosion inhibitor (thioalcohol solution, labelled as an environmentally hazardous substance). The drums are not labelled as waste, which is a non-compliance with Requirement 4 of Appendix 10 (Waste Containers, Labeling and Transport) of the Waste Management Standard.

Opportunity for Improvement: Ramboll Environ notes that the temporary hazardous waste store has been used since OPF operations commenced and that upgrades have been made such as improvements to ventilation. However, we recommend that a purpose-built hazardous waste storage area is developed to further improve waste containment.

3.3.2 Waste Segregation and Labelling

During the audit the standard of waste segregation and labelling of waste containers was excellent. However, it is understood that waste segregation is an ongoing challenge, especially for contractor staff who are not accustomed to such practices. The Environmental Engineer regularly raises awareness of this issue through site inspections and toolbox talks. In addition, a booklet has been produced to explain how different types of waste should be disposed of.

3.3.3 Waste Management Systems

Detailed waste records are maintained in a spreadsheet that lists numerous waste types under each of the five broad classes defined in Russian legislation. The records are based on observations of waste held at the accumulation area and on estimates of the amount of waste in each consignment removed from the site. The waste records include the amount of each type of waste generated and its disposal route. This data is shared with the environmental regulator, Rostechnadzor.

A waste transfer note is printed for each consignment. One copy is retained by Sakhalin Energy, a second is kept by the waste carrier (ETNO) and the third is signed by the disposal company

then returned to Sakhalin Energy. The waste tracking system appears to be working well and no issues were reported by the Environmental Engineer.

3.3.4 Waste Minimisation

A number of initiatives have been implemented to minimise waste at source and to increase recycling of waste, including:

- Off-site recycling of paper, cardboard, wood, scrap metal and food.
- Reuse of empty drums and Intermediate Bulk Containers (IBCs) to collect waste oil and oily rags. Sakhalin Energy investigated the feasibility of returning empty oil and chemical containers to the suppliers but this was found to be too expensive.
- Installation of additional drinking water treatment systems to allow water from the company's boreholes to be used in the canteen. This avoids use of 5 litre plastic water bottles.
- Use of reusable cups in the canteen to reduce plastic waste.

It was reported that used lube oil was formerly blended with crude oil, but that practice was stopped in 2016 due to a regulatory requirement for Sakhalin Energy to hold a waste management licence.

3.4 Management of Hazardous Materials

Chemical storage was well organised across the site, with good secondary containment systems, material safety data sheets (MSDS), spill kits and eye wash stations available at relevant locations. The different storage facilities and diesel tanker delivery locations are either bunded or provided with sumps to capture spills.

***Opportunity for Improvement*:** Three opportunities for improving management of MSDS were observed:

1. At the water treatment plant the MSDS for sodium hypochlorite was only available in Russian, which breaches the Chemicals Management section of the Occupational Health and Hygiene Standard (0000-S-90-04-O-0270-00-E).
2. At the Pipeline Maintenance Depot (PMD) the MSDS for Tellus Oil was only available in Russian (Photo 6). Also, the MSDS for Aqueous Film-Forming Foam Concentrates (AFFF) was not available at the storage location and when a copy was located in the office it was only in Russian.
3. At the chemical warehouse Company personnel had difficulty finding the MSDS for Paroil as it was not listed in the index of the MSDS file.

It is recommended that the OPF conducts a systematic review to ensure that MSDS for all chemicals and oil products used at the site are available near their point of use in English and Russian.

3.5 Emissions to Atmosphere

The main sources of emissions to atmosphere at the OPF are combustion gases from the four turbines, flaring, backup generators and vehicles. Emissions monitoring data for the turbines for the last three years were reviewed and found to be in compliance with the requirements stipulated in the HSESAP.

Ambient air quality is monitored (NO_x, SO_2, CO and soot) at two locations on the SPZ boundary each quarter. No breaches of requirements were found in the 2016-17 data.

Low sulphur fuel (with a sulphur content well below the 0.05% sulphur content specified in the HSESAP) is used throughout the OPF.

Dust is not a significant issue as much of the site is covered with hardstanding or grass and as there are no sensitive nearby receptors. No dust issues were noted in the site inspection. It is understood that roads are sprayed with water to suppress dust in the summer months.

Fugitive emissions (for example of natural gas and ozone depleting substances) are well managed through a preventive maintenance system and through the Fountain incident management system.

Three refrigerant gases are used in air conditioning systems: R407C and R410A, which are hydrofluocarbons (HFCs) and R22, which is a hydrochlorofluorocarbon (HCFC). R22 is being phased out around the world in accordance with the Montreal Protocol. Sakhalin Energy has removed some R22-containing air conditioning units but still has 216.5 kg of R22 refrigerant in 173 air conditioning units in the OPF. It is understood that Sakhalin Energy plans to replace R22 with modern non-ozone depleting alternatives such as R410A but detailed schedules have not yet been defined.

***Opportunity for Improvement*:** It is recommended that Sakhalin Energy develops and implements detailed plans for the replacement of R22 refrigerants in air conditioning systems at the OPF.

3.5.1 NOx Emissions from the Gas Turbines

Previous IEC monitoring visits have highlighted that the turbines do not always achieve the required NO_x emission standard of 51 mg/Nm^3 (25 ppm) stated in the HSESAP. Sakhalin Energy recently presented a plan to the Lenders regarding this issue, which is discussed in the main Monitoring Report.

3.6 Environmental Monitoring

Environmental monitoring is completed by a Yuzhno-Sakhalinsk based company called Sakhmeteo Agency. They have an environmental laboratory that is certified to relevant Russian standards and their facilities are periodically inspected by Sakhalin Energy.

During this audit monitoring data for water and wastewater quality, and air emissions were inspected and found to be completed in accordance with the requirements of the HSESAP. Also, with the exception of sewage discharges (see section 3.2.2, above) and minor exceedances of the pH limit for groundwater (naturally occurring low pH due to peat deposits), the monitoring data did not highlight any breaches of the standards specified in the HSESAP.

***Opportunity for Improvement*:** All groundwater quality parameters specified in the HSESAP (section 8.9 of the HSE Monitoring and Reporting Standard, 0000-S-90-04-O-0009-00-E, Appendix 6) are monitored every six months except for organoleptical properties, which are not monitored. It is recommended that organoleptical properties are included in the groundwater monitoring programme.

APPENDIX 1
PHOTO LOG

Title:	Photographic Log	**Client:**	Sakhalin-2 Project Finance Parties
Site:	Onshore Processing Facility	**Date:**	October 2017

Photo 1. Treated sewage discharge point

Photo 2. Stormwater discharge point near Administration Building

Title: Photographic Log	**Client:** Sakhalin-2 Project Finance Parties
Site: Onshore Processing Facility	**Date:** October 2017

Photo 3. Non-hazardous waste storage at Waste Transit Area

Photo 4. Temporary hazardous waste store

Title: Photographic Log	**Client:** Sakhalin-2 Project Finance Parties
Site: Onshore Processing Facility	**Date:** October 2017

Photo 5. Drums containing residual corrosion inhibitor

Photo 6. Chemical and oil store at the PMD where no MSDS was available in English for Tellus Oil

APPENDIX 2
DOCUMENTATION

LIST OF KEY DOCUMENTATION REVIEWED

- Sakhalin Energy Health Safety Environment and Social Performance Management System Manual (0000-S-90-04-P-0006-00-E, Revision 06).
- Examples of weekly HSE meeting minutes.
- Recent examples of daily and monthly environmental inspection checklists and reports.
- Waste accumulation area inspection reports.
- Fountain incident management database.
- Lists of 2016-17 environmental incidents and near misses at the OPF (2016-17).
- List of ozone depleting substances at the OPF (HFCs Spreadsheet V02_16).
- Waste tracking spreadsheets.
- Monitoring data for:
    - Groundwater abstraction from the Spokoiny water abstraction facility (quality and quantity)
    - Air emissions from gas turbines
    - Ambient air quality
    - Treated sewage quality
    - Groundwater monitoring boreholes.
- Correspondence from OPF Environmental Engineer to Sakhalin Energy management on environmental monitoring results.

APPENDIX 3
ITINERARY

ITINERARY

Friday 15th September 2017

14:00	Arrival
14:00 – 14:30	Kickoff Meeting with Facility Leadership Team
14:30 – 19:00	Site inspection, including waste accumulation areas, stormwater and treated sewage discharge points (outside site boundary fence), water supply wells (approximately 1.5 km from the OPF), fire-fighting facilities, water treatment facilities, process areas, utilities building, diesel AST, MEG ASTs, and chemical storage warehouses.

Saturday 16th September 2017

07:00 – 10:00	Site inspection (continued), including PMD (warehouses, workshops, vehicle refuelling area, vehicle washing facility, and backup generators), generators serving main administrative building, and sewage treatment plant.
10:00 – 12:30	Interview OPF HSE Manager and Environmental Engineer
12:30 – 13:30	Lunch
13:30 – 18:00	Interview Environmental Engineer and Head of Operations

Sunday 17th September 2017

07:00 – 08:00	Interview Environmental Engineer
08.00 – 08:30	Interview HVAC Engineer
08:30 – 10:30	Document review
10:30 – 11:30	Close-out meeting
13.00	Departure