





Sakhalin 2 Project  
Environmental Audit of  
Platform PA-B

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**Sakhalin-2 (Phase 2) Project Finance Parties**

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## List of Abbreviations

CRI	Cuttings Reinjection Well
HSEMS	Health, Safety and Environmental Management System
HSESAP	Health, Safety, Environmental and Social Action Plan
HUET	Helicopter Underwater Escape Training
IEC	Independent Environmental Consultant
LRQA	Lloyd's Register Quality Assurance
OIM	Offshore Installation Manager
PPE	Personal Protective Equipment
PTW	Permit To Work
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 Ashtok B production platform (the 'Platform' or 'PA-B') undertaken by Chris Halliwell of ENVIRON in September 2011. 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 auditors would like to thank the auditees for their assistance with the audit.

Overall ENVIRON considers that environmental performance at PA-B 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:

- Failure to take instrumental measurement of compressor and generator exhaust stack emissions.
- The unavailability of a written flaring strategy for PA-B and the fact that smokeless flaring is not always achieved.
- Discrepancies between HSESAP requirements for workplace air quality monitoring and actual parameters/locations monitored.
- Effluent quality monitoring results to date for 2011 show exceedances in levels of ammonia nitrogen, nitrite and phenols.
- Seawater analysis does not currently cover all parameters included in the HSESAP.
- Further efforts could be made to minimize wastes both in order to stay within allowed limits and to comply with good management practices.
- The secondary containment for some hazardous materials does not meet the specification within the HSESAP.
- Isolated instances of unlabeled chemical drums and drums without secondary containment were observed.
- The volume of chemicals stored on the Platform exceeded the capacity of chemical storage facilities.
- DTP vaccinations are currently non-mandatory despite being required within the HSESAP.
- There is limited awareness of Sakhalin Energy's formal grievance mechanism on the Platform.

In addition, a number of recommendations to improve performance have been highlighted in this audit report, including:

- Sakhalin Energy should consider the mandatory use of sole protectors in safety boots worn by all Sakhalin Energy and Contractor personnel.

- In 2012 new legislation governing the permitted volume of associated gas that can be flared will come into effect. The new legislation will set the maximum permissible volume at 5% of associated gas; currently Sakhalin Energy is exceeding this limit. Sakhalin Energy's flaring strategy will need revision to accommodate the new Russian requirements as set out in RF Government degree #7, dated 8<sup>th</sup> Jan 2009.

# 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 Ashtok B production platform (the 'Platform' or 'PA-B') undertaken by Chris Halliwell of ENVIRON on 29<sup>th</sup> and 30<sup>th</sup> September 2011.

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-B 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;
  - areas housing oil spill response equipment;
  - storage of chemicals, oils and fuel;
  - wastewater treatment facilities;
  - 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 EHS Management Systems;
- air emissions and air quality;
- water usage and wastewater management;
- waste management;
- hazardous materials;
- emergency response;

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 summarised below:

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



## 2 Overview of the PA-B Platform

### 2.1 Overview and Description of the PA-B Platform

The Platform, designed as a production and drilling platform, is newly constructed and was completed in 2008 with a design capacity of 70,000 bbl/d oil and 100MMscf/d of gas.

**Figure 1- Photo of PA-B offshore platform**



Photo acknowledgement: Sakhalin Energy

#### 2.1.1 Location

The Platform is one of three offshore platforms located in the Sea of Okhotsk to the West of Sakhalin Island that is operated by Sakhalin Energy. It is the most northerly of Sakhalin Energy's offshore assets based in shallow water in the Piltun Development Field, of the north east coast.

#### 2.1.2 Environmental Setting

The Platform sits upon a 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 critical endangered Western Gray Whale population.

### 2.1.3 Current Activities

At the time of the audit the Platform was producing oil at a production rate of 44,000bbl/d. Simultaneously the Platform was in the early stages of drilling the PB-318 oil well. The well will be the most southerly extending well of the Piltun field with the drilling programme consequently estimated to be 125 days in duration.

The Platform can accommodate 140 people. During the audit all 140 beds were fully occupied with an additional 15 workers being housed by the nearby Flotel (accommodation vessel) and transferring by 'frog' transfer capsule (see Photo 24) to the Platform daily. Thus the audit was conducted during what was described as 'a very busy period'.

## 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 EHS 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-B<sup>1</sup> 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 HSE MS as documented in the Health Safety Environment and Social Performance Management System Manual<sup>2</sup>. 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 auditors noted that there was good integration of the EHS MS with the requirements of the HSESAP.

Certain generic elements of the HSE management system relevant to PA-B are further discussed below with further description of management systems provided throughout this report where 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-B has a permanent HSE Supervisor reporting to the Offshore HSE Manager. The Offshore HSE management structure is shown in Figure 2.

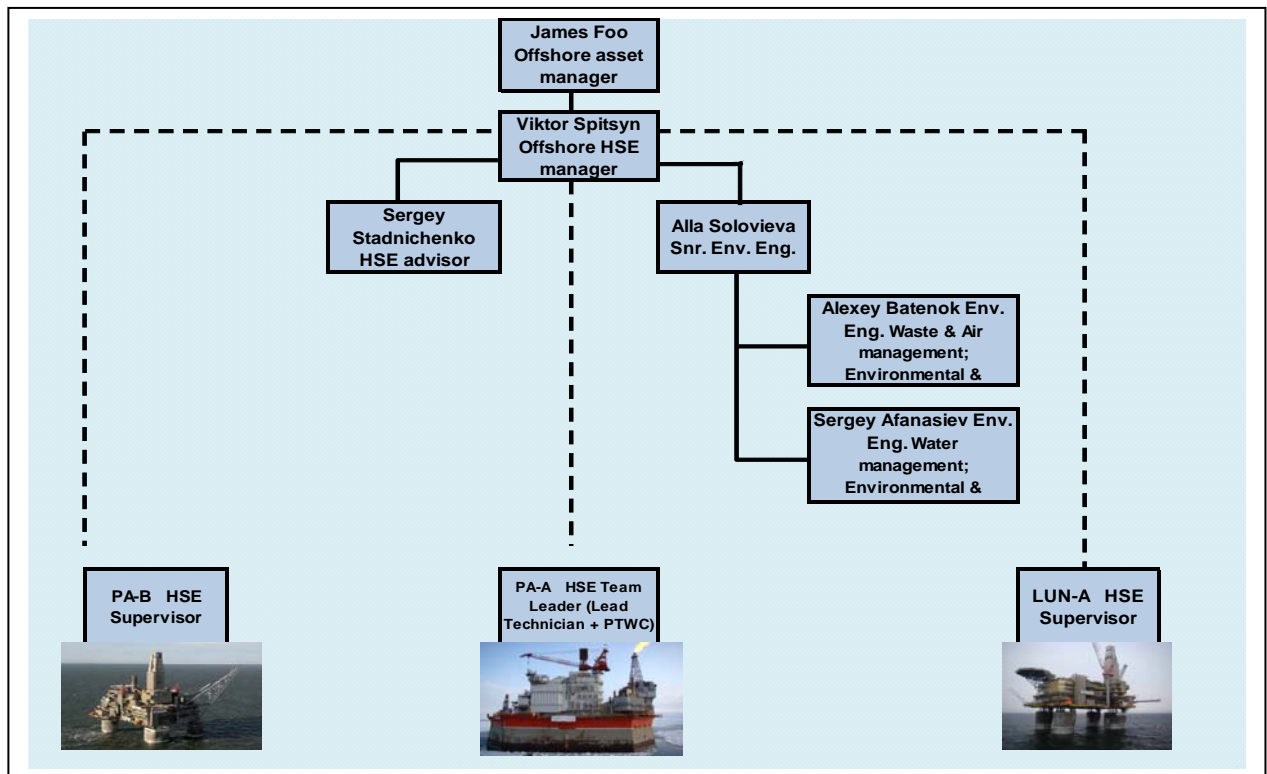
The PA-B HSE Supervisor is supported by others with HSE responsibilities, including individuals responsible for the issuance of permits to work, waste shipments, procurement of chemicals and Contractors' HSE representatives and management on the Platform, including notably the Offshore Installation Manager (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 demonstrated a high level of competency.

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1 ISO14001; 2004 Certificate of Approval. Current Certificate dated 6 Jan 2010; expiry date 5 Jan 2013.

2 Health Safety Environment and Social Performance Management System Manual Doc no. 0000-S-90-04-P-0006-00-E, Rev 05. May 2010.

**Figure 2 - Offshore HSE management structure**

### 3.1.2 Contractors Management and Integration

In addition to 36 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, working closely with Sakhalin Energy representatives. For example, KCAD has its own HSE Supervisor sharing an office with the Sakhalin Energy HSE Supervisor. 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. For example, the 'permit to work' system<sup>3</sup>, 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 3<sup>rd</sup> parties e.g. lenders' IEC.

Level 2 – audit of a facility of activity performed by the Company e.g. Corporate HSE team.

<sup>3</sup> The permit to work system was not formally audited. However it was witnessed first-hand by the Auditor when requesting permission to take photographs.

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 2011 for Level 1 and 2 audits were reviewed by the Auditor. A number of large 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-B has been subject to:

- Level 1 - ISO14001 and OSHAS 18001 surveillance audits<sup>4</sup> in Q2, 2011 (external audits)
- 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.
- Level 4 – weekly inspections performed by the HSE Supervisor.

ENVIRON has reviewed the ISO14001 and OSHAS 18001 surveillance audit. The audit report is generally positive and demonstrates Sakhalin Energy's proactive efforts to address and close earlier non compliances. In summary, ENVIRON feels the Corporate Audit programme is comprehensive and has not identified any significant concerns regarding the adequacy of the PA-B 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. Access to Fountain and levels of authority vary depending on the user's needs. 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-B 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 then requires that the Corporate HSE department is involved.

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<sup>4</sup> Sakhalin Energy Integrated Audit and Assurance Plan 2011

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

The Auditor was shown examples of some incidents records, including 1) fuel tank overtopping and 2) foot injury.

In the first example, the incident description, investigation, assigned actions and corrective actions (to reduce the fuel pumping rate once the tank is at 85% capacity) are clearly recorded.

The second incident involved a worker stepping backwards onto a screw protruding from a plank of wood which pierced the sole of the workers safety boot. The Auditor followed the incident management procedure via Fountain and reviewed assigned actions. Of note, although actions were closed the outcome was for the 'contractor to consider its PPE'. Such an outcome is considered to be ambiguous, and does not provide a resolution.

**Recommendation:** Sakhalin Energy should reconsider the incident outcome and in particular should consider specifying the use of safety boots that have sole protectors – such a safety requirement will have minimal costs and would prevent a repeat incident.

Overall the Fountain database/incident management software was found to be an effective tool that is being used by the PA-B 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 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-B HSE Supervisor, reporting to the Offshore HSE Manager via the Corporate HSE Supervisor<sup>5</sup>. 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-B is integrated with overall HSE reporting requirements and in line with HSESAP requirements (see Section 2.4.3, Monitoring for detailed commentary on chemical analysis of water samples).

### 3.1.6 Competency Assessment and Training

A strong HSE culture is practiced at PA-B. For example, all personnel wishing to travel to the Platform must have the valid Helicopter Underwater Escape Training (HUET) training in order to obtain a vessel pass. 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.

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<sup>5</sup> Example report provided – Monthly Environmental Performance Overview, August 2011.



Competency and training needs were discussed on PA-B and there appeared to be comprehensive training given to those interviewed. For example, it is understood that contractors have their own learning and development programs, but are also subject to mandatory Sakhalin Energy training requirements, such as emergency response training. However central competency and training records held by the Learning and Development Office in Yuzhno could not be reviewed.

**Recommendation:** It is recommended that the Learning and Development Office should be visited during future monitoring/audit trips.

## 3.2 Emissions to Atmosphere

The platform has a number of significant emission sources including:

- the flare
- two 24MW dual fuel generators
- an 18 MW compressor driver
- two 1.5 MW diesel fired water pumps
- two 1.6MW standby generators

Of these the latter two are not operational except during periodic short-term testing and during abnormal conditions. They therefore contribute little to the Platform's air emissions and hence are not discussed further in this report.

### 3.2.1 Compressor and Main Generators

The HSESAP specifies Project emission standards for the compressor and large generators as follows:

*PA-B main power generators: two x 24MW Rolls Royce dual fuel (gas/diesel) generators*

- $NO_x = 700 \text{ mg/m}^3$
- $SO_2 = 300 \text{ mg/m}^3$  ( $SO_2$  based on diesel fuel containing 0.2% w/w) shall
- $CO = 47 \text{ mg/m}^3$

*PA-B 18 MW compressor driver*

- $NO_x = 700 \text{ mg/Nm}^3$
- $SO_2 = 300 \text{ mg/Nm}^3$
- $CO = 50 \text{ mg/Nm}^3$

The HSESAP further states that '*Emissions from these combustion sources should be assessed using instrumental measurements of  $NO_2$ ,  $NO$ ,  $SO_2$ ,  $CO$  and Hydrocarbons on a quarterly basis.*'

**Finding:** To date there has been no measurement of emissions from either the compressor or generator stacks because there is no means to take such samples i.e. there is no sampling window for such monitoring. Sakhalin Energy is therefore unable to demonstrate that emissions from these sources meet the agreed Project standards.

### 3.2.2 Flaring

The HSESAP includes a number of requirements relating to flaring including:

*Implement the Flaring Strategies for each Asset as documented: PA-A, PA-B, LUN-A, OPF, LNG plant.*

- *These Flaring Strategies shall govern operation for each production and processing facility, including maximum venting / flaring periods during compressor breakdown and scheduled maintenance, and shall be approved by the HSE Management Committee.*
- *Flaring shall only be conducted during process upsets or non-routine maintenance activities. There shall be a constant small pilot and purge gas flare at all facilities.*
- *There shall be no venting and / or flaring from production well tests except in exceptional circumstances*
- *A preference shall be demonstrated to flaring gas rather than venting during operational testing, and maintenance activities shall be assessed on a case-by-case basis to assure the safest evacuation method is utilised. Log of non-routine emissions shall be recorded.*

The Auditor was informed that the pilot flare is deliberately fed by gas from the compressors (that have an inbuilt designed leakage).

There is no venting in accordance with the HSESAP (and good industry practice).

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 and has made significant improvements in 2011 when compared with 2010. These reductions have been achieved since the repair of a previously failed vapour recovery system (in 2010), and therefore a similar level of improvement is not anticipated for 2012.

#### Findings:

- Whilst the Platform is applying good industry practice through avoidance of venting and the minimisation of flaring and continuously logging flared volume of gas personnel were unable to present the Auditor with a written flaring strategy. In the absence of a flaring Strategy it is noted that acceptable and unacceptable flaring and venting practices are outlined in Piltun-Astokhskiye 'B' Platform, Operating Procedures Manual - Volume 33, waste management and Environmental Monitoring. Such practices would form the basis for the flaring strategy.
- The flare is also designed to be smokeless (equipped with knock out drums to prevent combustion of liquids) although smokeless flaring is not always achieved – see Photo 4.

**Recommendation:** In 2012 new legislation governing the permitted volume of associated gas that can be flared will come into effect. The new legislation will set the maximum permissible volume at 5% of associated gas; currently Sakhalin Energy is exceeding this limit. Sakhalin Energy's flaring strategy will need revision to accommodate the new Russian requirements as set out in RF Government degree #7, dated 8<sup>th</sup> Jan 2009.



### 3.2.3 Fugitive (Hydrocarbon) Emissions

The fugitive emission of hydrocarbons (gas leaks) would represent a very serious risk to the Platform and consequently significant effort is made to prevent gas leaks. To detect gas leaks at the earliest opportunity gas detectors are positioned in many locations across the Platform i.e. there are 100 gas detection zones with multiple monitors in each zone. The detection of elevated gas levels would result in an automatic shutdown of the plant. Personnel are also equipped with portable gas detectors.

Emission of fugitive hydrocarbon emissions are considered to be well managed and minor in nature.

### 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 3<sup>rd</sup> party specialists. Workplace assessments are undertaken every 3 years in accordance with national legislative requirements.

Following earlier workplace assessments risks to human health from welding fumes were identified. Sakhalin Energy acted upon this finding and installed a local/directional extraction system (see Photo 8).

Dust and aerosols were also identified to be a concern close to the shale shakers. To reduce aerosol levels the shale shakers have been retrospectively fitted with plastic curtains and extraction systems (see photos 5). Furthermore the area was given restricted access (barriers in place) and those working in close proximity to the shale shakers were wearing respiratory protection.

The HSESAP requires that for all platforms the following air monitoring will take place:

*Accommodation block, working areas and of fugitive emissions:*

*HVAC intakes and in accommodation block:*

- *Monitoring of NO, NO<sub>2</sub>, SO<sub>2</sub>, CO and total hydrocarbons by active air sampling (by entrapment on chemical sorbents and detection by photometric method) at the air intakes to the HVAC system and in the accommodation block.*
- *Total VOCs by active air sampling and detection by gas chromatography.*
- *Particulate matter gravimetrically by trapping on membrane filter.*

*Working areas:*

- *NO, NO<sub>2</sub>, SO<sub>2</sub>, CO, total hydrocarbons and particulate matter monitored at working areas on the platform*

*Fugitive emissions*

- *Active air sampling of total VOCs at tank vents, fuel and hydrocarbon storage locations (detection by gas chromatography)*

The Auditor was informed that these measurements are not routinely taken by the Platform personnel but instead by specialists that visit the Platform every 6 months. The air quality monitoring programme included the following parameters:

- NO, NO<sub>2</sub>, SO<sub>2</sub>, CO, Temp, Pressure, soot (particulates) for drill deck L3; and
- Lead (Pb) for the helideck, level 6 North.

- NO, NO<sub>x</sub>, SO<sub>2</sub>, CO and soot for drill deck, upper deck and level 4 (landing area for the 'frog')

Further monitoring is also conducted at the laundry, cement bulk room, electrical workshop, mechanical workshop, drilling rotary table, oil sample points, pig launcher.

**Finding:** Whereas the actual monitored parameters broadly align with the HSESAP requirements there are some deviations. In particular, the data reviewed does not include total VOCs nor does it specify sampling at the HVAC intake/accommodation block.

### 3.3 Water and Wastewater Management

The Platform operates under a Water Use License 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 on Gravity Base Structure 1 (Caisson 1) and measured by a flowmeter to ensure volumes are in compliance with the Water Use License.

The intake is fitted with a fish protection screen for operational purposes and in accordance with the HSESAP. The Platform has experienced some sporadic clogging of the fish screen, but this has been resolved with a more effective back flushing system. Of note the positioning of the intake is restricted by the water depth and the presence of ice and therefore cannot be positioned any further from the sea bed.

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. Despite the quality of drinking water, 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);
- Super saline water (following reverse osmosis to generate freshwater); and
- Produced water

Treatment routes for these wastewater streams are discussed below:

##### Cooling waters

Cooling waters are discharged untreated to the sea. They are monitored for temperature (see monitoring section below). The relatively small quantity of super saline water is co-mingled with cooling water prior to discharge to avoid elevated salinity in the discharge.

## Deck drainage

The Platform is designed with two contained drainage systems for potentially contaminated and uncontaminated run off each being directed to 25m<sup>3</sup> contaminated and uncontaminated tanks respectively. The contents of the uncontaminated tank is subsequently co-mingled with the contents of the potentially contaminated tank and all contents sent for reinjection via the CRI well (see Produced water).

## Produced waters

Produced waters (water separated from the oil and therefore containing a residual oil content) is reinjected via a Cuttings Reinjection Well (CRI). The Platform is therefore designed to have zero discharge of produced waters. The CRI was seen to be fully operational.

## Sewage effluent

The Platform operates a sewage treatment plant (STP) that uses UV disinfection technology rather than chlorination to avoid potential discharge of residual chlorine. The STP is designed for 140 people and can therefore be put under stress when additional workers are being transferred to the Platform on a daily basis from the Flotel (during busy periods). Effluent quality from the STP is monitored regularly (see below).

The STP has been out of compliance in the past due to the laundry effluents (detergents) and because of grease from the kitchens. To address these issues laundry effluent is now diverted to the CRI and grease taps have been fitted to the kitchen sinks.

Sludge is transported back to shore for disposal (see Section 2.5, Waste Management).

### 3.3.3 Wastewater Monitoring

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

- *Oil products daily average: 5 mg/l*
- *TSS: 22 mg/l*
- *BOD: 15 mg/l*
- *Ammonia nitrate: 13 mg/l*
- *Nitrate nitrogen: 3.5 mg/l*
- *Nitrite nitrogen: 0.5 mg/l*
- *Synthetic surfactants: 1.7 mg/l*
- *Total phosphorus: 5.5 mg/l*
- *Phenols: 0.003 mg/l*
- *PA-B will use ultraviolet as a sterilisation medium. Residual chlorine levels are therefore not relevant.*

*SanPiN 4631-88 sanitary rules and standards for the protection coastal waters in areas of public water use states that:*

- *the residual free chlorine content shall be from 1.5 to 5.0 mg/l or disinfection shall be achieved using UV sterilisation;*
- *Coli-index (lactose positive coliform bacteria count) shall not exceed 1000 bacteria/L;*

- *Coliphages shall not be present.*

The HSESAP also requires monitoring as follows:

*PA-B: Wastewater from outlet 1 (final treated effluent from grey water and sewage treatment plant) - Suspended solids, hydrocarbons, BOD Full, ammonia nitrogen, nitrite, nitrate, phosphates, synthetic surfactants, phenols, pH, dissolved oxygen, organoleptic properties, thermo-tolerant coliform bacteria, total coliform bacteria, total microbial count, coli-index. Weekly: hydrocarbons, ammonia nitrogen, nitrite, nitrate, phosphates. All other components, once a month.*

*PA-B: Wastewater from outlet 2 (conditionally clean water from cooling systems, desalination plant, washings of seawater filters) - Suspended solids, hydrocarbons, anionic chloride, once a month.*

### **Effluent monitoring (for environmental protection purposes)**

Independent analysis of effluent quality is performed on a bi-weekly basis. Samples are collected by a nominated individual on the Platform and dispatched for analysis by to SakHydroMet. Samples collected include:

- Raw sewage
- Treated sewage effluent
- Samples from the cooling water stream (at the seawater dump Caisson)

From SakHydroMet all results are sent to Corporate HSE Department in Yuzhno.

Based on a review of monitoring reports the parameters monitored include:

- Discharge 2; Ammonium Nitrogen, Phosphorous, Nitrite, Nitrate, Phenols, BOD, surfactants and petroleum products.
- Discharge 1; Petroleum products, suspended solids, pH, sodium hypochlorite.
- Sewage caisson and seawater intake; analysis for heavy metals and radiation (once each year for alpha and beta emitters).

The monitored chemical parameters broadly align with those specified in the HSESAP. Separate samples taken from the seawater intake, domestic taps and the sewage caisson are also sent to the Federal Sanitary Authority twice each month for analysis of bacteria.

**Finding:** Monitoring results to date for 2011 for the chemical parameters show exceedances in the levels of ammonia nitrogen, nitrite (thought to be due to poor nitrification process caused by poor composition of bacteria species) and phenols (thought to be due to poor bioreactor aeration process).

### **3.3.4 Seawater and Sediment Monitoring**

Environmental monitoring requirements for seawater and sediment monitoring are detailed in the HSESAP are provided below.

**Seawater****Table 1: HSEAP requirements for seawater analysis**

<b>Impact type / controlled environment</b>	<b>Monitoring points</b>	<b>Monitoring parameters</b>	<b>Monitoring frequency</b>
<i>Water column – CGBS placement</i>	<p><i>Total of 11 stations including:</i></p> <ul style="list-style-type: none"> <li>• <i>8 stations NSEW at 250m and 1km from each platform. Measurements taken at 5m depth intervals using CTD probe.</i></li> <li>• <i>Three control points 10km to north of each platform.</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Salinity, temperature, pressure, oxygen content, pH and turbidity.</i></li> <li>• <i>Biochemical oxygen consumption, nitrite, nitrate, ammonia, nitrogen, phosphates, silicates, suspended substances, petroleum hydrocarbons, detergents, phenols, metals (Al, As, Ba, Cd, Cr, Cu, Fe, Hg, K, Mo, Mn, Na, Ni, Pb and Zn).</i></li> </ul>	<i>Post-installation (11 water stations will not be continued after 3 years of post-construction monitoring.</i>

Monitoring data was studied to confirm the monitoring frequency and parameters aligned with the HSESAP. Records showed that surface water samples are taken to the north, east, south and west of the Platform for chemical, hydrology and biota analysis at distances of 125 m, 250m, 500m (to the south only) and 2000m from the Platform. Additional samples are taken as background samples 5000m from the Platform. Samples are taken by the support vessel (surface and at depth samples) with results sent to central HSE department, Yuzhno.

**Finding:** The samples are analysed for suspended sediments, petroleum hydrocarbons, heavy metals, phenols, detergents, and benthos but notably other parameters listed in the HSESAP do not appear to be analysed.

Environ has requested the results of the analysis and is awaiting results.

## Sediments

**Table 2: HSEAP requirements for sediments analysis**

<b>Impact type / controlled environment</b>	<b>Monitoring points</b>	<b>Monitoring parameters</b>	<b>Monitoring frequency</b>
<i>Sediment characteristics – CGBS placement</i>	<ul style="list-style-type: none"> <li>• 20 stations arranged NSEW at 125, 250, 500, 1000, 3000m from platform.</li> <li>• Three control points 10km to north of each platform</li> </ul>	<i>Granulometric composition</i>  <i>Metal content – Al, As, Ba, Cd, Cr, Cu, Fe, Hg, K, Mg, Pb and Zn</i>  <i>Total content of petroleum hydrocarbons and organic carbon</i>	<i>Post-construction monitoring will be carried out for 3 – 5 years until results indicate parameters have returned to the baseline level determined during pre-construction phase</i>
<i>Benthos – CGBS placement</i>	<i>As above</i>  <i>Macrobenthos</i>	<i>Species diversity, abundance and biomass</i>	<i>Post-construction monitoring will be carried out for 3 – 5 years until results show full recovery of the benthos community after dredging and dumping operation</i>

Monitoring reports were reviewed during the audit that confirmed the analysis of sediment samples for particle size distribution, petroleum hydrocarbons, heavy metals (full list unconfirmed), phenols, detergents, benthos at 125m, 250m, 500m and 2000m to the north, east, south and west of the Platform, which is broadly in line with the HSESAP.

Environ has requested the results of the analysis and is awaiting results.

### Other monitoring

Visual monitoring is performed every 3 hours to check for Platform debris in the sea or evidence of spills, presence birds and marine mammals and follow up investigation of any reported sightings e.g. steller sea eagle.

### 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 (see section 5.3 of the Monitoring Report for further details).

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

- Sakhalin Energy Solid Waste Management Plan, Appendix 4: December 2002 (Doc No: 1000-S-90-01-T-0003-07)

- PA-B Waste Management and Tracking System (Doc No: 3000-T-90-04-T-7055-00-P1)

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

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

The main hazardous wastes generated by the Platform include:

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

Segregation of waste (metals, lamps, wood, oily wastes and incompatible chemical wastes etc.), labeling, classification in accordance with Russian Hazard classes, temporary storage prior to its shipment to shore were found to be good (see Photos 9-12).

The platform's waste is managed by the Platform's Logistics Manager. 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. Thirty-two waste types are identified and their volumes compared with the permitted quantities provided in the waste permits. Based on year to date volumes, the Platform is below permitted limits for all waste types with the exception of oily rags.

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.

**Finding:** Workers interviewed on the Platform couldn't highlight any waste minimization initiatives or practices which are required under the HSESAP. Further efforts could be made to minimize wastes both in order to stay within allowed limits (e.g. oily rags) and to comply with good waste management practice.

### **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 procedures<sup>6</sup> 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. As such, individuals on PA-B cannot add new chemicals to the SAP system thus preventing the procurement of chemicals that have not been approved.

The characteristics of approved chemicals, including hazard information, are captured on the 'Dolphin' chemical database.

Regular audits (site inspections by Sakhalin Energy staff escorted by Contractors' representatives) are undertaken during which any unapproved chemicals can be identified. Reportedly some small quantities of chemicals dating back to Platform commissioning have been found during these inspections.

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.*

Material Safety Data Sheets (MSDS) are held on the Dolphin database. During the Platform walkover dual language MSDSs were found to accompany the majority of observed chemicals.

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<sup>6</sup> Chemicals Handling and Storage (Doc No: 1000-S-90-04-P-0128-00)



### 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 (see Photos 14 and 15 for evidence of good practice). Furthermore, the entire chemical storage area has a closed drainage system capable of capturing 25m<sup>3</sup> of spilled substances.

Additional PPE and emergency provisions in the form of eye wash bottles and emergency showers were also available at the chemical storage area (see Photo 26). However there were some examples of poor practice as described below.

#### Findings:

- Drums containing chemical products were located in numerous locations, including in areas close to the edge of the Platform edge. These were generally placed on drip trays, but not in all cases. Two types of drip were observed and it is understood the smaller trays are being replaced by the larger 83 litre drip trays (see Photo 14). The replacement of the older smaller capacity drip trays is welcomed, although it is noted that the 83 litre capacity for 200 litre drums does not meet the HSESAP Standard for Soil and Groundwater Industrial Controls<sup>7</sup> which states '*Where bunded areas are not practical, chemicals are stored over grated drip trays designed to hold and retain 150% stored volume*'.
- During an inspection of the main chemical storage area some drums had been identified without labelling. Elsewhere drums were stored either without secondary containment and/or without any labels (see photo 17).
- The chemical storage area was overfilled making access to materials other than those at the front of the storage area difficult to reach. The restricted access will result in excessive movement of chemical materials thereby increasing the risk of accidents. It also makes stock-taking/inspection of the area more difficult. The Auditor understands the area was filled beyond design capacity with drilling chemicals because the Platform was in the early stages of an extended drilling campaign (120 days). Nevertheless, better management of chemicals, possibly through the staged delivery of drill chemicals would help reduce over filling and the associated HSE risks.

### 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 (See Photo 19). However should these measures fail Sakhalin Energy has a suite of oil spill response plans. One of these plans jointly covers the activities of PA-A and PA-B. The Piltun Astokhskiye oil spill response plan has been extensively reviewed by the IEC under a separate scope of work

<sup>7</sup> The requirement to retain for 150% of the stored volume is specified as a soil and groundwater industrial control standard (see Annex 2 for full reference).

For the purposes of the audit it is assumed this standard applies to offshore assets.

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-B 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, for example the use of oil spill trajectory models, are also excluded.

### **Oil spill response plan**

A full copy of the Oil Spill Response Plan is held by the OIM. 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-B would generally be 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. Approximately 15 people working on PA-B have received specialist training for firefighting and chemical/oil spill incidents during a 5-day training course provided by the East Asia Response Limited (EARL) based in Malaysia.

The Platform also conducts regular emergency drills including monthly spill response exercises. Other drills include: Platform muster drills (weekly); Platform abandonment drills (monthly); Skyscraper/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. One wheelie bin containing spill equipment (sorbent pads etc.) had been opened and used items had not been replenished. Contrary to Platform requirements the HSE Advisor had not been informed; immediate action was taken by the HSE Supervisor to rectify the situation.

Further details regarding Sakhalin Energy's overall emergency preparedness is found in section 6 of the monitoring report.

## **3.6.2 Medical Emergencies**

Medical emergency training drills occur at least once a week and will include simulated medical evacuations. Exercises involve role play with casualties, stretcher parties etc. Sakhalin Energy also has a helicopter on stand-by at all times for medical emergencies.

The Auditor was shown an incident report for a recent serious incident that occurred on a contractor's vessel. The incident, involving the shooting of two individuals, was successfully dealt with at PA-B. The casualties were given first aid treatment on the Platform before transfer by helicopter to a land based hospital (approximately 1 hour from the Platform).

Review of this unfortunate incident demonstrated the effectiveness of the Platform's medical evacuation procedures and resources and the competency of medical staff on board the Platform.

### 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 an open hatch which was observed on the well bay which had been fenced off with scaffolding bars and warning tape (see Photo 25), thus providing an effective barrier and safe environment for work.

The number of days since the last Loss Time Incident (LTI) was approaching 500 days at the time of the audit.

#### 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 (4 on board the Platform at any given time). 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.*

*Preventative measures - All Contractor Employees shall have completed a vaccination programme for at least Diphtheria, Tetanus, Polio (DTP). All Medical Staff and First aiders shall also have completed a vaccination programme for Hepatitis B. Depending on the working activities and working location, some specific vaccinations may be required as per Russian Federation regulations.*

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:** Vaccinations tend to be given on a job specific basis using a risk based approach. The Sakhalin Energy medical department works with International SOS in this respect. The Auditor was informed that DTP vaccinations are not mandatory but would be recommended to all Russians. The non-mandatory nature of these vaccinations is in contrast to the wording of the HSESAP above.

#### 3.7.5 Random Searches

The HSESAP has amongst others the following requirement(s) for the control of drugs and alcohol:

*Searches at offshore facilities may be enforced by a Ship's Captain or an Offshore Installation Manager (OIM).*

*In addition, Sakhalin Energy may conduct unannounced searches for drugs and alcohol.*

The HSE Supervisor and Doctor confirmed that random drugs and alcohol searches are carried out monthly. Lockers checks (using a universal key) are conducted by the OIM, HSE Supervisor and the Doctor. The Platform has a calibrated breathalizer which was confirmed to have been calibrated 3 days prior to the Auditor's arrival.

### 3.7.6 Drugs and Alcohol Tests

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

***Prescribed medication***

*Staff/contractors or visitors to any offshore installation shall notify the installation Medic.*

***Alcohol testing***

*Alcohol testing shall be undertaken by licensed medical or para-medical staff using equipment approved for use within the Russian Federation.*

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 5-10 personnel (Sakhalin Energy and Contractor staff) will typically be tested for marihuana, amphetamines, cocaine, morphine and methamphetamine. The test is based on urine samples.

### 3.7.7 Grievance Procedure

**Finding:** There is limited awareness of Sakhalin Energy's formal grievance mechanism on the Platform. The Auditor was informed that in practice any worker would raise their grievance with their supervisor to be subsequently raised with the OIM. Issues can then be discussed within monthly Welfare Meetings which involve the HSE forum (deputies from all Contractors). Discussions with Platform personnel suggest that the Platform has a reasonable mechanism for raising and addressing grievances. Nevertheless all Sakhalin Energy and Contractor staff should be made fully aware of the Grievance Procedure.

## 4 Conclusions and Recommendations

Overall ENVIRON considers that environmental performance at PA-B is good and that Managers, Platform workers and working practices on the Platform demonstrates a strong HSE culture. During the course of the audit the Auditor focused on Management Systems and more specifically the management of wastes, hazards 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:

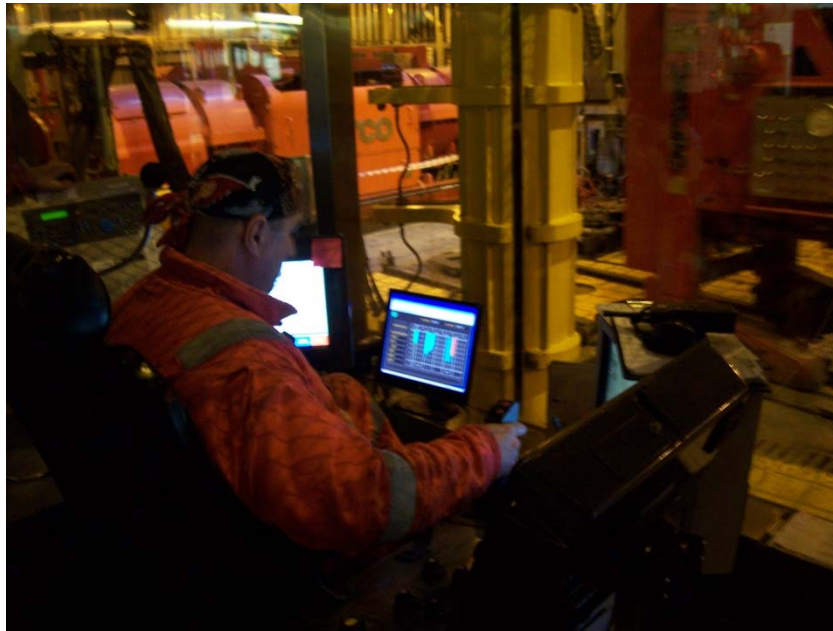
- Failure to take instrumental measurement of compressor and generator exhaust stack emissions.
- The unavailability of a written flaring strategy for PA-B and the fact that smokeless flaring is not always achieved.
- Discrepancies between HSESAP requirements for workplace air quality monitoring and actual parameters/locations monitored.
- Effluent quality monitoring results to date for 2011 show exceedances in levels of ammonia nitrogen, nitrite and phenols.
- Seawater analysis does not currently cover all parameters included in the HSESAP.
- Further efforts could be made to minimize wastes both in order to stay within allowed limits and to comply with good management practices.
- The secondary containment for some hazardous materials does not meet the specification within the HSESAP.
- Isolated instances of unlabeled chemical drums and drums without secondary containment were observed.
- The volume of chemicals stored on the Platform exceeded the capacity of chemical storage facilities.
- DTP vaccinations are currently non-mandatory despite being required within the HSESAP.
- There is limited awareness of Sakhalin Energy's formal grievance mechanism on the Platform.

In addition, a number of recommendations to improve performance have been highlighted in this audit report, including:

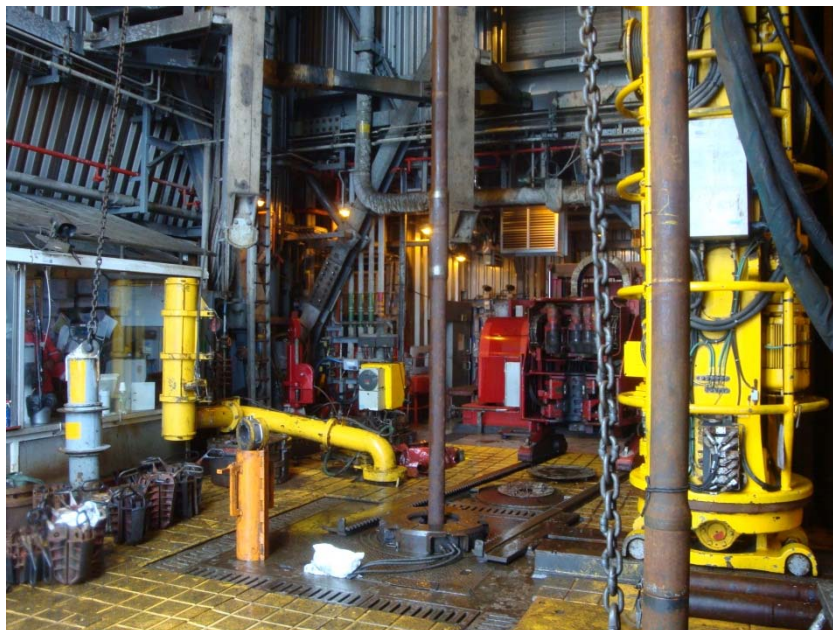
- Sakhalin Energy should consider the mandatory use of sole protectors in safety boots worn by all Sakhalin Energy and Contractor personnel.
- In 2012 new legislation governing the permitted volume of associated gas that can be flared will come into effect. The new legislation will set the maximum permissible volume at 5% of associated gas; currently Sakhalin Energy is exceeding this limit. Sakhalin Energy's flaring strategy will need revision to accommodate the new Russian requirements as set out in RF Government degree #7, dated 8<sup>th</sup> Jan 2009.

## Annex A: Photographic Log





**Photo 1:** Driller inside secure control room



**Photo 2:** Drill deck – remotely operated drill machinery (iron rough neck reduces manual handling)

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011





**Photo 3:** Drilling operations



**Photo 4:** PA-B with smokey flare

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011



**Photo 5:** Shale shakers retrofitted with screens and local extraction to reduce dust and aerosols

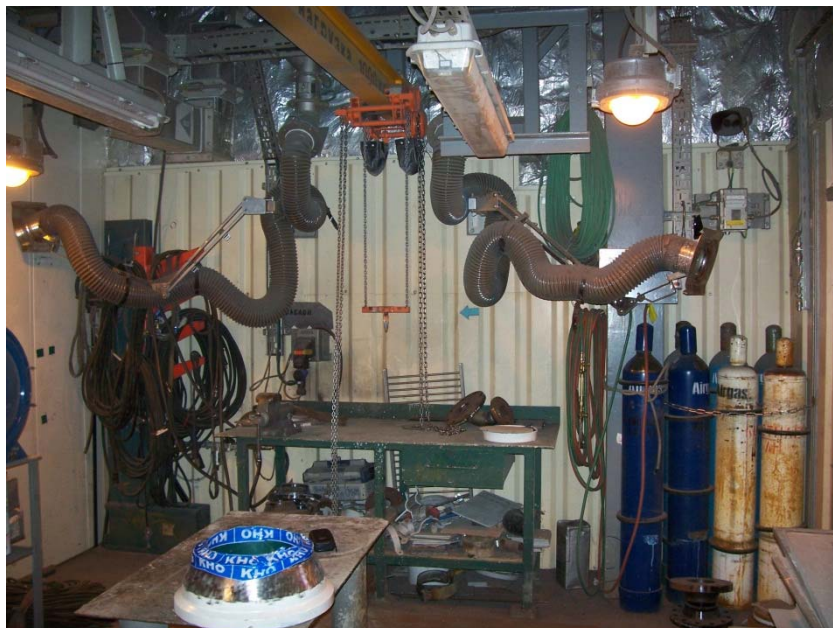


**Photo 6:** Compressor exhausts in the foreground

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011



**Photo 7:** Generator exhaust (attached to flare tower)



**Photo 8:** Adjustable extraction for welding activities (installed following workplace assessment)

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011





**Photo 9:** Waste segregation – example wheelie bin for general waste



**Photo 10:** Compactor for domestic waste

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011



**Photo 11:** Segregated wastes (oil rags)



**Photo 12:** Segregated waste (electrical wire)

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011



**Photo 13:** Cuttings reinjection facility (CRI)



**Photo 14:** 220 litre drums on 83 litre drip trays

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011





**Photo 15:** Good use of PPE and dual language MSDS

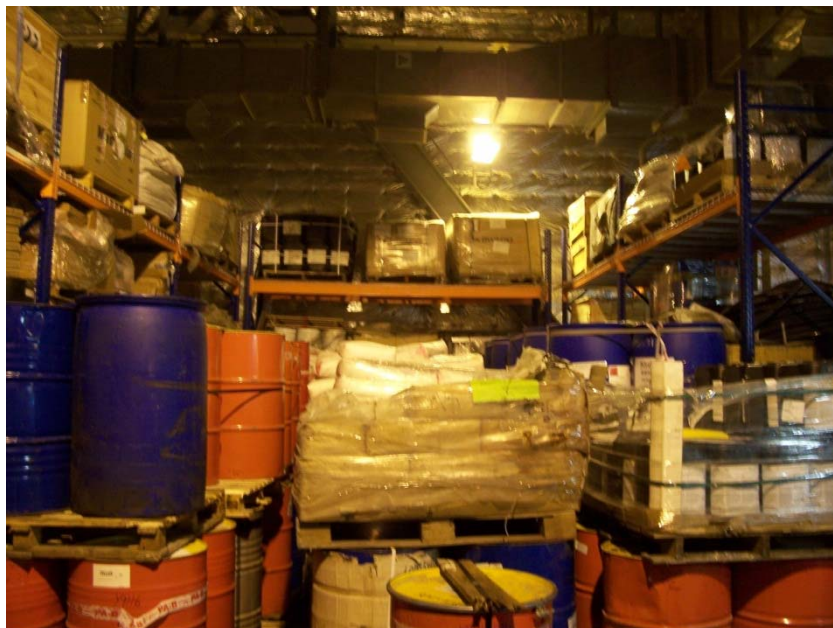


**Photo 16:** Bunding in design – location is 1st oil separator

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011



**Photo 17:** Chemicals drums – unlabelled



**Photo 18:** Congested chemical storage area

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011





**Photo 19:** Emergency planning - blow out preventer

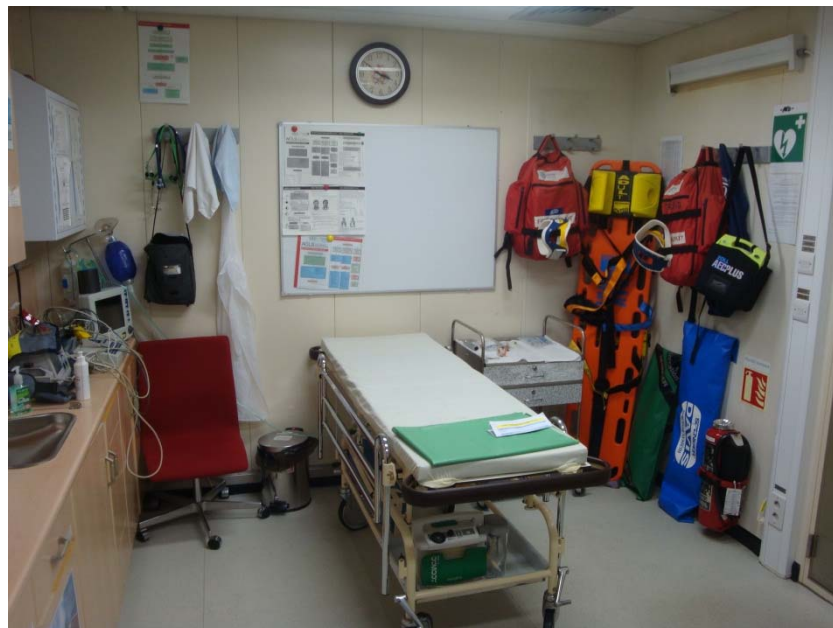


**Photo 20:** Sealed oil spill kit – for emergency use

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011



**Photo 21:** Control room – dedicated area for emergency coordination



**Photo 22:** Sick bay, manned by experience doctor

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011



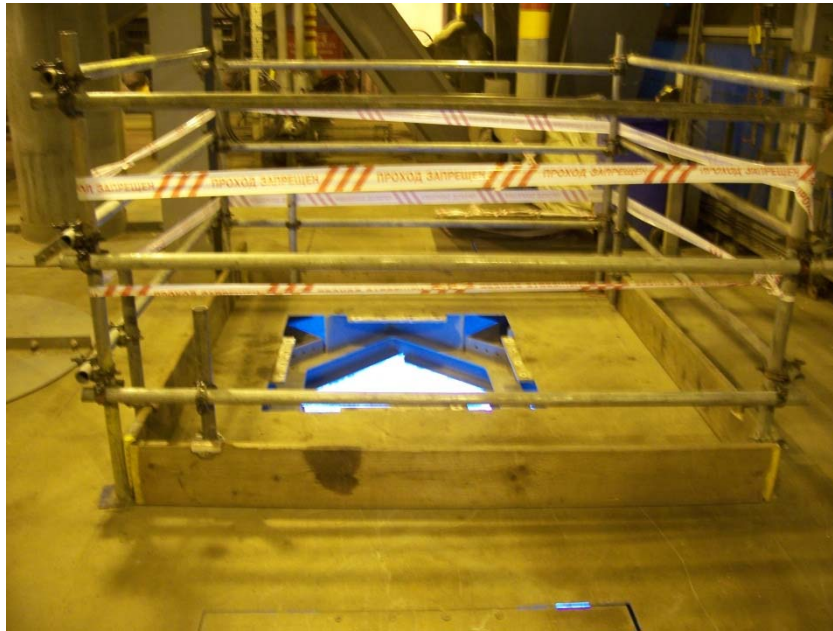
**Photo 23:** Life boats accessed via the accommodation block



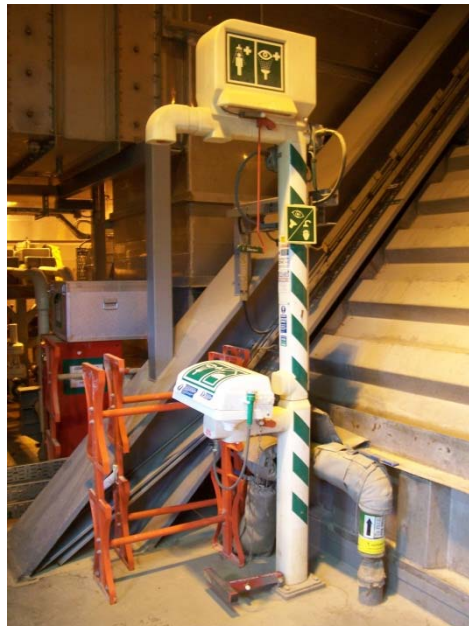
**Photo 24:** 'Frog' for ship to Platform transfer of personnel

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011





**Photo 25:** Open hatch to sea – temporarily secured with scaffolding.



**Photo 26:** Emergency shower located next to chemical store (tested)

<b>Title:</b> Photographic Log	<b>Client:</b> Sakhalin-2 Project Finance Parties
<b>Site:</b> PA-B Platform	<b>Date:</b> October 2011

## Annex B: Findings Log

Findings Log								
Ref	Rank	Status	Date	Topic	HSESAP Ref:	Finding	Action Progress Review	Action
1	Low Amber	Open	Sept 2011	Stack emission monitoring	Air Emissions and Energy Standard Rows 10 & 11 Doc. 0000-S-90-04-O-0257-00-E App 4, Rev 02	To date there has been no measurement of emissions from either the compressor or generator stacks. Moreover there is no means to take such samples i.e. there isn't a sampling window available. Sakhalin Energy is therefore unable to demonstrate that emissions from these sources meet the applicable Project standards.		
2	Low Amber	Open	Sept 2011	Flaring	Air Emissions and Energy Standard Doc. 0000-S-90-04-O-0257-00-E App 1 Rev 03	Platform personnel were unable to present the Auditor with a written PA-B Flaring Strategy.		
3	Blue	Open	Sept 2011	Flaring	Air Emissions and Energy Standard Row 6 Doc. 0000-S-90-04-O-0257-00-E App 4, Rev 02	Whilst the flare is designed to be smokeless (equipped with knock out drums to prevent combustion of liquids) smokeless flaring is not always achieved.		
4	Low Amber	Open	Sept 2011	Workplace air quality	HSE monitoring and reporting standard table AC1.2. Doc. 0000-S-	Whereas the actual monitored parameters for workplace air quality broadly align with the HSESAP there are some deviations. In particular, the data reviewed did not include total VOCs nor did it specify sampling at the HVAC		

					90-04-O-0009-00-E App 6 Rev 02	intake/accommodation block.		
5	Low Amber	Open	Sept 2011	Effluent quality	Water Use Standard Row 4 Doc. 0000-S-90-04-O-0255-00 E App 5 Rev03	Effluent monitoring results to date for 2011 show exceedances in the levels of ammonia nitrogen, nitrite (thought to be due to poor nitrification process caused by poor composition of bacteria species) and phenols (thought to be due to poor bioreactor aeration process).		
6	Low Amber	Open	Sept 2011	Seawater analysis	HSE monitoring and reporting standard table AC1.1. Doc. 0000-S-90-04-O-0009-00-E App 6 Rev 02	Seawater samples are collected for analysis. However the parameters analysed do not match those specified in the HSESAP.		
7	Blue	Open	Sept 2011	Waste minimisation	Waste Management Standard Standard Overview Doc. 0000-S-90-04-O-0258-00-E App 1, Rev 03	Further efforts could be made to minimise wastes both in order to stay within allowed limits (oily rags) and to comply with good waste management practice.		
8	Low Amber	Open	Sept 2011	Hazardous materials	Soil and Groundwater Standard Clause 1b	Drip trays have an 83 litre capacity for 200 litre drums and therefore do not meet the standard for Soil and Groundwater Industrial Controls which requires that		



					Doc. 0000-S-90-04-O-0018-00-E App 5, rev 01	'where bunded areas are not practical, chemicals are stored over grated drip trays designed to hold and retain 150% stored volume'.		
9	Low Amber	Open	Sept 2011	Hazardous materials	Occupational Health and Hygiene Standard – Chemicals Management Doc. 0000-S-90-04-O-0270-00-E App 3, Rev 02	Isolated incidence of unlabeled chemical drums and drums without secondary containment were observed.		
10	Low Amber	Open	Sept 2011	Hazardous materials	Occupational Health and Hygiene Standard – Chemicals Management Doc. 0000-S-90-04-O-0270-00-E App 3, Rev 02	The volume of chemicals stored on the Platform exceeded the capacity of chemical storage facilities resulting in increased handling of chemicals and risk to workers.		
11	Blue	Open	Sept 2011	Medical fitness	Occupational Health and Hygiene Standard Doc. 0000-S-90-04-O-0270-00-E App 3, Rev 02	DTP vaccinations are not mandatory but instead are recommended based on a risk based approach. The non-mandatory nature of these vaccinations is in contrast to the requirements of the HSESAP.		
12	Blue	Open	Sept	Grievance		There is limited awareness of Sakhalin		

			2011	procedure		Energy's formal grievance mechanism on the Platform. All Sakhalin Energy and contractor staff should be made fully aware of the Grievance Procedure.		
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## **Annex C: Documentation**

## List of Key Documentation Reviewed

1. PrD update (Slide presentation by Sakhalin Energy)
2. Certificate of Approval for ISO14001: 2004
3. South Piltun – Operations Status (slide presentation by Sakhalin Energy)
4. Sakhalin Energy Integrated Audit and Assurance Plan 2011
5. HSE Audit Report, 2011. Well engineering Level h3 HSE audit.
6. HSE Audit Report, 2010 HSE Control Framework Audit
7. Results of Random drug testing on PA-B, dated 13-19/8/11
8. HSE Audit Report, 2010 OHSAS 18001:2007 Stage 2 Assessment.
9. Environmental permits
  - a. Air emission permit
  - b. Application package
  - c. Water Use Decision 5
  - d. Water Use Decision 648
  - e. Water use Agreement
  - f. Waste Generation and disposal limits
  - g. Water Use License
10. Government reports for:
  - a. Air emissions
  - b. Water Use
  - c. Waste generation and disposal
  - d. Surface water monitoring
  - e. Water compliance report (Q3 2010 to Q4 2011)
11. PA-B HSES Plan Action Tracking 2011 (excel spreadsheet)
12. PA-B Platform operating procedures manual volume 33 waste management and environmental monitoring. Doc ref. 3000-S-90-90-M-0033-00-01.
13. Environmental Industrial Control Program on the PA-B Platform for 2011-2015 period Doc ref. 3000-S-90-04-T-7006-00-02.
14. PA-B Platform Procedure – Waste Management and Minimisation. Doc ref. 3000-0S090S04SPS7006-00-02
15. Waste Disposal Limit no 20-018/640011015421, PA-B Platform. Doc ref. 3000-HSE-0036-001-MNR-R-A
16. Health Safety Environment and Social Performance Management System Manual. Doc Ref 0000-S-90-04-P-0006-00-E Rev 5.

## **Annex D: Itinerary and Auditees**

**Itinerary**

28 <sup>th</sup> September	Helicopter transfer to PA-B HSE Induction/orientation Meeting with HSE Supervisor and Offshore Installation Manager
29 <sup>th</sup> September	Auditing (0730 – 19.30)
30 <sup>th</sup> September	Auditing (0730-1100) Depart by helicopter (1200)

**List of Key Auditees**

<b>Name</b>	<b>Role</b>	<b>Location</b>
Andrei Vada	PA-B HSE Supervisor	PA-B
Kevin Craig	Offshore Installation Manager	PA-B
Yuri Tishkin	Doctor	PA-B
John Baillie	Control Room Representative	PA-B
Evgeny Senin	Logistics Manager	PA-B
James Foo	Offshore Asset Manager	Yuzhno