



Sakhalin-2 Phase 2 Project
Lenders' Independent Environmental Consultant

Environmental Audit of
Platform PA-A (Molikpaq)
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Contents

Executive Summary	i
1 Introduction and Audit Scope	1
2 Overview of the PA-A Platform	3
2.1 Overview and Description of the PA-A Platform	3
3 Audit Findings	5
3.1 HSE Management Systems	5
3.2 Emissions to Atmosphere	8
3.3 Water and Wastewater Management	10
3.4 Waste Management	13
3.5 Management of Hazardous Materials	14
3.6 Emergency Preparedness and Response	15
3.7 Occupational Health and Safety	16
4 Conclusions	19

Annex A: Photographic Log

Annex B: PA-A Summary Findings

Annex C: Documentation

Annex D: Itinerary and Auditees

List of Abbreviations

CRI	Cuttings Reinjection
HSE	Health, Safety and Environmental
HSEMS	Health, Safety and Environmental Management System
HSESAP	Health, Safety, Environmental and Social Action Plan
HUET	Helicopter Underwater Escape Training
IEC	Independent Environmental Consultant
MSDS	Material Safety Data Sheets
NORM	Naturally Occurring Radioactive Materials
OBM	Oil Based Muds
OIM	Offshore Installation Manager
PPE	Personal Protective Equipment
Sakhalin Energy	Sakhalin Energy Investment Company Ltd
STP	Sewage Treatment Plant

Executive Summary

ENVIRON UK Ltd (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, ENVIRON and Lender representatives undertake periodic monitoring visits and audits of the Project. This report provides the findings of an environmental audit of Sakhalin Energy's Piltun Ashtokskoye A production platform (the 'Platform' or 'PA-A', also known as 'Molikpaq') undertaken by ENVIRON on 3rd and 4th October 2013. The environmental audit assessed the Company's compliance with material environmental law and the Sakhalin Energy Health, Safety, Environment and Social Action Plan (HSESAP). The auditor would like to thank the auditees for their assistance with the audit.

Overall ENVIRON considers that environmental performance at PA-A is good and that Managers, Platform workers and working practices on the Platform demonstrate a strong HSE culture. During the course of the audit the Auditor focused on Management Systems and more specifically the management of wastes, hazardous materials, air emissions and aqueous discharges and emergency response. There was a good level of compliance with environmental law and the requirements of the HSESAP with the following exceptions:

- Discharged effluent from the sewage treatment plant (STP) in early 2013 breached permit conditions. However, platform personnel are confident that the third STP module and education of maintenance staff is expected to address these exceedance issues.
- Dual language material safety data sheets (MSDS) were found to accompany the majority of observed chemicals. However, there were a number of chemicals in the main chemical store which were accompanied by only English or Russian MSDS.
- The secondary containment for some hazardous materials does not meet the specification within the HSESAP.
- The auditor observed a contractor being allowed onto the helicopter without producing evidence of a valid offshore medical certificate despite the Global Logistics Management System showing that one was not on file.
- The auditor was not subjected to 'mandatory' alcohol testing before boarding the helicopter to PA-A at Nogliki airport.
- The emergency exits from the chemical storage container were found to be locked.

1 Introduction and Audit Scope

ENVIRON UK Ltd (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, ENVIRON and Lender representatives undertake periodic monitoring visits and audits of the Project. This report provides the findings of an environmental audit of Sakhalin Energy's Piltun Ashtokskoye A production platform (the 'Platform' or 'PA-A', also known as 'Molikpaq') undertaken by Marcus Reynolds of ENVIRON on 3rd and 4th October 2013.

More specifically, ENVIRON has conducted a Level 1 audit in accordance with paragraph 4.6.3 of the Common Terms Agreement which, amongst others, allows for bi-annual audits of the project facilities. In accordance with the Terms of Reference issued by Sakhalin Energy in September 2011 *'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 19011:2002). Two days were spent at PA-A to complete the following tasks:

- Site Inspection: A brief orientation tour of the facility, followed by detailed inspections of areas of interest including:
 - the waste management area;
 - the drill deck and shale shakers;
 - compressors and CRI well pumps;
 - areas housing oil spill response equipment;
 - storage of chemicals, oils and fuel;
 - wastewater treatment facilities; and
 - medical facilities.
- Interviews: Meetings were held with senior management, HSE personnel and selected other Sakhalin Energy and contractor staff.
- Document Review: Many documents were reviewed on-site and others were scrutinised after the site audit. These included HSE plans and procedures, monitoring data and various environmental records.

Specific attention was given to:

- the adequacy and implementation of HSE Management Systems;
- air emissions and air quality;
- water usage and wastewater management;
- waste management;
- emergency Response; and
- hazardous materials

Whilst the primary focus of the audit was environmental compliance and health and safety was considered outside of scope, nonetheless where health and safety issues were observed we have provided high level commentary.

Elements of the HSESAP considered outside of the scope of this audit are listed below:

- Road Transport HSE Management;
- Loss Prevention in Design and Construction Specification;
- Soil and Groundwater;
- Land Management; and
- Social Performance.

During the audit, progress made towards the closure of open Findings raised from previous IEC reviews and site visits were reviewed. The updated status of the Findings is provided in a revised Findings Log (see Section 9 of the main IEC Monitoring Visit Report 2013). The Findings Log also includes all new Findings identified as a result of this audit.

In addition, a number of suggestions are made following the audit that do not relate to specific areas of non-compliance (and hence are not included in the Findings), but which are made for the benefit of either Sakhalin Energy and/or Lenders to either improve performance or, in some cases, avoid future areas of non-compliance. These are provided in Section 7 of the main IEC Monitoring Visit Report 2013.

A summary of information requests where information/documentation was not available at the time of the site visit is also listed in the main IEC Monitoring Visit Report 2013 (Section 8).

2 Overview of the PA-A Platform

2.1 Overview and Description of the PA-A Platform

The Platform, designed as a production and drilling platform, was originally constructed in 1984 for operation in Canadian waters with a design capacity of 90,000 bbl/d oil and 100MMscf/d of gas.

PA-A was the first platform to be operated by Sakhalin Energy since 1999 as a seasonal oil producing platform and has undergone significant upgrade and alteration since original construction.

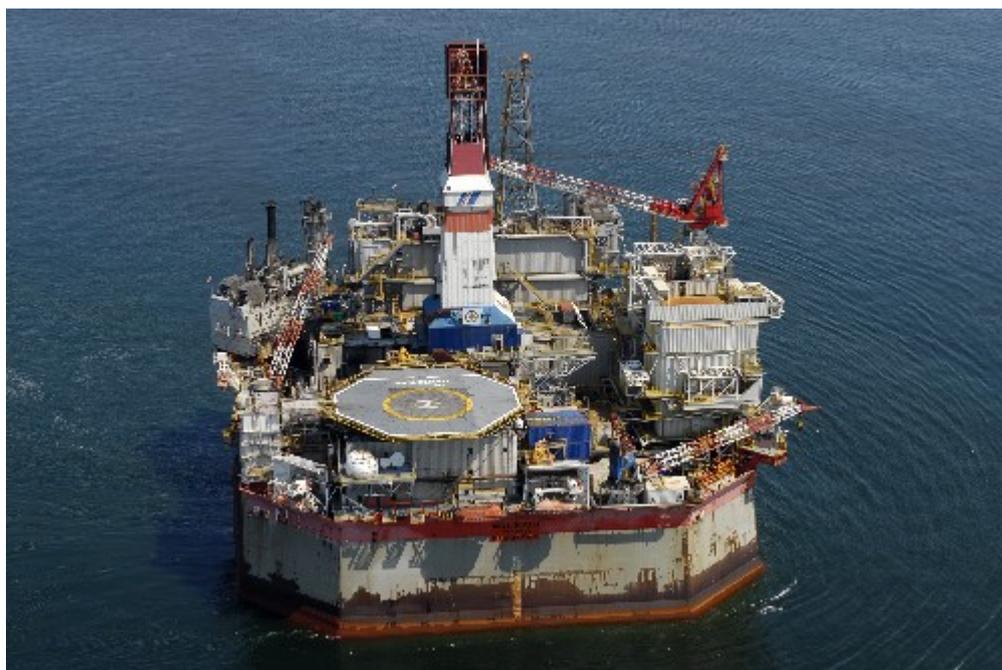


Figure 1: PA-A Platform (Photo: Sakhalin Energy, 2007)

2.1.1 Location

PA-A is one of three offshore platforms operated by Sakhalin Energy, located in the Sea of Okhotsk to the east of Sakhalin Island. It is the centrally located Sakhalin Energy offshore asset based in shallow water in the Piltun Development Field, 16 km off the island's north eastern coast.

2.1.2 Environmental Setting

The Platform sits upon a concrete and steel gravity based structure in 30m depth of seawater. Temperatures fluctuate significantly throughout the year ranging from approximately +30°C in the summer months to minus 35°C in the winter. The cold winter temperatures cause the sea surrounding the Platform to freeze for up to 6 months of the year.

The surrounding sea provides an important habitat for sea life, including summer feeding grounds for the critically endangered Western Gray Whale population.

2.1.3 Current Activities

At the time of the audit the Platform was producing oil at a rate of 46,700 bbl/d and 35 MMscf/d of gas. The platform was not currently undertaking active drilling activities.

The Platform has beds to accommodate 164 people. During the audit all beds were fully occupied. A total of 207 workers were present at the platform, with the additional persons being housed by the nearby accommodation vessel 'Heimdall' and transferring by 'frog' transfer capsule to the Platform daily. During annual periods of sea ice the accommodation vessel is no longer required and personnel numbers on the platform are reduced.

3 Audit Findings

The detailed audit findings presented below contain extracts from the HSESAP. These extracts are not intended to be exhaustive, but rather used as examples to demonstrate compliance or otherwise against HSESAP requirements.

3.1 HSE Management Systems

Sakhalin Energy has an integrated Health, Safety and Environmental Management System (HSEMS) that has been certified to the relevant international standards:

- ISO 14001:2004 (environmental); and
- OHSAS 18001:2007 (occupational health and safety).

The scope of these systems include PA-A¹ i.e. '*operation and maintenance of offshore hydrocarbon drilling, production and export facilities*'.

The Platform has a dedicated HSE Safety Case and is fully integrated within the corporate HSEMS as documented in the Health Safety Environment and Social Performance Management System Manual². The manual details the Company's approach/provisions for: leadership and commitments; roles responsibilities and HSE structures; risk assessment; training and competency needs; communications; performance monitoring; operational controls including management of change, emergency preparedness and response, monitoring and reporting; management of non-conformance, incident management; and assurance. The auditor noted that there was good integration of the HSEMS with the requirements of the HSESAP.

Certain generic elements of the HSE management system relevant to PA-A are further discussed below with further description of management systems provided throughout this report where applicable.

Finding: While reviewing HSE documentation on board the platform, the PA-A offshore installation manager (OIM) could not locate the MARPOL certificates for Molikpaq, including several mandatory pollution prevention certificates. We were subsequently informed by Sakhalin Energy that offshore platforms were removed from shipping registers in 2012, and hence MARPOL certificates are no longer applicable.

3.1.1 Roles and Responsibilities

Overall management of offshore HSE matters is the responsibility of the Offshore HSE Manager reporting directly to the Offshore Asset Manager. Each offshore asset, including PA-A has a permanent HSE Supervisor reporting to the Offshore HSE Manager.

The PA-A HSE Supervisor is supported by others with HSE responsibilities, including individuals responsible for the issuance of permits to work, waste shipments, procurement of

¹ ISO14001; 2004 Certificate of Approval. Current Certificate dated 6 Jan 2013; expiry date 5 Jan 2015

² Health Safety Environment and Social Performance Management System Manual Document no. 0000-S-90-04-P-0006-00-E

chemicals and Contractors' HSE representatives and management on the Platform, including notably the OIM.

Over the course of the audit the Auditor found a good level of cooperation between individuals with direct and indirect responsibility for HSE matters. The Auditor found individuals with HSE responsibilities to be well trained and demonstrating a high level of competency.

3.1.2 Contractors Management and Integration

In addition to 56 Sakhalin Energy employees the Platform houses workers from several other specialist contractors. The main Contractors include KCAD (drilling contractors), Schlumberger (sub-contractors to KCAD), MI Swaco (water injection and cuttings reinjection), IoCa (catering) and SMNM (construction/maintenance).

The Contractors have a long term presence on the Platform, having been present since operations began, and work closely with Sakhalin Energy representatives. A good degree of cooperation was observed.

Notably Contractors were found to be working in accordance with Sakhalin Energy's HSE Management Systems and there was a common understanding of HSE requirements throughout the Contractors. Inductions and refresher training was undertaken by Sakhalin Energy employees. Contractor employees interviewed had also undertaken refresher training provided by their respective companies. For example, the 'permit to work' system³, which applies to everybody on the Platform, includes Sakhalin Energy safe working practices.

3.1.3 Compliance Assurance

Sakhalin Energy operates a tiered HSE audit programme. The various levels of audit are described in the HSESAP and Sakhalin Energy's internal Compliance Assurance procedures (HSE Audit Procedure). In summary these include:

- Level 1 – facility audits undertaken by 3rd parties e.g. lenders' IEC.
- Level 2 – audit of a facility of activity performed by the Company e.g. Corporate HSE team.
- Level 3 – self-assurance activities managed by the asset, often with a system or process focus.
- Level 4 – self-assurance activity to identify specific non compliances. These are often referred to as inspections.

The audits are scheduled within a rolling HSE Assurance Five Year Plan.

The current Sakhalin Energy Integrated Audit & Assurance Plan 2013 for Level 1 and 2 audits were reviewed by the Auditor. A number of audits were seen to have been conducted or were planned covering a broad range of assets and HSE matters. Execution of audits was found to be on target for the year.

In addition to this Lenders' audit, PA-A has been subject to:

³ The permit to work system was not formally audited. However it was witnessed first-hand by the Auditor when requesting permission to take photographs. The Permit issue included a brief 'toolbox talk'.

- Level 1 – ISO14001 and OSHAS 18001 surveillance audits (external audits undertaken by company 'Russian Register');
- Level 1 – Bi-annual Russian party audits (H&S workplace assessments);
- Level 2 – monthly visits by Corporate HSE department;
- Level 3 – Quarterly HSE review; weekly area specific HSE audits, monthly waste audits in line with ISO14001, quarterly chemical management audits in accordance with ISO 14001 requirements; and
- Level 4 – weekly inspections performed by the HSE Supervisor.

ENVIRON reviewed a selection of Level 3 and Level 4 audit reports. The actions arising from the reports are entered into the bespoke Molikpaq Microsoft Access HSE tracking database.

In summary, ENVIRON considers the Corporate Audit programme to be comprehensive and has not identified any significant concerns regarding the adequacy of the PA-A specific audit and inspections programme.

3.1.4 Incident Management

Sakhalin Energy has developed a formal Incident Management System. The system requires incidents (including near miss incidents) to be reported and investigated where necessary. Incidents are logged on a Project-wide dedicated software database called 'Fountain Impact' which allows users to log incidents, report incident details, assign actions to specific individuals which must be satisfactorily completed before an incident can be closed.

Fountain was demonstrated to the Auditor. Users include contractors, but access may be restricted to read only. In the event of a health, safety or environmental incident affected/involved workers are required to report to the PA-A HSE supervisor. The HSE Supervisor will conduct an initial investigation and enter his findings into Fountain identifying action(s) for named individuals. All actions are captured in Fountain and the incident remains 'open' until all actions have been satisfactorily addressed.

Serious incidents are elevated to the Incident Review Panel, which requires that the Corporate HSE department is involved.

Incident reporting and review occurs monthly, led by the OIM. Incidents at PA-A are reported to Corporate HSE on a monthly basis.

The Auditor was shown examples of some incident records, including 1) dropped pipe section and 2) diesel leak.

In the first example, a dropped pipe section landed near a worker. ENVIRON reviewed the incident description, investigation, assigned actions and corrective actions (to ensure that lifting equipment was inspected). All were clearly recorded.

The second incident involved a leak of 2.5 litres of oil from a furnace into the secondary containment bund. The leaking component was replaced and the secondary containment was observed to have done its job.

Overall the Fountain database/incident management software was found to be an effective tool that is being used by the PA-A asset.

3.1.5 HSE Meetings and Reporting

HSE management and reporting is an important daily consideration on the Platform. For example, there is a daily meeting at 7am with all senior managers (and HSE Supervisor) where HSE matters are raised and a similar meeting at the end of each day. The OIM also has a daily call with the overarching Offshore Asset Manager where HSE matters are discussed. There is a monthly Critical HSE activities meeting chaired by the OIM.

A more detailed monthly report is produced by the PA-A HSE Supervisor, reporting to the Offshore HSE Manager via the Corporate HSE Supervisor⁴. Environmental reporting includes flaring volumes and air emissions (actual versus permitted), water intake and discharge volumes, water analysis results, waste volumes by category against permitted volumes, and an action plan.

Overall, HSE reporting from PA-A is integrated with overall HSE reporting requirements and in line with HSESAP requirements.

3.1.6 Competency Assessment and Training

A strong HSE culture is practised at PA-A. For example, all personnel wishing to travel to the Platform must have valid offshore survival and emergency training including Helicopter Underwater Escape Training (HUET) and training in the use of an escape chute ('Skyscape'). The validity of all workers', contractors' and visitors' training and medical certificates is checked against a database when travelling to the platform from Nogliki airport. However, airport personnel were observed allowing a contractor on to the helicopter without a valid medical certificate on file. Furthermore, breathalyser checks were not undertaken at Nogliki airport.

Upon arrival at the Platform it is mandatory that all new arrivals undertake induction training (provided separately in Russian and English). This was demonstrated by the Auditor being required to take the training and it was found to be fit for purpose (training video followed by a test). Refresher courses are given to anybody away from the Platform for more than 2 months and every 6 months for all individuals regardless of rotational pattern.

Competency and training needs were discussed on PA-A, and there appeared to be comprehensive training given to those interviewed. For example, it is understood that contractors have their own learning and development programmes, but are also subject to mandatory Sakhalin Energy training requirements, such as emergency response training. A training matrix maintained by the HSE Supervisor was observed.

3.2 Emissions to Atmosphere

The platform has a number of significant emission sources (Photo 1 of Annex A to this audit report; Photographic Log) including:

- the flare
- gas compressors
- power generators
- water injection pump turbines

⁴ Example report provided – Monthly Environmental Performance Overview, July 2013

3.2.1 Gas Compressor and Main Generators

The HSESAP requires compliance with air emissions permit conditions including the following emission standards for the compressors and generators as follows:

2 x Tornado Gas Compressors

- $NO_x = 62.35 \text{ mg/m}^3$
- $CO = 33.5 \text{ mg/m}^3$

Taifun A Power Generator

- $NO_x = 29.8 \text{ mg/Nm}^3$
- $CO = 18.1 \text{ mg/Nm}^3$

Taifun B Power Generator

- $NO_x = 37.8 \text{ mg/Nm}^3$
- $CO = 18.1 \text{ mg/Nm}^3$

4 x Generators

- $NO_x = 391.1 \text{ mg/Nm}^3$
- $Particulates = 14.55 \text{ mg/Nm}^3$
- $SO_2 = 203.68 \text{ mg/Nm}^3$
- $CO = 385.53 \text{ mg/Nm}^3$

2 x water injection pump turbine

- $NO_x = 37.7 \text{ mg/Nm}^3$
- $CO = 18.1 \text{ mg/Nm}^3$

The emissions from the gas compressors and the Taifun A generator are required to be monitored 2 to 3 times per year, with the remainder of the emissions sources requiring an annual monitoring session. This monitoring is undertaken through fuel use calculations.

Monitoring of a further range of atmospheric pollutants from PA-A is undertaken including oxides of nitrogen, particulates, sulphur dioxide, carbon monoxide and formaldehyde. In 2013 there have been no monitored exceedances of permitted air emission limits.

3.2.2 Flaring

The HSESAP includes a number of requirements relating to flaring.

The *Air Emissions and Energy Management Standard Appendix 1* (0000-S-90-04-O-0257-00-E) details Sakhalin Energy's commitment to no continuous flaring or venting (Requirement #6), and the Company maintains a Greenhouse Gas and Energy Management Plan (Requirement #5). Sakhalin Energy applies good industry practice and technologies in line with the IFC guidelines. For example, installation of knock out drums to remove condensate, flare metering on all facilities, and flares designed to achieve smokeless flaring during normal operations. Venting is provided only for emergency situations (e.g. from relief valves on atmospheric pressure storage tanks) or on Booster Station 2 during abnormal conditions.

The volume of flared gas is monitored continuously with daily volumes recorded. In line with good practice the Platform continually aims to reduce its flaring, however some downstream

production issues and trips are beyond the control of the platform, such as in March 2013 when the monthly flaring factor was 15.1% of associated gas.

The platform does not have a smokeless flaring system installed (Photo 2), but manages to achieve relatively smokeless flaring by minimising liquid carry-over and entrainment within the gas stream.

In 2012 new legislation governing the permitted volume of associated gas that can be flared came into effect (RF Government degree #7, dated 8th January 2009). The legislation set the maximum permissible volume at 5% of associated gas; at the time of the audit the platform was operating at an annual flare rate for 2013 of approximately 4% of associated gas.

3.2.3 Fugitive (Hydrocarbon) Emissions

Significant effort is made to prevent and detect fugitive emission of hydrocarbons (gas leaks) as such leaks would represent a very serious risk to the Platform. To detect gas leaks at the earliest opportunity gas detectors are positioned in many locations across the Platform. The detection of elevated gas levels would result in an automatic shutdown of the plant.

Personnel are also equipped with portable gas detectors.

Fugitive hydrocarbon emissions are considered to be well managed.

3.2.4 Occupational Air Quality Monitoring

In the workplace, air quality is monitored by occupational hygienist(s), including Sakhalin Energy's internal resource and 3rd party specialists. Workplace assessments are undertaken every 3 years in accordance with national legislative requirements.

Following the installation of the processing machinery including generators in the platform 'core' it was observed that the ventilation system could not cope with the generator exhaust. The generators had been running for a matter of minutes before the carbon monoxide alarms were activated. The core was evacuated and the generators shut off. Sakhalin Energy acted upon this incident and installed a local extraction system (Photo 3).

3.3 Water and Wastewater Management

The Platform operates under a Water Use Licence issued by Russian regulatory bodies (verified by the Auditor). This section considers water abstraction and the discharge of aqueous effluents.

3.3.1 Water Abstraction and Usage

Seawater is used for generation of freshwater and as process water (process cooling water and for water reinjection purposes). The water intake is located within the base of the platform and measured by a flowmeter to ensure volumes are in compliance with the Water Use Licence. The auditor examined the water use tracking spreadsheet for 2013 and observed all water use to be within permitted limits.

The majority of abstracted water is for cooling processes and is discharged back into the sea. A small proportion is used for generation of freshwater on the Platform including drinking water. The drinking water is sampled by the platform doctor three times a week with samples delivered to on-shore testing facilities. However, bottled water is delivered to the Platform and is the clear preference of those on board.

3.3.2 Wastewater Management

The Platform has the following waste water streams:

- Cooling water;
- Uncontaminated deck drainage;
- Potentially contaminated deck drainage;
- Sewage effluent (including grey water e.g. laundry effluents);
- Fire-fighting water;
- Bilge oily water;
- Super saline water (generated by the seawater desalination unit); and
- Produced water

Depending on the type of wastewater, it is separately collected within one of four separate wastewater systems:

- Sanitary wastewater;
- Process water;
- Formation water (produced water); and
- Drilling module process water.

Treatment routes for these systems are discussed below:

Sanitary wastewater

The Platform's STP (Photo 4) uses electrostatic disinfection technology rather than chlorination to avoid potential discharge of residual chlorine. The two identical modules of the STP were originally designed with over-capacity for the persons on board. However, when one of the units is shut down for cleaning, the remaining unit cannot meet the demands placed upon it. A third STP module has been installed but was not commissioned at the time of the audit. It is expected that two modules will be able to cope with the full platform load when the third is off-line for cleaning. Effluent quality from the STP is monitored regularly (see below).

Sludge, generated only during cleaning activities as the electro-coagulating unit does not generate sludge during normal operations, is transported back to shore for disposal.

The HSESAP *Water Use Standards Comparison* Specification refers to the fact that MARPOL 73/78 does not set the regulation for the level of contaminants in sewage water after treatment for STPs installed before January 1, 2010. The newly installed wastewater treatment system should more than achieve these requirements; however the MARPOL certificates for the platform (including the International Sewage Pollution Prevention Certificate) could not be located at the time of the audit. We were subsequently informed by Sakhalin Energy that offshore platforms were removed from shipping registers in 2012, and hence MARPOL certificates are no longer applicable.

Process water

The Platform is designed with two drainage systems for potentially contaminated and uncontaminated run off. The uncontaminated deck drainage is discharged direct to sea without treatment. The contaminated deck drainage, including storm water from the

helideck, is collected in a 600m³ storage tank and all contents sent for reinjection via the cuttings reinjection (CRI) well (see Produced water).

Formation/Produced waters

Produced waters (water separated from the oil and therefore containing residual oil content) are re-injected via a CRI well after processing through a hydrocarbon separation system. The Platform is therefore designed to have zero discharge of produced waters. The CRI well was seen to be fully operational.

Drilling module process water

All drilling mud, drilled cuttings, residual cement slurry and completion fluids from the wells are re-injected into the dedicated CRI well (well PA-118).

3.3.3 Wastewater Monitoring

The HSESAP outlines the following project specification for PA-A wastewater.

- *Oil products daily average: 0.04 mg/l*
- *TSS: 27.14 mg/l*
- *BOD: 64.92 mg/l*
- *Ammonia nitrate: 16.1 mg/l*
- *Synthetic surfactants: 1.93 mg/l*
- *Total phosphorus: 1.7 mg/l*
- *Phenols: 0.007 mg/l*
- *Detergents: 1.93 mg/l*

The HSESAP also requires monitoring as follows:

PA-A: Wastewater from northern sluice (wastewater from the desalinators and the diesel generator cooling system) - Suspended solids, hydrocarbons, temperature, once a month.

PA-A: Wastewater from eastern sluice (conditionally clean water from cooling systems and process wastewater) - Suspended solids, hydrocarbons, temperature, once a month.

PA-A: Wastewater from western sluice (treated greywater and domestic wastewater) – Suspended solids, hydrocarbons, BOD5, ammonia nitrogen, nitrite, nitrate, phosphates, synthetic surfactants, phenols, pH, temperature, biogens and free chlorine, once a month.

The STP has been out of compliance in February and March 2013 due to the malfunction of one of the units electro-coagulating reactor (leading to a BOD and ammonia exceedance), excess use of domestic chemicals (leading to a phosphate, phenol and detergent exceedance), failure of a filter (leading to a suspended solids exceedance), laundry effluents (detergents) and because of grease from the kitchens. However, platform personnel are confident that the third STP module and education of maintenance staff is expected to address these exceedance issues.

Finding: Discharged effluent from the sewage treatment plant (STP) in early 2013 breached permit conditions.

Effluent monitoring (for environmental protection purposes)

Independent analysis of effluent quality is performed on a monthly basis. Samples are collected by a nominated individual on the Platform and dispatched for analysis by to ANO SakhMeteo. Samples collected include:

- Raw sewage
- Treated sewage effluent
- Samples from the cooling water stream

All results are sent from ANO SakMeteo to Corporate HSE Department in Yuzhno-Sakhalinsk.

3.4 Waste Management

Waste management procedures and the implementation of those procedures for the Platform were reviewed by ENVIRON. Wastes are collected on the Platform and returned by sea to Kholmsk port where the waste is then managed in accordance with Sakhalin Energy's broader waste management procedures. This audit only considers waste management practices up to the point where it is loaded on to a vessel for dispatch to Kholmsk.

The storage, transport (off-loading) and disposal of waste arising from Platform operations is carried out in accordance with written waste management documentation, including:

- Production Directorate PA-A (Molikpaq) Operations Procedure: Waste Management and Minimisation. Doc ref. 2000-S-00-N-P-0010-00-05
- PA-A Waste Management and Tracking System

The main non-hazardous wastes generated by the Platform include:

- food wastes
- plastic
- metal
- glass
- paper and cardboard
- clean textiles

The main hazardous wastes generated by the Platform include:

- Machine oils and hydraulic fluids
- Oily sludges
- Contaminated filters and rags
- Spent/unused chemicals
- Batteries
- Mercury lamps and fluorescent tubes
- Clinical wastes
- Spent drill muds and cuttings
- Produced sand (small quantities)

Segregation of waste (metals, lamps, wood, oily wastes and incompatible chemical wastes etc.), labelling, classification in accordance with Russian Hazard classes, temporary storage prior to its shipment to shore were found to be good (Photos 5-9).

The platform's waste is managed by the Platform's Offshore Services Supervisor. Waste records are kept that inventorise the volume and classification of all wastes, and checks are made to ensure these volumes are in compliance with the Platform's 'waste passport' (which prescribed monthly limits for each type of waste).

Waste manifests are maintained for all shipments of waste, and waste volumes are reported on a monthly basis to the central HSE Department in Yuzhno-Sakhalinsk. Based on year to date volumes, the Platform is below permitted limits for all waste types. The platform appears to be approaching the permitted limit for oily rags, and had only 3 tons allowance remaining in July 2013, but personnel have reported that the limit was in the process of being renegotiated.

The HSESAP specifies that:

Sakhalin Energy will not dispose drilling cuttings or residual muds or completion and workover fluids into the sea or other surface waters.

a. Oil Based Muds (OBM) shall not be used.

b. All platforms shall dispose of used drilling cuttings, muds, completion and workover fluids by injection down their dedicated cuttings reinjection (CRI) well. Each platform's CRI well is each other's backup.

The Platform's dedicated CRI, used for disposal of muds and cuttings was viewed and observed to be fully operational in accordance with the HSESAP. Reportedly no oil or water based muds have been discharged to sea.

NORM

The issue of naturally occurring radioactive materials (NORM) was briefly discussed. At this stage of the Project NORM is not considered a risk. However in the future there is the possibility that NORM will be encountered and this risk is being addressed through the early drafting of a NORM procedure.

3.5 Management of Hazardous Materials

Numerous hazardous chemicals are used on the Platform. In particular, large quantities of chemical additives are required for the drill muds. Sakhalin Energy has procedures⁵ in place for the management of hazardous materials.

3.5.1 Chemical Management Systems

The HSESAP includes the following requirement(s) for the management of hazardous materials:

'Only Chemicals approved by the Sakhalin Energy Chemicals Approval Panel (CAP) shall be purchased and used at Sakhalin Energy Sites.'

The procurement of chemicals is the responsibility of the Logistics Manager. All chemical orders are passed to the Logistics Manager who arranges for the purchase and shipping of chemicals. Chemicals can only be procured via the SAP system which contains the list of approved chemicals. Approved chemicals can only be uploaded to the SAP system by the Chemical Approval Panel based in Yuzhno-Sakhalinsk. As such, individuals on PA-A cannot add new chemicals to the SAP system, thus preventing the procurement of chemicals that have not been approved.

⁵ Chemicals Handling and Storage (Doc No: 1000-S-90-04-P-0128-00)

The characteristics of approved chemicals, including hazard information, are captured on the 'Dolphin' chemical database. Material Safety Data Sheets (MSDS) are held on the Dolphin database and at the point of storage.

A further HSESAP requirement is that:

An MSDS in Russian and English shall be available on-site for all potentially hazardous materials used in Sakhalin Energy operations.

Finding: During the Platform walkover dual language MSDSs were found to accompany the majority of observed chemicals. However, there were a number of chemicals in the main chemical store which were accompanied by only English or Russian MSDS.

3.5.2 Walkover Observations – Chemical Management

The Platform's chemical storage areas, including a dedicated main storage area, were inspected as part of the audit programme. In general labelling, the provision of dual language MSDSs and the use of secondary containment was good (Photos 10 and 11 show evidence of good practice). The storage of chemicals for drilling operations was observed to be in bulk ISO containers rather than 1m³ Intermediate Bulk Containers which minimises handling of hazardous chemical containers.

Additional personal protective equipment (PPE) and emergency provisions in the form of eye wash bottles and emergency showers were also available at the chemical storage area.

Finding: Drums containing chemical products were located in numerous locations, including in areas on elevated walkways and close to the Platform edge. These were generally placed on drip trays, but not in all cases (Photo 12).

Finding: The emergency exits from the chemical storage container were found to be locked.

3.6 Emergency Preparedness and Response

The scope of the audit included oil/chemical spill and medical emergencies. Fire-fighting and other emergencies are excluded.

3.6.1 Oil and Chemical Spill Response

Oil spills represent one of the greatest environmental and reputational risks to the Project. The risk of an oil spill is minimised through mitigation measures in the Platform design, such as closed drainage systems and the use of blowout preventers (Photo 13). However should these measures fail Sakhalin Energy has a suite of oil spill response plans. The Piltun Astokhskoye oil spill response plan jointly covers the activities of PA-A and PA-B. This plan has been extensively reviewed by the IEC under a separate scope of work and was not reviewed during this audit. The audit focused on emergency preparedness of the Platform and its ability to deal with oil spill contained on the Platform, including knowledge and capability of the PA-A workforce to respond. Spills to sea require additional clean-up resources in the form of response vessels which were excluded from the audit. Similarly response actions performed by the Emergency Crisis Team based in Yuzhno-Sakhalinsk, for example the use of oil spill trajectory models, were also excluded.

Oil spill response plan

A full copy of the Piltun Astokhskoye Oil Spill Response Plan is held by the OIM and was observed by the auditor. The HSE Supervisor also holds a copy of the Oil Spill Response Manual (Russian version). An emergency contact list identifying responders and contact

lists is updated on a weekly basis reflecting changes in Platform crews. In the event of a spill the 'Site Controller' would be the OIM, supported by 'On-scene Commanders' which for PA-A would generally include the HSE Supervisor.

Emergency training and exercises

Nominated responders receive specialist response training. For example, On Scene Commanders receive training in Montrose, Scotland every 2 years. The Platform also conducts regular emergency drills including monthly spill response exercises. Other drills include:

- Platform muster drills (weekly);
- Platform abandonment drills (monthly);
- Skyscape/lifeboat drills;
- Man overboard drills (bi-weekly in the ice free summer months);
- Fire training (Monthly); and first aid (bi-weekly).

Spill response equipment

The Platform is equipped with sufficient response equipment to deal with relatively small spills contained on the Platform. Numerous spill kits and a container of additional response equipment were observed.

Localised spill kits are generally provided in wheelie bins. The bins are sealed with a plastic tag to ensure the contents are not removed. The Auditor viewed numerous oil spill kits throughout the Platform. The use of emergency spill equipment should be reported to HSE Supervisor who will arrange to replenish the spill kits.

3.7 Occupational Health and Safety

Whilst the primary focus of the audit was environmental compliance and health and safety was considered outside of scope, nonetheless where health and safety issues were observed we have provided high level commentary below.

3.7.1 General

Overall there is a strong H&S culture on the Platform, typified by adherence to the '3 point contact' rule for stairwells i.e. staff observed to be using handrails when descending and ascending stairs. Another example was the two systems of cordoning off work areas with yellow 'enter with caution' tape and red 'do not enter' tape. This system works alongside the Sakhalin Energy permit to work scheme on the platform. The hazard intervention and reporting cards were observed to be located around the platform in both English and Russian and the cards are directed to the HSE Supervisor.

At the time of the audit the number of days since the last Loss Time Incident (LTI) was 1388 days and 516 days since the last Recordable Incident.

3.7.2 Signage and PPE

The Platform has safety information in the form of leaflets, posters and safety stickers that are appropriate and relevant to the hazards on the Platform.

Specific requirements of the HSESAP relevance to Sakhalin Energy's offshore operations regarding PPE include:

- *All staff, contractors, and visitors onboard offshore facilities are required to wear the PPE described below. Exceptions to these rules shall be approved only by the Offshore Installation Manager.*
- *Protective Clothing: Flame resistant (FR) clothing shall be worn onboard offshore facilities while working outside accommodation modules, or in offshore facility accommodation electrical rooms.*
- *Protective Head Gear: Safety helmets shall be worn onboard offshore facilities while working outside accommodation modules.*
- *Foot Protection: Safety toe-protective footwear shall be worn onboard offshore facilities while working outside accommodation modules.*
- *Eye and Face Protection: Eye protection shall be worn onboard offshore facilities while working outside of the accommodation modules.*

Each of these requirements was observed without exception during a walkover survey of the Platform.

3.7.3 Medical Facilities

The Platform has a well-equipped medical bay and a permanent fully trained and experienced Doctor. The medical facilities are capable of dealing with most emergency situations, including fractures, burns, strokes etc. and minor ailments.

The doctor attends a 3 week oil and gas industry training course, specially designed for oil and gas facility doctors, in Pretoria every 2 years. The doctor is supported by a team of additional trained first aiders. In addition, all staff on the Platform have basic first aid training.

3.7.4 Fitness to Work

The HSESAP includes the following occupation health and safety requirement(s):

Record keeping/certification - All employers should ensure that a current valid certificate of fitness is maintained for each worker.

Fitness to work is managed via the 'Global Logistics Management System' (a database) that contains records of all personnel wishing to work on the Platform (including HUET and Fitness to work certificates) as verified during the audit.

Finding: The auditor observed a contractor being allowed onto the helicopter without producing evidence of a valid offshore medical certificate despite the Global Logistics Management System showing that one was not on file.

3.7.5 Random Searches

The HSESAP includes the following requirement for the control of drugs and alcohol:

Legally authorised officers shall conduct random personnel and property searches.

The HSE Supervisor and Doctor confirmed that random drugs and alcohol searches are carried out, including locker checks when authorised by the OIM.

3.7.6 Drugs and Alcohol Tests

The HSESAP also includes the following requirements for the control of drugs and alcohol:

Staff/contractors or visitors to any offshore installation shall notify the installation Medic. (This message is reinforced during the induction video all staff, contractors and visitors must watch when arriving at the platform).

And:

Contractors to implement camp management policy in regard to alcohol and drug abuse (0000-S-90-04-O-0270-00-E Appendix 1 requirement 4).

These requirements were further emphasized during the HSE induction with all new arrivals to the Platform being interviewed by the Doctor.

Random drug tests are performed monthly. A sample of Sakhalin Energy and Contractor staff will typically be tested for a range of illegal substances. The test is based on urine samples.

Finding: The auditor was not subjected to 'mandatory' alcohol testing before boarding the helicopter to PA-A at Nogliki airport.

3.7.7 Grievance Procedure

The auditor experienced awareness of Sakhalin Energy's formal grievance mechanism within those interviewed during the audit. The Auditor was informed that in practice any worker would raise their grievance with their supervisor to be subsequently raised with the OIM. Evidence of the Sakhalin Energy Human Resources procedure and form was provided to the auditor. Discussions with Platform personnel suggest that the Platform has a reasonable mechanism for raising and addressing grievances.

4 Conclusions

Overall ENVIRON considers that environmental performance at PA-A is good and that Managers, Platform workers, Contractors and working practices on the Platform demonstrates a strong and robust HSE culture. During the course of the audit the Auditor focused on Management Systems and associated physical control measures with emphasis on the management of wastes, hazardous materials, air emissions, aqueous discharges and emergency response. There was a good level of compliance with environmental law and the requirements of the HSESAP with the following exceptions:

- The STP effluent exceedances in early 2013 have breached permit conditions. However, platform personnel are confident that the third STP module and education of maintenance staff is expected to address these exceedance issues.
- Dual language MSDSs were found to accompany the majority of observed chemicals. However, there were a number of chemicals in the main chemical store which were accompanied by only English or Russian MSDS.
- The secondary containment for some hazardous materials does not meet the specification within the HSESAP.
- The auditor observed a contractor being allowed onto the helicopter without producing evidence of a valid offshore medical certificate despite the Global Logistics Management System showing that one was not on file.
- The auditor was not subjected to 'mandatory' alcohol testing before boarding the helicopter to PA-A at Nogliki airport.
- The emergency exits from the chemical storage container were found to be locked.

Annex A: Photographic Log



Photo 1. Generator and compressor exhausts



Photo 2. Flare

Title: Photographic Log	Client: Sakhalin-2 (Phase 2) Project Finance Parties
Site: PA-A	Date: October 2013



Photo 3. Exhaust ventilation fitted to machinery in the 'core'



Photo 4. Sewage Treatment Plant 'A'. Unit 'B' is behind and the new Unit 'C' is to the right

Title: Photographic Log	Client: Sakhalin-2 (Phase 2) Project Finance Parties
Site: PA-A	Date: October 2013



Photo 5. Waste plastic compactor on the main deck



Photo 6. Scrap metal waste container on the main deck

Title: Photographic Log	Client: Sakhalin-2 (Phase 2) Project Finance Parties
Site: PA-A	Date: October 2013



Photo 7. Waste oil filters stored within steel drums



Photo 8. Waste fluorescent tubes within a steel box

Title: Photographic Log	Client: Sakhalin-2 (Phase 2) Project Finance Parties
Site: PA-A	Date: October 2013



Photo 9. Bagged waste oily rags in within drums inside a shipping container



Photo 10. Exterior of main chemical store

<p>Title: Photographic Log</p>	<p>Client: Sakhalin-2 (Phase 2) Project Finance Parties</p>
<p>Site: PA-A</p>	<p>Date: October 2013</p>



Photo 11. Interior of main chemical store



Photo 12. Drum in the 'core' without secondary containment

<p>Title: Photographic Log</p>	<p>Client: Sakhalin-2 (Phase 2) Project Finance Parties</p>
<p>Site: PA-A</p>	<p>Date: October 2013</p>



Photo 13. Blow-out preventer (BOP)

Title: Photographic Log	Client: Sakhalin-2 (Phase 2) Project Finance Parties
Site: PA-A	Date: October 2013

Annex B: PA-A Summary Findings

Findings Log							
Ref	Rank	Status	Date	Topic	HSESAP Ref:	Finding	Action Progress Review
WATER.10	Low Amber	New	Oct 2013	Wastewater	Water Use Standards Comparison Specification Doc. 0000-S-90-04-O-0255-00-E App 4	Discharged effluent from the STP in early 2013 breached permit conditions.	
H&S.11	Blue	Open	Oct 2013	Storage of Hazardous Materials	Chemicals Management Specification Doc. 0000-S-90-04-O-0270-00-E App 9	Dual language MSDSs were found to accompany the majority of observed chemicals. However, there were a number of chemicals in the main chemical store which were accompanied by only English or Russian MSDS.	Recommended Action: Ensure provision of MSDS in both languages
WATER.13	Low Amber	New	Oct 2013	Storage of Hazardous Materials	Soil and Groundwater Standard Doc. 0000-S-90-04-O-0018-00-E App 5 ⁶	Drip trays not provided for all oil/chemical drum storage.	Action: Provide secondary containment for all drums on the PA-A platform.
H&S.12	High Amber	New	Oct 2013	Health & Safety	Occupational Health and Hygiene Standard Doc. 0000-S-90-04-O-0270-00-E App 3	The auditor observed a contractor being allowed onto the helicopter without producing evidence of a valid offshore medical certificate despite the Global Logistics Management	

⁶ (The IEC notes that the relevant standard in the HSESAP, which is included in the Soil & Groundwater section of the HSESAP, needs to be reviewed for its applicability to offshore platforms, see also WATER.06)

						System showing that one was not on file.	
H&S.13	High Amber	New	Oct 2013	Health & Safety	Occupational Health and Hygiene Standard Doc. 0000-S-90-04-O-0270-00-E App 3	The auditor was not subjected to 'mandatory' alcohol testing before boarding the helicopter to PA-A at Nogliki airport.	
H&S.14	Low Amber	New	Oct 2013	Hazardous materials	Chemicals Management Specification Doc. 0000-S-90-04-O-0270-00-E App 9	The emergency exits from the chemical storage container were found to be locked.	

Annex C: Documentation

List of Key Documentation Reviewed

1. PrD update (Slide presentation by Sakhalin Energy)
2. Certificate of Approval for ISO14001: 2004
3. Sakhalin Energy Integrated Audit and Assurance Plan 2013
4. PA-A HSES Plan Action Tracking 2013 (access database)
5. Environmental permits
 - a. Air emission permit
 - b. Water use Agreement
 - c. Waste Generation and disposal limits
 - d. Water Use Licence
6. PA-A Offshore Training Matrix (excel spreadsheet)
7. Environmental Industrial Control Program on the PA-A «Molikpaq» Platform for 2011-2015 Period. Doc ref. 2000-S-00-N-P-3309-00-03.
8. Environmental Industrial Control Program on the PA-B Platform for 2011-2015 period Doc ref. 3000-S-90-04-T-7006-00-02.
9. PA-A HSE Plan
10. Programme for Operational Control over Compliance with Sanitary Rules and Sanitary-Epidemiological (Preventive) Activities for PA-A Molikpaq Platform. Doc ref. 2000-S-00-N-T-0098-00-03. Version 04 available only in Russian.
11. Monthly Environmental Performance Overview – July 2013 (powerpoint presentation)
12. 2013 PA-A Water Use Tracker (excel spreadsheet)
13. 2013 PA-A & PA-B Flaring vs Production figures (excel spreadsheet)
14. Production Directorate PA-A (Molikpaq) Operations Procedure: Waste Management and Minimisation. Doc ref. 2000-S-00-N-P-0010-00-05.
15. Incident Investigation and Follow-Up Procedure. Doc ref. 0000-S-90-04-O-0020-00-E Appendix 2, Revision 03.
16. PA-A Platform Emergency Response Procedure. Doc ref. 2000-S-00-N-P-3272-00 Rev B.

Annex D: Itinerary and Auditees

Itinerary

4th October	Helicopter transfer to PA-A HSE Induction/orientation Meeting with HSE Team Leader and Offshore Installation Manager Auditing (12:00-21:00)
5th October	Auditing (06:30-11:45) Depart by helicopter (12:00)

List of Key Auditees	
Role	Location
Offshore Installation Manager (OIM)	PA-A
Molikpaq HSE Team Leader	PA-A
Offshore Services Supervisor	PA-A
Head of Operations	PA-A
Doctor	PA-A
Logistics HSE Manager	Yuzhno-Sakhalinsk