Possible Scenarios for Marine Pollution in the Case of Shipwreck Collapse prior to the Removal of Fuel or Oil Cargo Stored in the Wreck

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Facts

- The wreck - ϕ = 54° 32’ 19,452” N; λ = 18° 57’ 57,024” E
- Technical data of FRANKEN, including
- 5 tanks for oil cargo could be still watertight with capacity of over 4,600 tons,
- unknown volume of bunker fuel, still to be found in the fuel tanks,
- unknown number of other dangerous cargo e.g. oil residues, lubricants, munition etc.

Facts

- Unknown information about oil

- volume,
- type(s) of oil(s) and its properties,
- state of weathering process,
- reactivity with seawater.

Even knowing the type of oil, there is no data necessary for prediction of oil drift and weathering, using modern modelling tools. The only one way is to take samples and analyse them for this purpose.

Risk management with limited information – a general assumption

- Oils may float, sink or persist in the water column (be over washed)
- This depends mainly on the oil density but also on;

- water temperature and density,
- oil weathering e.g. emulsification,
- oil creates the mixture with sediment.

The wort case scenario is:

Oil released creates emulsion and remains in the water column

Risk management continued (based on the worst case scenario)

- Scenario. One thousand tons of oil released creates five thousands tons of oil-water emulsion and remains in the water column or is just over washed.
- Consequences. A very few possibilities for slick monitoring

- satellite and aerial monitoring ineffective,
- oil is invisible or limited visible from ships,
- some laser detection could be possible but non effective taking account large areas,
- the only one way is to use a number current drifters, bring a wide range of sampling, and recovery oil while detected, or
- watch contaminated fauna, or
- watch the coastline and protect it while first droplets of oil appear.

Risk management continued (based on the worst case scenario)

- Threats to marine environment;
- long, up to several years persistence,
- a very large area contaminated, almost all countries of the Baltic Proper affected for the long period of time,
- secondary contamination (even cleaned beaches could be contaminated for the second or third time),
- extremely large number of species contaminated,
- the pollution cost including recovery and decontamination, environmental and economical lose – up to one billion EUR and no chance for compensation.

Risk management continued (based on the other scenarios)

- Scenario. One thousand tons of oil released creates or not an oil-water emulsion and has sunk.

- this the Stuttgart case but even more complicated because of depth,
- everlasting persistence,
- quite large area contaminated,
- the wreck becomes unavailable for non commercial diving,
- the pollution cost including recovery and decontamination, estimated even over one hundred million EUR and no chance for compensation.

Risk management continued (based on the other scenarios)

- Scenario. One thousand tons of oil released creates five thousands tons oil-water emulsion and floats.

- this the high viscous (heavy) oil case,
- long time persistence,
- quite large area contaminated,
- requires an international assistance, up to two months recovery operation at sea.
- the shoreline of more then one country affected,
- the pollution cost including recovery and decontamination, estimated even over twenty million EUR and no chance for compensation.

Risk management continued (based on the other scenarios)

- Scenario. One thousand tons of oil released does not create the oil-water emulsion and floats.

- this the light or medium viscous oil case,
- long time persistence,
- quite large area contaminated,
- probably should be managed by national response system without the international assistance, about one month recovery operation at sea including nearshore activity.
- the shoreline of more then one country still affected,
- the pollution cost including recovery and decontamination, estimated over ten million EUR and no chance for compensation.