

To the kind attention of

Ms. Renata KADRIC - Project Officer

723030 GASVESSEL Project

European Commission Innovation and Networks Executive Agency (INEA)

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B-1049 Brussels/Belgium

Trieste January 31st, 2020

H2020 – 723030 GASVESSEL – WP4 – Achievement of milestone MS5 – Statement

Dear Ms. Kadric,

Reference is made to MS5 in the Grant Agreement relevant to the “Results of PV pilot production and Tailored ship design and (on/off) loading system available”.

At the time of issuing this letter the status of the three items, object of the MS5, is as follows:

1. Results of the PV pilot production (see email from Coordinator to PO dated 20/01/2020)

After the satisfactory conclusion of all full-scale operative tests and tuning of the equipment of the complete Pilot line, including winding tests, an unexpected negative technical event occurred in the production line on 23 December 2019. A severe damage of electric nature occurred to the main switchboard feeding the winding machine, some internal components burnt and need to be replaced and other repaired. Safety procedures allowed that no people suffered injuries caused by the damage. We have immediately stopped all activities and alerted the competent technicians. They are working in order to solve the problem and permit us to finalize the internal works for testing the pressure vessels production. Unfortunately, this event is affecting the tuning of the production line regarding the resin distribution on the pressure vessels and thus the carrying out of the fatigue tests – for which all the relevant plants are ready – and the burst tests - plants also ready.



HYDROFORMING



WINDING



CURING OVEN



PUMPING UNIT FOR
AUTOFRETTAGE AND 10000 CYCLES FATIGUE

PRESSURE BOOSTERS

CONTAINERIZED PUMPING UNIT
FOR BURST TESTS

We believe that we shall be able to complete the repair job by the month of February/March 2020 (i.e. month 34 of the project, depending on the prompt availability of items to be replaced). Please note, in any case, that only after the replacement of the damaged main components (already ordered) we will be in condition to discover if there are other small damages along the electricity feeding line and relevant equipment.

After that, we shall be able to start the official tests together with ABS for the issuing of documents of homologation of the Pressure vessels and of the production process, by the month 40 of the project. This means that no negative influence on the overall timing of the project activities will occur caused by this unexpected electrical device failure.

Apart the inconvenience here above mentioned and notified, the pilot line is complete and ready to produce and test the PV, as it results from the pictures here above.

Furthermore, just before the damage occurred, we were able to calibrate the winding machine for the various required longitudinal angles and for the full circumferential wrapping:



In addition, using a special pulling machine designed, built and installed by the Consortium a pulling test has been performed up to rupture on a full-scale section of resin impregnated carbon fiber. Practical results obtained were very satisfactory and in line with the theoretical calculations done.



Consequently, based on the above, we and all the partners remain confident on the full success of the project, as soon as the electric damage is repaired, allowing the PV production testing.

We shall inform you as soon the next developments are available.

2. Tailored ship design

Deliverable D5.1 Basic Design and Naval Architecture Package. The basic tailored ships' design package is complete and in hands of partners ABS and HLL for information and comments.

We do not expect major comments from the Class because:

- Design done in strict coordination with the Class, with continuous exchange of info all along the development of design
- All the 27 recommendations raised during the Risk Assessment and HAZID sessions are duly incorporated in the design

Together with the ships' basic design submitted to the Class also the Special Studies (jet fire, gas dispersion, explosion, etc.) as required by the Rules and prepared by Partner ESTECO have been delivered to ABS.

DOCUMENT NUMBER	DOCUMENT TITLE
WP5-D5.1-RV1-833-0-001-B01	A-Ship outline specification
WP5-D5.1-RV1-833-0-002-B01	A-Ship General Arrangement plan
WP5-D5.1-RV1-833-0-003-B01	Capacity plan
WP5-D5.1-RV1-833-0-004-B01	Lines and body plan
WP5-D5.1-RV1-833-0-005-B01	Freeboard calculations
WP5-D5.1-RV1-833-0-006-B01	Equipment number calculations
WP5-D5.1-RV1-833-0-007-B01	Intact stability calculation
WP5-D5.1-RV1-833-0-008-B01	Damage stability calculation
WP5-D5.1-RV1-833-0-009-B01	Lightship and COG calculations
WP5-D5.1-RV1-833-0-010-B01	Preliminary resistance and propulsion calculations
WP5-D5.1-RV1-833-0-012-B01	Escape routes plan
WP5-D5.1-RV1-833-0-013-B01	Hazardous areas and gas dangerous spaces plan
WP5-D5.1-RV1-833-1-001-B01	Midship Section
WP5-D5.1-RV1-833-1-002-B01	Longitudinal strength analysis
WP5-D5.1-RV1-833-2-001-B01	Bilge keels schematic layout
WP5-D5.1-RV1-833-3-007-B01	Bow thruster grid
WP5-D5.1-RV1-833-5-001-B01	Structural fire protection plan - Insulation plans
WP5-D5.1-RV1-833-5-002-B01	Thermal insulation scheme of cargo area
WP5-D5.1-RV1-833-6-001-B01	Active fire protection systems philosophy
WP5-D5.1-RV1-833-1-020-B01	Ship collision structural analysis
WP5-D5.1-RV1-833-7-001-B01	Preliminary electrical load balance
WP5-D5.1-RV1-833-7-002-B01	Electric distribution one-line diagram
WP5-D5.1-RV1-833-7-003-B01	Emergency shutdown system philosophy
WP5-D5.1-RV1-833-7-004-B01	Gas-detection system philosophy
180GASV-DRW-050-T02A02	Loading and Unloading System P&Id
180GASV-DRW-050-T02A01	Cooling and Heating System P&Id
WP5-D5.1-RV1-833-0-101-B01	B-Ship Outline Specification
WP5-D5.1-RV1-833-0-102-B01	B-Ship General Arrangement
WP8-8.1*	Safety assessment: Special studies

(*) The safety assessment: Special Studies, belonging to WP8, is part of the ship basic design because special studies need to be performed before starting of Functional Design

The basic ship design is also complete with thermodynamics studies and cargo P&ID prepared by Partner CENERGY.

Two sizes of ship are foreseen in accordance to the needs of individuated scenarios:

- Up to **15 Millions Nm³** with vertical large capacity cylinders. Net gas delivery per trip **12 Millions Nm³**
 - Cylinders length = 22.5 m
 - Cylinders diameter = 3.4 m



To serve Cyprus – Crete,
Cyprus – Egypt and Black Sea Scenario.

- Up to **12 Millions Nm³** with vertical large capacity cylinders. Net gas delivery per trip **9 Millions Nm³**
 - Cylinders length = 17.5 m
 - Cylinders diameter = 3.4 m



To serve Cyprus – Lebanon,
and all the North Europe Scenarios.

The status of the basic design package is furthermore such to allow NAVALPROGETTI to progress in the Functional Design Package – Deliverable D5.3 – due to EU on month 36. In that occasion the feedback from Deliverable D6.3 (SINTEF), will be incorporated in the Functional Ship Design as necessary.

Deliverable D5.1 is uploaded on EU portal on the date of this letter.

3. Deliverable D5.2 Reports on towing tank experimental tests results. (WP5)

The experimental towing tank tests campaign is concluded, and all the results are available. The documentation provided is relevant to:

- | | |
|--|---------------|
| • Resistance and self-propulsion model tests | (Without ACS) |
| • Resistance and self-propulsion model tests | (With ACS) |
| • Seakeeping tests | (With ACS) |
| • Seakeeping tests | (Without ACS) |

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- Maneuverability tests (With ACS)
 - Wind tunnel tests

ACS = Air Cavity System, a special shape of the ship bottom to create an air cushion intended to achieve a reduction of propulsion power demand.

Deliverable D5.2 is uploaded on EU portal on the date of this letter.

4. On/off loading system available (WP6)

WP6 Partners, leaded by VTG, have produced a complete study referred to the loading/unloading equipment for each one of the three scenarios foreseen in the Grant Agreement.

Deliverables D6.1 and D6.2 have already been uploaded on the EU participant portal on month 30. Deliverable D6.3 (by SINTEF) will be uploaded on month 36, instead of month 34, due to the complexity of the study for tandem loading system to be foreseen in offshore.

In the meantime, Partner VTG issued a comprehensive study, “**WP6 General Report – Design Parameters and Costs of Onshore and Offshore Loading/Unloading Systems**” herewith forwarded complete with CAPEX and OPEX cost estimation. The contents of said document have been examined in a meeting in Athens on January 10th, 2020 between partners CHC, NP, VTG, ABS and SINTEF. In that occasion a methodology for appraisal of economic and financial aspects in WP7 has been outlined and defined.

In conclusion Coordinator, having appreciated the efforts done by the Partners and the results obtained up to now, considers the MS5 achieved in a large part with the only exclusion of PV Production Tests due to the unpredictable damage occurred to the pilot line. We expect that the remedial actions will allow shortly to re-start the PV production testing in the overall respect of Project timing.

Yours faithfully,

Loris COK
Project Coordinator

