

## Glen Sannox & 802 Monthly Report – [March 2022]

### 1.0 General

#### Executive Summary

The revised programme of works to deliver each vessel is now under joint development with the input of CMAL's secondee Programme Director. Project delays first reported as time slice detail in previous iterations of this report are now formally reported by the shipyard via their letter to the Convenor of the Net Zero, Energy & Transport Committee in their letter dated March 23rd, 2022, entitled Update on Hulls 801 and 802 setting out cumulative delays of eight months in the case of hull 801 and six months for hull 802.

	Hull	Original	Previous @ 09 Dec 2019	Previous @ 21 Aug 2020	Previous @ 24 June 2021	Previous @ 26 Nov 2021	Latest @ 23 March 2022
Projected Completion Date	801	May 2018	11 Oct 2021	14 April 2022	25 July 2022	30 Aug 2022	March - April 2023
(As advised by Shipyard)	802	July 2018	06 July 2022	08 Dec 2022	03 April 2023	03 April 2023	Oct - Dec 2023

The anticipated shift to a more commercially oriented, proactive leadership style of working under the direction of the new management team is now visible in the focus attached to direct key works in the emergency generator space, the engine control room, and deck seven crew accommodation. Corrective action is also now being undertaken to address significant coordination clashes in the accommodation electrical installation, as well as the start of work to address the significant modification (rework) required for statutory compliance of the main and auxiliary fuel delivery and transfer systems. The reinstallation of the recently removed legacy cabling has not yet begun, the start of this work has now governed under the revised planning philosophy which has yet to be shared.

The status of the overall outfitting in the engine control room has now reached a point where the main switchboard contractor is on site. Testing of the 415-volt switchboard is now underway, the initial DC ductor test was successfully completed Friday 8<sup>th</sup> April.




The Yards' most recent project report, published in February 2022, indicates project risk is decreasing. Yard-wide inefficiencies in onboard production supervision, project management's lack of understanding of the remaining project deliverables, and repetitive rework caused by inadequate construction design output all remain substantial risks that will cause further delays if allowed to continue unchecked. To remain objective, it must be stressed that the current management systems routine failure to recognise and control risk-based delays must be the subject of immediate detailed analysis.

The reinstatement of lapsed safety equipment certification took about four weeks. The access of production workers to enclosed spaces has been severely restricted. As a result, vessel productivity has dropped and out-of-sequence work has increased; nevertheless, the issue has been fixed since March 28th, 2022.

The following RAG assessment summarises key project performance presented against the last official baseline reference, issued 26<sup>th</sup> November 2021.

Process Stage	RED	Amber	Green
Overall Project RAG Status	v 801 and 802		
Programme RAG	v 801 and 802		
RisK Management RAG	v 801 and 802		
Cost RAG			
Quality RAG		v 801	

Key

	Primary objectives are at serious risk and remedial action is necessary.
	There is a problem and the objectives may be at risk.
	The item is progressing as planned and that no action is necessary.

## Warranty Issues 801 & 802

The ministerial statement shared 23<sup>rd</sup> March 2022 confirmed that a provision of 3.5 million pounds is to be made available as a builder's warranty.

## Yard Supervision

Mainstream supervision of 3<sup>rd</sup> party design and onboard production is still considered poor when measured against the amount of daily rework performed and the lack of official verification call made against completed works.

## 2.0 Changes to Site Supervision Team

CMAL are advertising for a technical superintendent with shipyard experience.

## 3.0 Design Changes Approved

Ongoing design changes affecting the constructability of the vessels design are driven exclusively within the Shipyard process. All are directly related to outstanding technical queries, previously unidentified works. Concerns that the vessel construction design is not frozen at this late stage of the project should be seen as a significant risk to the project, the impact of which is not currently accounted for in either vessel programme or risk register.

## 4.0 Agreed Changes to Delivery Date

Updated programme delivery dates are set out in section one above.

## 5.0 Agreed Changes to Price

(Note of changes; changes to be authorised & recorded in Contract Variation Register)

## 6.0 Changes Awaiting the Owner's Approval

LNG Control System Valves, Cost - Euros 43,000.00.

(Note of changes outstanding for approval by the Owner in excess of Buyer's Representative authority as stated in Consultancy Agreement Cl. 3.4)

## **7.0 Surveys / Inspections - 801**

Verification surveys of the as-built standard are listed below, too few call outs are currently made at this late stage of either project.

1. The integrity of fitted weathertight steel doors on deck 7 are now being water hose tested.
2. The emergency generator fuel storage tank was called for pressure testing, inspection was cancelled as significant fabrication work was not complete.
3. Ongoing structural fire protection callouts on deck 7
4. Electrical containment inspection on decks 5, 6 and 7
5. Emergency generator space out board bulkhead behind switchboard pre insulation inspection carried out.
6. Deck 7 instrument room pre insulation inspection carried out.
7. Deck 7 Server room forward outboard bulkhead pre insulation inspection carried out
8. Deck 6 linen locker pre insulation inspection
9. Deck 6 Fire locker external bulkheads pre insulation inspection
10. Deck 7 Crew cabins insulation repairs inspected port and starboard sides.
11. Electrical Inspection of cabling and main containment installation with BGEN/FMPG on decks 5, 6 & 7
12. Inspection of Emergency Generator Silencer Insulation

## **8.0 Progress Against Programme – Glen Sannox**

Comment will follow upon receipt of the revised programme.

### **Progress Against Programme - 802**

Comment will follow upon receipt of the revised programme.

### **Resource Allocation Glen Sannox & Hull 802**

Manning resources for main sub-contractors continues to be reduced, from week starting 4<sup>th</sup> April the electrical contractor has further reduced numbers by six, down from fifty in early March to nineteen at the time of writing. The easter holiday period (the yard remains open) will see structural steel workers from the sub-contracting firm <sup>[Redacted]</sup> drop from seventy-four to 20 workers (week commencing 18<sup>th</sup> April 2022). The push to timely complete all hot works on board Glen Sannox as well as meet programme key dates for 801 will be commented upon receipt of the revised programmes.

The core working week for Yard workers is Monday through Thursday, working times have been adjusted to create a single shift pattern where standard start and finish times are now between 06:45 hrs and 16:15hrs. The remaining three potential working days remain largely only worked by third party contractors and to a limited extent as yard overtime work.

Hull 801 Worker Resources		2022														
Week	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Yard Worker/Day</b>																
Welders	3				4	4	4	4	4	4	4	4	4	4	4	4
Platers/Burners	2				2	2	3	3	3	3	3	3	3	3	3	3
GMES Fabrication	24				30	38	71	70	70	70	70	64	64	44	44	42
Engineers	4				5	6	5	6	6	6	6	6	6	6	6	6
Yard Pipe Fitters	4				4	8	7	7	7	7	7	7	7	7	7	7
Painters	6				8	10	9	8	8	8	8	8	8	8	8	8
Joiner	4				3	4	6	6	6	6	6	6	6	6	6	6
Shipwright	0				2	2	3	3	3	3	3	3	3	3	3	3
Stagers	7				8	10	8	8	9	9	9	9	9	8	9	9
Ancils	12				12	14	14	12	12	10	10	10	10	10	16	16
Average Total Per Day	66				78	98	132	130	130	128	128	122	122	102	108	105
Weekly Hours 5 Day Week	3300				3900	4900	6600	2600	6500	6400	6400	6100	6100	5100	5400	5250

Week	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Contractors</b>																
[Redacted]	23				19	24	25	50	50	50	50	50	50	25	25	25
													4	6	6	6
														2	2	1
																2
	6				8	9	8	9	9	7	7	5	5	5	5	6
	4				5	5	5	5	5	5	5	5	5	5	5	6
	3				3	3	3	3	3	3	3	3	3	3	3	3
	20				18	35	34	45	50	50	50	62	62	37	37	37
	2				0	0	0	0	3	2	2	0	0	0	2	0
	4				3	5	6	6	6	6	6	6	6	6	6	6
	4				5	5	5	3	3	3	3	3	3	3	3	3
Total Per Day	66				61	86	86	121	129	126	126	138	140	92	94	90
Weekly Hours 5 Day Week	3300				3050	4300	4300	2420	6450	6300	6300	6900	7000	4600	4700	4500

195 Combined Total Workers  
9,750 Combined Total Hours

Hull 802 Worker Resources		2022														
Week	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Yard Workers</b>																
Welders	3				3	3	2	2	3	3	3	3	3	3	3	3
Platers/Burners	0				2	2	3	3	3	3	3	3	3	3	3	3
GMES Fabrication	9				10	22	22	28	31	31	31	32	32	32	32	32
Engineers	0				0	0	0	0	0	0	0	0	0	0	0	0
Yard Pipe Fitters	2				0	0	0	0	0	0	0	0	0	0	0	0
Painters	4				4	6	5	0	0	0	0	0	0	0	0	2
Joiner	0				0	0	0	0	0	0	0	0	0	0	0	0
Shipwright	2				3	3	3	3	3	3	3	3	3	3	3	3
Stagers	4				4	4	2	2	2	2	2	2	2	2	2	2
Ancils	1				6	6	6	6	6	5	5	5	5	5	5	6
Total Per Day	25				32	46	43	44	48	47	47	48	48	48	48	51
Weekly Hours 5 Day Week	1250				1600	2300	2150	880	2400	2350	2350	2400	2400	2400	2400	2550

Week	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Contractors</b>																
[Redacted]	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
	0				0	0	0	0	0	0	0	0	0	0	0	0
Total Per Day	0				0	0	0	0	0	0	0	0	0	0	0	0
Weekly Hours 5 Day Week	0				0	0	0	0	0	0	0	0	0	0	0	0

51 Combined Total Workers  
2550 Combined Total Hours

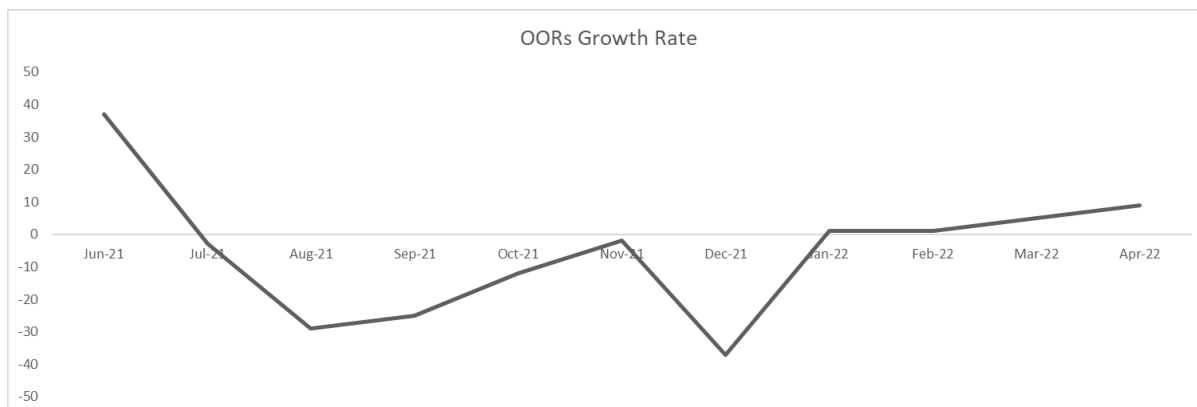
## Owners Observation Reports 801

Year	2021							2022						
	Month	June	July*	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
OOOR's Raised	37	25	4	7	0	26	8	8	21	12	13	0	0	0
OOOR's Closed	0	28	33	32	12	28	45	7	20	7	1	0	0	0

07/04/2022

Progress to close out Owner Observation Reports (OOOR's) remains slow and are performed largely out of sequence with the requirements of the previous vessel programme. Note the context behind the closure of 43 OOOR's in December is as a result of a detailed review to clean the current list based on an objective review on merging related deficiencies. At the time of writing 237 OOORs remain open, an increase of 15 from the previous months report. 65% of which relate to safety, maintainability, or specification requirements. Therefore, resolution of these is considered crucial prior to vessel handover. The impact of which remains unknown and not factored into the vessel programme. The chart below [OOORs Growth Rate] highlights concern that close out rates for OOORs has been steadily falling behind the rate at which they are raised.

Currently, 6 OOORs are regarded as "will not be done" based on FMPG comments made during the quarterly meeting between CMAL, FMPG and SG, held 19/01/22.



The yard process continues to apportion no special priority to outstanding OOR's. The emphasis given over to statutory priority 1 issues should warrant far greater attention.

### **Yard Production Reporting**

Yard reporting was last shared seven weeks ago in February, the level of detail contained remains heavily restricted, largely generic and is typically presented as simple graphics that do not present the level of detail needed to determine the health of either project. The next scheduled meeting is to be held 21<sup>st</sup> April 2023.

### **Inspection Call Outs**

The frequency with which inspections are called are made to verify completed production works, remains concerningly low. This should be seen as a significant KPI that flags the volume of work that has still to be completed.

### **801 Commissioning**

The latest edition of the revised programme is now under review.

### **Hull 802**

#### **802 Hot Works**

Structural Works Continue in the following areas:

1. Mezzanine deck doubler plates in way of locking devices and 03/04dk recesses continues and some MPI checks completed by QC
2. Main vehicle deck area missing lashing points continue to be fitted along with the required underdeck stiffening.
3. Ongoing modifications to bulkhead L11 units 38 & 39 continue.
4. Port side fender belting fitting/welding continues.
5. Stbd Aft Side-shell Fender belting fitting/welding continues making good progress.
6. Watertight Sliding doors welding now close to completion but still await survey request.
7. We the start up again of fitting Engine room areas sub-assembly foundation seats.
8. Erection joint program continues for units A3-5 & A4/5
9. Fwd Units 45-46-47 set-up consolidating continues to make progress.
10. Small sub-assemblies lifted into position after blasting/coating completed in machinery spaces.

## **Block Erection Status - 802**

Unit 50-51: Further part survey inspections carried out by Lloyds Register

Fabrication of units 85, 86, 96, A7-5 and A10-5 continues in module hall, all are late to be completed.

Unit A9-5 and A10-5 are both under construction, units A5-6 and A4-6 is completed and is waiting to be lifted on board to allow fit up work to begin.

Work continues to complete unit A8-5

### **802 Hot Works**

Structural Works Continue in the following areas:

- P&S Gun ports Panama eyes installation now underway.
- Starboard aft mooring deck Panama eyes mark up now in progress.
- Hot work to complete Mezzanine deck doubler plates in way of locking devices and recesses continues.
- Ongoing modifications to bulkhead L11 units 38 & 39 continues.
- Hot work to install port & starboard side hull fender belting has now started.
- Installation of watertight sliding doors is now underway onboard.
- Erection joint welding program continues for units A3-5 & A4/5.
- Forward unit's no's 45, 46 and 47 fit up now complete, erection seam welding now underway.

## **Hull 801 Outfitting Works**

### **Electrical**

The makers' technicians have been on-site since Tuesday 5<sup>th</sup> April, the process of preparing the main switchboards and motor control cabinets for operation is ongoing. The copper bus's contact resistance test (Ductor) and subsequent initial insulation resistance testing have now been satisfactorily completed.

### **Wheelhouse Communications and Safety Console Installation**

The decision has been taken to remove the existing centre console and exchange it entirely with the already modified/upgraded 802 console, this will present considerable time savings to the bridge commissioning programme.

### **Wheelhouse Windows**

Completion of the window installation has taken longer than planned, however this is not seen as leading in the current programme of works. The decision to reduce the dimension of the 'T' profile flat bar stiffening around the window openings to accommodate the installation of thermal fire protection insulation has now been agreed with Class. Completion of the outstanding welding of the port side mullions will likely coincide with the window glass removal to allow the ingress of the modified console.

## **Clam Shell Doors**

Installation of the principal components needed to open/close and lock the clam shell doors are now in position, <sup>[Redacted]</sup> installation technicians have attended the vessel over the reporting period to fine tune the maximum opening arc of both doors. The remedial work needed will involve changing the relationship geometry between related hinges, the feedback from the contractor and yard is that this work will be relatively simple to correct. The work needed to install the forward ramp and stowing structure and cleats has still to be started.

## **LNG Bunker Tank Valve Attachments**

The LNG Bunker tank passivation has been ensured by a 1 bar dry nitrogen charge since the tanks installation during hull fabrication. This charge has now been vented to allow a number of planned safety valve modification to be undertaken, the work to vent the tank was started at the end of week 13.

## **801 Bridge External walkways**

Work has started to install the external bridge walkway platforms.

## **801 – [Redacted] - Central Hydraulic System Installation**

Principle work this period continues to focus on the installation of small-bore piping supports in the machinery spaces and main vehicle gun port areas.

## **801 - Port Side Shell Fairing**

Work continues on the port side of the vessel and is now focusing on the funnel/Bow areas, the work has made a significant improvement to the level of original distortion.

## **Ongoing External Structural Works**

### **Panama Eyes**

Outstanding work remain to be completed. Original scheduled completion of this work (801Z05HTWK001) was planned as 29<sup>th</sup> November 2021.

### **Hull Belting**

Outstanding work remain to be completed, planned completion of hot works in zones 1,2 & 3 is respectively 9 December 2021, 30 July 2021 and 16 August 2021. This work should have been a component deliverable of the 7<sup>th</sup> May 2020 milestone claim for structural completion. Work was abandoned in March because of bad weather.

### **External Deck Coating Works**

On-going work stalled because of poor weather - Uncoated structural components remain open to the elements for the second winter season. External hull and superstructure deformation corrective fairing works is ongoing, burn damage to plating is not made good leaving the shell to corrode.

### **Forward And Aft Masts**

Remaining structural and outfitting works are on hold because on continued poor weather conditions.

## **Main and Auxiliary Engine Exhaust Resilient Supports**

Resurvey of the remaining works confirms that the internal volume of the funnel and casing provides insufficient space to allow completion of the outstanding pipe and exhaust installation. Significant changes to the available volume and removal of already installed funnel structure is now planned. OOR's have been logged with the yard since May 2021 concerning the above.

## **Structural Compensation of Pipe Transits**

Work is ongoing to fit compensation pieces in all affected areas. This work's out of sequence impact is hugely damaging to the progress of works set out in the master schedule. The delay impact will significantly impact the earliest date at which testing, and commissioning works can start. This hold point is not factored into the current planning philosophy.

## **Glen Sannox Piping**

### **LNG**

No progress is reported this period as the contractor has left the site until such time as the yard completes the installation of missing structural compensation spigots.

## **Zone 2 Machinery Space Isometric Pipe Installation**

Work continues to install system pipe for the black water and drencher systems above the mezzanine deck and in the accommodation areas. Deck seven crew accommodation is the most advanced, potable water, black water, fire sprinkler and external scuppers are all in progress. Many systems have been the subject of rework as ceiling heights and coordination issues born out of poor design detail have had to be corrected.

## **FMPG Responsible Piping Installation**

Work has started on the proposed modifications to correct the fuel system installation in the main and aux machinery spaces, it is understood the work is scheduled to be completed over a six-week period. Work continues in spaces 0307 (Hydraulic Room) and 1002 (Emergency Diesel Space). Work focusses on fitting missing pipe and pipe supports. Progress is slow in all areas. The fuel oil piping and storage tank installation in the emergency generator space are still not complete.

## **Piping, Cable & Transformer Space - 0303**

This reporting period saw minimal production progress. Final spool parts for some transiting systems can now be placed due to the completion of P&S stabiliser penetrations. Mechanical installation progress is around 85%. The installation has resumed after a delay in obtaining glycol system valves and pipe spools. The standard of installation of the Mapress stainless steel press fitting pipe for the NOVEC system is not in line with the manufactures installation guide. The yard's main issues are late LNG liquid pipe transit installation and a lack of resources to finish this section. This area's completion date was set for August 16, 2021.

## **Forward Machinery Space (0402) – 801**

Work has mainly stopped in this area; access is hampered because of installed scaffolding. Furthermore, we assume that this is driven by late procurement of key components, pipe installation was scheduled to be completed 31st August 2021, hot work was scheduled to be completed 03rd September 2021, HVAC testing is also scheduled to be completed as well of 13th August 2021.



### **Accommodation Outfitting**

Work continues for the installation of external weather tight doors on decks three & seven, many have now been water hose tested.

Deck7 insulation works continue, progress is continually hampered by continual out of sequence and repair works.

### **HVAC Installation - 801**

Work progresses on decks 6 & 7; the standard of installation is remains satisfactory.

### **Cardinal Date Status**

Milestone' Completion of Car Deck Recesses' originally due 9 April 2021 and is now claimed as complete 7 May 2021, is now scheduled to be complete 24 May 2021 under the guidance set out in the re-baselined programme. The balance of work needed to complete the remaining 17 structural recesses remains to be started. The programme slippage currently stands at 188 calendar days. Clearly the baseline expectations underpinning the RBP are unrealistic.

Work to complete the claimed milestone of structural completion claimed 7 May 2021 remains ongoing. Many other areas need to be worked and completed to achieve 'full' Steel/Aluminium Structural Completeness. Examples are, installation of all remaining internal bulkheads, aluminium bulkheads within the accommodation areas, installation of all stairwells, completion of welding of all Panama fairleads, completion of lift shafts, installation of all windows, installation of Forward Mast and the cutting / opening of bow doors and associated major structural works.

Aft Mast: As of week 21, 2021, milestone completion claimed 7 May 2012. However, final acceptance by CMAL inspection was not possible as the build quality of vent pipe supports, and poor standard of internal structure coating was insufficient to satisfy normal industry build standards, or the requirements set out in the contractual specification. Scaffold is now erected in support of further survey, findings by the yard confirm that the original work to complete the installation remains outstanding. Remedial works have not yet started.

Belting: Milestone completion claimed 7 May 2021; As of week 30, 2021, work remains incomplete on the starboard side of the vessel, work has been progressed this period to complete the port aft belting, this is not expected to complete until week 34, 2021. Programme slippage currently stands at 115 calendar days.

## **9.0 Next Stage Payment Due**

n/a

## **10.0 Forthcoming Period Events**

## **11.0 Tests & Trials Due**

A revised programme of works has been issued Monday 8<sup>th</sup> April 2022; the document is now under review.

## **12.0 Risk Register Update – Glen Sannox**

Concerns that the vessel construction design is not frozen at this late stage of the project should be seen as a significant risk to the project, the impact of which is not currently accounted for in either vessel programme or risk register.

The following risk issues remain to be seriously considered in the current register. Monitoring and reporting key production metrics in support of sound project decisions making. The risk impact associated with sustained high levels of rework driven by continued adherence to a policy that does not advocate in-house review of third-party design input. The most pressing risk issue preventing the vessel design being declared frozen is the failure to completely understand the actual remaining works that must be completed in order to deliver each vessel. The stability modifications that are now required to provide additional watertight subdivision around frame 51 in way of the engine control room accesses have been identified very late in the programme despite stability being elevated as a key risk from the project's outset.

## **13.0 Safety & Environmental**

Safety equipment certification required to support the yard emergency response team is now back in force. General safety incidents reporting by the yard are considered to have a low incident rate.

Print Name: [Jim Anderson]

Signature: [Redacted]

Date: [21 April 2022]