

HSE Challenges operating in the Sakhalin Offshore Environment

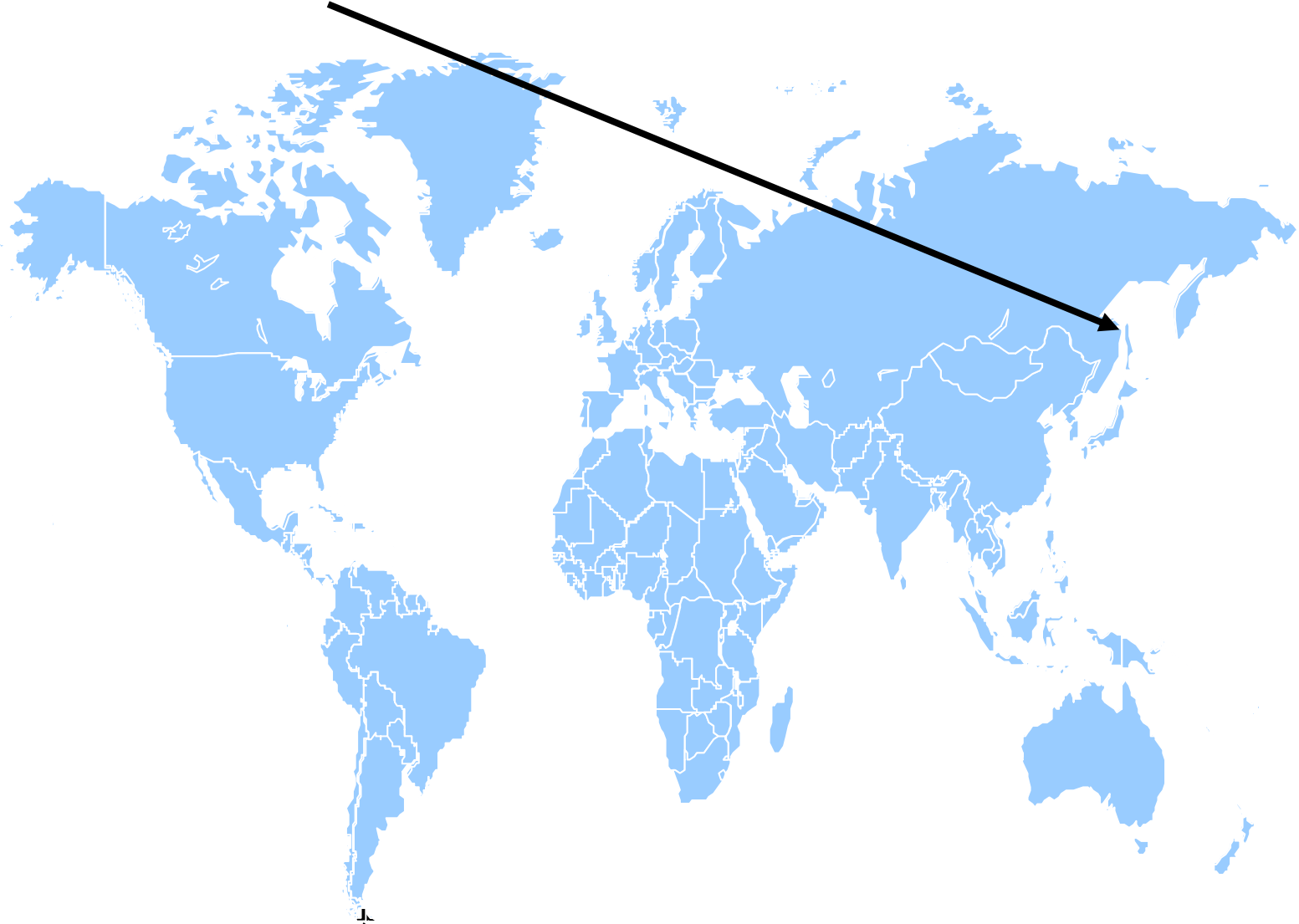
Installation Piltun B Platform



23 April 2014, Norsk Olje & Gass
Pieter Swart



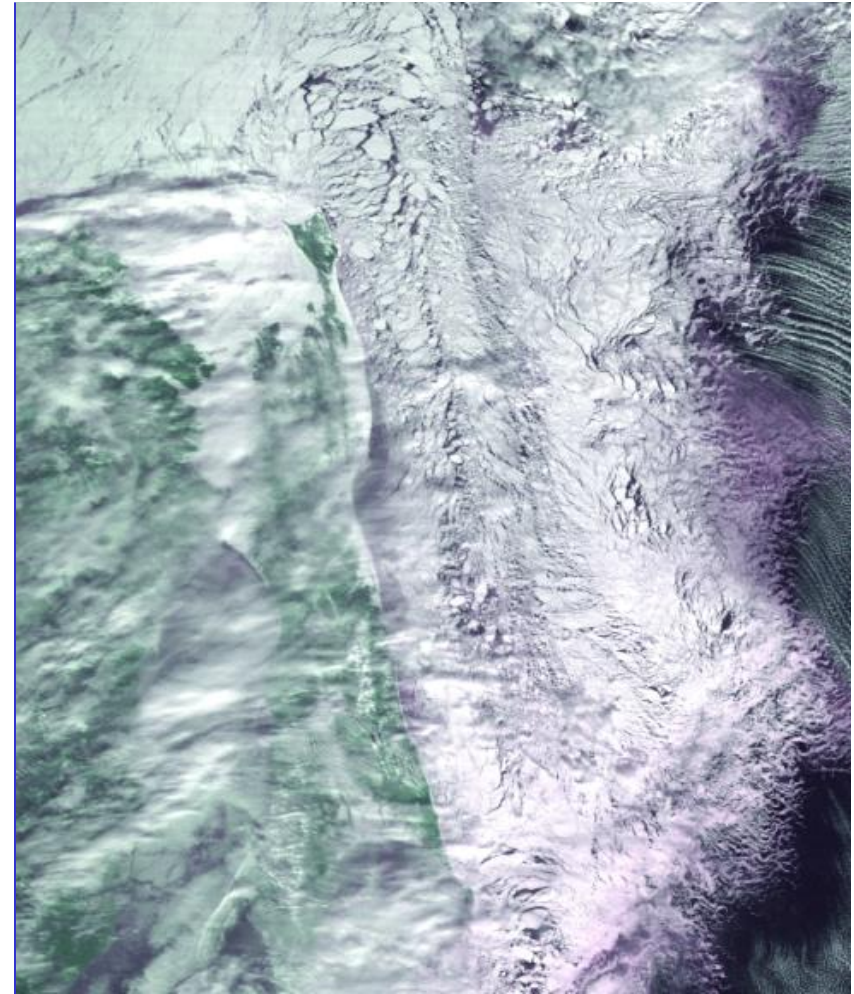
Sakhalin Island



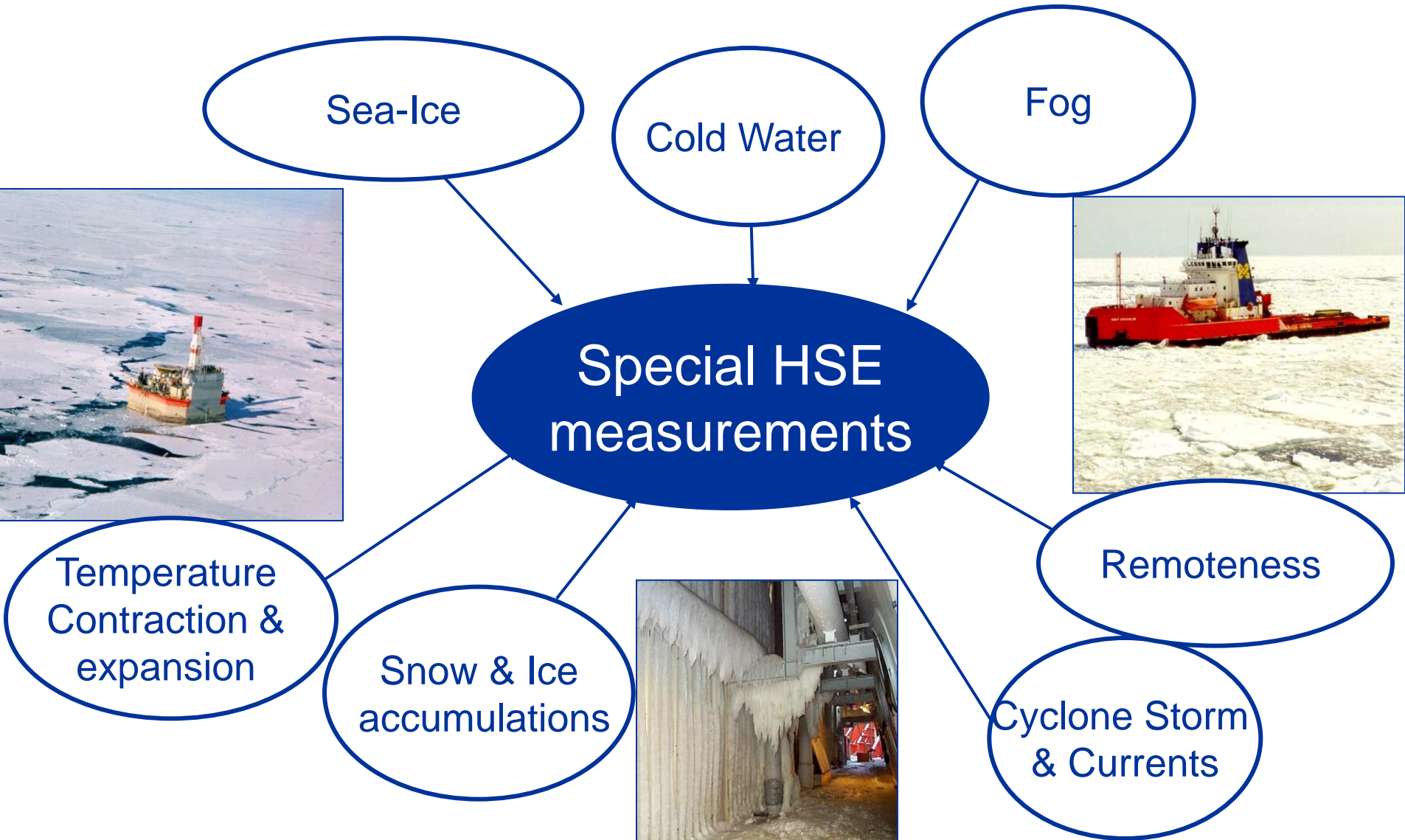


Climate - Sakhalin Island

- Remote
- Lack of infrastructure
- Low population density – 600,000
- Seismically active area
- Rich onshore and offshore wildlife
- Territory: 87,100 km²
- Length: 948 km
- Min. width: 30km
- Mountain areas 66%
- Extreme Climate
- Regional center: Yuzhno-Sakhalinsk
- Military Activity



Sub Arctic Offshore HSE Challenges

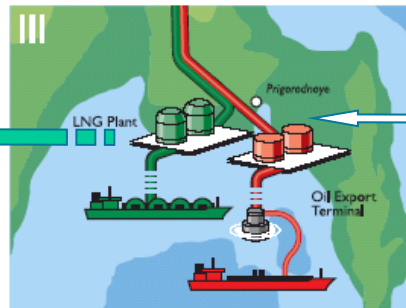
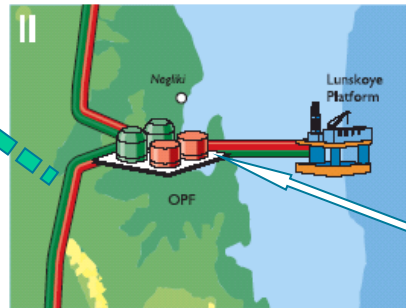
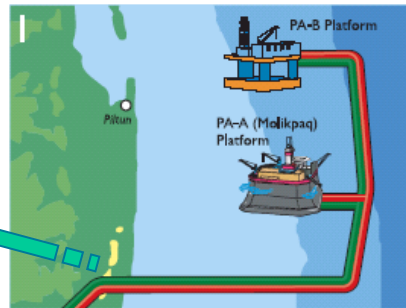
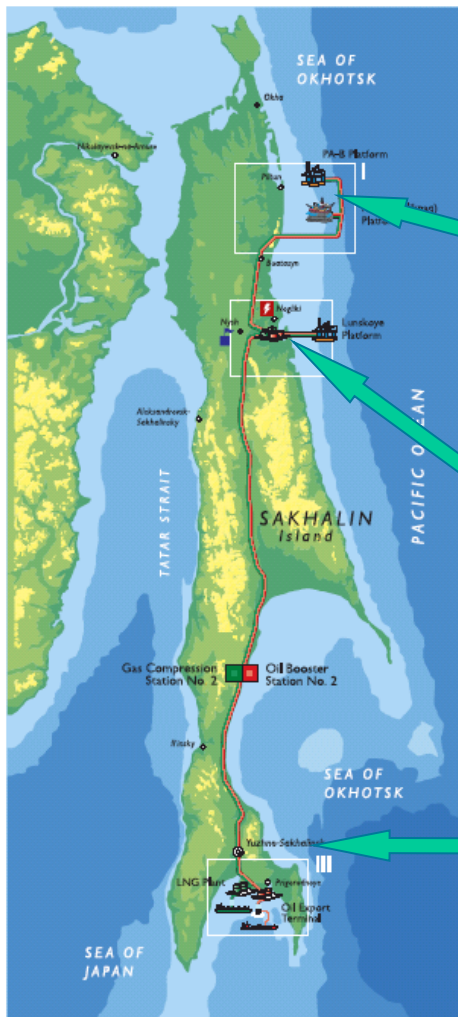


Offshore Conditions in the Sea of Okhotsk

- Temperatures range from +25 to -40 degrees
- Offshore ice from December till June
- Waves up to 10 metres significant
- Temperature offshore can drop to -40 degrees with wind chill
- Frequent fog in spring and summer
- Strong currents in summer
- Earthquake zone



Sakhalin Phase II – Project Overview



- Piltun-B platform
- Piltun-A year round production
- Lunskoye-A platform
- Onshore processing facility
- Oil and gas (multiphase) pipelines
- Booster station
- LNG plant and oil export terminal

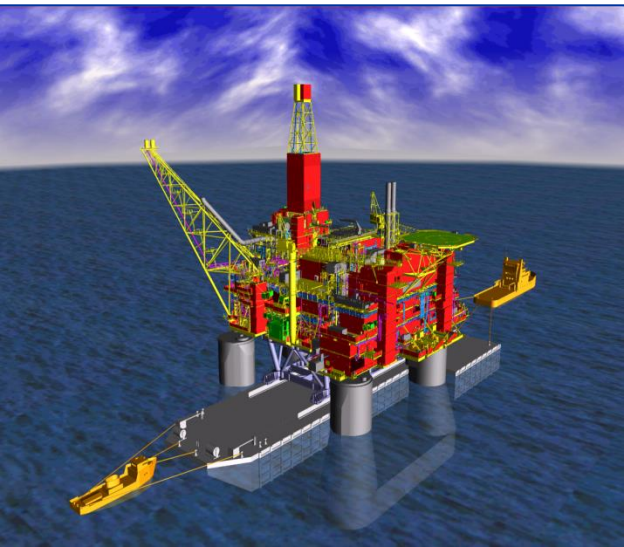


Piltun B Platform Transport & Installation



Piltun-Astokhskoye-B

- 4 leg concrete gravity base.
- Topside 28,000 tonnes.



Aug 2005- Gravity Base Structure Inst.



LMU INSTALLATION (CASTORO 8, 2006)





Navigation Mast

Interim Package Fuel Tank

Basket Landing Platform

Interim Package Generator

Basket Landing Platform

DCL CAP

ACCESS LADDER

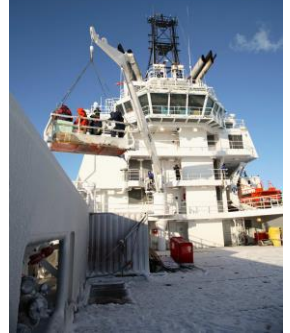
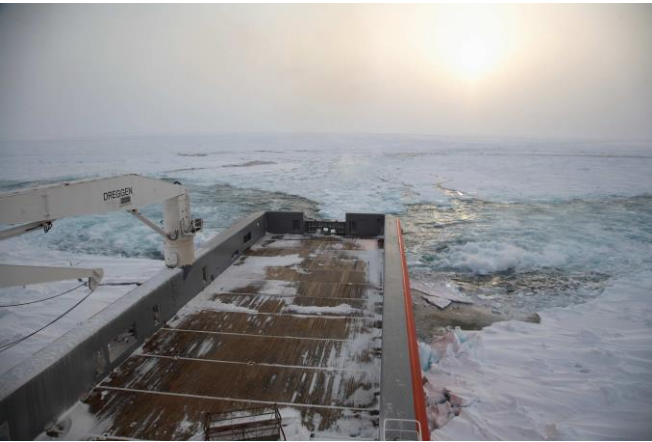


Some Specific HSE Measures

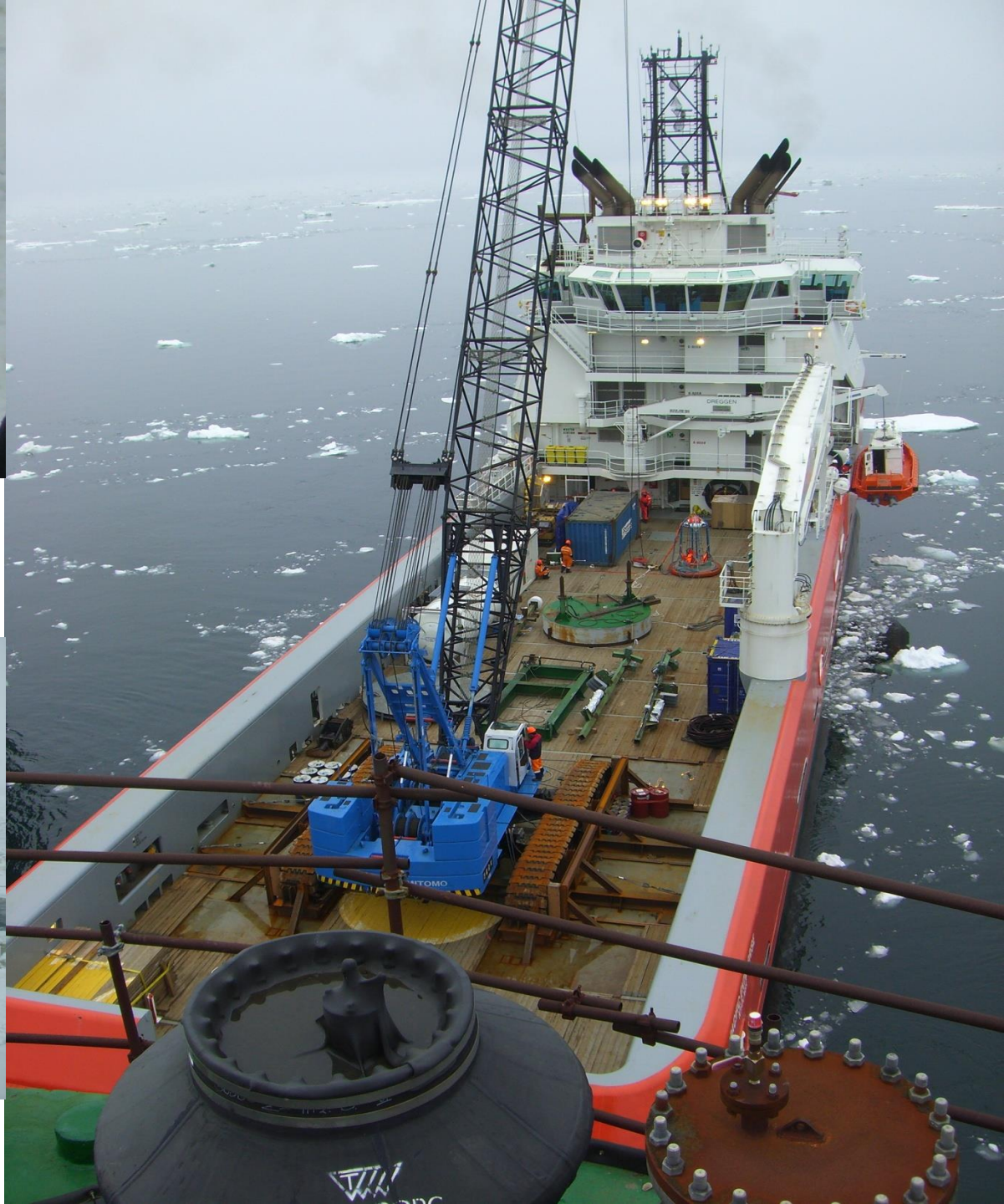
With fleet of Ice class vessels and offshore workforce of 500+, numerous HAZIDs/HAZOPs, RA's and SIMOPS meetings were held to have agreed :

- Clear Communication plans**
- Agreed Adverse Weather procedure**
- Personnel transfer plan incl Rescue**
- Marine Operations manual**
- Vessel Inspection & Certification**
- Personnel Travel briefing pack**
- Emergency Response Plan incl Medivac / Test**
- Oil Spill prevention and response plan**

Vessel utilized for the GBS preparation activities in May 2007





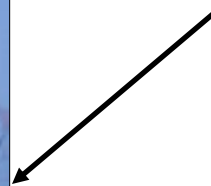




2007 – Piltun B Topside loadout



- Loadout in Korea of 28,000 t topside
- Ready to tow to Sakhalin June 2007.
- A world heaviest shipping – 34,200 t. ready to go



PA-B Topside on Tow to Sakhalin



Piltun B Topside Tow Route



July 1st 2007 Topside approaches GBS



PA-B Installation in the Fog



Ballasting down





**5th of July 2007 – Installation Safely
completed with 500,000 manhours
without LTI and/or Incident**

An aerial view of a large, complex offshore oil production platform situated in a field of broken sea ice. The platform is supported by several large, cylindrical concrete piles. It features a tall, central tower, various levels of decks with yellow safety railings, and a long, lattice-structured crane arm extending to the right. The surrounding water is a deep blue, contrasting with the white and grey ice.

TODAY

PILTUN-ASTOKHSKO

A FIXED PRODUCTION PLATFORM 7.5 MILE
SAKHALIN ISLAND IN 105' WATERS (2)