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Storage, processing, and transportation

Module 6b

Storage and processing of oil and gas

Creates several waste streams:

- Tank vapors when filling tanks
- Contaminated wastewater
- Tank bottoms may contain hydrocarbon residues, heavy metals, and poly nuclear aromatic hydrocarbons

Gas storage tanks

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Oil storage tanks

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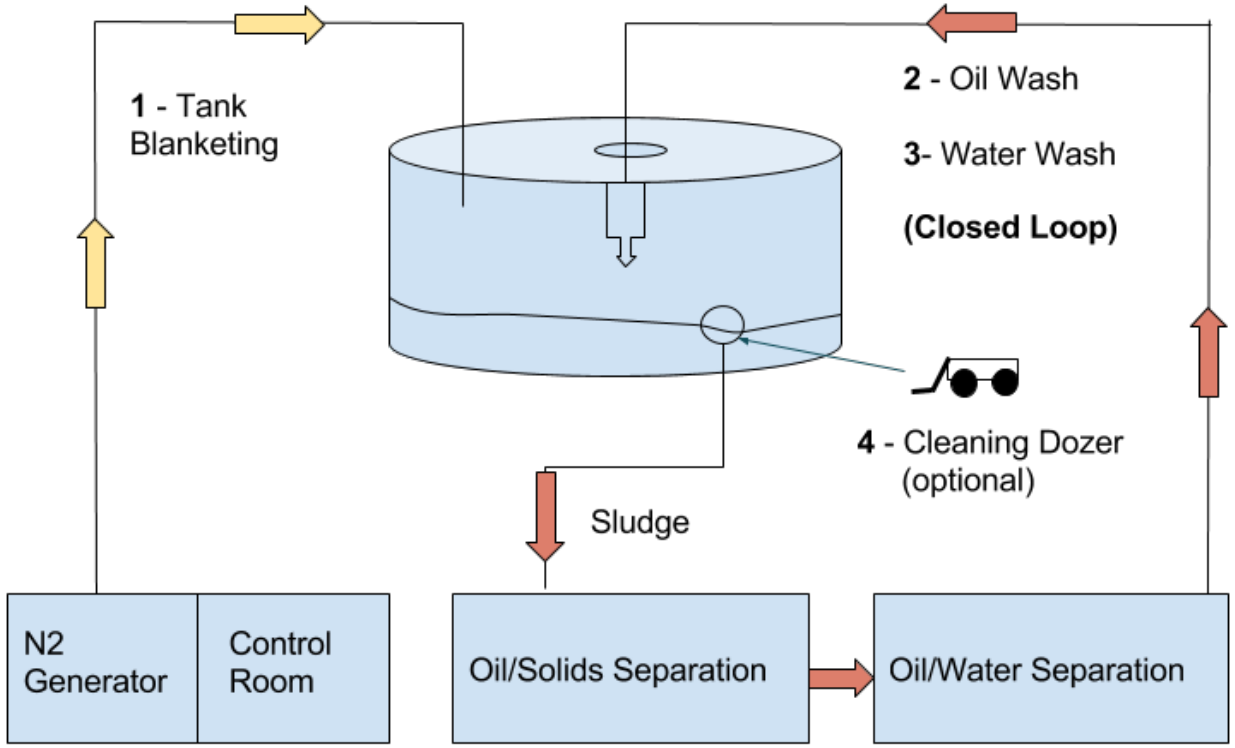
Oil tank cleaning



5 - Effluents: Oil, water, solids

Oil tank cleaning

How it should be

Hydrocarbon transport

Hydrocarbon transport occurs via rail cars, trucks, tanker vessels, and pipelines.

The method used to move oil depends on the amount and where it's going. The biggest problems with moving oil are waste discharge (e.g., ballast water) and risk of oil spills.

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MARPOL: Transport by sea

Reducing the consequences of accidents through:

- Protective location of segregated ballast tanks
- Double hulls
- Accelerated phase-out for single-hull tankers

The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and by the Protocol of 1997 (MARPOL). Ballast Water has serious ecological, economic and health problems from the multitude of marine species carried in ships' ballast water.

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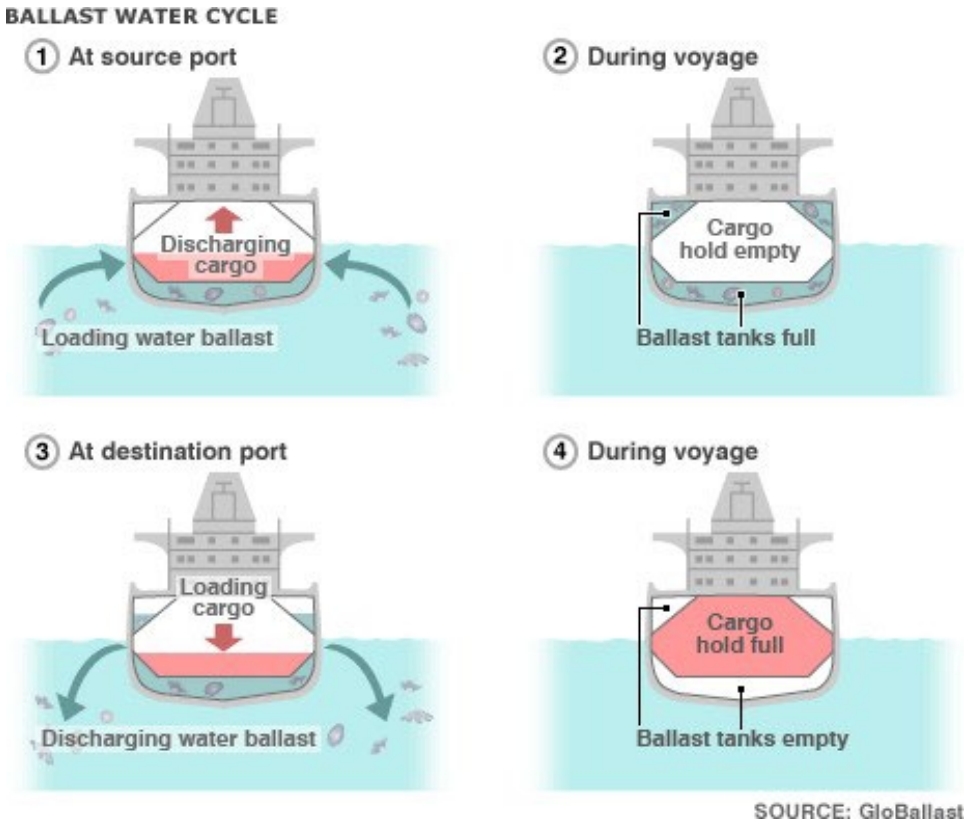
Ballast water cycle



Unfortunately, no ballast water treatment method fully eliminates the risk of introducing exotic species.

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Impact of ballast water

Example of comb jelly in the Black Sea

- A comb jelly feeds on anything smaller than itself.
- Probably introduced via ballast water from New England (USA) into the Black Sea.
- No natural predators & outcompeted native species.
- The once profitable anchovy fisheries in Russia & Turkey almost disappeared.

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Pipelines

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West-East Gas Pipeline

- The construction of the West–East Gas Pipeline started in 2002.
- The pipeline was put into trial operation on 1 October 2004, and the full commercial supply of natural gas commenced on 1 January 2005.
- 4,000 kilometres (2,500 mi) long pipeline from Lunnan in Xinjiang to Shanghai.
- The pipeline is supplied from the Tarim Basin gas fields in Xinjiang province.
- From 15 September 2009, the pipeline is also supplied with coalbed methane from the Qinshui Basin in Shanxi.

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Challenges

- The pipeline traverses many habitats, from the sparsely populated, through erosion-prone plains, through mountainous and forested areas, and heavily farmed and densely populated regions.
- Passes often close cultural heritage sites and other areas known to be of cultural heritage or archaeological significance.
- People needed to be resettled.
- Compensated for temporary or permanent land disturbance.

What are the issues?

- Biodiversity threats, especially negative environmental impacts on nature reserves.
- Disruption to local land use and irrigation patterns, including land acquisition.
- Difficulties in consulting with communities to disseminate information about the project.
- Social impacts, including compensation and resettlement, and livelihood disruption.
- Providing limited local employment opportunities (commonly referred to as “local content”).
- Overly optimistic local expectations for access to natural gas among citizens in villages along the pipeline but where gas off-take does not occur.
- Health and safety threats along the pipeline.
- Damage to cultural heritage.
- Insufficient attention to ethnic sensitivities.

Mitigation measures

- Best practice public consultation.
- Avoid environmentally and culturally sensitive areas.
- Minimize social impact through best practice compensation and resettlement practices.
- Minimize spills through right of way encroachment protection.
- Minimize leaks through frequent or rigorous pipeline inspections/testing.

Key messages

- Processing and moving oil and gas produce direct environmental impacts like vapor emissions when filling tanks and contaminated wastewater and tank bottom sludge when cleaning storage tanks.
- Indirect impact of moving oil by ships is the microbiological content of the ballast water, which is often discharged with no adequate treatment, causing the introduction of invasive species (Comb Jelly fish in the Black Sea)
- Pipeline construction requiring best practice public consultation, avoiding impact on environmentally and culturally sensitive areas (pipelines often traverse sensitive areas), Right of Way encroachment protection, frequent or rigorous pipeline inspection/testing.

Thank you

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