Cop ship 140/141X

1 /6

Nordic Environmental Engineering Group

**Ocean Resilience Enterprise**

\*

Ocean resilience system

Sustainable technology

Logistics

OP ship 141 2

Trg 180727**/**191130

***1Nordic environmental engineering group***

**COP SUPPLEMENT 01**

**COP- ship-140X©**

191130

International Clean Ocean Project© - COP -ships**©**

Conceptual Design proposal.

Combined emission free marine

waste plastic recovery & oil processing ship

for world wide operations.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Innovative COP-ship for world wide sea cleaning operations.

COP-ship system main duties.

***A. Recovery of marine waste plastic including microplastics.***

***B. Conversion process converting recovered plastic trash to syntethic oil.***

A semisubmersible ship to be used, adapted/equipped for world wide collection/- recovery operations using BAT technology in co-operation with a Sea-Vax Robotic vacuum vessel (1 for vacuum up microplastics.

The COP-ship is ballasted to operational draft (OD) and advancing astern collecting and capturing the trash through two 11 met. Stern doors. The capturing width (CW) is preliminary 45 meter, and can be increased to 500 met. by using one or two towed booms or nets connected to one or two towing boats.

The loaded (collected) plastic trash to be pumped to the ships processing plant (PP),

were it will be treated (fragmentation, separation) in a plastic-to-oil -process.

**Ships recovery/cleaning operation.**

During the recovery operation the ship is advancing astern by using propulsion system fore and aft. The stern doors (2) are open to the sea water with plastic trash to enter inside the ships main deck MD, to a depth of approx.. 0.3 – 0.5 met. or less depending on volume of trash.

The main deck is divided by a longitudinal bulkhead. On each side there are four openings (inlets) through which plastic trash is led down to bottom tanks. - Plan A Fig. 2.

These openings/inlets to be attached to a foldable grating it is possible to stop unsuitable trash to enter into the tanks will and the oil processing plant.

When the operational process is in progress, waste plastic/trash will enter the main deck area and can be flushed down to bottom tanks by pumps or by gravitational force.

- COP supplement 01 3

The product from waste plastic.

The plastic to oil product, syntethic oil, to be pumped to storage tanks on board before being transferred to other ship, to barges or to land facilities.

The syntethic oil may also be stored In tank containers on board the ship.

The produced oil will be offered to the market and profit will be an important contribution

to ships running costs.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

COP Supplement 01.2

**COP-ship-140X.©**

**Green ship - zero emission vessel.**

**The COP-ship concept will have the potential of becoming an appropriate platform**

**for R&D projects for various research programmes as well as for control, survey, measuring.**

COP-ship-140X© represents a new approach to Clean shipping Project as the ultimate Green Ship with fossil free operations. A zero vision Tool with Clean Ship Management CSM. The environmental objective for the COP-ship concept is to fulfil the requirements for environmentally sound ship management implementing systems innovative solutions, eco-efficient technologies and elimination of harmful operational discharges and emissions as well as taking advantage of new propulsion systems with environmental benefits, such as Hybrid propulsion system and/or Dual-fuel.

Environmental policies and green ship concept. (a

Clean ship approach requires innovative solutions and eco-efficient technologies, elimination of harmful operational discharges and emissions.

It shall include: Machinery

Propulsion

Operation

Logistics

The vessel be environmentally Clean Ship, clean design class notation in compliance with IMO/SOLAS Regulations.

Additional power

Solar cell power will generate/contribute to an important part for the power needed

for autonomous COP operations, logistics carried out during long periods at sea.

Hybrid technology.

Environmentally sustainable Hybrid technology will be implemented.

A hybrid ship uses two or more types of power, such as internal combustion engine to drive an electric generator that powers an electric motor (as in diesel-electric trains).

COP supplement 01.3 4

COP equipment for marine plastic trash recovery.

Inside the ships hull various kind of equipment can be loaded before ships passage, such as

containment booms, modular plastic harvesting nets, towing-/ and work boats, other items.

1. *Autonomous Robotic Sea-Vax vacuum vessel.*

Autonomous robotic vessel.

A 50 meter robotic Sea-vax robotic vacuum vessel can temporarily be loaded on board for transfer or service. This vessel is important for COP operations as it has the capacity to vacuum up small plastic particles at sea (microplastic).

Normally, such operations are difficult to carry out.

Loading the COP ship© at sea or in harbour.

This is carried out by using float-on / float-off method as he COP ship is semisubmersible

and it is able to ballasted to a proper depth.

Sea Rescue and emergency operations.

The COP ship© will be an asset with regard to sea safety and SAR/Seach & Rescue ops.

Solar- and wind power.

**\*** The COP-ship© swill be equipped with one of the largest solar cell systems for ships.

\* It will also be prepared to install two or four 27 meter high Flettner rotors for taking

advance of wind for the propulsion.

Potential future R&D development projects.

Environmentally sustainable hybrid technology.

Biofuel

Battery hybrid - hybrid electric

Total energy plants (TEP) – Climeon system.

Integration of solar energy and Stirling motor.

LNG hybrid system

Motor fuel of biogas

Water cleaning systems

Energy efficiency – enhanced energy systems

Dual fuel/LNG gas or liquified

System/method to increase redundancy to compensate engine downtime.

\* Efficient system for compostation of recovered waste plastic

not intended/suitable for syntethic oil production.

COP supplement 01.4

5

a) Green ship fuel saving operational measures / procedures.

Exhaust gas recirculation

Dual fuel engine

Advanced rudder- and propeller system

Optimized cooling system

Solar cell system

Flettner rotors

Speed nozzles.

Improved hull paints

Minimum ballast.

b) Other operational measures.

Waste water treatment and -cleaning (1.

Emission abatement

Evironment friendly fuels and lubricants are used.

Sewage treatment.

Sludge and bilge water systems/procedures.

Grey and black water cleaning.

Compostation of garbage

Active bilge water cleaning equipment to be implemented.

Oil spill cleaning including deposition of oil rest products.

1) *Vessel is fitted with efficient water treatment plant and all*

*waste water is cleaned b before being pumped overboard.*

Other systems, procedures, regulations.

. Marine HVAC plant (for saving energy, Operational economy, environmental efficiency).

Litter and waste control including compostation of consumer garbage.

Procurement regulations and control on board.

Control system for pipelines, valves sediment etc.

The use of chemicals not harmful to the environment.

The use of paint free from harmful, poisonous substances.

Sludge handling – Sludge tank on board for spills or fuel oil, lubricants, detergents,

solvents, will be accumulated in the Sludge Tank or Bilge water tank.

Relevant International Regulations.

COP-ship shall comply to all relevant International Regulations such as IMO. SOLAS,

IMO Green passport Certification, MARPOL Reg. and Annex, ISM certification, ISO certification (140001, Environment Management ISO), BS EN ISO 9001:2000 Quality Management standard.

6/6

COP Supplement 01.5

Preliminary dimensions.

Length over all 140 m

BM 30

Draught 7.5

Tank capacity syntethic oil 2650 m³

Plans and drawings to be included in additional Supplement

according to pending list and NDA document.

Trelleborg, Sweden, 2019 11 30

*S W Reinlert*

*NEE Group*