

Cleaning the Sea Bed of Tiksi Bay of Sunken Logs and Ship Wreckage. Phase 2

1. Project Name: Cleaning the Sea Bed of Tiksi Bay of Sunken Logs and Ship Wreckage. Phase 2.

2. Project Category: pilot project.

3. Project Rationale: The port of Tiksi located on the coast of the bay with the same name is Yakutia's biggest sea merchant port and also one of the hotspots of contamination in the Laptev Sea. A significant portion of the contaminants polluting the Laptev Sea come from the Bay of Tiksi.

Tiksi port is the sea gate of Yakutia and a large transport hub of the Russian Arctic. It was founded in 1934 owing to the trailblazing of the Northern Sea Route. It is located on the shores of Tiksi bay and Bulunkan gulf. The shipping period in Tiksi is very short lasting only two and a half months.

Tiksi Bay is of a fishery importance. This is a breeding location for such fish as sturgeon, herring, nelma, vendace, omul (Arctic cisco), broad whitefish, gwyniad, muksun, grayling, European smelt, of which 6 species (nelma, vendace, omul, broad whitefish, gwyniad, and muksun) are regarded as valuable Coregonidae (whitefish).

Many environmental problem areas have appeared over the 70-plus years of human activity in the bay. Some of the problem issues remain unresolved.

Sunken logs and wood, wrapping steel wire and steel cables (wire cables) detached from lumber rafts as well as half-sunk ships wrecks in the bay emit, as they rot and rust, noxious substances (organic, biogenic and other), which cause any forms of plankton (bacterio-, phyto-, zoo-) and zoobenthos to perish, hence possibly also to a loss of a major breeding ground for some of the most valuable populations of northern fish species, which are traditional catch for the fishermen of Northern indigenous nations living in the area. The sunk ships and sweepwood also generate a risk of navigational incidents, which may result in spills of oil products.

The extraction of biogenic substances from sweepwood is long-standing process. The loss of a set ecosystem is an issue of regional importance that influences the system of the World Ocean.

The first phase of this pilot project included:

- an assessment of the water quality based on the hydrobiological parameters of Tiksi Bay before the commencement of the work;
- a sweeping of the bed with the retrieved logs loaded onto watercraft and taken to a location ashore.
- offloaded, sorted out and stockpiled of the lifted wood;
- scuba divers examination of five sunk ships,
- the located holes and damages plugging;
- determination of the proper techniques for lifting the hulks of the sunk ships.

4. Proposed Scope: The purpose of this pilot project is to demonstrate an budget-efficient methodology for an environmental remediation of the water area of the bay of Tiksi with the aim of reducing Russian technogenic impact on the international Arctic waters. Phase 2 of the project is intended to resolve the following tasks: (1) protect the onshore and offshore

environment of Tiksi Bay area and the shallow bay of Bulunkan from pollution; (2) clean the surface of the sea bed from sunken timber; (3) recover at least 5 sunk ship hulks from Tiksi Bay water and prepare them for recycling; (4) assess the current environmental condition of the Tiksi and Bulunkan basin, checking it for presence of chemical contaminations once the bed cleaning is over; (5) developing recommendations for cleaning sea bed of sunk timber and lifting and recycling of the sunken ships.

The experience from Phase 1 of this project associated with lifting sweepwood has led to the conclusion that using clamshell dredging and sweeping would be the most efficient and right technique here. Cleaning the sea bottom from sweepwood can be done in winter and summer in two ways. Once a thick ice shield grapples the entirety of Bulunkan Bay, even heavy machinery can safely move on the ice. The task is then to saw out 'slots' (fissures) in the ice in those locations where sunken timber has been accumulated and then lift it up onto the ice.

A lifting crane is to be set up at a safe distance from the edge of the slot. The crane uses a logging clamshell in terms of its cargo grappling mechanism. While lowering the grab into the sea bed, the crane operator scoops sunk logs, wire, cables, steel rope (once used in making rafts) all across the bottom that happens to be under the fissure. The crane then lifts the material up onto the ice and stockpiles it.

Having cleaned the sea bed in one location the crane moves on to the next place whereto sweepwood has migrated. A signaling man is to work with the crane operator. Another crew consisting of 4 workmen and a tractor driver are to detach wire and metal ropes from logs, pile the logs and, using a bulldozer or a tractive vehicle with a sledge, take them to the port for subsequent sorting, with the wire and cables sent off for processing.

During the shipping season, when the area is ice-free, the said sweepwood lifting operation is to proceed with the use of a floating crane. The lifted timber is to be stockpiled into a lighter for further transportation to the port where it will be hoisted onto the mooring pier. The offloading of the timber from the lighter onto the pier floor will be done by a dockside gantry crane that will have a clamshell. Dock mechanics, using a wheel loader and the gantry crane, will do sorting of the logs, bundling and stacking .

It is considered various technologies for lifting, translocation and severing of the bay waters cleaning of hulks of sunk ships. This or that technique or a combination of techniques may be seen as acceptable in each particular case, depending on the conditions on location and on technical possibilities available. There are several factors that influence the choice, the most important being the physical condition of the object to be lifted, the environmental conditions *in situ*, the location and positioning of the object with relation to type of approaches and accessibility.

The following two main methods of lifting are planned for the project, based on the data from the Phase 1 scuba diving examinations and engineering:

- lifting and transportation with the intact of hulk integrity;
- shifting the object by dragging for severing onshore.

5. Expected Results: Completion of Tiksi Bay bottom cleaning of sunken timber; recycling of the hulks of 5 ships in Tiksi Bay; assessing the current environmental condition of the basin of Tiksi Bay and Bulunkan Gulf, including a baseline physical and chemical study of the contamination of bottom sediments and seawater in Tiksi Bay. Once finished, the operation will provide for a safe routing of ships across the bay to piers. The seawater and bottom sediment quality assessment will allow for coming to terms with the environmental

6. Current Project Status: the project is ready for being implemented as Phase 1 thereof saw the methodology for cleaning the bay of sunken timber developed, the scuba divers' inspection of the ship wrecks completed and all the necessary approaches to putting the project through has been analyzed.

7. Project Stakeholders: Yakutia (Sakha) Republic government agencies responsible for environmental protection (e.g. Ministry of Nature Protection of the Republic and its branches, such as Bulun Nature Protection Board (Tiksi) and Department of Biotic Resources, which are ready to supervise the different steps the project consists of), the local community. The project will be implemented with the participation of material, technical and human resources provided by corporate entities and agencies that use Tiksi Bay and Bulunkan Gulf basin. Besides, the Executive of the Republic and local self-government entities (Bulun municipality) see themselves as stakeholders as do governmental controlling agencies and local environmental organizations, which are all driven by one and the same idea: reduction of man-made impact on the sea environment in the project area.

8. Project Replicability Potential: The demonstration of a budget-efficient methodology of an environmental rehabilitation of Tiksi Bay may be used subsequently for a broad-scale elimination of the aftermaths of the chemical pollutions of the coastal areas, thus reducing the technogenic impact of Russia on the international Arctic waters. The results of this pilot project will be applicable for cleaning of other bays near towns and villages on the shore of the Arctic Ocean, since the procedures for restoring of the environment conditions are similar.

9. Project Timeframe: August 2009 – September 2010.

10. Project Funding: 100,000 USD by UNEP/GEF (Iceland funds). The project will use the machinery, loading and offloading mechanisms and manpower of OAO Tiksinsky Morskoy Port (OJSC Tiksi Sea Port). This company is prepared to co-finance the project up to the amount of 400,000 Russian rubles.