

"Zero Discharge" Interpretation and management of environmental risk

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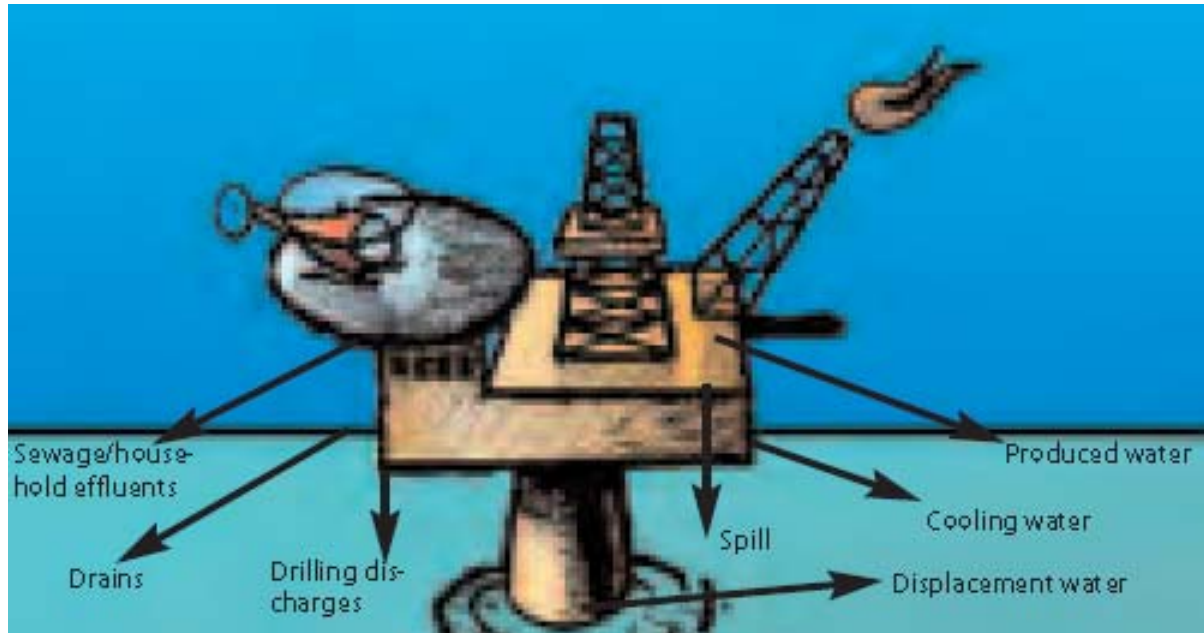


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1. General zero discharge requirements on the Norwegian continental shelf
2. Special zero discharge requirements in the Barents Sea
3. Zero discharge - Results and remaining challenges
4. Zero discharge - Consequences for HSE
5. Accidental pollution - Management of environmental risks

Zero Discharge requirement on the NCS



The operator must have permission pursuant to the [Pollution Control Act, chapter 3](#) to use and to discharge chemicals and to inject chemicals or water containing chemicals. Zero discharge goals are regulated by the Government and followed up by the Ministry of the Environment and the Norwegian Pollution Control Authority (SFT).

Zero discharge requirements limit what can be granted in discharge permits.

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General Zero Discharge requirement on the NCS

- is a precautionary target related to *operational* discharges (normal operations)
- is intended to prevent that operational **discharges to sea of oil and environmentally hazardous substances** do not lead to
 - unacceptable damage to human health or the external environment, or to
 - unacceptable increase in the background level of these substances over time.
- concerns both **natural existing** as well as **added** environmental dangerous substances, both in drilling fluid, cement, lubricants, firefighting fluids, production chemicals and produced water
- Chemicals are classified as green, red and black. Black chemicals are prohibited while considerable amount of work is done to substitute red chemicals (high priority)
- introduced on the NCS in 1997 (set target for compliance 1.1.2006)

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Zero Discharge – Barents Sea and Lofoten



Zero Discharge – Barents Sea and Lofoten

For the Barents Sea and the areas outside Lofoten, **additional requirements** apply since 2005

- Zero discharge of drilling fluid and drilling cuttings except from the top hole (before BOP is run). Top hole drilling fluid and cuttings **could** be released if
 - the discharge does not contain unacceptable environmental substances
 - Activities are in areas with low risk of harming vulnerable components

⇒ Injection of drilling fluid and drilling cuttings or transportation and handling onshore
- No discharge of produced water
 - In case of interruption in the production, maximum 5% of the produced water could be discharged after firstly being cleaned

⇒ Injection of produced water
- No discharge to sea from well testing

⇒ Down hole testing or collection of testing fluid

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Zero discharge - results

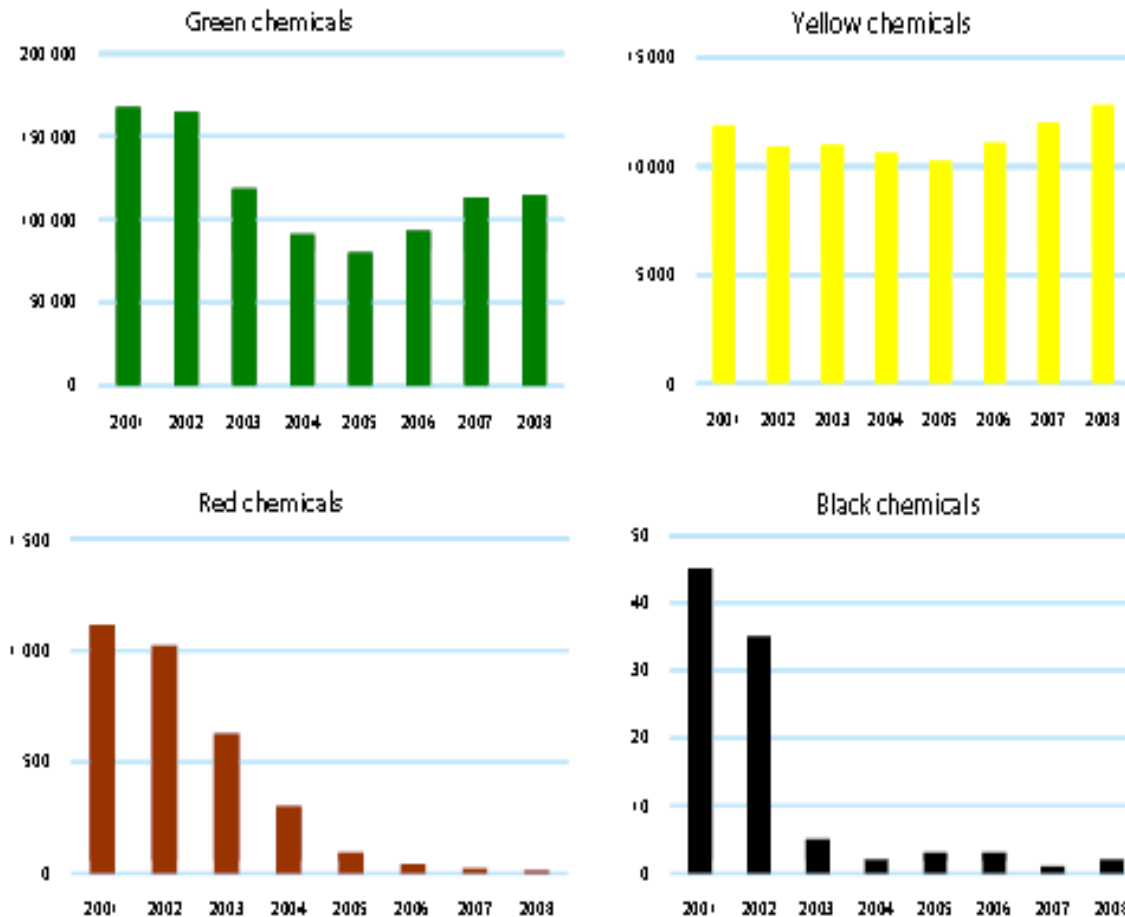


Figure 7: Historical development for discharges of green, yellow, red and black chemicals, tonnes.

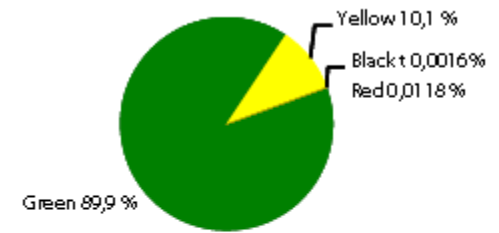


Figure 8: Distribution of chemical discharges in accordance with SFT's colour categories.

Reduction of around 85 % in releases of chemical additives from production processes from 2000 to 2004.

Remaining problem: Produced water

(discharge of natural existing harmful substances)

Plans to apply zero discharge requirements to radioactive material.

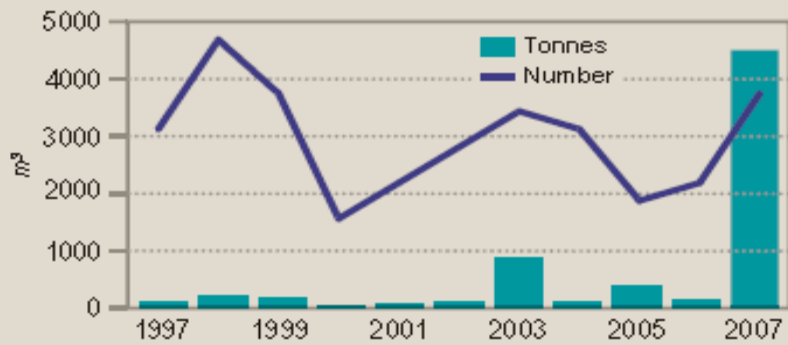


Figure 9.16. Acute oil spills larger than one cubic metre
(Source: Norwegian Petroleum Directorate)

Accidental discharges - pr definition illegal

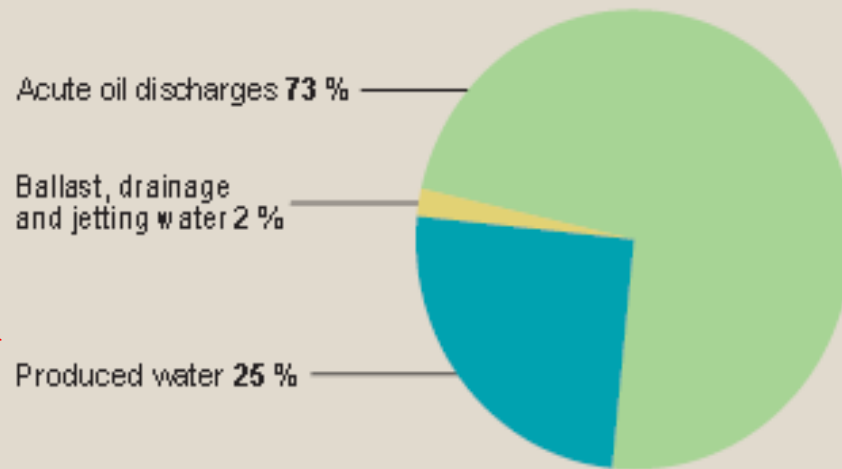


Figure 9.17 Discharges of oil from the petroleum activities distributed by activities, 2007 (Source: Norwegian Petroleum Directorate)

Legal operational discharges
covered by
zero discharge requirements
+ discharge permits

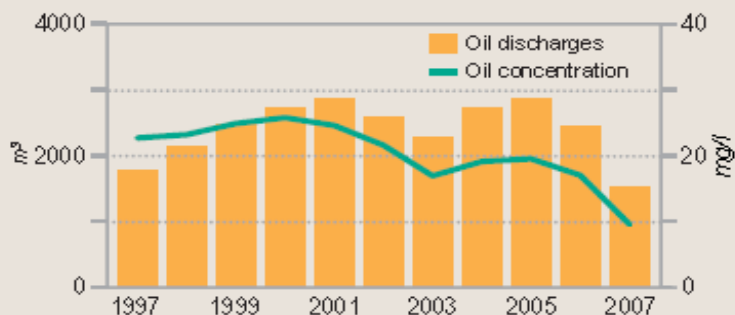
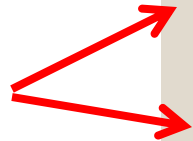


Figure 9.19 Discharges of oil in produced water and appurtenant oil concentration
(Source: Norwegian Petroleum Directorate)

Zero Discharge – Consequences for HSE

Zero discharge requirements



Technical and operational changes

Clearly stated that punctual non conformity with discharge permits is allowed if it is deemed necessary from a safety point of view.

Higher focus on and better understanding of the consequences of discharges to environment leads to better planning, development of new methods and equipment.

Reduction of chemicals that can harm the environment goes hand in hand with our efforts to reduce chemical exposure of offshore workers.

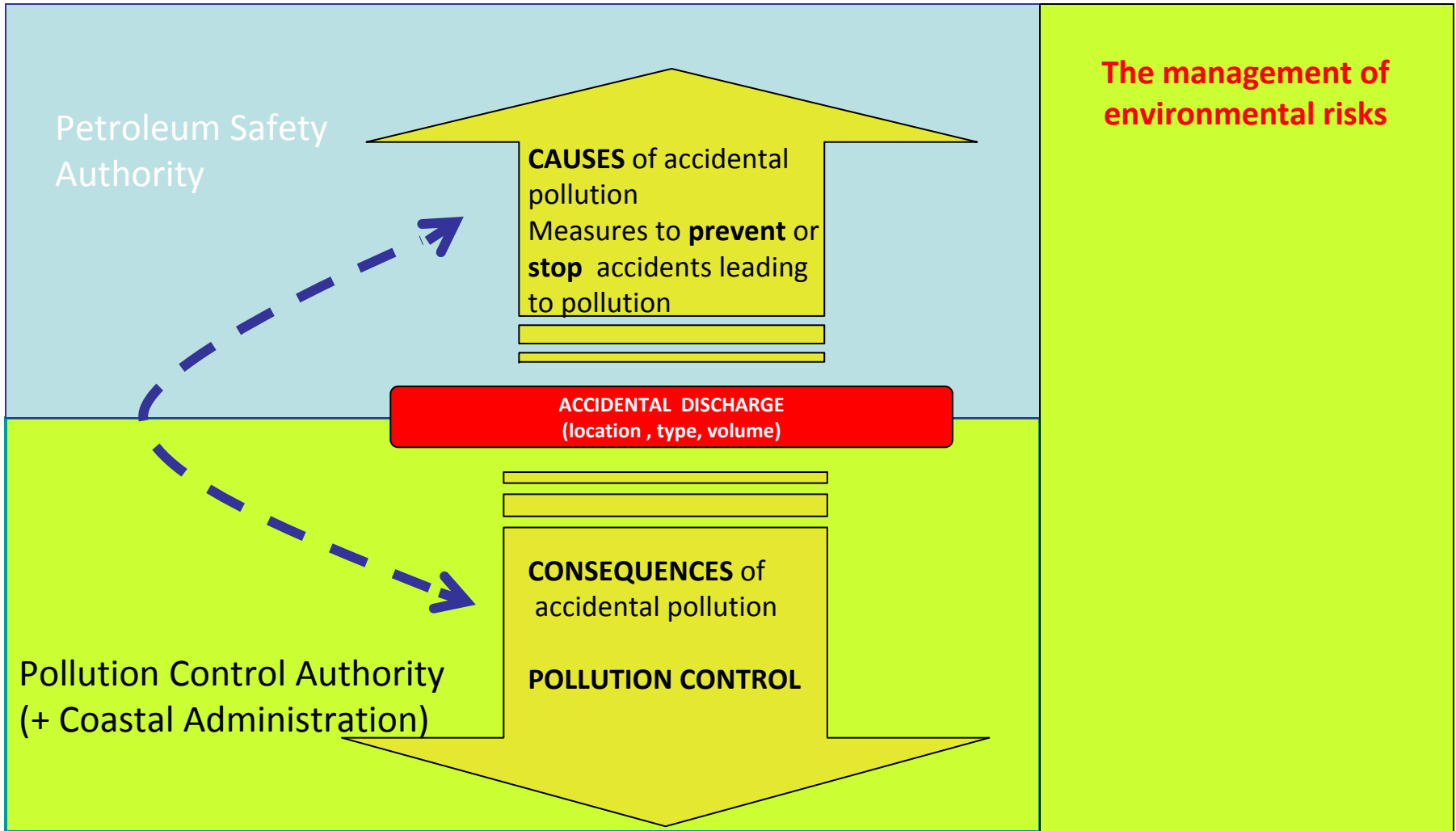
Potentially negative consequences for safety and working environment: modifications, increase in technical complexity, more injectors, more material handling, more lifting operations, more simultaneous activities etc.

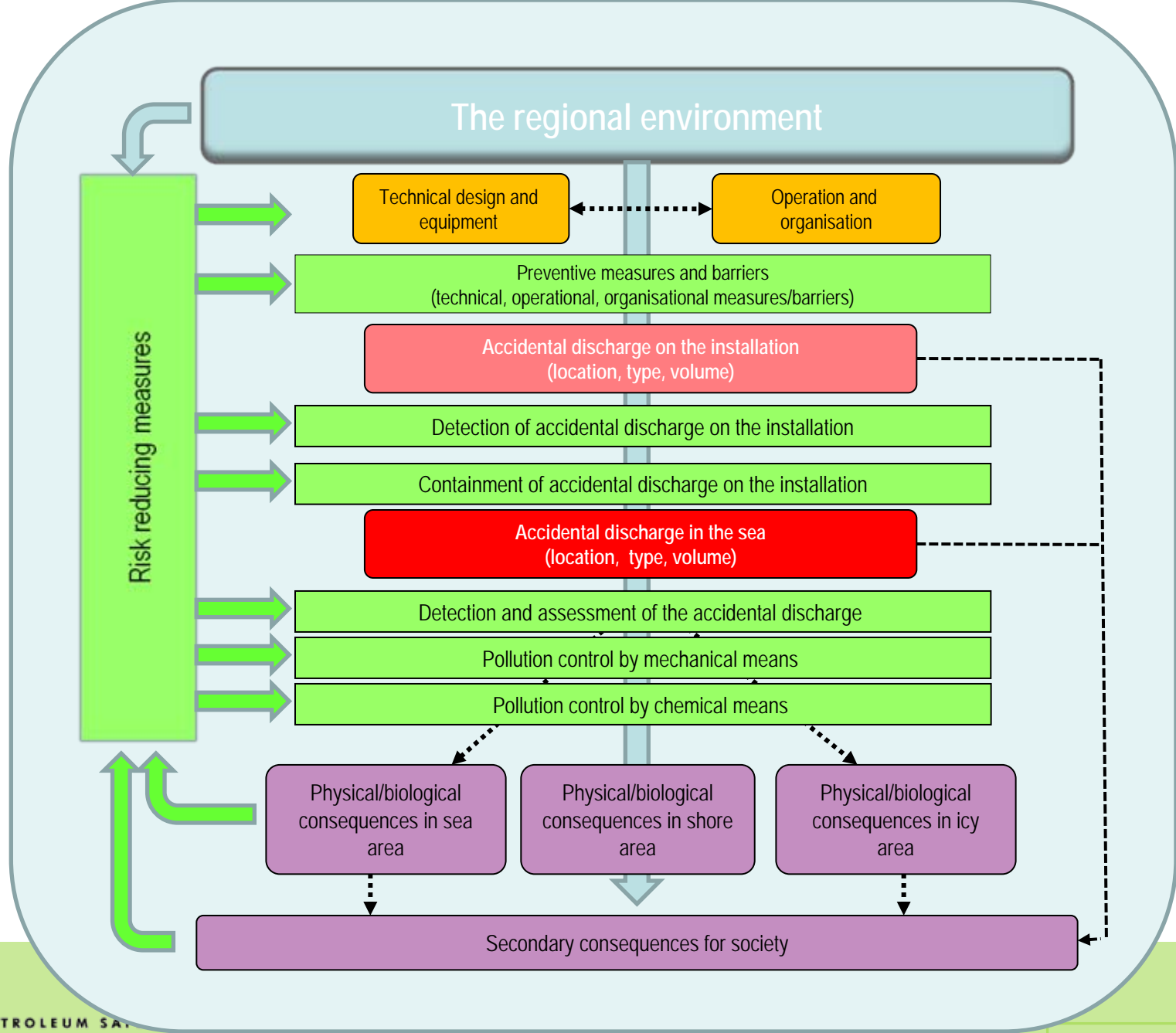
Potentially negative consequences for safety and working environment must be identified and handled.

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Thank you for your attention.

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