



DEPARTMENT OF THE NAVY  
MILITARY SEALIFT COMMAND  
471 EAST C STREET  
NORFOLK VA 23511-2419

5800  
Ser N00/  
11 Sep 25

FINAL ENDORSEMENT on CAPT (b)(6) ltr 5800 of 20 Nov 24

From: Commander, Military Sealift Command  
To: File

Subj: COMMAND INVESTIGATION INTO THE FACTS AND CIRCUMSTANCES  
SURROUNDING THE GROUNDING OF USNS BIG HORN (T-AO 198) OFF THE  
COAST OF OMAN ON 23 SEPTEMBER

Ref: (a) SMS 7.2-006-ALL Rev. 2.0, Electronic Chart Display and Information Systems, of  
19 Jul 24  
(b) Memo No. 190 to Masters, Chief Engineers, and Shore Staff of 25 Oct 24,  
International Hydrographic Organization's Mariner's Guide to the Accuracy of Depth  
Information in Electronic Navigational Charts

Encl: (1) Declaration of (b)(6) Military Sealift Command Force Navigator, of 12 Feb  
25

1. I thoroughly reviewed the subject investigation and its endorsement. Except as modified  
below, I approve the findings of fact, opinions, and recommendations as previously endorsed.

2. Findings of Fact

a. Finding of Fact 231 is added: "USNS BIG HORN was operating with two different  
Electronic Chart Display and Information System (ECDIS) Electronic Navigational Chart (ENC)  
databases – Admiralty Vector Chart Service (AVCS) and National Geospatial-Intelligence  
Agency (NGA) World Cover. See enclosure (1)."

b. Finding of Fact 232 is added: "There was a lack of clarity among the ship's crew  
regarding which database was in use. 2/O (b)(6) believed AVCS was in use, while Captain  
(b)(6) believed it was NGA World Cover. See enclosure (1)."

c. Finding of Fact 233 is added: "2/O (b)(6) was unaware that both databases were  
loaded into the ECDIS and did not properly update the ENCs. See enclosure (1)."

d. Finding of Fact 234 is added: "NGA ENC had not been updated since 7 May 24. See  
enclosure (1)."

e. Finding of Fact 235 is added: "AVCS ENC was updated on 30 Aug 24. See  
enclosure (1)."

Subj: COMMAND INVESTIGATION INTO THE FACTS AND CIRCUMSTANCES SURROUNDING THE GROUNDING OF USNS BIG HORN (T-AO 198) OFF THE COAST OF OMAN ON 23 SEPTEMBER

f. Finding of Fact 236 is added: “Differences were observed between the AVCS ENC and NGA ENC for Oman. The NGA ENC did not display the safety contour or the shoal area as clearly as the AVCS ENC. The ECDIS switched between the AVCS ENC and NGA ENC based upon the nearest complication scale as the operator changed the range (i.e., zooming-in and zooming-out). See enclosure (1).”

g. Finding of Fact 237 is added: “To date, costs associated with the grounding of the USNS BIG HORN include the following: approximately \$7,500,000 in towing costs; approximately \$8,600,000 in pier, generator, pump, and oily waste offload services in Oman; approximately \$1,900,000 in costs associated with offloading cargo fuel and approximately \$2,400,000 in CONUS lay berth costs.”

### 3. Opinions

a. Opinion 4 is modified to read: “The failure by the Master and bridge team to recognize the dangers of the Duqm A route may have been complicated by the presence and use of the different ECDIS databases, and lack of awareness that confusion would likely result unless special effort were made to reconcile any discrepancies. [FF 231, 232, 233]”

b. Opinion 20 is modified to read: “Navigation warnings on ECDIS 4 and 5 were set to silent mode, in violation of reference (1), section 3.7, which requires that the ECDIS be in voyage monitoring mode while on voyage. Although in SILENT MODE visual alarm can be displayed, the audible alarm is silenced thus reducing the warning and situational awareness to the ship crew of any potential dangers. [FF 83, 137, 139, 140-142, 162, 163, 169-183]”

### 4. Recommendations

a. Recommendation 1 is modified to read: “MSC Staff will review this investigation, including all enclosures and endorsements, to determine appropriate administrative and/or disciplinary action.”

b. Recommendations 2 through 4 are disapproved as they are subsumed by recommendation 1.

c. Recommendation 5 is modified to read: “Revise SMS 7.2-005-AO187 to direct the Master to consider various environmental factors, sea state, squat, and tides. Add to SMS 7.2-005-AO187, The Master shall take into consideration the effects of recent or potential weather on the rout, such as wind, reduced visibility, swells, and unusual tides and currents,’ which is included in SMS 7.2-005-ALL.”

d. Recommendation 9 is modified to read: “MSCCENT issue guidance requiring all MSC ships to use the deep-water route when entering and departing Duqm and all Area Commands should review port entries and provide guidance to Masters to use deep water routes.”

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SURROUNDING THE GROUNDING OF USNS BIG HORN (T-AO 198) OFF THE  
COAST OF OMAN ON 23 SEPTEMBER

e. Recommendation 10 is modified to read: "MSCCENT will issue guidance requiring all MSC ships to obey the 10kt speed restriction for humpback whale protection in vicinity of Duqm per enclosure 28 and all Area Commands should review and reinforce speed restrictions for humpback whale areas."

f. Recommendation 12 is modified to read: "Revise SMS 7.2-007-ALL, General Navigation and Navigation Safety, and SMS 7.3-001-ALL, Master's Standing Orders, to include the following note: 'Upon assuming the watch, ensure audible alarms are appropriately set to provide the bridge team with audible warning of imminent danger, in accordance with paragraphs 3.7.1 and 3.7.3 of SMS 7.2-006-ALL, Electronic Chart Display and Information Systems.'"

g. Recommendation 13 is modified to read: "MSC staff review BRM scheduling policy to add flexibility for even an abbreviated BRM led by the Master, when there is significant turnover of bridge team watch standers".

h. Recommendation 14 is added to read: Area Command Staffs institutionalize Operational Risk Management when scheduling underway replenishment events with a focus on following or preceding evolutions for which the ship is scheduled and Standards of Training Certification and Watchkeeping (STCW) requirements.

5. The following corrective actions are complete: None

6. Assigned corrective actions to be completed:

a. Recommendation 1 is assigned to TFM for further review and determination of any administrative or disciplinary action deemed appropriate within 90 days of this Final Endorsement.

b. Recommendation 5 is assigned to N7 to begin the SMS revision process within 90 days of this Final Endorsement.

c. Recommendation 6 is assigned to N7 to begin the SMS revision process within 90 days of this Final Endorsement.

d. Recommendation 7 is assigned to N04A for completion within 90 days of this Final Endorsement.

e. Recommendation 8 is assigned to N04A for completion within 90 days of this Final Endorsement.

f. Recommendations 9, 10, and 11 are assigned to MSCCENT for completion within 90 days of this Final Endorsement.

g. Recommendation 12 is assigned to N04A for completion within 90 days of this Final

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Endorsement.

h. Recommendation 13 is assigned to TFM for completion within 90 days of this Final Endorsement.

i. Recommendation 14 is assigned to the MSC Area Commanders for review and appropriate action within 90 days of this Final Endorsement.

7. N9 is tracking the accomplishment of all corrective actions assigned to ensure completion within 90 days. The assigned action codes shall report status every 30 days to N9 until completed.

8. This investigation is final.

(b)(6)

P. E. SOBECK

Copy to:

DSM

DMO

TFM

PM1

N00L

MSCCENT

MSCLANT

N09FS

N7

N12

Port Captains

N04A

I, (b)(6), do hereby state and declare:

1. I am the Force Navigator at Military Sealift Command (MSC).
2. Following the grounding of the USNS BIG HORN (T-AO 198) on or about 23 September 2024 off the Coast of Oman, I reviewed the Electronic Chart Display and Information System (ECDIS) data associated with the voyage and grounding.
3. At the time of the grounding, USNS BIG HORN was operating with two different Electronic Chart Display and Information System (ECDIS) Electronic Navigation Charts (ENC) databases – Admiralty Vector Chart Service (AVCS) and National Geospatial-Intelligence Agency (NGA) WorldCover.
4. There was a lack of clarity among the ship's crew regarding which database was in use. 2/O (b)(6) believed AVCS was in use, while Captain (b)(6) believed it was NGA WorldCover.
5. 2/O (b)(6) was unaware that both databases were loaded into the ECDIS and did not properly update the ENCs.
6. NGA ENC had not been updated since 7 May 24.
7. AVCS ENC was updated on 30 Aug 24.
8. Differences were observed between the AVCS ENC and NGA ENC for Oman. The NGA ENC did not display the safety contour or the shoal area as clearly as the AVCS ENC. The ECDIS switched between the AVCS ENC and NGA ENC based upon the nearest complication scale as the operator changed the range (i.e., zooming-in and zooming-out).
9. I have raised the discrepancy issue with NGA, and they are in the process of conducting an internal review.

I declare under penalty of perjury that I have read the foregoing statement and that the information contained therein is true and correct to the best of my knowledge and belief.

Executed on this 12 day of February, 2025.

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(b)(6)

Force Navigator  
Military Sealift Command



DEPARTMENT OF THE NAVY  
MILITARY SEALIFT COMMAND CENTRAL  
PSC 851 BOX 509  
FPO AE 09834-2800

5800  
Ser N00/231  
21 Nov 24

FIRST ENDORSEMENT ON (b)(6) ltr 5800 of 14 Nov 24

From: Commander, Military Sealift Command Central  
To: Commander, Military Sealift Command

Subj: COMMAND INVESTIGATION INTO THE FACTS AND CIRCUMSTANCES  
SURROUNDING THE GROUNDING OF USNS BIG HORN (T-AO 198)  
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1. Per reference (a), I concur with the findings, opinions and recommendations of the Investigating Officer with the following additions.

a. Findings of Fact:

(1) Add FF 228. In addition to music playing on the starboard bridge wing per FF 76, music was heard playing on the bridge while transiting at high speed in restricted waters. Music can be heard up to the moment of the grounding. (Encl 43)

(2) Add FF 229. The VDR microphone recorded significant unnecessary conversation by watch standers within the pilothouse that was unrelated to the navigation or operation of the ship. (Encl 43)

(3) Add FF 230. Although the Navigational Brief Checklist has information entered in the 45 checklist line items, none of the items are formally checked off to indicate the item was completed as required and/or discussed during the Navigation Brief. (Encl 15)

b. Opinions:

(1) Add Opinion 19. The bridge team rushed through steering checks as the ship was heading into restricted waters. The apparent motive behind this unreasonable sense of time urgency was to make their scheduled 1500L pilot pick up time. There was no sound reason for the ship to rush through or deviate from standard entering port processes and requirements. [FF 93, 145-149]

(2) Add Opinion 20. Navigation warnings on ECDIS 4 and 5 were set to silent mode. Although visual alarm queues were activated, an opportunity for audible warnings that the ship was standing into danger was lost. [FF 83, 137, 139, 140-142, 162, 163, 169-183]

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c. Recommendations:

(1) Add Recommendation 12. Recommend MSC review the policy for audible ECDIS alarm settings to ensure critical audible alarms are appropriately set to provide the bridge team audible warnings of imminent danger.

(2) Add Recommendation 13. Per FF 10, only 3/O (b)(6) completed Big Horn's latest Bridge Resource Management (BRM) training on 31 March 24. Recommend MSC review the BRM scheduling policy to add flexibility for even an abbreviated BRM, run by the ship's Master, when there is significant turnover of bridge team watch standers.

2. Captain (b)(6) turned over command of USNS Big Horn to Captain (b)(6) on 9 October 2024 as part of MSC's normal master rotation schedule.

3. Investigating Officer recommendations for MSCCENT action. Per recommendation 9, MSCCENT has directed that all MSC ships are required to use the deep water route when entering or departing the Port of Duqm. Recommendations 10 and 11 are acknowledged and are expected to be completed within 15 days of the date of this endorsement.

(b)(6)

Copy to:  
NAVCENT

5800  
20 Nov 24

From: (b)(6), USN, Investigating Officer  
To: Commander, Military Sealift Command, Central

Subj: COMMAND INVESTIGATION REPORT INTO THE GROUNDING OF USNS BIG HORN (T-AO 198) ON OR ABOUT 23 SEPTEMBER 2024 OFF THE COAST OF OMAN

Ref: (a) Manual of the Judge Advocate General  
(b) COMSCINST 3121.9C Military Sealift Command (MSC) Standard Operating Manual (SOM)  
(c) Russell Sydnor Crenshaw, *Naval Shiphandling* (Annapolis, MD: Naval Institute Press, 1976)  
(d) ISM Safety Management System (T-AO 187)  
(e) NGA Nautical Chart 62024, Duqm Coastal  
(f) NGA Nautical Chart 62330, Duqm Coastal  
(g) NGA Nautical Chart 62333, Duqm Approach  
(h) NGA Nautical Chart 62334, Duqm Harbor  
(i) NAVSEA Drawing 801-7080546, T-AO 187 Class Structure  
(j) CNSPINST 3530.4G, Navigation Department Organization and Regulations Manual (NAVDORM)  
(k) USCG Navigation Rules and Regulations Handbook (COLREGS)

Encl: (1) COMSCCENT ltr of 29 September 2024 – Appointing Letter and Extension  
(2) Summary and Acknowledgement, Master (b)(6), Voluntary Interview of 6 Oct 24  
(3) Summary and Acknowledgement, Chief Mate (b)(6), Voluntary Interview of 4 Oct 24  
(4) Summary and Acknowledgement, Navigator (b)(6), Voluntary Interview of 4 Oct 24  
(5) Summary and Acknowledgement, 3/O (b)(6), Voluntary Interview of 4 Oct 24  
(6) Summary 3/O (b)(6), Voluntary Interview of 17 Oct 24  
(7) Summary and Acknowledgement, Ops Chief (b)(6), Voluntary Interview of 5 Oct 24  
(8) Summary and Acknowledgement, Chief Cargo Mate (b)(6), Voluntary Interview of 5 Oct 24  
(9) Summary and Acknowledgement, A/B (b)(6), Voluntary Interview of 4 Oct 24  
(10) Summary and Acknowledgement, A/B (b)(6), Voluntary Interview of 17 Oct 24  
(11) Summary and Acknowledgement, O/S (b)(6), Voluntary Interview of 4 Oct 24  
(12) Summary and Acknowledgement, Chief Engineer (b)(6), Voluntary Interview of 6 Oct 24  
(13) Summary and Acknowledgement, 1 A/E (b)(6), Voluntary Interview of 6 Oct 24  
(14) Email from MSC HQ Navigation Policy and Certification  
(15) Navigation Brief and Checklist 7.2-003-01, dtd 22 Sep 24  
(16) Arrival Checklist 7.2-01-AO187/205 to Duqm dtd 23 Sep 24  
(17) Arrival Checklist 7.2-01-AO187/205 to Duqm dtd 24 Sep 24  
(18) Grounding Checklist 8.7-001-01-All, dtd 23 Sep 24  
(19) BGN Operational Schedule 9-23 Sep (UNCLASS)  
(20) BGN Deck Log dtd 22-24 Sep 24  
(21) BGN Engineering Log dtd 22-24 Sep

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- (22) BGN Position Log dtd 23-24 Sep 24
- (23) USCG 2692 dtd 24 Sep 24 and Medical Testing
- (24) BGN Trim and Stability Summary Pre-Arrival Duqm dtd 23 Sep 24
- (25) BGN Ready for Tasking Report dtd 30 Apr 24 and Attendance
- (26) BGN LOGREQ Change 2 for Duqm Arrival dtd 22 Sep 24
- (27) Pub 172, Sailing Directions excerpt for Duqm, Oman
- (28) Port of Duqm Humpback Whale Advisory Notice
- (29) ECDIS Familiarization Checklist, Master (b)(6) dtd 4 Oct 23
- (30) ECDIS Familiarization Checklist, Chief Mate (b)(6) dtd 15 Sep 24
- (31) ECDIS Familiarization Checklist, Navigator (b)(6) dtd 31 Aug 24
- (32) ECDIS Familiarization Checklist, 3/O (b)(6) dtd 15 Sep 24
- (33) Training Competency Captain (b)(6)
- (34) Training Competency 2/O (b)(6)
- (35) Training Competency 3/O (b)(6)
- (36) Training Competency 3/O (b)(6)
- (37) BGN OPREP-3 Initial, DTG 231725ZSEP24, CONFIDENTIAL [Held at MSCCENT]
- (38) BGN OPREP-3 Update, DTG 101220ZOCT24, CONFIDENTIAL [Held at MSCCENT]
- (39) Fleet Weather Center San Diego METOC Data Capture 23SEP24, dtd 02Oct24
- (40) CTF 56 Dive Report and Photos of Damage dtd 27 Sep 24
- (41) Timeline Established from Voyage Data Recorder dtd 31 Oct 24
- (42) ECDIS/Data Screen Captures from Voyage Data Recorder dtd 31 Oct 24
- (43) Voyage Data Recorder DVD
- (44) MSC BGN Paperless NAV Certification dtd 17 Feb 21
- (45) NAVSEA BIG HORN Patching Plan dtd 21 Oct 24
- (46) NAVSEA Grouting Plan dtd 29 Oct 24
- (47) CTG 56.1 UUV Survey of Grounding Site dtd 30 Oct 24
- (48) MSC SMS Procedure 7.2-005-AO187 Under Keel Clearance
- (49) Squat Data and Calculations MSC Lead Naval Architect dtd 31 Oct 24
- (50) Navigational Brief Checklist, 7.2-003-01 Revision 1.0, of 18 Apr 24

### Preliminary Statement

1. Overview. This memorandum documents findings, opinions and recommendations of the Command Investigation (CI) team that inquired into the grounding of USNS BIG HORN (BGN) (T-AO 198) on 23 September 24 while underway off the coast of Oman, near the Port of Duqm, in the Northern Arabian Sea. The investigation was convened per enclosure (1) and conducted according to reference (a). Captain (b)(6) (b)(6) USMM, assisted in this investigation as part of the investigation team. Captain (b)(6) has served with Military Sealift Command for 35 years and began sailing as Master in 2005 (b)(6) has commanded eight MSC ships. Military Sealift Command Central (MSCCENT) Area Counsel, (b)(6), served as legal advisor per enclosure (1). The investigation team traveled to Duqm, Oman to conduct witness interviews and collect documentation and evidence onboard USNS Big Horn, 3-7 October 2024.

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2. Personnel Interviewed. The following personnel were interviewed for this investigation, and their statements are summarized in enclosures (2) through (13). All persons interviewed were provided an opportunity to review, comment on, and concur with final summaries included as enclosures. All interviews were conducted onboard USNS Big Horn except for interviews with 3/O (b)(6) and A/B (b)(6). Interviews for those two individuals were conducted via phone as they had detached from the ship prior to the CI team's arrival. 3/O (b)(6) did not respond to multiple requests to review and concur with (b)(6) interview summary (Encl 6). It is an accurate summary of the information (b)(6) provided during (b)(6) 7 Oct 24 phone interview.

- a. (b)(6), Master
- b. (b)(6), Chief Mate
- c. (b)(6), 2/O and Navigator
- d. (b)(6), 3/O
- e. (b)(6), 3/O
- f. (b)(6), Operations Chief
- g. (b)(6), Chief Cargo Mate
- h. (b)(6), A/B
- i. (b)(6), A/B
- j. (b)(6), O/S
- k. (b)(6), Chief Engineer
- l. (b)(6), 1 A/E

3. Evidence Collected. Documentary evidence for this investigation includes: data recording (ARPA, ECDIS, and voice) from the ship's Voyage Data Recorder (VDR). Screen captures from the VDR are included within this report and additional captures can be found in Encl 42. CTF 56 underwater photos of the hull, rudder, and propeller (samples are included in Encl 40). CTF 56.1 conducted a remotely operated vehicle dive on the grounding site. Results of that dive are provided in Encl 47. All times listed in this report are local and indicated by an "L" in the time.

### Executive Summary

a. USNS BIG HORN (BGN) was operating in the Northern Arabian Sea on 23SEP24, conducting underway replenishment-at-sea (RAS) with ships from the ABRAHAM LINCOLN (ABE) Carrier Strike Group (CSG). As BGN was conducting the final RAS event for the day with USS OKANE (OKN), at approximately 1230, BGN Captain and Navigator discussed the navigation track they would use to transit to the Port of Duqm pilot pick up point for their scheduled port visit. The pre-arranged time to meet the pilot at the pick-up point was 1500L. Two tracks were considered: Duqm A and Duqm B. Duqm A, referred to as the "shoot the gap" track, transited through the San Carlos Banks area and was the shorter distance of the two to the pilot pick up point. Duqm B was the "deep water" route which was to the north and approximately 5 to 6 miles longer to the pilot pick up point than Duqm A. The Captain decided to use Duqm A.

b. BGN completed the RAS with OKN approximately one hour later. Their location at the conclusion of the RAS was further away from the pilot pick-up point than originally planned, and the track to the pilot pick up point was adjusted to reflect the ship's current position. While transiting to the pilot pick up point using the Duqm A track, BGN ran aground.

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c. The navigation track chosen, Duqm A, went through a gap between two charted areas of shoal water. This area, known as the San Carlos Banks, is contained inside a charted 20m depth safety contour with only three depth soundings inside the entirety of the contour – 11m, 12.1m, and 18.9m – all soundings less than 19m, which nautical charts recommend deep draft ships avoid due to chart inaccuracy and uncertainty in depth surveys. The ship's calculated deepest draft was 9.93m, before squat was factored. The Captain chose the Duqm A track despite it lacking depth soundings along the track, clear chart warnings (both ECDIS and paper charts), and local sailing directions which recommended using the deep water route. Attention to detail and consideration of the risks should have negated Duqm A as an option. Instead, this track was selected, and the ship transited through San Carlos Banks, at 17 to 18kts, squatting heavily, which resulted in the ship impacting the sea floor.

d. The grounding caused substantial damage to the hull, internal support structures, port propeller and port rudder. Exhaustive damage control efforts were conducted by the ship's crew enabling BGN to anchor overnight and receive a tow into Duqm the next day.

e. The grounding was preventable. This grounding was caused by poor adherence to MSC standards, poor seamanship, poor risk calculation, a lack of formality, no attention to detail, and lack of forceful backup from watchstanders.

### **Findings of Fact**

1. Captain (b)(6) has been the resident Master on BGN since June 2022 (b)(6) has served as a Master on multiple Combat Logistics Force (CLF) platforms in MSC since 2017 and has been with MSC for 17 years. [Encl 2, 33]
2. Captain (b)(6) completed ECDIS familiarization on 04OCT23. [Encl 29]
3. BGN assigned Chief Mate is (b)(6). (b)(6) reported to BGN on 13SEP24, onboard 10 days prior to grounding (b)(6) has sailed with MSC for 11 years and has been a Chief Mate for four (b)(6) last served as Chief Mate on USNS PECOS. [Encl 3]
4. BGN Chief Mate (b)(6) completed ECDIS familiarization on 15SEP24. [Encl 30]
5. BGN 2/O and Navigator is (b)(6) reported to BGN on 31AUG24, onboard three weeks prior to grounding (b)(6) has sailed with MSC for 14 months, starting on USNS YUKON as 3/O. BGN is (b)(6) first assignment as Navigator. [Encl 4, 34]
6. 2/O (b)(6) completed (b)(6) ECDIS familiarization the day (b)(6) reported onboard, 31AUG24. [Encl 31]
7. 3/O (b)(6) had served onboard BGN for approximately 4 months at the time of the grounding, having previously served on USNS MERCY as 3/O. On 23SEP24 (b)(6) stood the 0800-1200 Mate on Watch. [Encl 5, 35]

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8. 3/O (b)(6) had served on BGN for approximately 6 months as 3/O at the time of the grounding. BGN was (b)(6) second ship, having previously served on USNS ARCTIC for approximately two months. On 23SEP24 (b)(6) took the 1200-1600 Mate on Watch (b)(6) was on watch when the grounding occurred. [Encl 6, 36]
9. BGN achieved ready for tasking (RFT) certification on 20APR24. [Encl 25]
10. BGN completed Bridge Resource Management (BRM) on 31MAR24. Of the Master, Chief Mate, Navigator, and 3/O watchstanders onboard during the grounding, only 3/O (b)(6) attended this BRM. [Encl 25]
11. BGN's last navigation assessment and check ride was completed 23SEP23. None of the deck officers on BGN at the time of the grounding attended that assessment. [Encl 25]
12. BGN was certified to use electronic navigation as primary plot on 17FEB21. [Encl 44]
13. ECDIS familiarization includes job sheet line items to complete the following:
  - a. 2.7: Determine the methods for scrolling and zooming charts, including determining current scale and displayed charts and setting the display to a particular scale.
  - b. 2.11: Determine how to select the safety contour and safety depth.
  - c. 2.13: Determine how to select deep and shallow area display options.
  - d. 2.15: Establish how alarms and other alerts are given by ECDIS and understand the procedure needed to acknowledge them.
  - e. 4.2: Determine how to select information about an object (pick report).
  - f. 4.10: Establish the facilities provided for the measurement of range and bearing (e.g. EBLs and VRMs) and determine their use.
  - g. 5.10: Determine how to use facilities for checking planned route.[Ref d, Checklist 7.2-005-01-ALL]
14. The Captain's and Navigator's ECDIS check sheets have each of the above lines initialed "yes." [Encl 29, 31]
15. BGN was ordered from its operating location in SEVENTH Fleet to the FIFTH Fleet Area of Responsibility (AOR) to fill a void in CLF coverage for the AOR. When ordered to C5F, BGN was originally scheduled to be in theater for approximately 30 days. [Encl 2].
16. BGN arrived in C5F on 17JUN24 and the crew experienced a high operational tempo, supporting two CSGs and completing on average 2-3 RAS events per day, often racing back to port to load fuel and cargo, and then racing back to meet RAS commitments. [Encl 2, 3, 4, 7, 8, 12]
17. On 23SEP24, BGN was underway in the Northern Arabian Sea, having departed the Port of Fujairah, United Arab Emirates on 15SEP24. [Encl 2, 3, 15]

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18. BGN was manned for three replenishment stations but does not have a certified flight deck due to lack of aviation firefighting school graduates. [Encl 2, 3]
19. BGN completed a Replenishment-At-Sea (RAS) with HMS LANCASTER (LANC) on 21SEP24. [Encl 15, 20]
20. The original schedule for 22SEP24 included a full ABE CSG RAS (ABE, STOCKDALE (STK), SPRUANCE (SPR), and OKN). [Encl 2, 3, 4, 5, 6, 19]
21. The schedule was modified by ABE CSG to split RAS events across two days. BGN conducted RAS with SPR and STK on 22SEP24 from approximately 0700-1155L. [Encl 2, 3, 4, 7, 15, 20]
22. The change in schedule pushed the RAS with ABE and OKN to 23SEP24. [Encl 2, 3, 4, 5, 6, 19]
23. BGN conducted RAS with ABE on the morning of 23SEP24 from approximately 0700-1045L. This was a three station RAS, with stations 2/4/6 in use. [Encl 2, 3, 4, 7, 8, 15, 20]
24. BGN was originally scheduled to arrive at pilot pick up point for Duqm for a 5-day maintenance and repair availability at 0700L, 23SEP24. This arrival time was revised to 1500L due to the RAS schedule change. [Encl 2, 3, 4, 5, 6, 19, 26]
25. Because BGN is limited to three stations due to manning, the RAS with OKN, also scheduled for 23SEP24, had be conducted as a subsequent event vice a two-ship simultaneous RAS with ABE, pushing final RAS completion to later in the day. [Encl 2, 3, 4, 7, 8, 15, 20]
26. After completing RAS with ABE earlier in the morning, BGN conducted RAS with OKN on 23 Sep 24 from approximately 1130-1330L. [Encl 2, 3, 4, 15, 20, 43]
27. BGN conducted a Navigation (NAV) Brief for entering Duqm in the pilothouse on 22SEP24 at 1600. Master, Chief Mate, Chief Engineer, Navigator, 3/O (b)(6) 3/O (b)(6) Cargo Mate, and Ops Chief were in attendance as required by the Safety Management System (SMS) checklist and signed muster sheet. [Ref d, Encl 2, 3, 4, 5, 6, 15]
28. The NAV brief utilized MSC SMS navigational brief checklist, 7.2-003-01 (Rev 0.7, 24NOV20), which is not the most recent version, for entering the Port of Duqm. [Encl 15]
29. The current version of the NAV brief checklist, Rev 1.0, is dated 18APR24. [Ref d, Encl 50]
30. The difference between Rev 0.7 and Rev 1.0 is line 6, squat. The line was changed from simply stating "Squat" to "Note: Obtain Squat value from CargoMax. When entering values for channel width, depth, and ship's speed, use most conservative estimates obtained from ship's projected trackline." [Ref d, Encl 15, 50]

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31. The Navigator did, however, use the most recent version of the squat table with input from CargoMax. [Encl 15]
32. The Navigation brief utilized MSC SMS port arrival checklist 7.2-01-AO187/205, which was updated for entering the Port of Duqm. This is the current version. [Ref d, Encl 16]
33. The Navigation brief makes note of possible humpback whales in the vicinity of (IVO) the Duqm entrance, and advised watches to keep a lookout. It does not mention a speed limitation. [Encl 15]
34. The Port of Duqm has established a “whale management zone” which limits speed to 10kts. The zone extends out to 30nm from shore, and included the area within which BGN was operating when the grounding occurred. Pub 172 Sailing Directions does not mention the speed limitation. [Encl 27, 28]
35. No person interviewed was familiar with this notice and speed restriction. [Encl 2, 3, 4, 5, 6, 7, 28]
36. Pub 172 Sailing Directions, listed in NAV brief as a reference reviewed, states, “Vessels bound to or from Duqm shall use the recommended deep water route.” [Encl 27]
37. The NAV brief makes reference to the “deep water route” in line 27 of the checklist, but does not state requirement to use it. [Encl 15]
38. No attendee at NAV brief recalled mandatory use of the deep water route being discussed. [Encl 2, 3, 4, 5, 6, 7]
39. Several attendees recall the deep water route discussed in terms of currents IVO the breakwater and channel entrance. [Encl 2, 4, 5, 6, 15]
40. The Navigator stated (b) (6) reviewed Pub 172, Sailing Directions, and was aware the publication states mandatory use of the deep water route. [Encl 4, 41, 43]
41. The Captain did not review Pub 172, Sailing Directions. The Captain stated that per the SMS, the Navigator is delegated and responsible for reading/reviewing the Sailing Directions and is required to raise any concerns noted in the Sailing Directions to the Captain. [Encl 2]
42. A review of all applicable SMS procedures did not reveal this delegation of responsibility. [Ref d]
43. Line 27 of NAV brief checklist highlights shoal area “near the southwesterly portion of the deep water route.” This shoal area is known as the San Carlos Banks. [Ref e, f, g, h, Encl 15, 42, 43, 47, 48, 49, 50]
44. No brief attendee or watchstander could recall knowing the name “San Carlos Banks.” [Encl 2, 3, 4, 5, 6, 7]

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45. San Carlos Banks is clearly identified and labeled on NGA Chart 62024 and 62330, reviewed and updated by the Navigator, and is discussed in Pub 172 Sailing Directions, paragraph 9.36. [Ref e, f, Encl 27]
46. Navigation charts 62330, 62333, and 62334 are cancelled chart publications, used for reference and situational awareness only for the transit from RAS to Port of Duqm. [Ref f, g, h, Encl 2, 4, 5]
47. Navigation chart 62024, an active chart, was also used for reference and situational awareness for the transit from RAS to Port of Duqm. [Ref e, Encl 2, 4, 5]
48. Navigation chart 62024 contains the following “DEPTHS” note for the San Carlos Banks:  
“Many of the areas on this chart have not been systematically surveyed. Depths in these areas are from miscellaneous line of passage soundings of old leadline surveys. Uncharted dangers may exist.” [Ref e]
49. Navigation chart 62024 contains the following “CHART ACCURACY” note:  
“Owing to the age and the quality of the source information, some detail on this chart may not be positioned accurately. Particular caution is advised when navigating in the vicinity of dangers, even when using an electronic positioning system such as GPS.” [Ref e]
50. Navigation chart 62333 contains the following “DEEP DRAFT ROUTE” note:  
“All deep draft vessels, bound for or from port of Duqm, are recommended to use the deep draft route and keep clear of all depth patches less than 19 meters.” [Ref g]
51. Navigation chart 62334, contains the following “RECOMMEND DEEP WATER ROUTE” note:  
“All deep draft vessels, bound for or from port of Duqm, are recommended to use the deep draft route and keep clear of all depth patches less than 19 meters.” [Ref h]
52. Captain stated (b) (6) reviewed the paper chart and courses during discussions with the Navigator. [Encl 2]
53. Captain stated (b) (6) review of the ECDIS/charts did not indicate any warning affecting the navigational tracks selected. [Encl 2]
54. The Navigator stated (b) (6) was aware of these depth and accuracy warnings. [Encl 4]
55. The Captain did not recall the NAV brief going over warnings on charts. [Encl 2]
56. Captain stated (b) (6) has reread the charts since the incident and noted that some chart warnings and survey data were not readily available on the NGA World Cover charts being used at the time. [Encl 2]
57. All charts were corrected through the latest Notice to Mariners (38/24) and ECDIS had the latest update (36/24). [Encl 15]

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58. The NAV brief and entering port checklist for Duqm on 23SEP24 stated BGN draft FWD was 8.23m, MID 9.12m, and AFT 9.93m. [Encl 15, 16]
59. When asked about BGN being trimmed down on the stern 1.7m, the Captain stated it was normal for a T-AO. [Encl 2]
60. The arrival checklist includes a squat table for T-AO 187 class. The table cites source as SMS 7.2-005-AO, referring to SMS procedure 7.2-005-AO187, "Under Keel Clearance (UKC)." [Encl 48]
61. The note attached to the squat table in SMS 7.2-005 states:  
 "Notes: The above values were determined by the Carderock Division using the Ship Wave Analysis (SWAN, Sclavounous, 1994) and Beck, Newman, and Tuck (BNT – 1975) computer programs. None of these values have been verified with shallow water model tests. For sinkage greater than the initial under keel clearance condition the table shows a "G" to indicate a grounding condition. All values shown in the tables are in feet and should be added to the initial static draft to obtain the dynamic draft at the bow, LCB, and stern at the speed condition. Note: When operating in confined waters consider limitations on speed." [Ref d, Encl 48]
62. UKC SMS states acceptable clearance under keel in open water is 2 feet plus tides plus squat. [Encl 48]
63. UKC SMS states acceptable clearance under keel in confined waters (harbors) is 3 feet plus tides plus squat. [Encl 48]
64. Arrival squat table states minimum tide range was 1.5m above minimum. [Encl 16]
65. Ship squat is defined as, "a low-pressure area beneath the keel effectively increases draft, either uniformly (sinkage) or by the bow riding higher than the stern as if trimmed (squat)." Squat can begin to impact a ship when the water depth to draft ratio is less than four to one. (Ref c)
66. The T-AO squat table only goes up to 15ft of under keel clearance at 16kts. Under those conditions, per the UKC SMS procedure table, a T-AO squats: Bow 4.6ft (1.4m), Stern: 1.3 ft (0.4m). [Encl 15, 16, 48]
67. MSC naval architect, (b)(6), provided the following calculations of BGN potential squat using four different methods, using last speed (18kts) and fathometer (fathom) reading of 4.5m prior to grounding. It is critical to note, these calculations are based on a vessel with even trim. BGN was trimmed down on the stern by 1.7m.
- a. Eryuzulu and Hausser Formula: Squat 1.2m
  - b. Barras Formula L: Squat 2.23m
  - c. 2<sup>nd</sup> Emperical Formula, built into CargoMax: Squat 1.47m

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d. Remish: Squat Bow: 2.38m, stern 2.23m  
[Encl 49]

68. Using the average squat of the four calculations, the MSC naval architect calculated the draft (static draft + squat) at the time of grounding to be FWD 10.03m, MID 10.92m, AFT 11.73m. [Encl 49]
69. The 23SEP24 arrival checklist, using UKC SMS squat table, states the required depth, based on draft and squat at 10kts in confined water is 11.05m. [Encl 16]
70. Due to planned RAS events the following day, and an unknown location at the conclusion of those RAS events, no navigation track from RAS to the pilot pick-up point was established at time of NAV brief on 22SEP24. [Encl 2, 3, 4, 15]
71. BGN desired a northerly RAS course (R CORP) with OKN to accommodate their arrival time at the pilot pick up point, Port of Duqm, of 1500. [Encl 2, 3, 4, 5]
72. After discussion between the two ships, BGN and OKN agreed on R CORP of 235T. This course put BGN further away from the deep water channel and entrance to the Port of Duqm, and put the San Carlos Banks between the port entrance and their projected position at the end of the RAS. [Encl 2, 3, 4, 20, 41, 42, 43]
73. BGN is equipped with a Pilothouse Voyage Data Recorder (VDR) that integrates navigation, radar, and audio files for review after an event. For reference and understanding – VDR recording references ECDIS 5 as the unit located in the Pilothouse, against the forward bulkhead, just port of centerline. This is the common unit used by the Captain and Mate on Watch. The VDR recorded ECDIS 5 every 30 seconds on the xx:14 and xx:44 second mark of each minute. [Encl 43]
74. For reference and understanding – VDR recording references ECDIS 4 as the unit located in the Pilothouse, adjacent to the Ship's Control Console (helm) on the starboard side. The VDR recorded ECDIS 4 every 30 seconds on the xx:29 and xx:59 second mark of each minute. [Encl 43]
75. For reference and understanding – the VDR system includes 6 microphones: 1) above ECDIS 5, 2) chart room, 3) starboard side near Captain's chair, 4) above helm, and 5/6) each bridge wing. [Encl 43]
76. While the RAS with OKN was conducted, music can be heard playing throughout the event via the STBD bridge wing VDR microphone. OKN was on BGN STBD side. [Encl 43]
77. On 23 September 2024, the ECDIS shallow contour, defined as the depth a ship could run aground, was set to 9m. [Encl 14, 42]
78. The ECDIS safety depth, defined as the minimum depth required to safely navigate the vessel, was set to 12m. [Encl 14, 42]

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79. The ECDIS safety contour, defined as the line on a chart that indicates the boundary between safe and unsafe water for a vessel, was set to 10m. [Encl 14, 42]
80. The ECDIS deep contour was set to 20m. [Encl 42]
81. The ECDIS draft and maximum draft were both set to 9m. [Encl 42]
82. Restated from FF #57: NAV brief and entering port checklist for Duqm on 23SEP24 stated BGN draft FWD 8.23m, MID 9.12m, and AFT 9.93m. [Encl 15, 16]
83. Both ECDIS 4 and 5 were in “silent mode” and alarms were not audible, but visual alarm queue was present. [Encl 41, 42, 43]

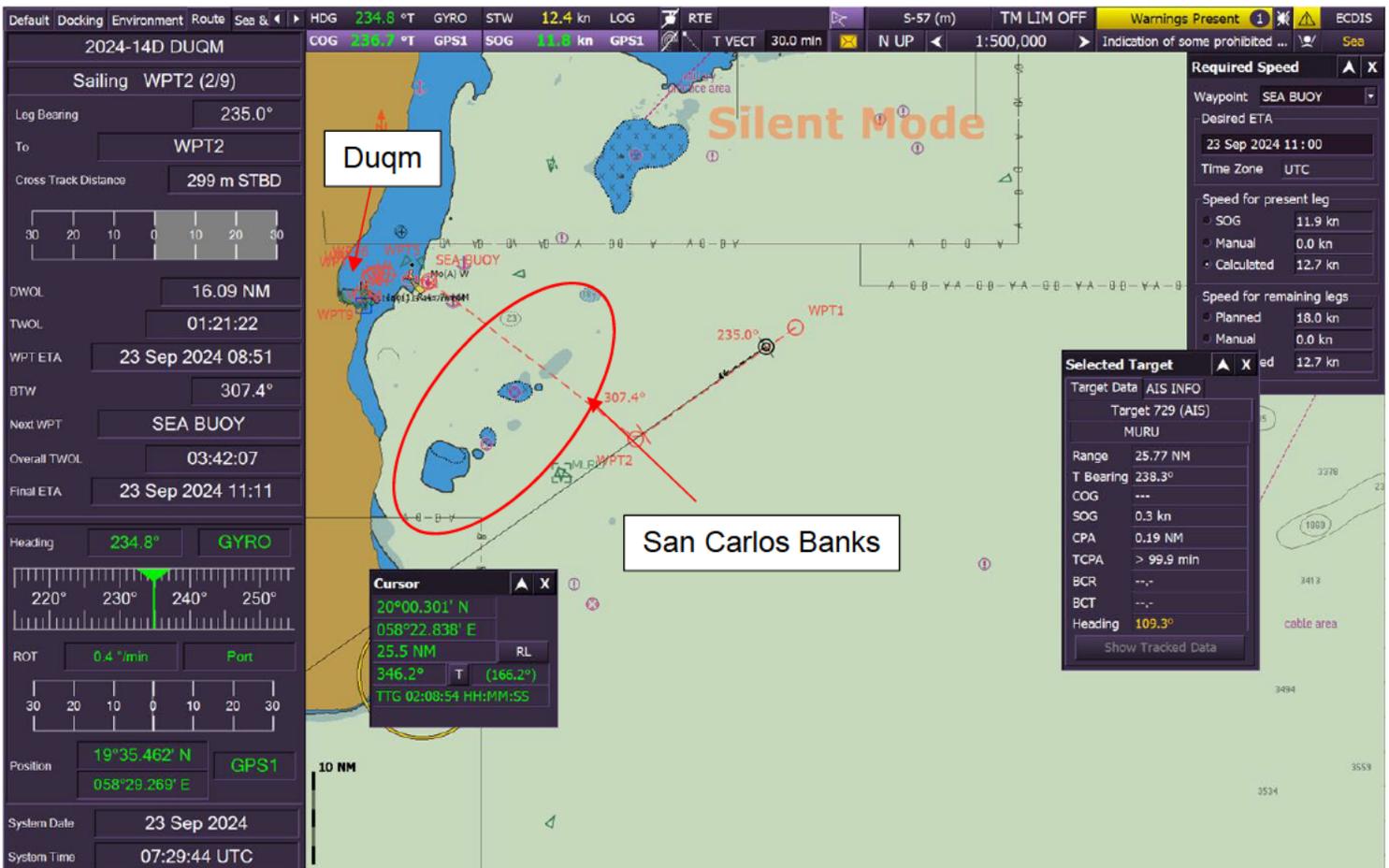


Figure 1 – ECDIS 5 Screen Capture at OKN RAS Start, approx. 11:30L.

84. By 1200L on 23 Sep, the Navigator was working on a navigation track from the predicted end of RAS with OKN position to the Port of Duqm. [Encl 4, 41, 42, 43]

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85. This track required constant adjustments as remaining RAS pumping time was relayed from OKN. [Encl 2, 3, 4, 5, 6, 41, 42, 43]

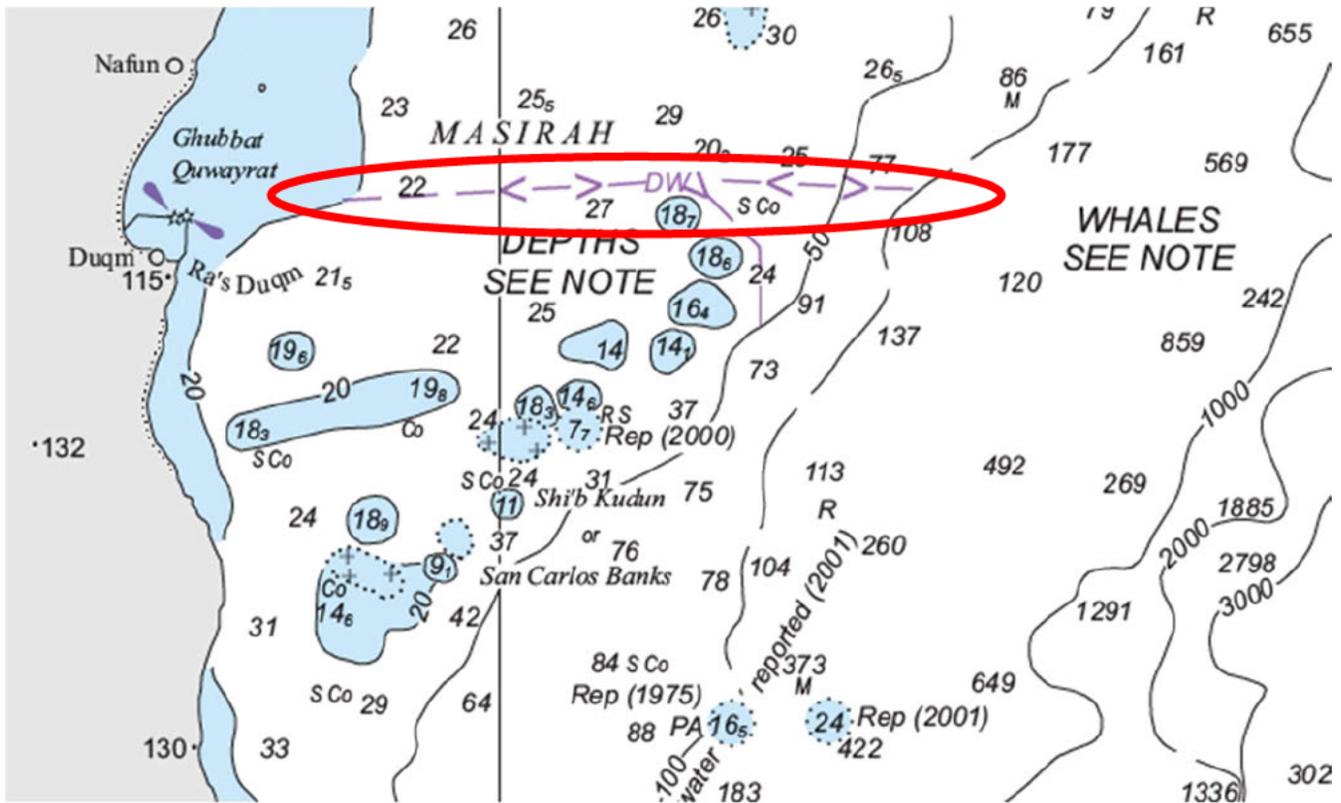


Figure 2 - Screen Capture of NGA Chart 62024 – Note deep water “DW” route in purple

86. At 1203, VDR recorded conversation between Navigator and 3/O (b)(6) regarding navigation track and use of the deep water route.

12:03	Conversation between Nav and 3/O (b)(6)
	Nav: “Double checking my work (b)(6) covering my ass.”
	3/O: “That looks pretty good.”
	Nav: “I don’t trust it, I prefer to take it from over here.”
	3/O: “The deep water route?”
	Nav: “Yeah, and avoid all of this.”
	3/O: “What does it look like on the paper chart?”
	Nav: “Looks like this, just like this.”
	3/O: “What does El Captain say?”
	Nav: “I don’t know. If we finish here [turnpoint on ECDIS 5], maybe just come straight north and do the deep water route.”
	3/O: “It is recommended.”
	Nav: “It is recommended.”
	Nav: “I just don’t want to run aground.”

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	3/O: "Remember low tide is 1.5m above the table."
	Nav: "That's in Duqm, not in the middle of the ocean. You think it can be that close...that we can cut it that close?"
	Nav: "So you think the tide will take effect (unheard)."
	3/O: "Probably not, that's a good point."
	3/O: "It would be safe to just do the deep water route, although, I think that will probably be fine too." [track on ECDIS 5 1200]
	3/O: "What is our deep draft?"
	Unheard further discussion of water depth and draft.
	3/O: "How much extra distance is it?"
12:06	Discussion of measuring distance on ECDIS
12:07	Nav working track to head due north post-RAS and use deep water route to Duqm. [ECDIS 5]
12:08:40	Nav: "I'm just scared of right here...scared of these shallow points. Granted it's more than enough, but it's just...you know what I'm trying to say?"
	Nav: "We can take the safe route, guaranteed, but it will take more time or we can take a shortcut and be a little bit more riskier. Know what I'm trying to say?"
	3/O: "I know exactly what you are trying to say."
	Nav: "What's the risk? Is it really worth it?"
	3/O: "I say ask the Captain and say, this route is about 10 miles shorter, but goes through this, do you feel comfortable?" " (b)(6) probably say yes."
12:10	Navigator saved two potential tracks, labeled Duqm A (shorter route just north of San Carlos Banks) and Duqm B (Deep water route)
12:13	Ukn: "It will be interesting to see what (b)(6) Capt] goes with."
12:14	3/O: "I'll bet all the fishing boats hang out by the reefs."
	3/O: "Realistically, add a meter to that...that's not nothing...you got 18' under the keel and that's if you go over that sounding which we probably wouldn't."
12:15	80min standby RAS w/ OKN (announced over radio)
	3/O: "This changes the entire equation."
	Nav begins to work new route based on estimated position at new end-of-RAS posit.

[Encl 41, 43]

87. At 12:19, Chief Mate takes the comm. [Encl 20, 41, 43]
88. Two track options began to emerge from the 1203 conversation, referred to a "Duqm A" and "Duqm B." Duqm B track left the San Carlos Banks to the west/southwest of BGN and intercepted the deep water route. This was not the track ultimately used. The Navigator refers to this on the VDR recording as (b)(6) route." See Figure 3. [Encl 2, 4, 5, 6, 41, 42, 43]

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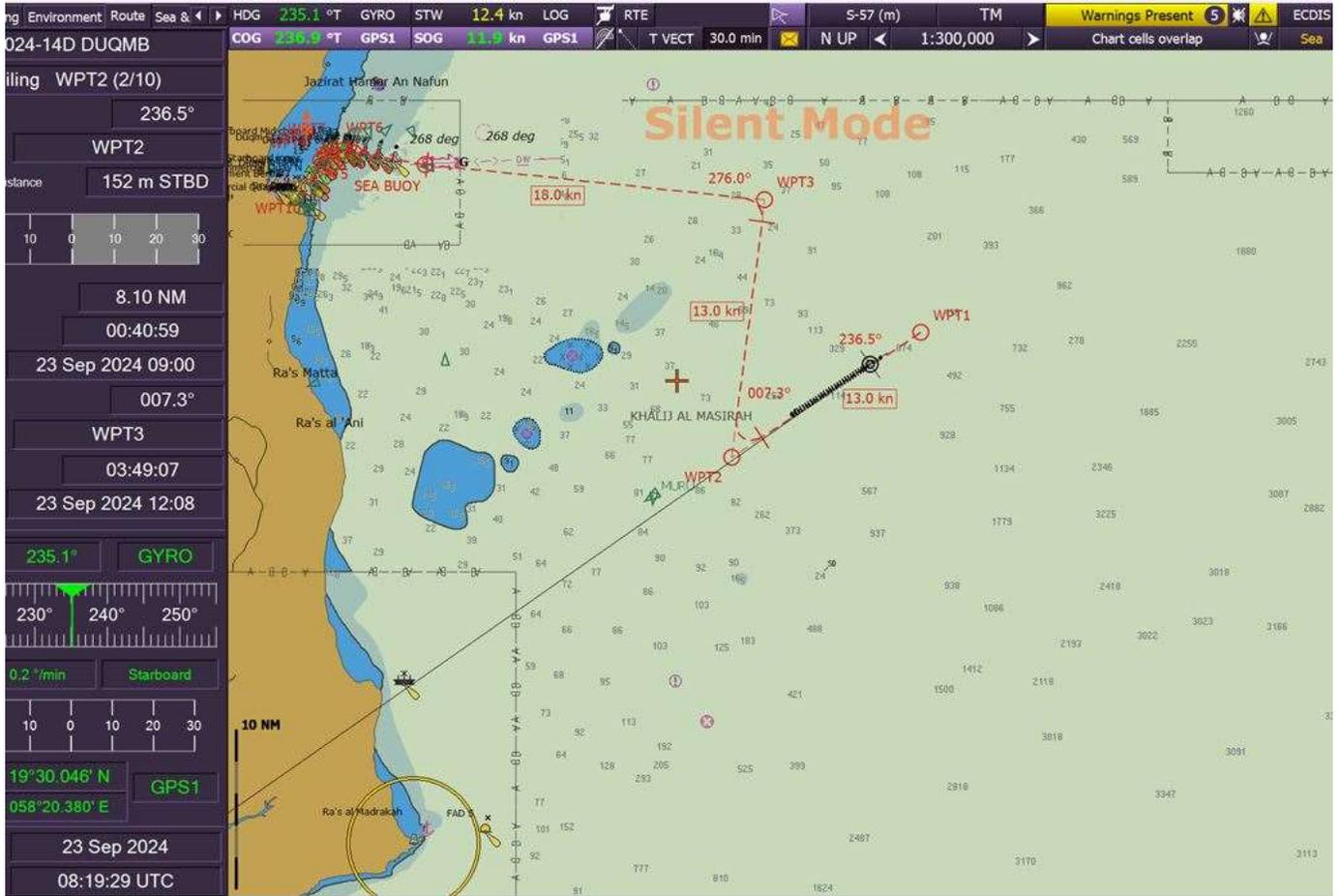


Figure 3 - "Duqm B" Track 1219L

- 89. Duqm A, a more direct route, initially split the difference between two soundings, 14m and 14.5m, inside of a 20m safety contour north of the San Carlos Banks reef. This track was under continuous adjustment as the RAS progressed and continued southwest. See Figure 4.[Encl 2, 4, 5, 6, 41, 42, 43]
- 90. Duqm A, as planned to this point, crossed the 20m contour and split the middle of a 14m and 14.5m charted sounding with a CPA to shoal of approx. 2800yds and CPA to charted 14m sounding of 1800 yds. See Figure 4. [Encl 41, 42, 43]
- 91. This version of Duqm A was not ultimately used. [Ref d, Encl 41, 42, 43]
- 92. The Navigator briefed the Captain at 1226 and proposed the two tracks, Duqm A and B. [Encl 2, 4, 5, 6, 41, 42, 43]

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Figure 4 - "Duqm A" Track, First Iteration, 1230L

93. At 1226:13, the VDR recorded the following conversation between the Captain and Navigator. At this point, the Duqm A track is on the ECDIS display and used as basis for discussion:

12:26:13	Conversation between Captain and Nav
	Nav: "We have a draft of about 10m and I'm wondering which..."
	Captain: "Shoot the gap."
	Nav: "That's what I was going to ask you if you wanted to shoot the gap."
	Capt: "Yep, plenty of space here."
	Nav: "Rgr we'll work it."
	Capt: "Line up the 24s." (Referring to 24m soundings on chart). That's the deepest, safest water."
	Nav: "There is also a different route over here." (referring to "Duqm B, track due north to deep water route)
	Capt: "What is the distance between the two?"
	Nav: "5-6 miles."

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	Capt: "That could be an hour if we were doing 5 kts."
	Nav: "Speed required is not that bad."
	Capt: "Let's try to shoot the gap there."
	Nav: "OK, rgr that sir. I verified on the chart more than enough UKC."
12:27:26	Capt: "Rad."

The 73 second conversation ended at 1227:26. [Encl 2, 4, 41, 43]

94. There is no indication that a paper chart was reviewed by the Captain during this discussion. [Encl 2, 4, 41, 42, 43]
95. MSC SMS 7.2-007 All General Navigation and Navigation Safety states in para 6.2:  
"Restricted waters: Area for navigational reasons, such as the presence of shoals or other dangers, confines the movements of shipping with narrow limits." [Ref d]
96. COMSCINST 3121.9C, states in para 2-2-2.b:  
"Restricted waters are defined as any waters less than the ship's navigation draft/safety depth and any position within two nautical miles (2nm) of these waters." [Ref b]
97. MSC SMS 7.2-003-All, Navigational Brief Checklist, states in para 3.1:  
"A navigation brief must be completed before each arrival, departure, and transit within restricted waters." [Ref d, Encl 15]
98. No navigation brief was conducted prior to transiting through the San Carlos Banks as it was deemed not required by the Captain. [Encl 2]
99. The CPA to shoal water was less than 2,000 yds during the planned transit. [Encl 41, 42, 43]
100. The Captain stated per the SMS, there is no need – or requirement – to conduct an additional NAV brief for regular 'at sea' transit, as course changes and adjustments occur regularly during navigation. [Encl 2]
101. The Captain stated the discussion with the Navigator was intended to determine the safest and most efficient route. [Encl 2]
102. The Captain stated the areas of shallower water were considered, and transit of the vessel was to remain safely away from those areas. [Encl 2]
103. The Captain stated the scale used was the best available on the ECDIS, which did not show any hazards on the selected transit track. [Encl 2]
104. The scale used for review was 1:200,000. [Encl 41, 43]
105. There are 11 scalable chart levels between 1:200,000 and 1:8,000. [Encl 41, 43]

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106. The ECDIS 1:200,000 scale the Captain and Navigator used to discuss the proposed track was too small to show the 20m contour except in the immediate vicinity of the 11m sounding to the south of the track. The complete 20m contour appears at 1:90,000. See Figure 4. [Encl 41, 42, 43]
107. Captain stated the decision to transit via the “Duqm A” route was made after careful consideration of all available information, including ECDIS, safe transit, and the advice of the Navigator. [Encl 2]
108. At no point during the 1226 conversation was a range to shoal or any shallow sounding discussed. No EBL/VRM tools were observed on either ECDIS display. [Encl 2, 4, 41, 42, 43]
109. The Captain stated Duqm A was the shorter of the two tracks. [Encl 2]
110. The Captain stated there were no hazard areas on the selected transit track which would have caused (b)(6) to have any navigational or safety concern (b)(6) stated (b)(6) deemed the track to be safe and appropriate by using all available means at the time. [Encl 2]
111. At no point in the 1226 conversation, or further conversations, was the 11m sounding south of the navigation track discussed or acknowledged. [Encl 41, 43]
112. In the 1226 conversation, the Captain re-directed the Navigator’s planning efforts to what eventually became the revision of Duqm A used. The statement of “Line up the 24s” means to line up the 24m depth soundings south of the charted reef and north of the 11m sounding. [Encl 41, 42, 43]
113. The Navigator stated (b)(6) did not make a track recommendation to the Captain (b)(6) et the Captain decide between Duqm A and Duqm B. [Encl 4, 41, 43]
114. At 1232L OKN relayed a 60-minute standby time for RAS. [Encl 41, 42, 43]
115. At 1233L the Captain took the conn. [Encl 20, 41, 42, 43]
116. Between 1256L and 1308 BGN and OKN conducted a turn while remaining connected for RAS, changing course from 235T to 250T. [Encl 20, 41, 42, 43]
117. At 1300L, Duqm A revision 1 was visible on the ECDIS displays. The heading change is due to the course change, which was in progress at 1300L. See Figure 5. [Encl 41, 42, 43]
118. The planned track crossed the 20m contour and split the middle of a 14m and 14.5m charted sounding with a CPA to shoal of approx. 1800yds, and CPA to charted 14m sounding of 1800 yds. See Figure 5. [Encl 41, 42, 43]
119. The proposed track in ECDIS displayed a measurable CPA to the northern-most section of the San Carlos Banks [darker blue on display – shoal water] of less than 1nm. [Encl 41, 43]

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120. At 1310L, and unknown (b)(6) voice asked, “How are we looking?” and the response from NAV was, “Looking good, but we are going to have to haul ass.” [referring to getting to pilot pick up point at 1500] [Encl 41, 43]

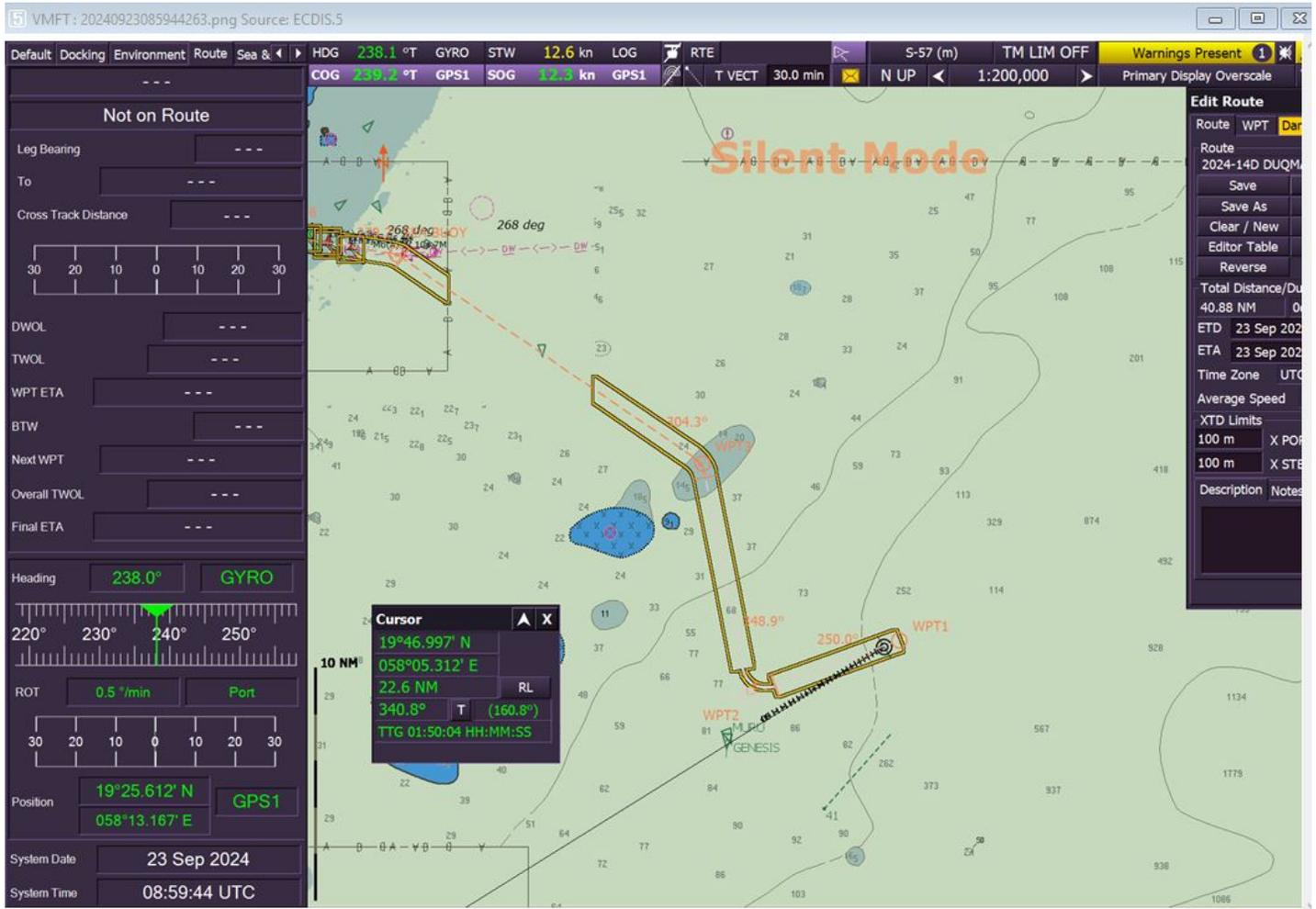


Figure 5 - ECDIS 5 1300L Duqm A Rev 1

121. By 1311L, Duqm A revision 2 was established on ECDIS 5. Planning occurred using 1:150,000 scale where the full 20m contour is not visible. The Captain and Navigator referred to it as the “shoot the gap” track during interviews. The gap referred is between a set of charted shoal water depths to the north and south. Note how the 24m soundings line up per Captain’s direction to the Navigator during their conversation. See Figure 6. [Encl 2, 4, 5, 6, 41, 42, 43]
122. The Navigator stated (b)(6) was aware of the direction in Pub 172, Sailing Directions and recommendations on charts to use the deep water route, but assessed the conditions along Duqm A to meet safety requirements. [Encl 4]

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- 123. The Captain stated (b) (6) perceived the distance between the 11m sounding and shoal that laid to the north was about 5 nm wide and (b) (6) felt comfortable with that route. [Encl 2]
- 124. The measured distance between 11m sounding and shoal, the “gap” the Captain refers to is approx. 2nm. See Figure 6. [Encl 42]

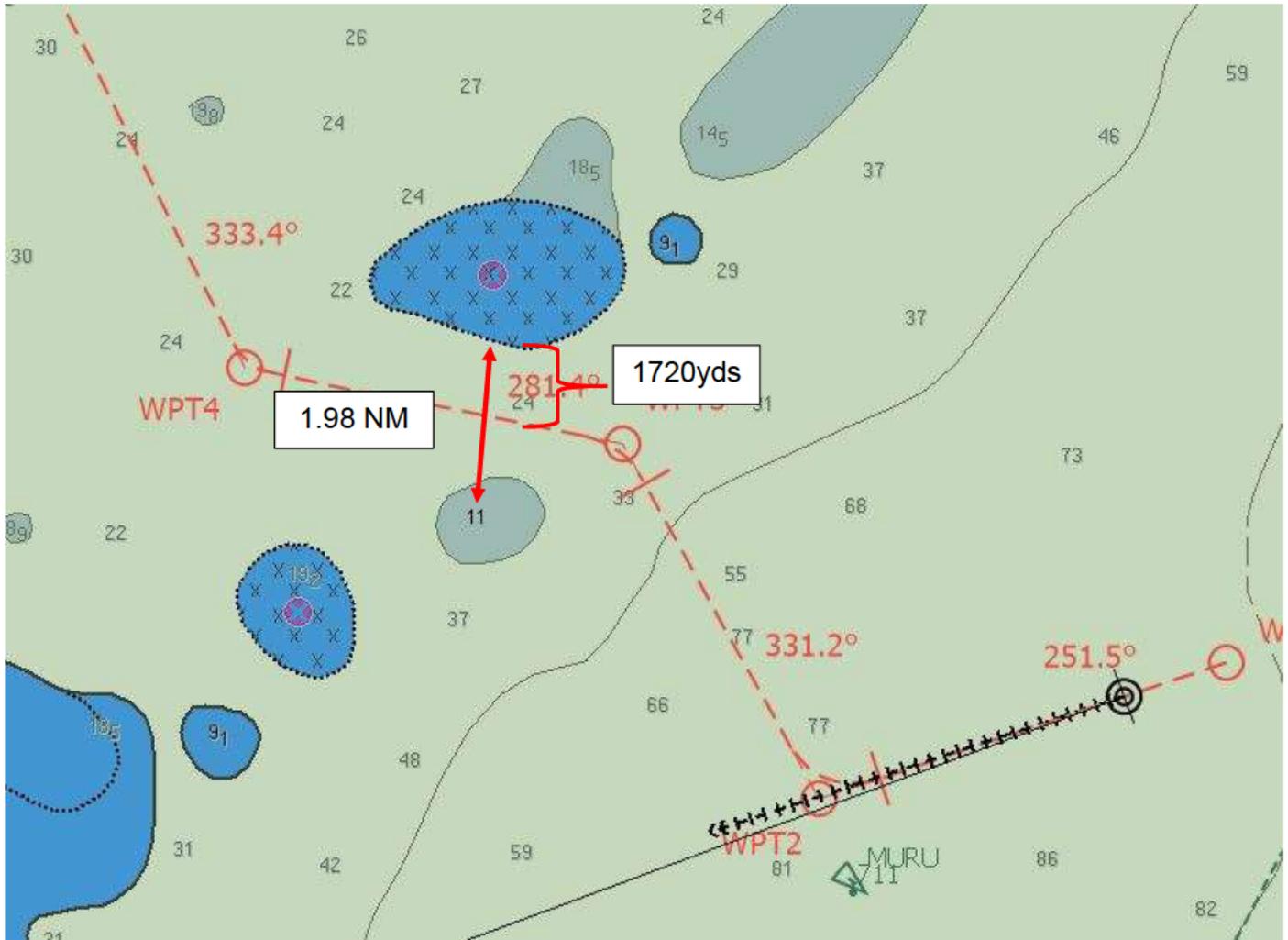


Figure 6 – ECDIS 5 Duqm A Rev 2

- 125. The measured distance between planned Duqm A track and San Carlos Banks shoal to north was 0.86nm/1720yds. This distance was never discussed as a risk factor, but is well inside MSC defined restricted waters. [Ref b, d, Encl 2,4,5,6,41,42,43,48]
- 126. The Navigator stated that based on ECDIS and chart data, 24m of safe water was available throughout the proposed route. [Encl 4]

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127. The Captain stated (b)(6) assumed there was 24m of water along the entire track because that is what the Navigator told (b)(6) [Encl 2]
128. ECDIS chart, at scale 1:90,000 and closer, clearly indicates the track crosses the 20m contour. See Figure 7. [Encl 41, 42, 43]
129. The Navigator state (b)(6) was comfortable with the use of the Duqm A track. [Encl 4]
130. The Navigator stated (b)(6) ensured all navigation checks were completed in ECDIS and on paper charts. [Encl 4]
131. The Navigator stated (b)(6) ensured the Captain was informed of all navigation risks, including general awareness of shoal water based on chart data. [Encl 4]
132. The Captain stated the selected track and course taken was evaluated to be safe for navigation. [Encl 2]
133. Captain stated, as no warnings (chart or otherwise) were present and considering all available navigational information available at the time (b)(6) maintained that the decision to select Duqm A track for transit to Duqm was appropriate. [Encl 2]
134. Restated from FF 47, 48, 49, 50, charts warnings were present on NGA chart 62024, 62333, and 62334, which were reviewed by the Captain and the Navigator. [Ref e, g, h, Encl 2, 4]
135. The Captain stated (b)(6) would have made a different decision prior to commencing the transit to Duqm on the Duqm A route, had (b)(6) been aware of any warnings (chart or otherwise) regarding cargo containers or debris that might have been lost/dropped in the intended course. [Encl 2]
136. At 1315L, BGN ceased pumping STA 7. [Encl 20, 41, 43]
137. At 1320L, VDR recorded a conversation between Navigator and 3/O (b)(6)  
 NAV: "We gotta haul ass, it's up to 17kts [speed needed to arrive at pilot pick up point at 1500L], we're not making it on time."  
 3/O: "It's a big squat."  
 NAV: "It's a big squat."  
 [Encl 41, 43]
138. At 1328 all lines cleared to STBD. [Encl 20, 41, 43]
139. At 1329, VDR recorded a conversation between Chief Mate and Navigator:  
 CM: "What is our speed required?"  
 NAV: "17.5."  
 CM: "Jesus!"

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[Encl 41, 43]

140. At 1330L, NAV confirmed a 1500L pilot pick up with Duqm Pilots via VHF radio. [Encl 41, 43]
141. At no point in track planning, was an adjustment of the pilot pick up time discussed. [Encl 2, 4, 5, 6, 41, 43]
142. The Captain stated (b)(6) did not feel any perceived pressure to arrive in Duqm at a specific time. There was no operational pressure from C5F or CTF 53 to meet the 1500L pilot pick up time. [Encl 2]
143. The Navigator stated, that while staying on schedule was an operational goal, safety considerations were thoroughly evaluated. [Encl 4]
144. At 1333 the Chief Mate departed the Pilothouse (b)(6) was aware of the high speed of advance (SOA) required, but was not briefed on any updates to the track to get to Duqm. [Encl 3, 4, 41, 43]
145. At 1335-1338L, while approx. 4.5nm from shoal and closing, thrust control was transferred to Engine Room Control (ERC) and pre-port entry ahead/astern checks were performed. [Encl 2, 4, 5, 6, 12, 13, 20, 21, 41, 43]
146. At 1338L speed was increased to 80% power on 2 engines, or about 17kts. [Encl 20, 21, 41, 43]
147. At 1341L pre-port entry steering checks were started. [Encl 20, 21, 41, 43]
148. At 1346L, the VDR recorded a conversation between Captain and 3/O (b)(6) regarding the ongoing steering checks:  
Capt: "Didn't they just do that? ...Let's get this done!"  
Capt: "I need to come left, I need to come over to 310T."  
[Encl 41, 43]
149. At 1347L, NAV commented, "Need to get this shit done!" [referring to steering tests] [Encl 41, 43]
150. At 1349L Captain changed course to 310T. Base course in ECDIS is 331T. [Encl 41, 42, 43]
151. Based on ARPA and ECDIS playback combined with discussion between Captain and 3/O (b)(6) (Mate on Watch), multiple fishing contacts described as small to medium sized boats during interviews, came into view ahead of BGN [IVO large reef to the north, approximately 5nm north of the ship's position]. These radar contacts can be seen on the Figures as green dots with 3-digit numbers. [Encl 2, 4, 6, 10, 41, 43]
152. At 1350L, VDR recorded Captain saying to 3/O (b)(6) "...just help me on BRM and look out and we'll just....gun it through this thing together. You and me buddy!" [Encl 41,43]

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- 153. Captain stated that the speed to the pilot pick up was not an overriding factor. [Encl 2]
- 154. USCG COLREGs Rule 6, Safe Speed, states the draft of a vessel in relation to available depth of water as one of the factors of determining safe speed. [Ref k]
- 155. At 1353L, the Captain changed course to 306T. Base course remained 331T. On this course, BGN would eventually CPA shoal water to the northwest at approx. 1,000 yds. [Encl 41, 43]
- 156. At 1354L, ECDIS 4 was zoomed in to 1:54,800 scale. 20m contour and 11m sounding were clearly visible. Unclear from VDR and interviews who changed the scale on this ECDIS. It is unclear who performed this scale shift. See Figure 7. [Encl 41, 43]

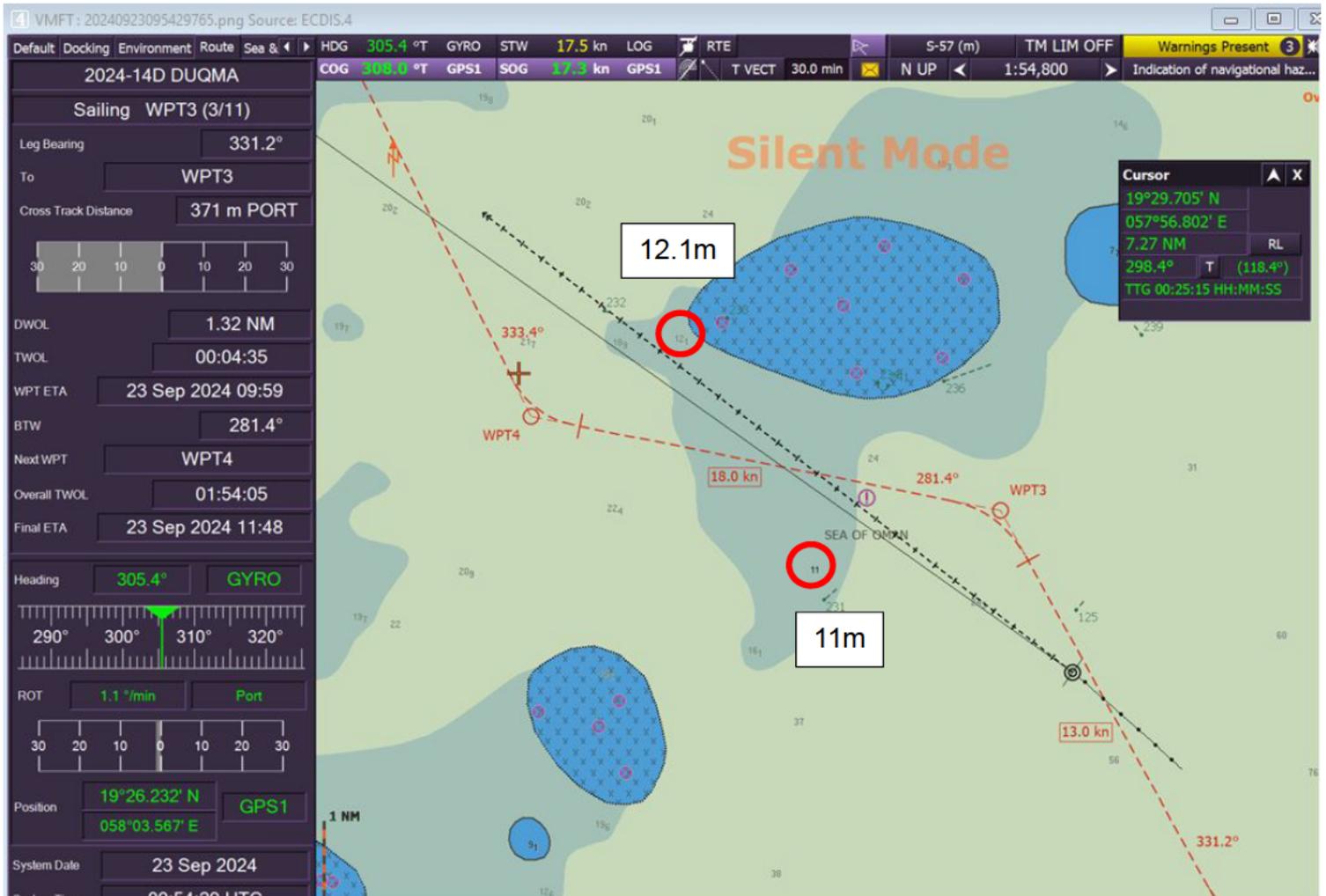


Figure 7 - ECDIS 4 1354L, 20m Contour Visible

- 157. At 1356L, engine control was shifted from ERC to the Pilothouse and speed increased to 82% power on 2 engines (or 18kts). [Encl 20, 21, 41, 43]

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158. At 1400L, ship was steering 306T, base course was 331T, ship was going 17.7kts SOG, fathometer read 24.5m. Ship was 1,780yds left of planned track and opening. ECDIS 5 (Captain viewing) was scaled to 1:150,000 and 20m contour was not visible. ECDIS 4 was scaled to 1:54,000 and the 20m contour was visible. See Figures 8 and 9. [Encl 41, 42, 43]
159. At 1403L, the ship was steering 306T, base course was now 281T [turnpoint has passed], ship was going 17.7kts SOG, fathometer read 23m. Ship was 1,300yds left of planned track and closing. ECDIS 5 (Captain viewing) was scaled to 1:150,000 and 20m contour was not visible. ECDIS 4 was scaled to 1:54,000 and the 20m contour was visible. [Encl 41, 42, 43]
160. At 1404L, VDR recorded Captain and Navigator discussing pilot pick up time:  
NAV: "Capt it looks like 1505 we will be at the sea buoy."  
Capt: "If we cut corners we'll get there."  
NAV: "Yes sir!"
- Despite having given direction to "line up the 24s," the Captain is cutting corners on the track in ECDIS and ignoring those depth soundings. [Encl 41, 43]
161. 1404:33L BGN crossed 20m contour. [Encl 41, 43]
162. ECDIS activated (silenced) alarm stating, "Indication of crossing safety contour." There is no indication the alarm was viewed or acknowledged. [Encl 41, 43]
163. ECDIS activated (silenced) alarm stating, "Indication of navigational hazard." There is no indication that alarm was viewed or acknowledged. [Encl 41, 43]
164. The Navigator stated they made appropriate course adjustments for fishing boats to ensure safe passage and the Captain steered the ship to port to avoid traffic (b)(6) further stated the Captain was fully aware of the ship's position and deviations from track. [Encl 4]

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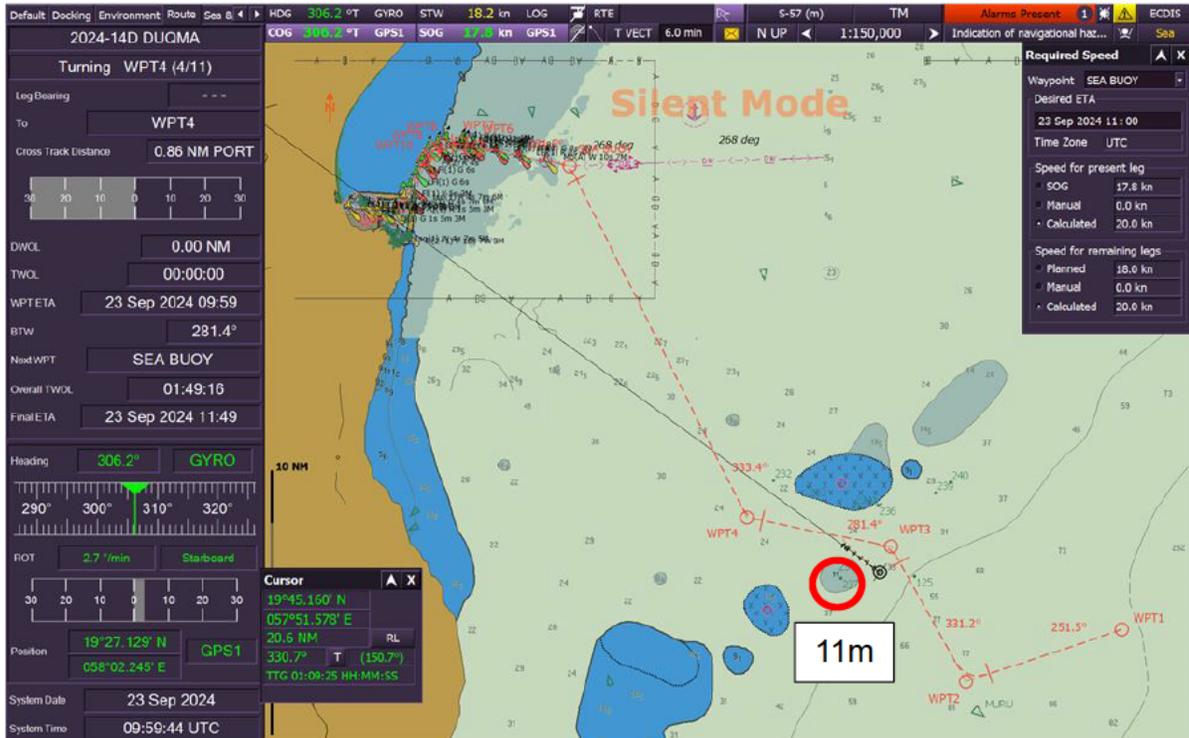


Figure 8 - ECDIS 5 view at 1400L. This is the Captain's ECDIS view.

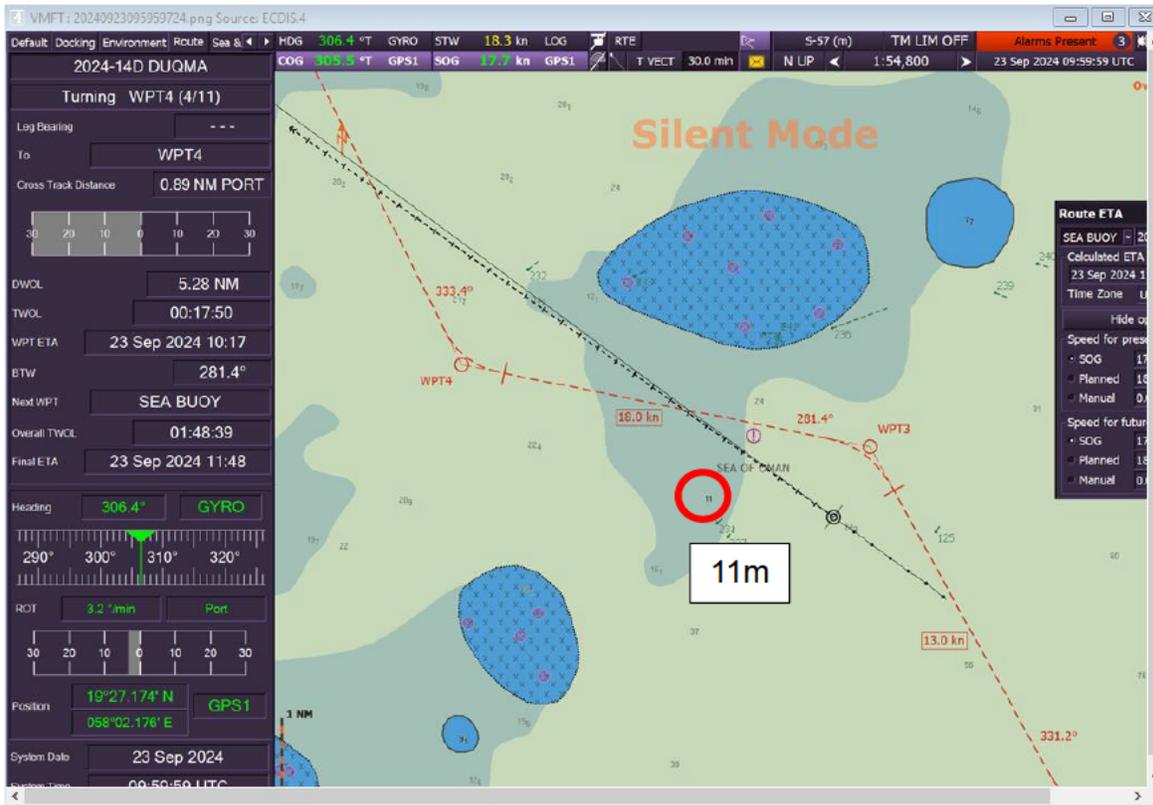


Figure 8 - ECDIS 4 Screenshot at 1400L, (grounding -12 minutes)

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165. At 1404L, BGN was 1,600yds from the 11m sounding to south and 560yds from the 20m contour (not full contour due to Captain's range scale) containing the 11m sounding. See Figure 10. [Encl 41, 42, 43]

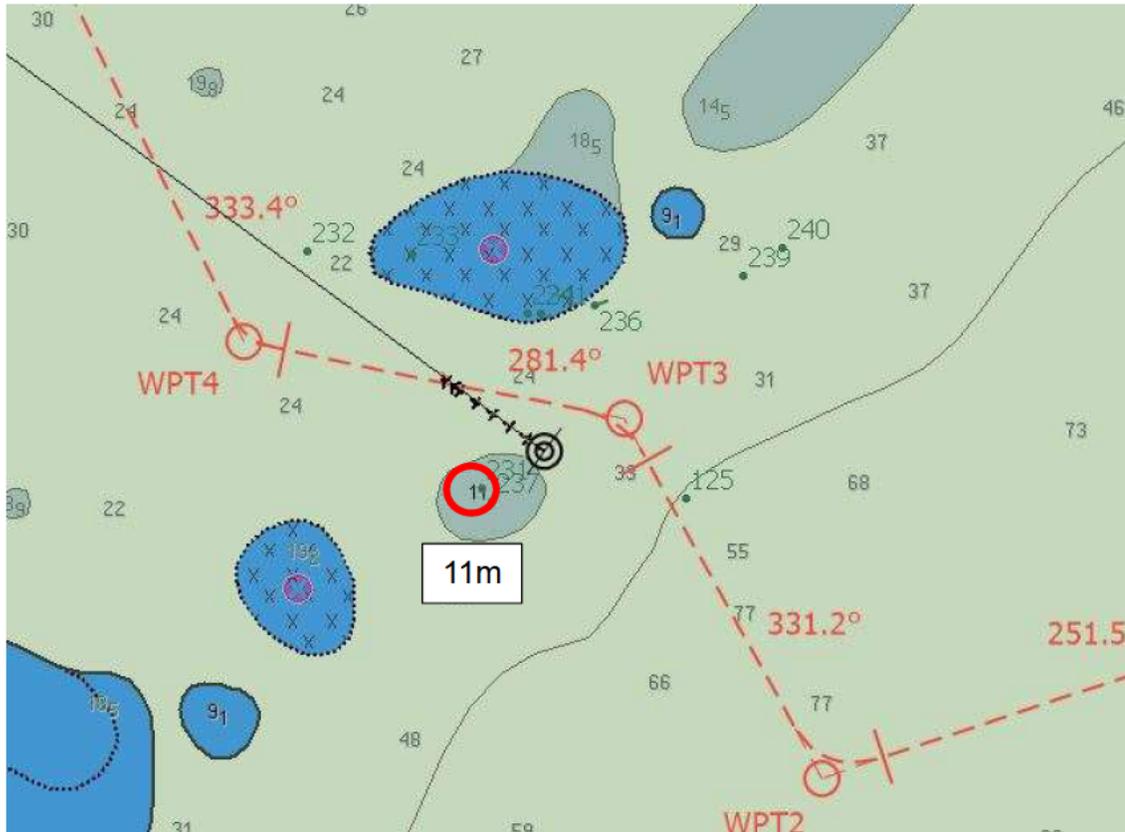


Figure 10 - ECDIS 5 screen capture of CPA distance from track to 20m contour. This is the Captain's view. Green numbers (ie 232) with dots represent surface contacts from radar.

166. No discussion, recommendation, or update was provided to the Captain by either the Navigator or 3/O on watch regarding distance to shoal or how far left or right of track the ship was for the duration of transit. [Encl 2, 4, 6, 41, 43]
167. The Captain stated (b)(6) didn't recall being more than 1nm off track and did not receive any recommendations from NAV or the Watch to regain track. The Captain stated the ship was always within safe navigation parameters and minor course deviations are common. SOP is to maintain the vessel within 1nm of the intended track line. [Encl 2]
168. The Captain stated (b)(6) relied on the recommendations of (b)(6) Navigator and the Captain stated (b)(6) confirmed safe transit parameters using all available and reliable navigation information. [Encl 2]
169. At 1409L fatho read 19.7m. Based on fatho location on hull and trim down on stern by 1.7m, subtract 1.7m from fatho readout to see depth beneath stern. 18m beneath stern. [Encl 41, 43, 49]

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170. At 1410L fatho read 17.5m. [Encl 41, 43]
171. At 1411L fatho read 15.2m. [Encl 41, 43]
172. At 1411:05L fatho read 13.5m. [Encl 41, 43]
173. At 1411:20L fatho read 10.5m. [Encl 41, 43]
174. At 1411:30L fatho read 6.7m, 5m beneath stern. [Encl 41, 43]
175. At 1411:40L fatho read 11m. [Encl 41, 43]
176. At 1411:44 ECDIS 5 shifted charts with no apparent user prompt. Scale remained same (1:150,000) but 20m contour was now visible. [Encl 41, 42, 43]
177. At 1411:50L fatho read 10.7m. [Encl 41, 43]
178. At 1412L fatho read 10.7m and ship slowed to 16.9kts due to squat. [Ref c, Encl 41, 43, 49]
179. At 1412:10L fatho read 6.7m. [Encl 41, 43]
180. At 1412:20L fatho read 4.5m, 2.8m beneath stern. [Encl 41, 43]
181. At 1412:25L, the ship experienced vibrations and made contact with sea floor. [Encl 2, 3, 4, 5, 6, 7, 41, 43]
182. The ship was in position 19 29.2348N, 057 59.0399E, heading 305T, the fathometer reads “\*” indicating error. [Encl 41, 43]
183. Both BGN deck and engineering logs stated in error vibrations began at 1407L. [Encl 20, 21]
184. The CTG 56.1 grounding site survey revealed a triangular shaped rock/shoal in 10m of water at point of impact, 19 29.2348N, 057 59.0399E. [Encl 47]
185. The measured distance to charted shoal at time of grounding is 1,400yds. [Encl 42]
186. The closest charted depth sounding to grounding location is approx. 1,700yds to the NNW, a 12.1m sounding, on the edge of charted shoal water. [Encl 42, 43]
187. The vibrations continued and became increasingly loud and per VDR, the vibrations and noise lasted a total of 21 seconds and ended abruptly. [Encl 41, 43]



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194. At 1415 ERC made initial reports to the Chief Engineer of possible fuel leaks in engine room via radio. [Encl 2, 4, 6, 12, 13, 41, 43]
195. At 1415:34, ERC reported fuel leaks on both main engines. Water and fuel were leaking into engine room via vents, drains, and fittings. [Encl 2, 4, 6, 12, 13, 41, 43]
196. At 1416:13, the Captain gave permission to secure main engines. BGN was 1,400yds from shoal to the north. No discussion of ship's position and distance to danger was audible on VDR. [Encl 2, 4, 6, 12, 13, 20, 21]
197. The Main engines and fuel oil service system were quickly secured. [Encl 12, 13, 20]
198. 1416:42 Captain states, "Fathometer shot up. We must have hit a shallow spot. We must have hit a sand bank." [Encl 41,43]
199. At 1419 Sea and Anchor Detail was ordered. [Encl 3, 20, 41, 43]
200. The Captain made the decision to anchor due to loss of propulsion and steering. [Encl 2, 41, 42, 43]
201. By 1456 the ship is safely anchored with 17.5m beneath the keel. [Encl 41, 42, 43]
202. The source of fuel in engine room was the contaminated fuel tank (a.k.a. "leak off tank") where uncombusted fuel from the main engines is collected. The fuel was pushed back up and out through the various drain lines feeding the tank. It was assumed (and later confirmed) the tank was open to and pressurized by the sea. [Encl 2, 3, 8, 12, 13]
203. Seawater was coming into the engine room via stuffing tubes in the bilge. The volume of water entering the engine room was referred to as a "geyser" by the 1<sup>st</sup> Assistant Engineer. [Encl 12, 13]
204. The combined liquid level rose to approximately 4 feet in the engine room. [Encl 2, 3, 12, 13, 37]
205. Shoring and DC plugs were used to slow the water ingress into the engine room. [Encl 2, 3, 8, 12, 13, 40]
206. Dewatering of the engine room began and liquid in the bilge was transferred to an oily waste holding tank. [Encl 2 ,3, 8, 12, 13]
207. Later that evening, levels rose in fuel tanks 9C and 10C, which are two JP5 tanks, located just forward of the deckhouse, frames 51-59. The Cargo Mate and Cargo Engineer logged each tank as taking on approx. 5,000gal per hour. It became clear both tanks were exposed to the sea and water was filling those tanks. [Encl 2, 3, 8, 12, 13, 20]

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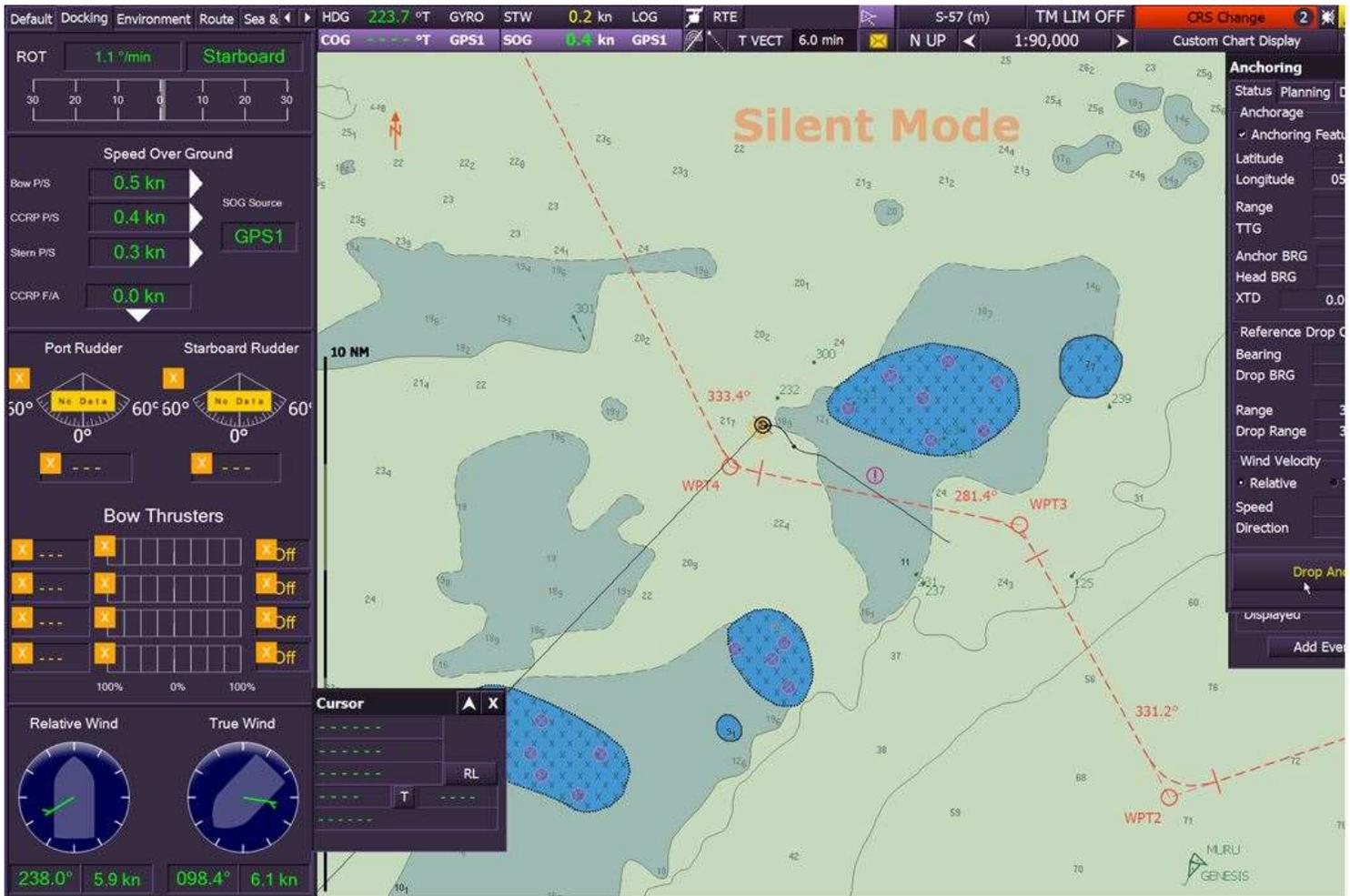


Figure 10 - 1456L, anchored position.

- 208. The ship pumped tanks 9C and 10C to 3C. [Encl 20, 21]
- 209. The Chief Cargo Mate noticed drop in tank 7C, an F76/DFM tank located between frames 43-47. 7C had initially been 87% full of fuel, with approximately 585,000 gals. [Encl 2, 3, 8, 12, 13, 24]
- 210. At approx. 21:00, flooding was reported in the pump room. Dewatering of the pump room began using oily waste transfer pumps and DFM stripping pumps putting liquid into cargo 3 port and starboard tanks. The source of liquid was believed to be 7C DFM tank. [Encl 20, 21]
- 211. DC efforts and tank evaluation indicated free communication between several tanks and the ocean as well as between tanks and spaces internally. [ Encl 2, 3, 8, 12, 13]
- 212. BGN made arrangements for tow into Port of Duqm. With tugs made up, anchor was aweigh at 12:37, 24SEP24. [Encl 20]

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213. BGN safely moored pierside Duqm at 1740L. [Encl 20]
214. Once moored, shore-based services began to assist dewatering BGN via pierside trucks. [Encl 2, 3, 4, 8, 12, 13]
215. CTF 56 dive team conducted dive operations over the course of several days to identify, document, and begin exterior methods of controlling water ingress through BGN's hull. [Encl 12, 13, 40]
216. From CTF 56 dive report, the port rudder suffered significant damage. Multiple penetrations, metal deflection and deformities. Rudder flooded. Rudder post collar in after steering was displaced, with all bolts sheared. [Encl 40]
217. From CTF 56 dive report, the port propeller suffered significant damage. One blade missing with retaining ring and internals also missing. Crack to sliding block assembly apparent. Remaining blades all have significant damage to blade leading edges, including missing chunks of blades. [40]
218. The port CPP hydraulic oil sump was empty; it is likely all of the oil used for the port CPP system leaked out of hole of missing blade. [Encl 12,13]
219. CTF 56 divers reported heavy hydraulic oil in the water pierside Duqm while performing initial dives. [Encl 40]
220. CTF 56 divers noted the gap between the port hub and port strut barrel to be approx. 5-6". Stbd gap is approx. 1.5". [Encl 40]
221. From CTF 56 dive report, significant damage was observed to the hull starting at frame 34 through stern. Multiple hull penetrations, dents, cracks, warping, and hull deflection noted from frame 34 to skeg on port side. Damage to include dents and metal deflection also present on starboard side of keel, frames 50-54. Hull cracks are all narrow (up to approx. 3" wide) and range in length from 4-5" up to approx. 16'. [Encl 40]
222. Damage control efforts continued in port Duqm where oily waste offload and dive efforts to stop water ingress revealed free communication between multiple tanks, indicating ruptured bulkheads between tanks. [Encl 12,13,40]
223. NAVSEA Grouting Plan highlights locations of hull penetrations: engine room void, main contaminated fuel tank, deep tank 2P, cargo tank 10C, pump room double bottom oily waste tank. [Encl 46]
224. CTG 56.1 conducted a dive operation at the site of grounding. They identified a triangular shaped rock, at a depth of 10m at the grounding position. This rock is the likely impact point. No manmade objects were detected in the area. [Encl 47]

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225. The CTG 56.1 dive report further added to chart uncertainty and lack of depth information in stating, “The charts, sourced from MINEnet tactical, display a depth of 22-24 meters; however the actual depth was 9.4-12 meters....the point of impact was located in a shallow area they [Omanis] normally avoid. [Encl 47]
226. During witness interviews, virtually all BGN crewmembers stated they enjoyed serving onboard BGN and praised Captain (b)(6) as a good ship’s Master. [Encl 3, 4, 5, 8, 12]
227. The crew conducted damage control throughout the night and continuously until the ship was towed into Duqm. [Encl 2, 3, 8, 12]

### Opinions

1. The BIG HORN grounding was preventable. The cause of the grounding was a series of poor decisions, failure to follow procedure, application of open water navigation to restricted waters, and failure to exhibit proper risk calculation. The ship’s Captain is ultimately responsible for the safe navigation of the vessel. Through qualification and experience, it is incumbent on the Captain to bring (b)(6) experience and knowledge to bear through proper risk evaluation and information synthesis. Captain (b)(6) failed to employ the tools required of his position as Captain of a USNS Combat Logistics Force Oiler. Per the Captain’s interview (b)(6) stated:

“No warnings (chart or otherwise) were present along the track (b)(6) elected and that (b)(6) considered all available navigational information available at the time, the Captain stated (b)(6) decision to select the Duqm A track for transit to Duqm was appropriate.”

In fact, there were multiple warnings, readily available to the Captain, Navigator and Mate on Watch, in ECDIS, paper charts and Sailing Directions, yet those warnings were inexplicably not identified and considered. [FF 13, 14, 27, 28, 29, 35, 37, 38, 40, 41, 44, 45, 46, 48, 49, 50, 51, 53, 93, 97, 100, 102, 103, 105, 108, 110, 119, 123, 124, 125, 127, 132, 133, 152, 160, 166, 167, 168]

2. The Duqm A route transited through restricted waters; therefore, a Navigation brief should have been conducted. The NAV brief requirement alone should have been enough to trigger another thoughtful round of discussion and evaluation. However, no members of the bridge team, including the Captain and Navigator, seemed to realize they were steaming into restricted waters. No consideration was given for a required navigation brief, a more detailed plan, or thorough review of the proposed track prior to steaming through a named bank with a CPA to shoal inside of 1nm. In fact, the Captain stated a NAV brief was explicitly not required. Further, the application of open ocean navigation and failure to realize the ship was transiting restricted waters is negligent. Despite the ship’s presence in restricted waters, the bridge team transited at high speed, using open ocean cross-track deviations, and open maneuvering at speed for fishing contacts without regard for distance to shoal water. [FF 27, 42, 43, 44, 48, 49, 53, 54, 55, 86, 88, 89, 90, 93, 95, 96, 97, 100, 102, 107, 108, 118, 119, 121, 122, 123, 124, 125, 126, 127, 133, 152, 166, 167, 168]

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3. Had the Captain and (b)(6) licensed deck officers properly discussed and evaluated the route into Duqm, using readily available information, and followed requirements, such as conducting a Navigation brief due to transiting in restricted waters, I believe they would have chosen an alternate route. The Navigator had only been onboard BGN for three weeks prior to grounding, in (b)(6) first Navigator tour. A brief 73-second conversation and a quick look at the ECDIS track were the only consideration given prior to steaming BGN through waters fraught with danger. The Captain should have provided more “trust, but verify” to the Navigator’s work to ensure the proposed track was safe. [FF 5, 6, 10, 11, 13, 14, 36, 37, 38, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 57, 62, 86, 89, 90, 92, 93, 95, 96, 97, 98, 99, 100, 102, 108, 110, 111, 112, 118, 121, 122, 123, 124, 125, 126, 127, 128, 133]
4. Duqm A should never have been considered as a possible option to transit to the pilot pick-up point. I have made several references to the 20m contour and the single 11m sounding located approximately 1,600 yds south of BGN’s position at CPA. The 11m sounding is readily visible and apparent on every ECDIS scale used for track planning and watchstanding situational awareness, as well as on paper charts – including the scale used for review of the Duqm A route between the Captain and the Navigator. The synthesis of navigation data that should have occurred onboard BGN includes the combination of the presence of an 11m sounding, stark absence of other soundings inside the 20m contour along track, and warnings regarding depths, soundings, and chart accuracy. These factors along with written direction to use the deep water route should have negated Duqm A as an option. [FF 36, 38, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 58, 60, 62, 67, 86, 89, 90, 93, 95, 96, 97, 104, 105, 106, 108, 110, 118, 119, 123, 124, 129, 130, 131, 132, 166, 167, 168]
5. The Watch Team, and the Captain in particular, were unreasonably focused on meeting the pilot at the 1500L pick up time. Although all persons interviewed stated it was not a driving factor, the desire to meet the pilot at the 1500 pick-up time appears to have been the sole motivator to transit at 17 to 18kts, taking the shortest possible route through a charted bank, while cutting corners on their own navigation track. This is a direct violation of COLREGS Rule 6 – safe speed. At no time did it occur to anyone involved to simply shift the pilot pick-up to the right and take a safer route. [FF 20, 21, 22, 24, 25, 71, 86, 92, 93, 101, 102, 107, 109, 110, 120, 137, 139, 141, 142, 148, 149, 152, 154, 158, 159, 160]
6. The Navigator and 3/O (b)(6) sought to find a way to justify Duqm A as a reasonable option even though they realized there were significant risks associated with the track. The Navigator and 3/O (b)(6) discussed at length the charted depth of water and technical MSC allowable tolerances per MSC UKC SMS. They focused on whether Duqm A met bare minimum UKC requirements, vice directing their attention to safer routes, with less risk. They openly discussed the risks of Duqm A and had the right answer to take the deep water route, but ultimately deferred to the Captain’s desire to “shoot the gap.” [FF 86, 137]
7. The Navigator was fully aware of the dangers, uncertainty, and associated risk with cutting through San Carlos Bank as evidenced by (b)(6) conversation with 3/O (b)(6). In fact (b)(6) stated to 3/O (b)(6) that using the deep water route as preferred; however, (b)(6) failed to fully articulate (b)(6) view to the Captain. As is evident in FF 93, the Captain’s decision to “shoot the gap” was made quickly and the Navigator failed to point out potential dangers of that decision. Instead, on three separate track revisions,

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- (b)(6) plotted the ship into restricted waters with close CPAs to charted shoal. [FF 36, 40, 54, 86, 92, 93, 126, 129, 130, 131, 143]
8. 3/O (b)(6) failed to provide adequate backup to the Captain and Navigator (b)(6) remained in the Pilothouse after (b)(6) 0800-1200 watch and served as a sounding board for the Navigator as (b)(6) was consulted at least three times regarding the track into Duqm. 3/O (b)(6) made off-hand comments regarding depth of water, the use of the deep water route and considerations for how much the ship would squat at 18kts (b)(6) comments may have led the Navigator to falsely believe steaming through San Carlos Banks was a safe water route. 3/O (b)(6) should have vigorously recommended against going through charted areas with noted shoal and shallow depth soundings. [FF 86, 137]
  9. 3/O (b)(6) the Mate on Watch, failed to stand a proper watch through failure to properly review track plan, charts, and warnings associated with BGN intended track. Additionally (b)(6) did not exhibit a sense of a questioning attitude (b)(6) made no evaluation of the track (b)(6) (b)(6) took what the Navigator and Captain established without question, even when it was obvious the ship was heading into uncertain waters. [FF 151, 152, 154, 155, 158, 159, 160, 165, 166, 167, 168]
  10. MSC SMS procedure 7.2-007-ALL (General Navigation and Navigation Safety) is inadequate to ensure safe navigation of vessels at sea. UKC SMS procedure allows a vessel to proceed into open ocean waters with only 2 feet of clearance beneath the keel. This depth of water is insufficient to accommodate inaccurate or old surveys, shoaling, storm deposits, environmental factors, and others. [FF 62, 63]
  11. MSC SMS squat table is inaccurate, off by upwards of 4.5ft. This table does not provide a Mariner with the proper tools to fully evaluate a shallow water situation. I do not believe this was a contributing factor to the BGN grounding, but requires MSC immediate attention. [FF 65, 66, 67, 68, 69]
  12. Aft trim calculation from the CargoMax program indicated 9.93m. With squat, BGN was drawing in excess of 11m midships and ~ 11.5 stern. No discussion occurred regarding proximity to the 11m sounding. When asked, the Captain had no idea the distance to CPA of that sounding. Additionally, the Captain decided to “cut the corners” of the proposed track in an effort to cut down the total distance of the track and make the 1500L pilot pick up on time (b)(6) did so without regard for distance right or left of track, exceeding 1,800 yds off track at one point (b)(6) while having a CPA to shoal of less than 500 yds. Per the VDR recording, the Captain stated, “if we just cut the corners, we’ll get there.” While the vessel’s point of impact was not at the 11m sounding the Captain’s decision to cut the corner of the intended track placed the ship in danger. [FF 30, 31, 50, 51, 53, 54, 58, 59, 60, 67, 68, 86, 92, 93, 97, 98, 99, 100, 106, 108, 118, 119, 121, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 137]
  13. Had the Captain stayed on track throughout the transit, BGN’s chances of running aground would likely not have diminished. BGN was well right of its intended track when the ship ran aground, but the warnings for that entire area are clear and there is a lack of sounding data throughout that waterspace. Accordingly, the ship never should have transited through that area. [FF 36, 40, 42, 43, 48, 49, 50, 51, 53, 58, 67, 93, 95, 96, 97, 99, 106, 110, 118, 123, 124, 126, 127, 128, 131, 133, 155, 158, 159, 160, 166, 167, 168]

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14. Based on significant gap between port propeller hub and strut barrel, there is likely significant undiscovered (or unknown to the investigator) damage to the entire port drivetrain to include – strut bearing, stern tube seal, main reduction gear, and oil distribution box. [FF 180]
15. Uncommanded chart shift moments before the grounding likely occurred because BGN had multiple versions of the same chart loaded in ECDIS, provided by different suppliers. Both NGA and Admiralty Vector Chart Service charts for the area are loaded. While this has no impact on the lack of due diligence in route planning, it could have an impact on watchstanding situational awareness. [FF 176]
16. No consideration was given to engineering plant control and close vicinity to shoal. Rudder and engine control were shifted without situational evaluation. Main engines were also shut down based on CHENG's recommendation from ERC, however that recommendation was not evaluated to distance to shoal, existing set/drift (which was onto shoal) and how quickly the anchor could be dropped. [FF 189, 194, 195, 196, 199, 200, 201]
17. No consideration was given to the major fuel oil leak in the engine room and required immediate actions. While T-AO 187 class ships do not have fixed bilge AFFF sprinkling, they do have AFFF hose reels. Given both main engines had been running the 40 minutes prior to grounding at over 80% power, the engine room and engine components were extremely hot and heat sources abundant. The ship was fortunate that there was not a fire in the engine room. [FF 194, 195, 196, 204]
18. Crew morale onboard BGN was high. All witnesses expressed their satisfaction with the ship and crew, despite the heavy operation schedule. Many of the more senior crew stated they had never worked this hard, but the crew maintained high morale and a sense of mission accomplishment. The crew performed superbly in damage control to help mitigate flooding and maintaining stability of the ship. [FF 226, 227]

### Recommendations

1. MSC take administrative/disciplinary action, as appropriate, against Captain (b)(6) for dereliction of duty and negligence in the grounding of BIG HORN.
2. MSC take administrative/disciplinary action, as appropriate, against 2/O (b)(6) for dereliction of duty and negligence in the grounding of BIG HORN.
3. MSC take administrative/disciplinary action, as appropriate, against 3/O (b)(6) for failure to stand a proper watch and provide forceful backup in events leading to grounding of BIG HORN.
4. MSC take administrative/disciplinary action, as appropriate, against 3/O (b)(6) for failure to provide forceful backup in events leading to grounding of BIG HORN.
5. MSC conduct an immediate and full review of SMS 7.2-005-AO187 Under Keel Clearance. Two feet of UKC in open ocean is not sufficient to account for various environmental factors, tidal ranges at sea, sea state, and complete interaction of the hull and sea floor in terms of squat.

Subj: COMMAND INVESTIGATION REPORT INTO THE GROUNDING OF USNS BIG HORN (T-AO 198) ON OR ABOUT 23 SEPTEMBER 2024 OFF THE COAST OF OMAN

6. MSC conduct an immediate review and issue revision of squat table contained in SMS 7.2-005-AO187 and associated links to CargoMax program. The table is off by as much as 4.5ft at certain depth/speed combinations and also needs to be expanded to included deeper water.
7. MSC conduct a full review of navigation qualification and training. There is no requirement for a new 2/O selected as a Navigator to attend additional training, review, or upgrade from training received for 3/O license to assume role as Navigator. While MSC and USN paths are different, for reference, a fully qualified USN Surface Warfare Officer is sent through 9 weeks of training prior to reporting as a Navigator.
8. MSC conduct a full review of navigation processes and directives, up to and including implementing a directive similar to the Naval Surface Forces/Naval Air Forces Navigation and Organization Manual (NAVDORM). Requirements for consideration (not exhaustive):
  - a. Updated SMS definitions of open, piloting and restricted waters.
  - b. Updated SMS requirements for watchstanding, chart review, track establishment, review and approval for each of (a) prior to entry and;
  - c. Conduct and requirements while sailing in those defined waters.
  - d. Mandatory ECDIS sensor set up (fathom, safety contours, etc)
  - e. Mandatory ECDIS alarm set up
  - f. Define electronic chart loading procedures and chart sources.
9. MSCCENT issue guidance requiring all MSC ships to use the deep water route when entering and departing Duqm.
10. MSCCENT issue guidance requiring all MSC ships to obey the 10kt speed restriction for humpback whale protection in vicinity of Duqm per enclosure 28.
11. MSCCENT initiate chart correction to NGA per enclosure 47.

(b)(6)





DEPARTMENT OF THE NAVY  
MILITARY SEALIFT COMMAND CENTRAL  
PSC 851 BOX 509  
FPO AE 09834-2800

5800  
Ser N00/200  
29 Sep 24

From: Commander, Military Sealift Command Central  
To: (b)(6), USN

Subj: COMMAND INVESTIGATION INTO THE FACTS AND CIRCUMSTANCES  
SURROUNDING THE GROUNDING OF USNS BIG HORN (T-AO 198)  
OFF THE COAST OF OMAN ON 23 SEPTEMBER 2024

Ref: (a) Manual of the Judge Advocate General (JAGINST 5800.7G), Chapter II

1. Per reference (a), this appoints you to inquire into the facts and circumstances surrounding the grounding of USNS BIG HORN (T-AO 198) off the coast of Oman on 23 September 2024.
2. Inquire into the facts and circumstances surrounding the grounding. Your report of investigation should include a detailed sequence of events that led to the incident, the cause(s) and any contributing factors, resulting damage to the vessel, and any fault, neglect, or responsibility therefore. Additionally, make recommendations, as appropriate, for corrective actions to prevent future incidents. Report your findings of fact, opinions, and recommendations in letter form by 30 October 2024, unless I grant an extension.
3. As the investigating officer, this is your primary duty until complete. If there are any circumstances which may impact your ability to complete the investigation on time, notify me immediately.
4. If you have not previously done so, review chapter II of reference (a) before beginning your inquiry.
5. You may seek legal advice during the course of your investigation from MSCCENT Legal Counsel, (b)(6), DSN: (b)(6).

(b)(6)

Copy to:  
NAVCENT  
MSC

Enclosure (1)

Page 1 of 3

28 Oct 24

From: (b)(6)  
To: Commander, Military Sealift Command Central

Subj: COMMAND INVESTIGATION INTO THE FACTS AND CIRCUMSTANCES  
SURROUNDING THE GROUNDING OF USNS BIG HORN (T-AO 198)  
OFF THE COAST OF OMAN ON 23 SEP 2024

Ref: (a) Your appointing order of 29 Sep 2024

1. Per reference (a), I request a 2-week extension to complete the subject command investigation. I request this extension because I received the data and recording from the USNS Big Horn Voyage Data Recorder (VDR) on 21 October, and additional time is required to review and analyze the relevant information captured by the VDR. Additionally, arrangements are currently being made to conduct a dive or otherwise collect sounding data/underwater video at the suspected grounding site. A date for this evolution has not been determined, but will likely occur within the next ten days.

(b)(6)

Enclosure (1)

Page 2 of 3



DEPARTMENT OF THE NAVY  
MILITARY SEALIFT COMMAND CENTRAL  
PSC 851 BOX 509  
FFO AE 09834-2800

5800  
Ser N00/216  
29 Oct 24

From: Commander, Military Sealift Command Central  
To: (b)(6), USN

Subj: COMMAND INVESTIGATION INTO THE FACTS AND CIRCUMSTANCES  
SURROUNDING THE GROUNDING OF USNS BIG HORN (T-AO 198)  
OFF THE COAST OF OMAN ON 23 SEPTEMBER 2024

Ref: (a) Your ltr of 28 Oct 24

1. Your request for an extension to complete the subject command investigation per reference (a) is approved. Report your findings of fact, opinions, and recommendations in letter form by 14 November 2024.

(b)(6)

Copy to:  
MSC

Enclosure (1)

Page 3 of 3

## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: Master

Date of Interview: 6 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to Captain (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others. (b)(6), Government Fleet Representative, International Organization of Masters, Mates & Pilots, (AFL-CIO) was present via phone.

Captain (b)(6) stated (b)(6) has been the resident Master of USNS Big Horn since June 2022. On the current deployment, (b)(6) relieved (b)(6) in May 2024. Prior to Big Horn, (b)(6) served as Master onboard Richard Byrd, William Mclean, Supply and Mathew Perry. (b)(6) has served with MSC for 17 years. (b)(6) first sailed with MSC in June 2007. (b)(6) has been a permanent Master for approx. 3 years.

Captain (b)(6) stated (b)(6) was in Sasebo, Japan when (b)(6) was informed the ship would be going to 5<sup>th</sup> Fleet. Big Horn in chopped to 5<sup>th</sup> Fleet on 17 June 2024. Since entering 5<sup>th</sup> Fleet, the ship

Enclosure (2)

has primarily been supporting the TR Strike Group and the ABE Strike Group. They have been operating in the Northern Arabian Sea and have frequently pulled into and out of Fujairah, UAE.

Captain (b)(6) stated (b)(6) was initially told the ship would be in 5<sup>th</sup> Fleet for 30 days. The vessel had a scheduled VRA with ABS conditions of class to be addressed in September 2024. The VRA had been re-scheduled to December and ABS COCs had been extended in late August. They have had no extended maintenance periods while in 5<sup>th</sup> Fleet. (b)(6) stated this is the most Replenishments at Sea that (b)(6) has conducted over the specific time period. The in-port periods have been compressed, 2-3 days loading fuel and dry cargo. (b)(6) has had RAS events moving 400 pallets, single station, servicing two Carrier Strike Groups without additional CLF support. Conducting RAS with TR generally took longer than ABE.

Captain (b)(6) stated that per DRRS-N, the ship is manned to 3 stations but could operate four fuel stations simultaneously. The ship is designed to operate with an AKE when operating with a single CSG. Big Horn has had to take on additional duties supporting two CSGs due to engineering/mechanical issues with Alan Shepard and Amelia Earhart that prevented them from assisting with RAS support as they normally would. For example, ASD had issues with their freeze capability.

Captain (b)(6) stated that working 3 stations, (b)(6) had high confidence in (b)(6) department heads and on deck leadership. (b)(6) has worked with many of them before on other vessels. (b)(6) approach is to always be accommodating and professional. Get the customers what they need. The ship's lack of flight deck qualification, and inability to VERTREP, has been a hindrance in that the ship

Enclosure (2)

was limited in cargo support options to single station CONREP. Specifically, the ship does not have enough personnel with current helicopter firefighting qualifications to obtain an aviation readiness qualification and follow on aviation certification. Captain (b)(6) also stated that (b)(6) is the only member of the crew with the helicopter control officer qualification at present.

Captain (b)(6) stated the optempo in 7<sup>th</sup> fleet was a lot less tasking than 5<sup>th</sup> Fleet. There was a dramatic increase in optempo when they arrived in 5<sup>th</sup> Fleet. They took on AKE duties in addition to their normal AO duties.

Captain (b)(6) stated that on 21 September they had been tasked to RAS 4 vessels, Stockdale (STK), Spruance (SPR), O'Kane (OKN), and ABE. The plan was to do all of them in one day on 22 September. They would plan a 10–15-hour day, roughly 6:30 a.m.-8:30 p.m. and RAS all four. The plan subsequently changed. The new plan was for BGN to RAS SPR and STK on the 22<sup>nd</sup>, and ABE and OKN on the 23<sup>rd</sup>, and then pull into Duqm. The original plan had a 0700 pilot pick up for entry into Duqm on 23 Sep. The 23 September Duqm port visit had been scheduled in mid-August. After the two RAS events were completed, BGN would be heading into Duqm for a Window of Opportunity (WOO) availability for 4-5 days to address some CASREPS and maintenance issues. There were tech reps and other personnel in Duqm to support their WOO.

Captain (b)(6) stated the NAV brief to pull into port was held at 1600, 22 Sep, after BGN had completed the RAS with SPR and STK. The initial thought was to RAS ABE and OKN together the next day (23 Sep), and they estimated they would be done by noon.

Enclosure (2)

Captain (b)(6) stated that on the morning of 23 Sep, they set RAS detail at 0700. (b)(6) was on the bridge at 0630. ABE came alongside at approximately 0800.

Captain (b)(6) stated that around mid-morning, ABE was alongside and they moved dry cargo and took hazmat off. OKN could not go alongside at the same time, so they would have to do OKN separately. While ABE was alongside, BGN began to plan and coordinate with OKN for their RAS. BGN wanted to run a northerly course during the RAS. OKN pushed back because they stated did not want to go into territorial waters. They coordinated a southwesterly course for the RAS.

Captain (b)(6) stated when they completed the RAS with ABE, OKN was approximately 11 miles away. The Navigator and Ops were on the bridge. Captain (b)(6) was on the bridge wing where there is no ECDIS. There was good coordination with the OKN Commanding Officer, and they set a RAS Corpen of 235. This was changed to 250 via a CORPEN-N maneuver for traffic after OKN was alongside BGN. Captain (b)(6) stated they completed the RAS with OKN at approximately 1315-1330 and (b)(6) had lunch brought up to the bridge. BGN was further south than anticipated after the RAS, and the 3<sup>rd</sup> Mate and Navigator were working COAs to get into port.

Captain (b)(6) stated (b)(6) had a discussion with the Navigator about the transit into Duqm and there were two tracks proposed by the Navigator: Duqm A and Duqm B. Duqm B was a northerly track that intercepted the deep-water route east of Duqm. It is standard operating procedure (SPOP) and per the SMS for the Navigator to prepare and recommend navigational tracks to the Captain. The discussion with the Navigator was intended to determine the safest and most efficient

Enclosure (2)

route. Duqm A track was the shorter of the two tracks. The selected track and course taken was evaluated to be safe for navigation. The areas of shallower water were considered, and transit of the vessel was to remain safely away from those areas. The Navigator had not laid the tracks in ECDIS at the time, but (b)(6) told Captain (b)(6) that the depth was at least 24 meters throughout the track. This was normal practice as the track was later added to ECDIS prior to actual transit and verified by Captain (b)(6). Captain (b)(6) decided on Duqm A. This decision to transit via the "Duqm A" route was made after careful consideration of all available information, including ECDIS, safe transit, and the advice of the Navigator.

Captain (b)(6) stated that there were a lot of fishing boats in the area. When they began the transit towards the pilot pick up point, (b)(6) saw fishing vessels spread out off the port bow. (b)(6) had dealt with fishing vessels before. (b)(6) planned to increase speed to get through them. The track that was chosen looked like a clear and open means of transit looking at the scale that (b)(6) used. The scale used was the best available on the ECDIS, which did not show any hazards on the selected transit track. At the scale (b)(6) used, (b)(6) saw white in the middle. (b)(6) stated (b)(6) did not see blue. (b)(6) was not aware of any hazard areas. There were no hazard areas on the selected transit track, which would have caused Captain (b)(6) any navigational or safety concern. (b)(6) did a quick ORM calculation. (b)(6) had the conn and was watching out for fishing vessels. (b)(6) perceived that the DISTANCE between the 11-meter sounding and shoal that laid to the North was about 5 miles wide and that (b)(6) felt comfortable with the route. The selected track was deemed to be safe and appropriate by using all available means at the time.

Enclosure (2)

Prior to transiting on the Duqm A track, the main engine astern and ahead tests, as well as port and starboard steering gear tests, were conducted.

Captain (b)(6) stated that (b)(6) had previously transited into Duqm in 2014 on Byrd. (b)(6) had also transited into Duqm in 2017/2018 and in Feb/March 2023 onboard Perry. Each time (b)(6) had transited into Duqm before, it was a point-to-point approach from the north in the vicinity of operations during those occasions. (b)(6) stated that 23 Sept 2024 was the first time that (b)(6) had approached the Duqm Pilot Station from the south east. This decision to approach the Duqm Pilot Station from the southeast was influenced in part due to the geographic position the last RAS had placed the BGN. The NAV brief that was conducted on the 22<sup>nd</sup>, was focused on the transit from the sea buoy into port. It is standard operating procedure and per the SMS, for the NAV brief to be drawn for the vessel transit from the sea buoy into port. Per the SMS, there is no need – or requirement – to conduct an additional NAV brief for regular ‘at sea’ transit, as course changes and adjustments occur regularly during navigation. (b)(6) did not read the Sailing Directions. Per the SMS, the Navigator is delegated and responsible for reading/reviewing the Sailing Directions. The Navigator is required to raise any concerns noted in the Sailing Directions to the Captain. No concerns and or issues were raised to Captain (b)(6) Captain (b)(6) would read/review the Sailing Direction as situation required (for example: unknown port; concerns raised by Navigator, etc.), yet for the instant traffic there was no need to review the Sailing Directions separately. The NAV brief indicated the Navigator had reviewed the Sailing Directions as per the SMS navigation Brief Checklist. As mentioned, this is the SOP and was done in the present transit. There were three paper charts consulted at the time, two were used for navigation and the third one was a cancelled chart. The first one used was a large-scale chart, which was discussed during

Enclosure (2)

the NAV brief, intended for navigation from the sea buoy to Duqm. The second one used was a smaller-scale chart, used for navigating the Duqm A transit/track course. The third paper chart could not be used for navigation because it had been cancelled. Per SOP, Captain (b)(6) is required to use primarily the vessel's ECDIS for transit, which is uploaded with updated navigational information and maintained by the Navigator. The updated navigational information is received regularly from NGA World Cover. The Navigator is responsible for maintaining vessel fixes on the paper chart, which Captain (b)(6) consults/confirms as needed throughout transit. (b)(6) was operating under the assumption that the Navigator had reviewed the paper chart. Per SOP/SMS, the Navigator reviewed the paper charts, had drawn transit courses, presented and discussed these courses with the Captain before transit. Captain (b)(6) reviewed the paper chart and courses during discussions with the Navigator. Captain (b)(6) was familiar with the deep-water route, as (b)(6) had transited through that area before while doing operations in that vicinity, and the route had been discussed during the NAV brief.

Captain (b)(6) stated that (b)(6) worked with the Navigator for approximately 1 month. The Navigator was highly recommended and (b)(6) came off as smart. Captain (b)(6) was aware that the Navigator was junior and this might have been (b)(6)'s first Navigator job. However, the Navigator was fully licensed and displayed seasoned qualities of an experienced Navigator. (b)(6) stated the Navigator made a good impression. The NAV brief did not go over the chart warnings. However, the NAV brief covered transit from sea buoy to the Port of Duqm, and no warnings were noted therein. The NAV brief did not discuss – nor was it intended to or required to address – the offshore transit via the Duqm A track to the sea buoy. Captain (b)(6) review of the ECDIS/charts did not indicate any warning affecting the navigational tracks selected. Captain

Enclosure (7)

(b)(6) has reread the charts since the incident and noted that some chart warnings and survey data were not readily available on the NGA World Cover charts being used at the time. Captain (b)(6) would have made a different decision prior to commencing the transit to Duqm on the Duqm A route, had (b)(6) been aware of any warnings (chart or otherwise) regarding cargo containers or debris that may have been lost/dropped in the intended course. There were no warnings in the ECDIS affecting the selected track. As no warnings (chart or otherwise) were present and considering all available navigational information available at the time, Captain (b)(6) maintains that the decision to select Duqm A track for transit to Duqm was appropriate. (b)(6) stated (b)(6) was not aware that the group of reefs and shoals southeast of the Duqm Pilot Station was named the San Carlos Bank. Captain (b)(6) notes that (b)(6) was aware of the referenced reefs and shoals, but not the name "San Carlos Bank", as this name did not appear in the ECDIS, and the important fact is whether these would affect the safe navigation of the BGN, which they did not.

Captain (b)(6) stated there was no real pressure to execute pilot pick up exactly on time. Specifically, that no pressure was being exerted on (b)(6) by (b)(6) operational chain of command. Speed to get to pilot pick up was not an overriding factor. There was no perceived pressure different than normal operations. They changed courses to do steering gear test and to avoid fishing boats. 3rd Officer (b)(6) was also on watch on the bridge. The fishing traffic had some moving fishing vessels, and some were stationary.

Captain (b)(6) stated the decision to increase speed was driven by desire to get through fishing traffic, by showing a more definitive change (vice course change) to the fishing boats, pick up the pilot, and for engineering reasons. The engineering reason being a desire to run the engines at a

Enclosure (2)

higher load after prolonged operation at the unrep speed. The Navigator was on the bridge with 3/O (b)(6) assisting. There were no recommendations from Navigator or 3/O (b)(6) during the transit. There were no recommendations regarding proximity to shoal water/20-meter contour. There was no recommendation needed as the vessel was transiting safely and within expected parameters. Had the Navigator OR 3/O noticed any issues, they would be expected to notify Captain (b)(6) immediately. (b)(6) stated (b)(6) didn't recall being more than 1nm off track and did not receive any recommendations from NAV of watch to regain track. The BGN was always within safe navigation parameters and minor course deviations are common. SOP is to maintain the vessel within 1 NM of the intended track line. The Captain stated (b)(6) standard cross-track error is 1NM and was comfortable with keeping that in place as they transited to Duqm.

When asked if (b)(6) was aware the track had a CPA to the 20m contour curve containing the 11m sounding of approx. 500 yds (b)(6) stated (b)(6) not was aware. Captain (b)(6) recalls that Captain (b)(6) stated to (b)(6) that this was a 'gotcha question' to which Captain (b)(6) replied that it would surprise (b)(6). This was because the track laid by the Navigator, the information provided to (b)(6) and everything (b)(6) reviewed, showed a 24-meter depth all the way through transit and that there was no such CPA as asked by Captain (b)(6).

Captain (b)(6) stated that 1.7-meter trim down aft is not uncommon. And the ship typically had a 1.5-2.3ish trim (b)(6) had assumed that there was 24m depth all the way through because that is what the Navigator told (b)(6) relied on the recommendations of (b)(6) assigned Navigator and confirmed safe transit parameters using all available and reliable navigation information. (b)(6) also stated (b)(6) was not concerned about squat due to depth of water at 24m the whole transit. When

asked about whale restrictions, Captain (b)(6) stated that there was mention of whales during the Nav brief, but to (b)(6) knowledge there was no discussion about speed restrictions due to whales. Again, the NAV brief covers transit from the sea buoy to the port. The BGN was transiting towards the sea buoy at the time of the incident. SOP/SMS and common practice dictate the reducing of speed and changing course, if needed, to avoid whale traffic in accordance with critical whale habitat restrictions.

Captain (b)(6) stated that at some point (b)(6) started to feel vibrations. (b)(6) ordered a hard left rudder. The Chief Mate came to the bridge immediately and they soon learned there were issues with flooding and issues with steering. (b)(6) could not get the rudder out of hard left.

Captain (b)(6) stated they immediately began to prep to drop the anchor. They quickly had key people on station in all key positions, so they did not sound general alarm.

Captain (b)(6) stated (b)(6) was not sure how long vibrations lasted. There were some initial vibrations then a pause, and then some stronger vibrations. (b)(6) looked (b)(6) head over the side and did not notice any discoloration in the water. No signs of sand or coral debris or bottom disturbance. No sign of JP-5 or DFM. Once the ship was at anchor, (b)(6) immediately made voice reports. The Cheng began to pump bilges. They had power the entire time. The ship anchored approximately 12.4 nm from land, just outside Oman territorial waters.

Captain (b)(6) stated (b)(6) has heard there had been Connex boxes lost over the side in that area and that (b)(6) felt that it is possible that the ship had hit a sunken Connex box. This information was

relayed to (b)(6) by the local Duqm pilot who mentioned that the local monsoon season may have moved debris into the area of the incident, including but not limited to several lost/dumped ship containers. Captain (b)(6) understood that the safety board requested that a dive survey, or sonar team, be dispatched to examine that area of the incident and potentially locate the existence of an uncharted/unreported navigational hazard.

Captain (b)(6) stated the pump room began flooding and they shifted tanks and began pumping. Initial reporting was there were a few hull penetrations and some flooding. They went from 82% to all stop quickly. The main entry points seemed to be at centerline 9 and 10.

Captain (b)(6) stated (b)(6) does not know what (b)(6) hit. Looking back, in hindsight, the surveys in that area are old. Captain believes that (b)(6) may have hit an uncharted underwater obstruction. ECDIS contained no information as to when surveys were done.

Captain (b)(6) stated the Big Horn is a tight crew. The Cheng, Bos'n, Ops Chief, among others, have been on the ship a long time. It is a close-knit group and there is good crew cohesion. The biggest thing now is that everyone is concerned about the status of the ship. (b)(6) stated this is our home, Morale is pretty high, all things considered.

Captain (b)(6) expressed that (b)(6) has been a loyal and dedicated employee of MSC and remains available to assist in any way.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)  
\_\_\_\_\_  
Commodore James Murdock

\*\*The above summary of my interview conducted onboard USNS Big Horn is correct to be the best of my knowledge.\*\*

Email concurrence

\_\_\_\_\_  
(b)(6)

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

---

**From:** (b)(6) <(b)(6)@gmail.com>  
**Sent:** Friday, November 1, 2024 9:21 AM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** [Non-DoD Source] USNS BIGHORN CI interview summary  
**Attachments:** 01 NOV 23 - FINAL DRAFT - USNS BIG HORN - Interview Summary.docx

CDRE (b)(6)

You will find the Summary with my changes/edits attached. I tried to mark all revisions and edits as best I could.

Again, thank you for giving me some extra time to review after the typhoon. If you need anything else, I am absolutely available by phone or email.

Very Respectfully

(b)(6)

(b)(6)

(b)(6)

(b)(6)

12 hours ahead of EST

Enclosure (2)

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## SUMMARY OF INTERVIEW

Name: (b)(6)  
Position/Title: Chief Mate  
Date of Interview: 4 October 2024  
Location: Onboard USNS Big Horn  
Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)  
Email Contact: (b)(6)@bighorn.navy.mil

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others. (b)(6), Government Fleet Representative, International Organization of Masters, Mates & Pilots, (AFL-CIO) was present via phone.

(b)(6) stated (b)(6) has been onboard USNS Big Horn (BGN) since 13 September 2024. (b)(6) has served with MSC for 11 years and has been Chief Mate since 2020. (b)(6) last job was as Chief Mate of USNS Pecos. (b)(6) has served in 5<sup>th</sup> Fleet and 7<sup>th</sup> Fleet.

(b)(6) stated that on the morning of the 23<sup>rd</sup> the ship was conducting a RAS with USS Abraham Lincoln (ABE). The plan was to RAS with O'Kane (OKN) after completing the RAS with ABE. Due to manning levels, the RAS events could not be conducted simultaneously. The pilot pick up to head into Duqm had originally been scheduled for 0700 on the 23<sup>rd</sup>, but due to a change in the RAS schedule, the pilot pick up time shifted to 1500. The ship had completed RAS with Spruance and Stockdale the day before. The NAV Brief for entry into Duqm was also held at 1600 the day before on the 22<sup>nd</sup>. (b)(6) stated that different options for the transit into Duqm were discussed during the NAV brief, but the intent was to use the deep water channel into Duqm.

BGN and OKN had gone back and forth regarding the RAS Corpen. BGN wanted to go north, OKN wanted to go south. (b)(6) had the Conn for portions of the the RAS with OKN.

While (b)(6) had the Conn, the Navigator and the Captain had a discussion about the revised route into port. The original route was altered due to the ship being further to the southwest than originally planned due to RAS course (b)(6) was not a part of that discussion. The route into port

Enclosure (3)

Page 1 of 5

(b)(6) previously observed in ECDIS was not ultimately used. (b)(6) did not review nor was (b)(6) aware of the revised track through San Carlos Bank. The last time (b)(6) had been in Duqm was 2015 (b)(6) was aware of the time/speed/distance issue to get to the sea buoy and queried the Navigator about speed required after the RAS event and prior to the incident, to which the Navigator replied 17.5 kts.

When asked if there were any additional requirements on BGN to man additional watch stations for a restricted water transit, the response was there is not, understanding this was separate from inland waters in which a Maneuvering Detail or Modified Maneuvering Detail is stood up.

Upon conclusion of RAS detail, (b)(6) stated (b)(6) departed the bridge and went to muster the deck department and to make preparations for the arrival at Duqm later that afternoon. After that (b)(6) went to her stateroom, where (b)(6) was when the incident happened, (approximately 1412). (b)(6) felt a vibration on the ship that soon became very strong. It went from something that could have been normal to something (b)(6) knew was wrong. (b)(6) immediately went to the Bridge. They were taking control of the engines in ERC. (b)(6) made contact with the Navigator. (b)(6) looked at ECDIS and the fathometer and noted 9 meters under the keel. (b)(6) stated the shaking of the ship lasted 10-15 seconds and (b)(6) knew something was wrong. (b)(6) took a fix at 1414. The Navigator had plotted on the paper chart and (b)(6) looked at ECDIS closely. (b)(6) asked if the Navigator thought it was a grounding and the Navigator stated they thought it was.

Getting anchor detail manned took a while, (several minutes). The ship was in damage control mode. Water was coming into the engine room, the bilge was flooding. Calling out the anchor took approximately 30 minutes. While awaiting anchoring, the ship was drifting with no engines running. The rudder was stuck at 7-10 degrees left rudder. After the anchor was dropped, (b)(6) (b)(6) and the Captain went to ERC. They did not sound the General Alarm as everyone was already on station. They were focused on flood mitigation and seawater in 9C and 10C tanks as well as fuel water mixture in the engine room bilge.

(b)(6) stated that, after the event, the ship was at anchor for about 24 hours. They were pier side in Duqm at 1800 on 24 September.

(b)(6) stated that there was a very high OPTEMPO since (b)(6) had been onboard, and pressure on the crew, and crew fatigue. (b)(6) stated (b)(6) thought the grounding was a direct result of the time crunch. Since the ship left Fujairah, 15 September, they conducted 08-10 UNREPs. As well as servicing two Carrier Strike Groups in the months prior (both the ABE CSG and TR CSG).

Enclosure (3)

Page 2 of 5

(b)(6) stated the BGN is one of the best crews (b)(6) has served with. They were prepared 100% to accomplish the mission. The plan was to set sea and anchor detail around the sea buoy. The 3<sup>rd</sup> mate on watch at the time of the incident, 3/O (b)(6) was relieved when the ship arrived in Duqm and is on leave in New York. (b)(6) stated the bridge was calm after the incident. There was a lot of concern for the ship (b)(6) stated the response by the crew was, in general, really good.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)

Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email concurrence provided

(b)(6)  
Chief Mate

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

---

**From:** (b)(6) CIV USNS BIG HORN  
<(b)(6)@bighorn.navy.mil>  
**Sent:** Friday, October 18, 2024 1:07 AM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** RE: Interview Summary  
**Attachments:** Big Horn CI interview summary Chief Mate-edit.docx

Sir,  
I only made some minor edits. Please see attachment, which I concur with. Thank you.

Very Respectfully,  
(b)(6)  
Chief Mate, MSC

-----Original Message-----

**From:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA) (b)(6)@us.navy.mil>  
**Sent:** Thursday, October 17, 2024 6:03 PM  
**To:** (b)(6) CIV USNS BIG HORN <(b)(6)@bighorn.navy.mil>  
**Subject:** RE: Interview Summary

With attachments this time.

**From:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Sent:** Thursday, October 17, 2024 10:03 AM  
**To:** (b)(6) CIV USNS BIG HORN <(b)(6)@bighorn.navy.mil>  
**Subject:** Interview Summary

Chief Mate (b)(6)

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Additionally, if there is any other information you believe would be helpful for the investigation, you are welcome to submit a voluntary statement using the attached form.

Enclosure (3)

Request your review be returned by COB Wednesday, 23 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Commodore, MSCLANT

CTG 80.83 / CTF 42

(O) (b)(6)

(C) (b)(6)

Enclosure (3)

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## SUMMARY OF INTERVIEW

Name: (b)(6)  
Position/Title Navigator  
Date of Interview: 5 October  
Location: Onboard USNS Big Horn  
Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)  
Email Contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others. Subsequent to the interview, the interview summary was prepared and provided to (b)(6) for review and for the opportunity to provide additional input. (b)(6) provided additional information to the investigation team.

(b)(6) stated (b)(6) is the ship's Navigator and has been onboard Big Horn since 31 August 2024. (b)(6) previously served onboard USNS Yukon for approximately 14 months as 3<sup>rd</sup> mate. (b)(6) graduated from SUNY Maritime in January 2023. This is (b)(6)'s 1<sup>st</sup> assignment as Navigator. When (b)(6) served onboard Yukon, they operated strictly in 7<sup>th</sup> Fleet. (b)(6) stated that (b)(6) had never been to the Port of Duqm prior to 23 Sep 2024.

(b)(6) stated that on the 23<sup>rd</sup> of September, BGN was scheduled to RAS USS Abraham Lincoln (ABE) and USS O'Kane (OKN) and then transit to the port of Duqm. As the RAS track put them further to the southwest, and in preparation for the transit into Duqm (b)(6) had prepared two tracks, "Duqm A" and "Duqm B." These two tracks were prepared at approximately 1230. (b)(6) stated Duqm A was prepared with care, verified through ECDIS and paper charts, and was the track ultimately chosen by the Captain. Duqm B was the route that left the San Carlos Bank to the west and eventually joined the Deep Water Route to the Duqm Pilot Station. (b)(6) discussed the two routes with the Captain and wanted to get (b)(6) decision on which track they would take. (b)(6) stated that while staying on schedule was an operational goal, safety considerations were thoroughly evaluated. .

(b)(6) stated (b)(6) saw 24 m depth on ECDIS for the Duqm A track. The focus was on ensuring safe navigation along the chosen track, and both routes were discussed thoroughly with the

Enclosure (4)

Page 1 of 3

Captain. The Captain made the decision to proceed with Duqm A based on the information provided and the (b)(6) stated (b)(6) ensured that all navigational checks were completed in ECDIS and on paper charts. (b)(6) stated (b)(6) was comfortable with decision to use the Duqm A track.

(b)(6) stated the track indicated sufficient depth throughout, and (b)(6) included squat calculations to ensure safe under-keel clearance. .

(b)(6) stated (b)(6) did read the Sailing Directions and was aware of the two times that the Sailing Directions recommend the use of the Deep Water Route for deep draft ships arriving at Duqm. (b)(6) stated that, based on the ECDIS and chart data, 24 meters of safe water was available throughout the route. (b)(6) stated (b)(6) was aware of the recommendation to use the Deep Water Route but assessed the conditions along Duqm A to meet safety requirements.

(b)(6) looked at charts 62330, 62333 and 62024 for reference and situational awareness.

(b)(6) stated (b)(6) plotted the track in ECDIS and received no depth alerts. There were cautions on each leg of the Duqm A track for prevailing currents and whale migration.

(b)(6) stated during the execution of the "Duqm A" track, they made appropriate adjustments for fishing boats to ensure safe passage. The Captain steered the ship to port to avoid traffic. (b)(6) stated the Captain, who retained the conn, was fully aware of the ship's position and deviations from the track.

(b)(6) stated that on 22 September, they conducted a NAV Brief. This brief covered the items on the SMS Navigation Brief checklist and the expected arrival time. The plan at that time was to use the deep water route to approach the pilot station.

(b)(6) stated (b)(6) was present in the Pilot House when (b)(6) detected a "rumbling" sensation. The Captain immediately issued a hard left rudder order to respond. Upon checking the fathometer and it showed a question mark, indicating an issue with depth readings. Order was given to "all stop" and control was shifted to ERC.

(b)(6) stated (b)(6) did not make a recommendation regarding which track (Duqm A or B) to use heading into port. (b)(6) stated (b)(6) showed the Captain the two routes for the Captain to decide. They wanted to stay on schedule. (b)(6) stated (b)(6) confirmed there was 24 m throughout the route. (b)(6) stated (b)(6) ensured the Captain was informed of all navigational risks, including general awareness of shoal waters based on the chart data. (b)(6) stated the Captain made the recommendation to line up the 24 meter depth spot sounding to facilitate "shooting the gap." (b)(6) stated the Captain was aware of the ship's proximity as it related to shoal water.

Enclosure (4)

Page 2 of 3

(b)(6) stated there was no discussion of contacting the pilot to delay pickup time to allow the ship to use the longer Duqm B route around the San Carlos Bank.

(b)(6) stated (b)(6) was aware of a speed limitation in the area due to whales, but (b)(6) was not aware of the specific limitation.

(b)(6) stated (b)(6) was aware of warnings on the paper chart regarding 19M soundings

(b)(6) stated that after the RAS with OKN, the Captain kept the conn. (b)(6) stated that (b)(6) remained on the bridge after the unrep maneuvering detail secured because (b)(6) wanted to assist with navigation and to provide an extra set of eyes for the Captain.

(b)(6) stated (b)(6) was aware that the Sailing Directions stated ships "shall use" the deep water route.

This summary is an accurate reflection of the information provided during the interview process. I certify that the summaries are true and correct to the best of my knowledge.

(b)(6)

Commodore (b)(6)

I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.

(b)(6)

## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: 3<sup>rd</sup> Mate

Date of Interview: 4 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)

Email contact: (b)(6)@gmail.com

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) has served onboard USNS Big Horn for approximately 4 months as 3<sup>rd</sup> Mate. Prior to serving onboard Big Horn, (b)(6) had served onboard USNS Mercy. Big Horn is his second ship.

(b)(6) stated that on the morning of the 23 September, (b)(6) had the 08-12 watch in the pilot house. (b)(6) left the pilot house at 1330 when they secured from RAS detail. (b)(6) was in (b)(6) room when (b)(6) felt a slight change in the ship. (b)(6) thought they were doing ahead/astern testing. Shortly after that (b)(6) felt the ship shudder – very bad. (b)(6) estimated it lasted for about 2-3 minutes.

(b)(6) stated (b)(6) walked around the deck and looked over the side and noticed the water was dark, there was no sheen. (b)(6) saw the ship's wake and noticed the ship had turned to port. (b)(6) contacted Chief Mate and asked if (b)(6) needed any help and (b)(6) said no.

(b)(6) stated the Nav brief for entering Duqm was held on the 22 September at 1600. (b)(6) did not remember anything remarkable about the Nav brief. It was held in the pilot house. The route they discussed in the Nav brief, the deep water route, was not the one they ultimately took into Duqm. As they were finishing the RAS with OKN, the Navigator had a conversation with the Captain and the route changed due to the ship's location further to the southwest than planned. (b)(6) stated (b)(6) saw the route that they were going to take in ECDIS and on the scale (b)(6) saw, it looked "o.k." But (b)(6) remembers saying out loud to no one in particular

Enclosure (5)

Page 1 of 4

words to the effect of "Man, I wouldn't cut any corners" on the route. The speed required was 17.5 knots. (b)(6) recalled stating words to the effect of, "Damn, that's a big squat." (b)(6) stated that, from (b)(6) outside view, the route and the speed were chosen to get into the pilot pick up point on time. (b)(6) did not recall anyone discussing or suggesting a change to pilot pickup time.

(b)(6) stated that during the Nav brief, it was mentioned to keep an eye out for whales. (b)(6) did not recall mention of a speed limitation. After the fact, (b)(6) reviewed the paper chart and noted warnings. (b)(6) did not see any warnings on ECDIS. (b)(6) had no role in the transit into Duqm. (b)(6) did not read the Sailing Directions for the approach to Duqm.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge. \*\*

(b)(6)  
Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

\_\_\_\_\_  
Email Concurrence

(b)(6)

3<sup>rd</sup> Mate

Enclosure (5)

Page 2 of 4

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6)@gmail.com>  
**Sent:** Saturday, October 26, 2024 3:32 AM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** [Non-DoD Source] Re: Interview Summary

Commodore (b)(6)

My apologies for the tardiness of my response. The statement is good as written; I have no notes or changes. Thank you very much for your time.

Very Respectfully,

3/O (b)(6)

(b)(6)

On Thu, Oct 17, 2024 at 18:10 (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
(b)(6)@us.navy.mil> wrote:

3/O (b)(6)

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Request your review be returned by COB Wednesday, 23 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Enclosure (5)

Page 3 of 4

Commodore, MSCLANT

CTG 80.83 / CTF 42

(O) (b)(6)

(C) (b)(6)

Enclosure (5)

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## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: 3<sup>rd</sup> Mate

Date of Interview: 17 October 2024

Location: Interview conducted via phone

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) had served onboard USNS Big Horn for approximately 6 months as 3<sup>rd</sup> Mate when the incident occurred. Prior to serving onboard Big Horn, (b)(6) had served onboard USNS Arctic for approximately two months. Big Horn is (b)(6) second ship. (b)(6) graduated from SUNY Maritime in September 2023.

(b)(6) stated that this was (b)(6) first time pulling into Duqm. For the NAV brief conducted on 22 September, (b)(6) recalled the Navigator stated there was a possibility of whale pods, but (b)(6) (b)(6) did not recall discussion of a speed limitation.

(b)(6) stated that on 23 September (b)(6) was on the bridge and was standing behind the helmsman as HSO during the RAS with O'Kane. The Captain came into the wheel house and had a discussion with the Navigator regarding the transit into port. They stood by the forward ECDIS on the port side and spoke for about 10-15 minutes. (b)(6) understood that the Navigator had prepared two track options to transit into port for the Captain's decision.

(b)(6) stated that as the RAS with O'Kane ended, they secured from UNREP detail and (b)(6) would normally take the conn. In this case, the Captain retained the conn because of the speed they were going and the fishing vessel traffic in the vicinity. The Captain was in the chair and (b)(6) was assisting, and looking out for potential danger. The pre-entering port engine and steering tests were completed between 1330-1345. (b)(6) stated (b)(6) was looking at the track

Enclosure (6)

Page 1 of 2

line to see where they had to turn. (b)(6) saw that the track line transited through white/blue area. That struck (b)(6) as a little odd, but (b)(6) looked at the soundings and they looked o.k. (b)(6) stated they made some small course changes to maneuver through fishing vessels. Many vessels were stationary, but some were moving. They had a pilot pickup time of 1500, so they were transiting at a higher speed to get to the pickup point on time. They were making good, 17.5 to 18 knots. (b)(6) estimated Big Horn would squat about 1 to 1.5 feet on the stern at that speed. (b)(6) stated (b)(6) does not recall any discussion of the CPA to the 11 meter shoal.

(b)(6) stated that when the incident happened the ship experienced violent shaking for about 10-15 seconds. (b)(6) immediately thought they had hit an uncharted shoal/obstruction. About 10-15 minutes after the ship shook (b)(6) went to the bridge wing and noticed many small to medium sized vessels at anchor about 1/2 to 3/4 miles away. That struck (b)(6) as odd given the size and type of those vessels didn't appear to be large or capable enough to anchor in deep water.

(b)(6) stated that (b)(6) thought the Captain ordered a left full rudder when the shaking began because there was some small boat traffic off the starboard bow. The Navigator had brought the engines to all stop. The Chief Engineer reported there was fuel leaking and water in the main engine space. They were not able to regain steering on the bridge. The steering pumps were secured and the Captain told the Chief Mate to set anchor detail. They had the port anchor 5 shots to the water's edge and dropped it. (b)(6) looked over the side and saw sandy water, mud/dirt.

(b)(6) stated (b)(6) looked at ECDIS after the incident. (b)(6) zoomed in on the screen and did not see any depth soundings that would have been a concern. (b)(6) stated they did not use the paper charts for navigation because they had been cancelled. (b)(6) did not look at the fathometer during the incident. The fishing boats they were maneuvering around were mostly small to medium sized, many were small dhow boats. (b)(6) stated (b)(6) was not familiar with San Carlos Bank. After the incident, they took photos to document the incident and preserve information.

(b)(6) stated the Captain stated they would "shoot the gap" to transit to the pilot pick up point. (b)(6) estimated the gap between the two hazardous areas was approximately 4-5 miles wide.

\*\* This summary is an accurate reflection of the information 3/O (b)(6) provided during the interview. I certify that the summaries are true and correct to the best of my knowledge. 3/O (b)(6) did not respond to multiple requests to review and concur with (b)(6) interview summary. \*\*

(b)(6)  
Commodore (b)(6)

Enclosure (6)

Page 2 of 2

## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: Ops Chief

Date of Interview: 5 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6) Captain (b)(6), (b)(6)  
(b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) has served onboard USNS Big Horn for approximately 4 years as the Ops Chief.

(b)(6) stated that during the RAS with O'Kane (OKN) on the morning of the 23 September, (b)(6) was in the pilot house on SIPR Chat. (b)(6) stated (b)(6) had submitted the LOGREQ for pulling into Duqm and the pilot pick up was scheduled for 1500. If the pilot pick up was delayed, it would not be a problem coordinate. There was no discussion with (b)(6) about delaying the pilot pick up.

(b)(6) stated that (b)(6) went to (b)(6) office after the RAS was completed. When (b)(6) was in (b)(6) office (b)(6) felt the violent ship movement and grabbed (b)(6) desk. It lasted less than a minute/30 seconds (b)(6) immediately went to the pilot house. (b)(6) logged into chat and provided 5Ws/SITREP to CTF 53 BWC. At one point (b)(6) went to the bridge wing and looked over the side, but did not see anything. (b)(6) also coordinated the LOGREQ for the tugs to assist the Big Horn after the grounding.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)  
Enclosure (7)

Page 1 of 4

Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email concurrence

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(b)(6)

Ops Chief

Enclosure (7)

Page 2 of 4

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6) CIV USNS BIG HORN <(b)(6)@bighorn.navy.mil>  
**Sent:** Saturday, October 26, 2024 1:01 AM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** (b)(6) Interview Summary  
**Attachments:** smime.p7s; Big Horn CI interview summary Ops Chief (b)(6).docx

CDRE,

Good morning, concur as written and have a great weekend.

V/r,

OPS CHIEF

-----Original Message-----

**From:** (b)(6)  
**Sent:** Saturday, October 26, 2024 8:48 AM  
**To:** (b)(6), CIV USNS BIG HORN <(b)(6)@bighorn.navy.mil>  
**Subject:** [Non-DoD Source] Fw: Interview Summary

Yahoo Mail: Search, Organize, Conquer

<https://usg01.safelinks.protection.office365.us/?url=https%3A%2F%2Fmail.onelink.me%2F107872968%3Fpid%3DNativePlacement%26c%3DGlobal\_Acquisition\_YMktg\_315\_EmailSignatureGrowth\_YahooMail%3ASearch%2COrganize%2CConquer%26af\_sub1%3DAcquisition%26af\_sub2%3DGlobal\_YMktg%26af\_sub3%3D%26af\_sub4%3D100000945%26af\_sub5%3DOrganizeConquer\_\_Static\_&data=05%7C02%7C(b)(6);40us.navy.mil%7C6433970c20fe4230c12608dcf57b364a%7Ce3333e00c8774b87b6ad45e942de1750%7C0%7C0%7C638655156840127692%7CUnknown%7CTWFpbGZsb3d8eyJWljoImC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Iik1haWwiLCJXVCi6Mn0%3D%7C0%7C%7C%7C&sdata=jJoG5nhKWxCyyRMo9W4V3N%2FF5PIUr2%2Bu7dPiN59jx5c%3D&reserved=0>

----- Forwarded Message -----

**From:** "(b)(6) CAPT USN COMSC LANT NORFOLK (USA)" (b)(6)  
**To:** (b)(6) "(b)(6)" >  
**Cc:**  
**Sent:** Thu, Oct 17, 2024 at 18:25  
**Subject:** Interview Summary

Ops,

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

Enclosure (7)

Page 3 of 4

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Request your review be returned by COB Wednesday, 23 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Commodore, MSCLANT

CTG 80.83 / CTF 42

(O) (b)(6)

(C) (b)(6)

Enclosure (7)

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## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: Cargo Mate

Date of Interview: 5 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) has been onboard USNS Big Horn for approximately 5 years. (b)(6) has been with MSC for 25 years. (b)(6) stated (b)(6) has never worked as hard as (b)(6) has in the past four months since the ship inched to 5<sup>th</sup> Fleet. (b)(6) stated (b)(6) thought the crew was very tired. (b)(6) stated BGN did approximately 1-2 unrep events per month in C7F vice 2-3 per day in C5F.

(b)(6) stated the ship conducted 6 Replenishments at Sea in 2 days. After completing the final RAS on the 23<sup>rd</sup>, (b)(6) prepared the post RAS stability report then (b)(6) went to (b)(6) stateroom. At some point shortly after (b)(6) arrived in (b)(6) stateroom, (b)(6) soon felt a shake like the ship was going in reverse. There was a break, then it happened again. (b)(6) proceeded to the foc'sle after anchor detail was called away. While anchoring, the anchor did not freefall and had to be walked out.. Once anchored, (b)(6) went to cargo control.

(b)(6) stated (b)(6) prepared the post-grounding arrival stability report for Duqm. The draft was about 34-35 feet. Throughout the night (b)(6) started seeing changes in tank levels. After about 4-5 hours (b)(6) saw fuel level going down, so (b)(6) knew there were leaks, with liquid either moving internally or via free communication with the sea. (b)(6) stated that it appeared that there was free communication between cargo tanks 9C and 10C. (b)(6) also responded to flooding in the pump room, which (b)(6) believed was coming from vents from an oily waste holding tank under the pump room.

Enclosure (4)

CUI

(b)(6) stated that during the night at anchor no one slept. (b)(6) emphasized that the crew did a great job in a very challenging situation.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)

Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email Concurrence Attached

(b)(6)  
Cargo Mate

CUI

Enclosure (8)  
Page 1 of 7

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6) CIV BIG HORN <(b)(6)@bighorn.navy.mil>  
**Sent:** Wednesday, October 23, 2024 5:50 AM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Cc:** (b)(6) CIV (USA)  
**Subject:** RE: Interview Summary  
**Attachments:** Voluntary statement form BGN.doc  
**Signed By:** (b)(6)@bighorn.navy.mil

(b)(6)

I've included my voluntary statement to clarify a few points, and otherwise concur with what was written. I would also like to say, it was like therapy talking to you and the other members of your team. I was still in shock from what occurred and hadn't slept much. We are still working long hours trying to take care of our ship.

V/r

(b)(6)

Cargo Mate

USNS BIG HORN T-AO 198

(b)(6)

@bighorn.navy.mil

(b)(6)

@bighorn.navy.smil.mil

-----Original Message-----

**From:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
<(b)(6)@us.navy.mil>  
**Sent:** Monday, October 21, 2024 2:41 PM  
**To:** (b)(6) CIV BIG HORN  
<(b)(6)@bighorn.navy.mil>  
**Subject:** RE: Interview Summary

Absolutely no worries. I've attached a voluntary statement form for you to use. Pls send back to me when ready.

V/r (b)(6)

-----Original Message-----

**From:** (b)(6) CIV BIG HORN  
<(b)(6)@bighorn.navy.mil>  
**Sent:** Saturday, October 19, 2024 12:07 PM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
(b)(6)@us.navy.mil  
**Subject:** RE: Interview Summary

Commodore,

I was pretty tired when we did that interview, I had just woken up 10 minutes before we did it. I feel like the information I was trying to convey is not really included in your choice of statements that you pulled out.

Enclosure (8)

Page 3 of 7

There are a lot of other things that we discussed that are not listed in this statement. If you want me to write a statement and sign it, I will do so conveying the information that I wanted to express. Please let me know how you would like me to proceed.

V/r

(b)(6)

Cargo Mate

USNS BIG HORN T-AO 198

(b)(6)

@bighorn.navy.mil

(b)(6)

@bighorn.navy.smil.mil

-----Original Message-----

From: (b)(6) CAPT USN COMSC LANT NORFOLK (USA)

(b)(6)

@us.navy.mil>

Sent: Thursday, October 17, 2024 2:24 PM

To: (b)(6) CIV BIG HORN

<(b)(6)@bighorn.navy.mil>

Subject: Interview Summary

Cargo,

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Request your review be returned by COB Wednesday, 23 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Enclosure (8)

Page 4 of 7

Commodore, MSCLANT

CTG 80.83 / CTF 42

(O) (b)(6)

(C) (b)(6)

Enclosure (8)

Page 5 of 7

**VOLUNTARY STATEMENT**

2. 10/23/24

I, (b)(6), make the following and voluntary statement to Commodore (b)(6), whom I know to be Investigating Officer for the Administrative Command Investigation.

I make this statement of my own free will and without any threats or promises extended to me. I fully understand that this statement is given concerning my knowledge of suspected grounding of USNS Big Horn off the coast of Oman on 23 September 2024.

On 5 Oct 2024 I had an interview with the Investigative Team and needed to clarify a few topics. I wanted to get across the amount of work that had been required to be done by a minimal crew on a tanker. Since we started talking about the number of unrep events, the facts are that we did 2 UNREP's in May, 16 in June, 15 in July, 24 in Aug, and 21 the first 3 weeks in Sep. But it's not the number of unrep's that we did that matters. It's the amount of work required to complete those unrep's. We were loading copious amounts of cargo, to supply two carrier battle groups. We started running with the Roosevelt group on June 1<sup>st</sup> and then the Lincoln on 23 Aug.

One of the best ways for me to illustrate this is by our overtime on our LES's. A normal pay period is about 50 hours of overtime every two weeks for most sailors. In May 5/18 my OT was 50 hours. 6/15 75 hours, 6/29 75 hours, 7/15 72 hours, 7/27 78 hours, 8/10 97 hours, 8/24 85 hours, 9/7 92 hours, 9/21 75 hours. In 25 years working for MSC I have never been required to work this many hours to get the job done. But the crew, with their unwavering dedication, delivered and got the job done. These are the facts that I was trying to get across.

Another point I would like to clarify is that when I saw a change in the tank's levels, they went up in 9C and 10C not down. The level of 7C was going down and we started transferring that fuel to other

Enclosure (8)

Page 6 of 7

tanks.

Also the 21<sup>st</sup> -23<sup>rd</sup> we did 5 unreps not 6. I said 5 or 6, but I was tired and misspoken.

Enclosure (8)

Page 7 of 7

## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: Helmsman

Date of Interview: 4 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) reported onboard USNS Big Horn on 24 March 2024. (b)(6) has been with MSC for 5 years (b)(6) normal watch station is the Pilot House, and (b)(6) steers the ship during unreps. This was (b)(6) first time pulling into Duqm. (b)(6) was on helm at the time of the incident. The ship started shaking and then it stopped briefly but began shaking a second time much harder and louder.

(b)(6) stated that (b)(6) took the helm at 1400, and prior to the incident, everything on the helm was normal. There were other ships on the horizon, but no other ships were close to Big Horn. (b)(6) was using normal rudder with no issues. The ship's speed was 83% ahead on 2 engines, approximately 17 knots. When the incident happened, dust from the overhead fell on (b)(6). The Captain ordered a hard left rudder. The rudder went hard left. When ordered to go rudder amidships, the rudder did not respond. Steering control was transferred to Aft steering where steering control was still not regained.

(b)(6) did not overhear any discussion about the navigation track or route to Duqm.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)  
Com e (b)(6)

Enclosure (9)

Page 1 of 4

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email concurrence

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(b)(6)

Enclosure (9)  
Page 2 of 4

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

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**From:** (b)(6)  
**Sent:** Wednesday, October 23, 2024 12:06 PM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** [Non-DoD Source] Re: Interview Summary

Everything is correct except for when the steering was transferred to Aft Steering it still did not respond so we turned off the whole steering system.

On Thu, Oct 17, 2024 at 10:28 (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
(b)(6) @us.navy.mil> wrote:

(b)(6)

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Request your review be returned by COB Wednesday, 23 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Commodore, MSCLANT

CTG 80.83 / CTF 42

Enclosure (9)

Page 3 of 4

(O) (b)(6)

(C) (b)(6)

Enclosure (9)

Page 4 of 4

## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: A/B

Date of Interview: 17 October 2024

Location: Interview conducted via phone

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) had served onboard USNS Big Horn (BGN) since 28 Feb 2024 (b)(6) left BGN when the ship pulled into Duqm as (b)(6) was 3 months overdue for relief. (b)(6) has been with MSC for 26 years. (b)(6) started as an O/S, but has been an A/B for 24 years. This was (b)(6) first assignment onboard BGN. (b)(6) has served on Ammo ships and many, many different ships during (b)(6) career with MSC. (b)(6) normal watch station is rotation between helm, lookout and rover. (b)(6) had been in Duqm 6 or 7 years ago.

(b)(6) stated that at the time of the grounding (b)(6) was standing starboard lookout. (b)(6) did not attend the 22 Sep NAV brief. (b)(6) recalls that the ship was trying to get a hold of the pilot to coordinate pickup to enter port and confirm 1500 pickup time. As the RAS was finishing, (b)(6) heard the Captain and Navigator discussing the time/speed to get to the pilot pickup point.

(b)(6) stated that when the incident occurred, (b)(6) felt vibrations and thought the engine had blown up. (b)(6) looked over the side and saw a bunch of mud coming up, and saw what (b)(6) described as mud/brown water astern of the ship. (b)(6) stated the vibrations started small and then got very strong. They lasted for about 30 seconds to one minute. (b)(6) stated the ship slowed down until the anchor was dropped. (b)(6) was still on watch when they dropped the anchor.

(b)(6) stated that everyone on the ship got along well despite being very busy. Compared to other ships (b)(6) has been on, the morale was good. Everyone liked the Captain. (b)(6) was a good Captain.

Enclosure (10)

Page 1 of 4

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)  
Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email Concurrence

(b)(6)

A/B

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6)  
**Sent:** Tuesday, October 22, 2024 11:02 AM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** [Non-DoD Source] Re: Interview Summary

Yes, I agree.

On Tue, Oct 22, 2024, 7:55 AM (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
(b)(6) <@us.navy.mil> wrote:

(b)(6)

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Request your review be returned by COB Friday, 25 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Commodore, MSCLANT

CTG 80.83 / CTF 42

(O) (b)(6)

Enclosure (10)

Page 3 of 4

10/10/2010 10:10:10 AM

(C)

(b)(6)

Enclosure (10)

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SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: OS

Date of Interview: 4 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) reported onboard USNS Big Horn on 1 September 2024. (b)(6) normal watch station is the Pilot House. (b)(6) had the 12-4 watch on 23 September and was Rover at the time of the incident, conducting rounds on the O2 level. (b)(6) had stopped by (b)(6) stateroom to pick up (b)(6) walkie-talkie charger. (b)(6) stated when the incident happened it felt like rumbling, violent, like an earthquake. This was (b)(6) first time pulling into Duqm.

Immediately after the incident, (b)(6) went outside and noticed several crew members on the flight deck trying to determine what had just happened to the ship. OS (b)(6) did not notice anything unusual in the water around the ship. (b)(6) then returned to the bridge and assumed the duties of lookout on the starboard bridge wing.

(b)(6) discussed Standing Orders and signatures on them. (b)(6) stated that, per the engineering log, they felt rattling at 1407. There were 2 other watchstanders on watch at the time of the incident who have since departed the ship: AB (b)(6) and 3<sup>rd</sup> Mate (b)(6)

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)

Enclosure (11)

CUI

Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email concurrence provided

---

(b)(6)

OS

Enclosure (11)

CUI

Page 2 of 4

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6) >  
**Sent:** Saturday, October 19, 2024 9:19 PM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** [Non-DoD Source] Re: Interview Summary

concur as written

On Thu, Oct 17, 2024 at 18:30 (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
<(b)(6)@us.navy.mil> wrote:

(b)(6)

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Request your review be returned by COB Wednesday, 23 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Commodore, MSCLANT

CTG 80.83 / CTF 42

(O) (b)(6)

Enclosure (11)

Page 3 of 4

(C)

(b)(6)

Enclosure (11)

Page 4 of 4

## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: Chief Engineer

Date of Interview: 6 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

(b)(6) stated (b)(6) has served onboard USNS Big Horn since 17 August. (b)(6) picked the ship up in Fujairah, UAE. (b)(6) stated the ship has had a very heavy optempo since (b)(6) has been onboard, both underway and inport. (b)(6) stated (b)(6) was adequately manned on 22 September. The schedule has been very flexible with a lot of schedule changes.

(b)(6) stated they had conducted pre-entry checks for Duqm around 1310 in 23SEP. They had various engineering work items set to be addressed while they were in Duqm and were eager to have the maintenance and repair time inport.

(b)(6) stated when the event happened, (b)(6) was sitting at (b)(6) desk and felt a shudder. (b)(6) thought the bridge had used too much rudder. But it took (b)(6) only a second and a half to realize something was not normal.

(b)(6) went to ERC after radio call from 1/AE (b)(6) Engine control had already been shifted to ERC when (b)(6) arrived. (b)(6) reported fuel oil leaks in the engine room with fuel leaking onto main engines to the bridge and recommended shutting engines down. (b)(6) received concurrence from bridge. (b)(6) emergency stopped both main engines and secured fuel oil service system. (b)(6) later discovered the fuel was coming back up through drains from main engine leak off system, likely as a result of seawater pressure in the tank as the tank was exposed to the sea.

Enclosure (12)

Page 1 of 3

They had leaks and flooding and began applying shoring to known leaks. They began pumping bilges into the oily waste holding tank. There was ankle high flooding between both engines on the deck plates. (b)(6) stated (b)(6) would provide the Damage Control Report for the details of the damage.

(b)(6) stated that MSC as a whole is short people, short qualified people. (b)(6) stated the ship was lucky they had the right people onboard when this incident happened. The crew did an outstanding job. And they managed to respond to this situation safely. It was fortunate that no one was hurt. (b)(6) stated the ship is still fighting water. Assessments, repairs are ongoing.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)  
Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email Concurrence

(b)(6)  
Chief Engineer

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6) >  
**Sent:** Saturday, October 26, 2024 12:52 AM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Cc:** BIGHORN CHENG; (b)(6)  
**Subject:** [Non-DoD Source] Re: Interview Summary  
**Attachments:** Big Horn CI interview summary, Cheng (b)(6).docx

Good day

I stated our pre arrival sms checks were done approximately 1310 just prior to the incident on the 23rd September.

Very Respectfully

(b)(6)

Sent from my iPhone

On Oct 17, 2024, at 18:33, (b)(6) CAPT USN COMSC LANT NORFOLK (USA) (b)(6)@us.navy.mil> wrote:

(b)(6)

I have attached a summary of the information we discussed during our interview onboard USNS Big Horn. Please review for accuracy. If you would like to make any edits/clarification, let me know and we can adjust. It is in .word form, so feel free to make edits. Request you use track changes or highlight any changes you want to make.

Be careful not to introduce any technical information that was discovered after we met. I'll get that info from other sources.

If you concur with write up as is, you can simply reply to this email with a "concur as written." No need to print/sign/scan/email.

Request your review be returned by COB Wednesday, 23 Oct.

Please let me know if you have any questions.

Respectfully,

(b)(6)

Commodore, MSCLANT  
CTG 80.83 / CTF 42

(O) (b)(6)

(C) (b)(6)

Enclosure (12)

Page 3 of 3

## SUMMARY OF INTERVIEW

Name: (b)(6)

Position/Title: 1 Assistant Engineer

Date of Interview: 6 October 2024

Location: Onboard USNS Big Horn

Investigation Team Members: Commodore (b)(6), Captain (b)(6), (b)(6)  
(b)(6)

Email contact: (b)(6)

Intro: Prior to beginning the interview, the Investigating Officer (IO) explained to (b)(6) that (b)(6) was appointed by Military Sealift Command Central to conduct a Command Investigation (CI) into the 23 September 2024 grounding of USNS Big Horn. The IO also explained that the CI is completely separate from the ongoing safety investigation and interviews conducted by the safety investigation team were separate from those conducted as part of the CI. The IO introduced the other two members of the investigation team. The IO also explained that due to the sensitive nature of the investigation, the information discussed during the interview should not be shared with others.

This interview was conducted in conjunction with a walk around of the Engineering spaces. 1 A/E (b)(6) walked us through (b)(6) actions on the afternoon of 23 Sep, mostly the time immediately post-grounding. The investigation team did not use a pre-made set a questions for this interview as done with other interviews due to the unique set up of this discussion.

(b)(6) stated (b)(6) has served onboard USNS Big Horn for approximately one month, but had significant time onboard 187 class AOs and is very comfortable with operating the engineering plant. (b)(6) picked the ship up in Fujairah, UAE. (b)(6) stated the ship has had a very heavy optempo since (b)(6) has been onboard, both underway and in port.

Starting in the ERC, (b)(6) began to explain the engineering plant set up at the time of the grounding. (b)(6) relayed they had just completed both steering and engine EOT tests prior to entering port.

(b)(6) was in the ERC when the vibrations started. (b)(6) stated they lasted for 30 seconds to a minute. Since the ship was steaming at ~18kts, (b)(6) noticed the rudder had gone hard left and called up to the bridge to get them to ease the rudder, thinking the vibrations were a result of speed+rudder angle.

Enclosure (13)

Page 1 of 2

(b)(6) then received a report of possible fuel leaks in the engine room. (b)(6) immediately called the Chief Engineer to have (b)(6) come to ERC. By the time the CHENG got to ERC, engine control had already been shifted to ERC from bridge.

With CHENG in ERC, (b)(6) went to engine room to assess situation. (b)(6) confirmed fuel leaks in vicinity of main engines, source not immediately known. (b)(6) stated they later learned the fuel was from the leak off tank drain lines, coming back up from the tank through the drains into the space – a direct result of seawater intrusion into tank.

Upon seeing the fuel leaks, (b)(6) recommended to CHENG immediately stopping both main engines. Both engines were stopped and the fuel oil service system was secured.

(b)(6) and the other engineers began to assess the rest of the space. They observed water spraying into engine room from fittings beneath the deck plates. [Investigator observation – fittings are similar to stuffing tubes] The amount of water coming into space was described as “significant and geyser like.”

They began to plug leaking fittings with DC plugs and keeping them in place using wedges and shoring. They also began pumping bilges into the oily waste holding tank. (b)(6) assesses the water was mid-calf high between the engines (above the deck plates).

(b)(6) stated that MSC as a whole is short people, short qualified people. (b)(6) stated the ship was lucky they had the right people onboard when this incident happened. The crew did an outstanding job. And they managed to respond to this situation safely. It was fortunate that no one was hurt. (b)(6) stated the ship is still fighting water. Assessments, repairs are ongoing.

\*\* This summary is an accurate reflection of the information provided during the interview. I certify that the summaries are true and correct to the best of my knowledge.\*\*

(b)(6)  
Commodore (b)(6)

\*\*I agree that this is an accurate summary of the information provided during the interview conducted onboard USNS Big Horn.\*\*

Email concurrence

(b)(6), 1 A/E

Enclosure (13)  
Page 2 of 2

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6) CIV (USA)  
**Sent:** Tuesday, October 15, 2024 2:17 PM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Subject:** RE: ECDIS Question(s)  
**Signed By:** (b)(6) @us.navy.mil

CAPT (b)(6)

Good Afternoon. MSC Force Navigator is currently out of the office and I've been covering down. I have some ships that I'm working immediate situations with so please give me some time to confirm if these settings are not IAW SMS set up or common/best practice. The definitions you requested are listed below.

Can you give me a definition of

Ship safety – Measures dealing with safety of navigation are prescribed mainly in SOLAS chapter V (1974), COLREG (1972) and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978

Safety depth: The minimum depth required to safely navigate a vessel

Safety contour: The line on a chart that indicates the boundary between safe and unsafe water for a vessel

Shallow / Deep shading – Navigation feature that highlights areas of shallow water to help avoid hazards/setting deeper ranges to monitor how quickly the bottom depth changes within a specific range

Shallow Contour: User set value that indicates the depth at which a vessel could run aground

Deep contour: A line that indicates the limit of an area where shallow water effects can impact a vessel

V/R,

(b)(6)

Navigation Policy & Certification (N-04A3)  
Military Sealift Command HQ

☎: (b)(6)

Email: (b)(6) @us.navy.mil

SIPR: (b)(6) @navy.smil.mil

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"ANY MISUSE OF THIS INFORMATION MAY RESULT IN BOTH CIVIL AND CRIMINAL PENALTIES."

**From:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA) (b)(6) @us.navy.mil>

**Sent:** Tuesday, October 15, 2024 10:36 AM

**To:** (b)(6) CIV (USA) (b)(6) @us.navy.mil>

**Subject:** ECDIS Question(s)

Enclosure (14)

Page 1 of 2

(b)(6)

I'm the Command Investigator for the BGN grounding and need a phone-a-friend for ECDIS.

Based on attached pic of BGN ECDIS, I want to make sure I have a good definition of each of the settings.

Can you give me a definition of

Ship safety –

Safety depth:

Safety contour:

Shallow / Deep shading –

Shallow Contour:

Deep contour:

BT

Are any of these settings not IAW SMS set up or common/best practice?

Thanks.

V/r (b)(6)

Commodore, MSCLANT

CTG 80.83 / CTF 42

(O) (b)(6)

(C) (b)(6)

Enclosure (14)

Page 2 of 2

# Navigational Brief Checklist

To be used in conjunction with SMS Arrival or Departure Checklists. The below items are information and discussion elements associated with special sea evolutions and to be incorporated into the Navigation Brief. The checklist and any supporting information will be retained onboard by the 2/O. The navigation brief will be conducted in a timely manner as determined by the Master within 24 hours of the evolution. A navigation brief is appropriate for arrivals, departures, transits within restricted waters, or situations as deemed necessary by the Master. A entry is to be made on completion of the brief.

**Vessel Name USNS BIG HORN**

**Port: DUQM, OMAN Voyage: 14-2024 Date: 23SEP2024**

**Description of Evolution: ARRIVAL**

The following individuals (where assigned duties associated with this event) have participated in applicable elements of this Navigation Brief. Mark "N/A" where not applicable.

Title	Printed Name	Signature
Master		(b)(6)
Chief Mate		
Chief Engineer*		
Cargo Mate		
Navigator		
Third Mate		
Third Mate		
Ops Chief		
Bosun		
Cargo Bosun		
Cadet		

\*As advised by the Master the Chief Engineer may report via email the status of the engineering plant and any equipment limitations in lieu of attending the brief.

1.  Arrival Times: **1500**
2.  Pilot ETA: **1500**
3.  Pilot Pick-up/drop-off Location: **Pilot pick-up location is 1 mile ESE of Fairway Lighted Buoy.**
4.  Updated Pilot Card: **Yes**
5.  Drafts reviewed: **FWD: 8.23M MID: 9.12M AFT: 9.93M**
6.  Squat **See Pilot card**
7.  Minimum Under Keel Clearance: **9.87 M at Pier**
8.  Calculate Air Draft (if applicable): **N/A**
9.  Keel clearance in channel: **9.37 M; Satisfies our SMS UKC Requirements.**
10.  Anticipated speed of transit: **5 kts.**
11.  ETA at berth: **N/A**
12.  VHF Channels for Pilot/Port Control: **Port Control (Channel 6,8,14 16), Pilots (Channel 6,8 14)**

Enclosure (15)

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Checklist 7.2-003-01-ALL, Navigational Brief Checklist		Page 1 of 3

# Navigational Brief Checklist

13.  Sailing Directions and/or Coast Pilot Port Information reviewed: **PUB 172**
14.  Charts and courses used for transit **62333/62334**
15.  Turn/Danger Bearings and ranges **See chart**
16.  Prominent navigational aids and references for each leg of transit **Breakwaters, Control Tower, ETC See Chart.**
17.  Transit passage plan entered on ECDIS and GPS (equipment limitations discussed) and attached to the Navigational Brief Checklist. **Yes**
18.  Verify latest editions and corrections for charts and DNC **38/2024 Charts 36/2024 ECDIS**
19.  Identify Navigational Hazards (shoals, reefs, wrecks, air draft obstructions, restricted marine life zones & sanctuaries, etc. chart ambiguities) **Humpback whales may be encountered in the area. Mariners are advised to keep a good lookout and restrict noise.**
20.  Buoyage System & COLREGS Demarcation Line: **IALA-A**
21.  Vessel Traffic System check-in points: **N/A**
22.  Traffic Separation Schemes **No TSS, but keep red/white banded fairway buoy to PORT and green colored buoy to STBD when headed INBOUND.**
23.  Speed Restrictions **5 kts in anchorages**
24.  Large Course and/or Speed changes during transit: **Within Channel**
25.  Areas to avoid: **Anchorages to the north when transiting inbound.**
26.  High traffic or crossing traffic areas: **Possible small craft and fishing vessels located in the channel.**
27.  Regulated areas (no wake, security, marine reserve, etc.) **Anchorages to north and south of the deep water route, shoal area near the south westerly portion of the deep water route.**
28.  Degaussing Ranges **N/A**
29.  Currents throughout transit: **Duqm currents which are strong and variable, are influenced by the prevailing wind. From April to November the current sets NE parallel to the coast at a rate of about 2 knots.**
30.  Tides: **Arriving during LOW tide which would be 1.8M above the datum at 1500. High tide will be at 1213 which is 2.4M above the datum**
31.  Updated weather report including visibility: **91° F, Southerly Winds at 15-25 KTS; 66% Humidity, Fair Visibility**
32.  Sunrise/Sunset: **0558/1804**
33.  Harbor Chart **62333**
34.  Port Authority concerns, restrictions, regulatory provisions: **N/A**
35.  Force Protection Profile (inside the life lines and outside the lifelines) **Chief Mate**
36.  Docking Pilot Pick-up Point: **N/A**
37.  Number of Tugs and Mooring Plan **2 tugs, one pilot**
38.  Pier / Anchorage Description: **N/A**
39.  Pier Heading: **07T**
40.  Identified Risks/Control Elements: **RAC 4, suggests conduct operation**
41.  Status of Navigation Equipment: **SAT**
42.  Status of ground tackle (Cargo Mate) **SAT**
43.  Status of engineering plant (Chief Engineer) **SAT**
44.  Review emergency procedures for Man Overboard, Steering Casualties, Loss of Navigational Equipment, reduced visibility, emergency anchorage locations, collision, grounding, communications failure, propulsion failure, etc.
45.  Lessons learned from previous transits:

**Enclosure (15)**

- CAREFUL FOR FISHING BOATS; SLOW IF NEAR NECESSARY

- NO TAXES ; HARD CURRENTS ON THE LAST LEG

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**T-AO-187/205 ARRIVAL CHECKLIST**  
 (\*\*) items required to be logged IAW 33CFR 164.25

USNS BIG HORN T-AO 198

PORT: DUYM VOYAGE: 14-2024 DATE: 23SEP24

Computed Arrival Drafts: Fwd: 8.2M Mid: 9.1M Aft: 9.9M \*\*

- Review charts, publications, and intended track. Ensure waypoints match in/on charts, GPS, ECDIS, and voyage plan
- Check that GPS datum matches chart datum
- Compute Tides and Currents for Arrival
- Compute and log Maximum Draft IAW 46 CFR 35.20-5
- Compute and log Under Keel Clearance IAW 33 CFR 157.455
- Compute and log Air Draft (if applicable)
- Conduct Pre-Arrival Navigation brief

- GPS
- RADARS
- NAVTEX
- VHF
- NAV LIGHTS
- ECDIS
- AIS
- WEATHERFAX

- FATHOMETER
- DOPPLER
- GYRO
- ARPA
- GMDSS (IAW 47 CFR 80.869)\*
- FLIGHT DECK VIEW SCREENS ON (If equip)
- CLOSED CIRCUIT TV SYSTEM (If equip)
- VDR/SVDR

**Test Electronic Equipment**

\*results entered in the GMDSS Log

**AT MINIMUM 30 MINUTES PRIOR TO ARRIVAL**

- Test Whistle and General Alarm
- Close Sliding Watertight Doors
- Test Engine Order Telegraph
- Check Gyro Error. Take Azimuth/Amplitude or use terrestrial references. Error 0.4 **EW**
- Synchronize Gyro Repeaters with Main Gyro
- Test Steering Gear in all Modes 1340 (time) \*\*
- Test Internal Communications 0700 (time) \*\*
- Test Emergency Generator for as long as necessary to show proper functioning, including steady state temperature and pressure readings. \*\*
- Test Engines Ahead and Astern 1340 (time) \*\*
- Anchors Ready for Letting Go
- Ship's Navigation Status Entered into AIS

1400

- Pilot ladder rigged IAW SOLAS Chapter V, Regulation 23
- Confirm ETA, Pilot name (if available), and tugs with Pilots/Port Control
- Set up Bridge (Bell Book) and Bridge Wings
- Make Call Outs
- Start and annotate Course Recorder and Fathometer
- Set the Sea, Anchor, and Maneuvering Detail (\_\_\_\_\_ Deck Dept Fore and Aft)
- Maneuvering Detail Manned and Ready

Master / Pilot Information Exchange completed and entered in Deck Log/Bell Book (see next page).

Enclosure (16)

Check off List complete & log completion / Master notified at time: Page 1 of 3

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Checklist 7.2-002-01-AO187/205, T-AO Arrival Checklist		Page 1 of 2

# Master / Pilot Information Exchange and Pilot Card

Per IMO Assembly Resolutions A.601(15) and A.960(23)

Master and Pilot Information Exchange shall occur between all embarked pilots (Sea, River, Harbor, and Docking Pilots). The Master and Pilot shall exchange information regarding navigational procedures, local conditions and rules and the ship's characteristics. This information exchange should be a continuous process that generally continues for the duration of the pilotage.

At a minimum, the below listed items shall be discussed during the Master / Pilot Information Exchange:

- Pilot Card: Ship's maneuvering characteristics including rate of turn at different speeds, turning circles, stopping distances and other appropriate data (refer to the Ship's Maneuvering Characteristics Data). Completed Pilot Card provided to Pilot, reviewed with the Master, and signed by both the Master and Pilot.
- Reach agreement with respect to the anticipated passage including waypoints and courses to steer, anticipated speed of transit, go-no-go criteria, emergency anchorages and contingency plans.
- Any special conditions such as weather, depth of water, under keel clearance requirements, air draft requirements, tidal currents, local regulations, and marine traffic that may be expected during the passage.
- Any unusual ship-handling characteristics, machinery difficulties, navigational equipment, status of the ground tackle, problems or crew limitations that could affect the operation, handling or safe maneuvering of the ship.
- Information on berthing arrangements and the vessel's mooring plan; use, characteristics and number and type of tugs to include horse power, bollard pull, connection points; mooring boats and other external facilities.
- Discuss information on mooring arrangements and depth of water alongside the pier.
- Communication Plan: VHF working channels to be monitored for the port, type of communication to be used with the tugs, VTS check points, use of standard helm and engine orders.
- Agree that the language to be used on the bridge and with external parties is English. If the Pilot is unable to communicate with external parties in English, the Master shall ensure that, as soon as practicable, the Pilot explains what was said to enable bridge personnel to maintain situation awareness and monitor subsequent actions taken by those external parties.

### CAUTION:

When a Pilot is communicating with parties external to the ship, such as vessel traffic services, tugs, or linesmen and the Pilot is unable to communicate in the English language, the Master shall ensure that, as soon as practicable, the Pilot explains what was said to enable the bridge personnel to monitor any subsequent actions taken by those external parties.

- Time: \_\_\_\_\_ Master / Sea, River, Harbor Pilot information exchange completed.
- Time: \_\_\_\_\_ Master / Docking Pilot information exchange completed.

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T-AO 187 Class Squat Data			
Loaded (Static Draft 36 Ft Even Keel)		Estimated Squat Effect	
Under Keel Clearance (ft)	Ship's Speed (kt)	Max Squat Bow (ft)	Max Squat Stern (ft)
5	10	1.9	0.5
	12	3.7	1.6
	14	4.5	1.1
	16	G	---
7.5	10	1.8	0.4
	12	3.3	1.1
	14	4.2	1.2
	16	6	2
10	10	1.7	0.4
	12	3	1
	14	3.9	1.1
	16	5.4	1.6
12.5	10	1.6	0.4
	12	2.7	0.8
	14	3.6	1
	16	4.9	1.4
15	10	1.5	0.4
	12	2.6	0.6
	14	3.4	0.9
	16	4.6	1.3

T-AO 187 Class Squat Data			
Light (Static Draft 26 Ft Even Keel)		Estimated Squat Effect	
Under Keel Clearance (ft)	Ship's Speed (kt)	Max Squat Bow (ft)	Max Squat Stern (ft)
5	10	1.8	1
	12	2.8	1.5
	14	4.6	1.7
	16	G	---
7.5	10	1.6	0.9
	12	2.5	1.4
	14	4.1	1.5
	16	6.5	2.4
10	10	1.5	0.8
	12	2.2	1.2
	14	3.6	1.4
	16	5.6	2.1
12.5	10	1.3	0.7
	12	2	1.1
	14	2.9	1.2
	16	5	1.9
15	10	1.2	0.7
	12	1.9	1
	14	2.7	1.3
	16	3.9	1.7

Source: SMS 7.2-005-AO

**Duqm Oman**  
**September 23, 2024**

FWD	Static Draft	AFT
11.23 m	Squat @ 10kts (confined Water)	9.93 m
10.93 m	MSC min. req. UKC	0.21 m <sup>8 1/4"</sup>
0.91 m	* Required Depth *	0.91 m
9.60 m	Least charted depth	11.05 m
12.00 m	Lowest tidal height	12.00 m
1.50 m	Depth & tide composite	1.50 m
13.50 m	Under Keel Clearance	13.50 m
3.90 m		2.45 m
	<b>True Under Keel Clearance</b>	
	<b>UKC w/ MSC safety margin</b>	

Enclosure (16)

# T-AO-187/205 ARRIVAL CHECKLIST

(\*\*) items required to be logged IAW 33CFR 164.25

USNS BIG HORN T-AO 118

PORT: DUYM VOYAGE: 14-2024 DATE: 24 SEP 24

Computed Arrival Drafts: Fwd: 27'00 Mid: 31'00 Aft: 35'00 \*\*

- Review charts, publications, and intended track. Ensure waypoints match in/on charts, GPS, ECDIS, and voyage plan
- Check that GPS datum matches chart datum
- Compute Tides and Currents for Arrival
- Compute and log Maximum Draft IAW 46 CFR 35.20-5
- Compute and log Under Keel Clearance IAW 33 CFR 157.455
- Compute and log Air Draft (if applicable)
- Conduct Pre-Arrival Navigation brief

- GPS
- RADARS
- NAVTEX
- VHF
- NAV LIGHTS
- ECDIS
- AIS
- WEATHERFAX

- FATHOMETER
- DOPPLER
- GYRO
- ARPA
- GMDSS (IAW 47 CFR 80.869)\*
- FLIGHT DECK VIEW SCREENS ON (If equip)
- CLOSED CIRCUIT TV SYSTEM (If equip)
- VDR/SVDR

Test Electronic Equipment

\*results entered in the GMDSS Log

**AT MINIMUM 30 MINUTES PRIOR TO ARRIVAL**

- Test Whistle and General Alarm
- Close Sliding Watertight Doors
- Test Engine Order Telegraph N/A
- Check Gyro Error. Take Azimuth/Amplitude or use terrestrial references. Error N/A E/W
- Synchronize Gyro Repeaters with Main Gyro
- Test Steering Gear in all Modes N/A (time) \*\*
- Test Internal Communications \_\_\_\_\_ (time) \*\*
- Test Emergency Generator for as long as necessary to show proper functioning, including steady state temperature and pressure readings. \*\*
- Test Engines Ahead and Astern N/A (time) \*\*
- Anchors Ready for Letting Go
- Ship's Navigation Status Entered into AIS
- Pilot ladder rigged IAW SOLAS Chapter V, Regulation 23
- Confirm ETA, Pilot name (if available), and tugs with Pilots/Port Control
- Set up Bridge (Bell Book) and Bridge Wings
- Make Call Outs
- Start and annotate Course Recorder and Fathometer
- Set the Sea, Anchor, and Maneuvering Detail (OPS 1 Deck Dept Fore and Aft)
- Maneuvering Detail Manned and Ready 1004

Enclosure (n)

Master / Pilot Information Exchange completed and entered in Deck Log/Bell Book (see next page).

Check off List complete & log completion / Master notified at time: 1035

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# Master / Pilot Information Exchange and Pilot Card

Per IMO Assembly Resolutions A.601(15) and A.960(23)

Master and Pilot Information Exchange shall occur between all embarked pilots (Sea, River, Harbor, and Docking Pilots). The Master and Pilot shall exchange information regarding navigational procedures, local conditions and rules and the ship's characteristics. This information exchange should be a continuous process that generally continues for the duration of the pilotage.

At a minimum, the below listed items shall be discussed during the Master / Pilot Information Exchange:

- Pilot Card: Ship's maneuvering characteristics including rate of turn at different speeds, turning circles, stopping distances and other appropriate data (refer to the Ship's Maneuvering Characteristics Data). Completed Pilot Card provided to Pilot, reviewed with the Master, and signed by both the Master and Pilot.
- Reach agreement with respect to the anticipated passage including waypoints and courses to steer, anticipated speed of transit, go-no-go criteria, emergency anchorages and contingency plans.
- Any special conditions such as weather, depth of water, under keel clearance requirements, air draft requirements, tidal currents, local regulations, and marine traffic that may be expected during the passage.
- Any unusual ship-handling characteristics, machinery difficulties, navigational equipment, status of the ground tackle, problems or crew limitations that could affect the operation, handling or safe maneuvering of the ship.
- Information on berthing arrangements and the vessel's mooring plan; use, characteristics and number and type of tugs to include horse power, bollard pull, connection points; mooring boats and other external facilities.
- Discuss information on mooring arrangements and depth of water alongside the pier.
- Communication Plan: VHF working channels to be monitored for the port, type of communication to be used with the tugs, VTS check points, use of standard helm and engine orders.
- Agree that the language to be used on the bridge and with external parties is English. If the Pilot is unable to communicate with external parties in English, the Master shall ensure that, as soon as practicable, the Pilot explains what was said to enable bridge personnel to maintain situation awareness and monitor subsequent actions taken by those external parties.

**CAUTION:**

When a Pilot is communicating with parties external to the ship, such as vessel traffic services, tugs, or linesmen and the Pilot is unable to communicate in the English language, the Master shall ensure that, as soon as practicable, the Pilot explains what was said to enable the bridge personnel to monitor any subsequent actions taken by those external parties.

- Time: \_\_\_\_\_ Master / Sea, River, Harbor Pilot information exchange completed.
- Time: \_\_\_\_\_ Master / Docking Pilot information exchange completed.

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T-AO 187 Class Squat Data			
Loaded (Static Draft 36 Ft Even Keel)		Estimated Squat Effect	
Under Keel Clearance (ft)	Ship's Speed (kt)	Max Squat Bow (ft)	Max Squat Stern (ft)
5	10	1.9	0.5
	12	3.7	1.6
	14	4.5	1.1
	16	G	---
7.5	10	1.8	0.4
	12	3.3	1.1
	14	4.2	1.2
	16	6	2
10	10	1.7	0.4
	12	3	1
	14	3.9	1.1
	16	5.4	1.6
12.5	10	1.6	0.4
	12	2.7	0.8
	14	3.6	1
	16	4.9	1.4
15	10	1.5	0.4
	12	2.6	0.6
	14	3.4	0.9
	16	4.6	1.3

T-AO 187 Class Squat Data			
Light (Static Draft 26 Ft Even Keel)		Estimated Squat Effect	
Under Keel Clearance (ft)	Ship's Speed (kt)	Max Squat Bow (ft)	Max Squat Stern (ft)
5	10	1.8	1
	12	2.8	1.5
	14	4.6	1.7
	16	G	---
7.5	10	1.6	0.9
	12	2.5	1.4
	14	4.1	1.5
	16	6.5	2.4
10	10	1.5	0.8
	12	2.2	1.2
	14	3.6	1.4
	16	5.6	2.1
12.5	10	1.3	0.7
	12	2	1.1
	14	2.9	1.2
	16	5	1.9
15	10	1.2	0.7
	12	1.9	1
	14	2.7	1.3
	16	3.9	1.7

Source: SMS 7.2-005-AO

Fujairah September 24, 2024		
FWD	Static Draft	AFT
8.20 m	Squat @ 10kts (confined Water)	10.70 m
0.46 m	MSC min. req. UKC	0.21 m
0.91 m	* Required Depth *	0.91 m
9.57 m	Least charted depth	11.82 m
12.00 m	Lowest tidal height	12.00 m
2.10 m	Depth & tide composite	2.10 m
14.10 m	Under Keel Clearance	14.10 m
4.53 m		2.28 m
3.19 m	<u>True Under Keel Clearance</u>	
2.28 m	<u>UKC w/ MSC safety margin</u>	

Enclosure (17)

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9/23/2024

## Grounding Response Checklist

NOTE: This checklist may be expanded or modified to suit individual vessels and is for guidance purposes only.

1414

1438

	Initial Actions:
✓	Notify Master & Chief Engineer immediately. When in port, if Master and Chief Engineer are NOT aboard, make immediate effort to contact them.
✓	Depending on the circumstances, determine the appropriate throttle placement; consider 'All Stop' for Main Engines.
✓	Sound general emergency alarm.
✓	Close watertight doors.
✓	Maintain a VHF watch on Channel 16 and, if appropriate, on Channel 13.
✓	Exhibit lights/shapes and make any appropriate sound signals.
✓	Switch on deck lighting at night.
✓	Submit initial Special Incident Reports by voice through chain of command (SMS Procedure 7.1-001-ALL).
✓	Check hull for damage (NOTE: May require divers).
✓	Determine environmental impact, if any (e.g. Spills, protected coral reefs, etc.).
✓	Determine degree of grounding (e.g. <u>hard</u> , <u>soft</u> )
✓	Sound bilges and tanks and record ALL levels for comparison to known levels.
✓	Visually inspect compartments, where possible.
✓	Determine the degree of grounding (i.e., sound depth of waters around ship). <i>9m</i>
✓	Determine what action(s) will most proficiently enable navigation to deeper water <i>Anchor</i>
✓	Determine the nature of the seabed (i.e. <i>Rock, sand, etc.</i> ). <i>SAND, ROCK, UNKN</i>
✓	Obtain information on local currents and tides, particularly details of the rise and fall of the tide.
Follow-up Actions (as applicable):	
✓	Reduce the draft of the ship or shift fluids/cargo.
✓	Periodically recheck (sound) bilges and tanks and compare to recorded soundings.
✓	Provide updates to Special Incident Reports.
✓	Make ship's position available to radio room/GMDSS station, satellite terminal and other automatic distress transmitters and up-date as necessary.
✓	Broadcast DISTRESS ALERT and MESSAGE if the ship is in grave and imminent danger and immediate assistance is required, otherwise broadcast an URGENCY message to ships in the vicinity. <i>N/A</i>
✓	Master shall direct the download of data from the VDR/S-VDR onto a portable storage device in accordance with SMS Procedure 8.22-001-ALL "Simplified Voyage Data Recorder (S-VDR). This step shall be taken within a timeframe that will ensure the stored incident data in the VDR / S-VDR is not overwritten., but should also ensure that the storing and copying of the data is not done in a way that would interrupt collection of on going data, relative to the incident. Waiting until initial remedial action is completed, or the situation has gone into extremis, to

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Master / Senior Deck Officer	1 Year	Nav Files
Checklist 8.7-001-01-ALL Grounding Response Checklist		Page 1 of 2

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## Grounding Response Checklist

	protect available data should be considered.
<b>Other Required Actions:</b>	
✓	Submit 'Report of Marine Accident, Injury or Death (Form CG-2692) to the USCG (SMS Procedure 7.1-004-ALL). <i>pending 9/25/2024</i>
✓	Calculate ship's stability status and determine if vessel can be safely refloated (obtain damage stability assessment). <i>ON GOING</i>

Enclosure (18)

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Checklist 8.7-001-01-ALL Grounding Response Checklist		Page 2 of 2

09 SEP - U/W FUJ  
09 SEP - ENR TRSG RDVU  
10 SEP - RAS COMPLETE WITH TR/INO  
11 SEP - RAS COMPLETE WITH ABE/SPR/STK  
12 SEP - IPT FUJ  
13 SEP - LOAD FUEL IPT FUJ  
14 SEP - LOAD CARGO IPT FUJ  
15 SEP - U/W FUJ  
15 SEP - ENR SPR/STK/OKN RDVU  
16 SEP - ENR SPR/STK/OKN RDVU  
17 SEP - RAS COMPLETE WITH SPR/STK/OKN  
18 SEP - ENR ABESG RDVU (IT WAS MOVED TO THE RIGHT)  
19 SEP - ENR LANC RDVU  
20 SEP - ENR LANC RDVU  
21 SEP - RAS COMPLETE WITH LANC  
22 SEP - RAS COMPLETE WITH STK/SPR  
23 SEP - RAS ABE/OKN  
23 SEP - COMMENCED RAS WITH OKN AT T-0732Z  
23 SEP - RAS COMPLETE WITH OKN AT T-0928Z

⊗ BGN Schedule provided by c/m

(b)(6)



Enclosure (19)

Page 1 of 1

Sunday, September 22, 2024

0001-0400

2345 As watch began, the vessel is underway in the Northern Arabian Sea, on voyage 14-2024. Vessel is keeping time zone (ZD-4). In STBD hand, steering various courses TMG 215° T, 60% ahead on BME. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as helmsman, lookout, and rove. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

0105 A/B (b)(6) returned from rove. All in apparent good order.

**0207 W/O completed daily checks of GMDSS and DSC equipment IAW 47 CFR 80.409(e)(5). Results SAT. Daily radar performance monitor checked SAT for 3/3 radars.**

0225 O/S (b)(6) returned from rove. All in apparent good order.

0335 A/B (b)(6) returned from rove. All in apparent good order.

0345 As the watch ended, vessel is underway as before in calm seas, light airs, and fair visibility. W/O is properly relieved by 2/O (b)(6)

(b)(6)

September 22, 2024 03:45

0400-0800

0345 As watch begins, the vessel is underway as before. Port steering unit in hand, steering on course 205° PGC, Checking 201°PSC, 60% on BME. On Watch: 2/O (b)(6) with A/B (b)(6) A/B (b)(6) O/S (b)(6) alternating as helmsman, lookout and rove. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

0450 O/S (b)(6) reported completion of fire and security rounds, all in good apparent order.

0538 Sunrise observed.

0605 C/C to romeo corpen 010°PGC.

0620 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

0655 Captain (b)(6) has the conn.

**0700 Set UNREP condition one and the UNREP maneuvering detail. Team 1 and Team 2 to Sta. 7.**

0706 All stations manned and ready. Romeo closed up to STBD.

0724 USS Stockdale commenced approach to starboard.

0727 USS Stockdale alongside to Starboard.

0736 Sta. 7 & Phone and distance shotline in hand.

0739 CO-CO established SAT Comms; Emergency breakaway procedures discussed and understood.

0745 As the watch comes to an end, the vessel is underway conducting UNREP operations with USS Stockdale (DDG-106), riding easy in calm sea with good visibility, clear sky, and a gentle SW'ly breeze. 2/O (b)(6) properly relieved by 3/O (b)(6)

(b)(6)

September 22, 2024 07:45

0800-1200

0741 As watch began, the vessel was underway in the Northern Arabian Sea, on voyage 14-24 engaged in an underway replenishment with the USS Stockdale (DDG-106) to port. In port hand, on R/C 220 PGC, 55% BME. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) alternating as helmsman and O/S (b)(6) as lookout. Captain (b)(6) has the conn. Captain's Standing Orders, Night Orders, MSC and USCG rules

Enclosure (2)

Generated by ShipsLog™

Report Date: Tuesday, October 01, 2024 16:10

**Sunday, September 22, 2024**

observed and followed throughout the watch.

0742 CO to CO comms established to port, emergency breakaway procedures discussed and understood.

**0751 STA 7. Spanwire tensioned.**

**0758 STA 7. Probe seated.**

**0806 Commenced pumping DFM in position L: 17°53.1'N LONG: 056°31.6'E.**

0809 DFM on grade.

0815 Commenced pumping JP-5.

0817 JP-5 Clear and bright.

**0925 Ceased pumping in position L: 17°41.2'N LONG: 056°20.2'E.**

0937 STA 7. UNREP completed.

0941 STA 7. De-tensioned.

0945 All lines clear to starboard.

**0947 DDG-106 Away and clear to starboard.**

**0954 All stations reported manned and ready.** Romeo closed up to starboard. USS Spruance (DDG-111) reported RADARs as sectored.

**0956 USS Spruance (DDG-111) commenced approach to port**

0958 DDG-111 Bow to stern.

**1000 DDG-111 Alongside to starboard.**

1001 Shotlines across to starboard.

1004 P&D, STA 3 & 7 Messenger in hand.

1008 CO to CO, STA 3, 7, & P&D comms established, emergency breakaway procedures discussed and understood.

1012 STA 3. Highline connected. STA 7. Spanwire connected.

**1014 STA 3. Highline tensioned.**

**1015 STA 7. Spanwire tensioned.**

**1018 STA 7. Probe seated.**

**1019 Commenced pumping DFM in position L: 17°32.8'N LONG: 058°12.5'E.**

1022 Commenced pumping JP-5. DFM on grade.

**1023 STA 3; First lift cargo.**

1024 JP-5 Clear and bright.

**1043 STA 3. Last lift cargo; First lift retro.**

**1055 STA 3 Last lift retro.**

1056 STA 7. Ceased pumping JP-5.

1057 STA 3. UNREP completed.

1102 STA 3. De-tensioned.

1104 STA 3. All lines clear.

1108 STA 3. Secured for sea.

1143 At the end of the watch, the vessel remained underway engaged in an UNREP with DDG-111 to starboard with a moderate breeze, clear skies, moderate sea condition, and good visibility. HSO is properly relieved by 3/O (b)(6)

(b)(6)

September 22, 2024 11:45

1200-1600

1145 As watch began, vessel is underway as before engaged in underway replenishment with USS Spruance (DDG-111) alongside to STBD. Master has the conn steering R/C 220° PGC, PORT hand, 55% ahead on BME. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as helmsman, lookout,

Enclosure (6)

**Sunday, September 22, 2024**

and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

1146 STA. 7, ceased pumping DFM in position LAT: 17°-19.5'N LONG: 057°-59.6'E.

1148 STA. 7, UNREP completed.

1150 STA. 7, spanwire de-tensioned.

1152 All lines clear to STBD.

1155 STA. 7, secured for sea.

1156 Secured from UNREP condition one and the UNREP maneuvering detail. ERC dismissed at Chief Engineer's discretion. AFT steering dismissed.

1200 3/O (b)(6) assumed the conn from the master steering 037° PGC.

1245 Switched to STBD steering unit.

1305 A/B (b)(6) returned from rove. All in apparent good order.

1425 A/B (b)(6) returned from rove. All in apparent good order.

1537 O/S (b)(6) returned from rove. All in apparent good order.

1545 As the watch ended, vessel is underway as before steaming toward MODLOC in calm seas, light airs, and fair visibility. W/O is properly relieved by 2/O (b)(6)

(b)(6)

September 22, 2024 15:45

**1600-2000**

1545 As watch began, the vessel is underway as before. In hand, steering on course 037°T. BME at 50%. On Watch: 2/O (b)(6) with A/B (b)(6) A/B (b)(6) O/S (b)(6) and Deck cadet (b)(6) alternating as helmsman, lookout, and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

1630 O/S (b)(6) reported completion of fire and security rounds, all in good apparent order.

1700 2/O (b)(6) relieved by 3/O (b)(6) for Dinner.

1720 2/O (b)(6) assumes the Conn.

1759 Sunset observed. Watertight doors closed from bridge.

1800 USNS Bighorn enters MODLOC box.

1820 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

1930 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

1945 As the watch came to and end, the vessel is riding easy in calm sea, clear sky, good visibility with a fresh SE'ly breeze. 2/O (b)(6) properly relieved by 3/O (b)(6)

(b)(6)

September 22, 2024 19:45

**2000-2400**

1945 As watch began, the vessel is underway in the Northern Arabian Sea, on voyage 14-2024. Vessel is keeping time zone (ZD-4). In starboard hand, steering various courses as per requirements of MODLOC and traffic therein. 50% BME. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as helmsman, lookout, and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations.

2105 O/S (b)(6) returned from rove. All in apparent good order.

2225 A/B (b)(6) returned from rove. All in apparent good order.

**2221 Steering gear tested satisfactorily in all modes IAW SMS Checklist 7.4-007-01-AO**

Enclosure (2)

Sunday, September 22, 2024

2335 A/B (b)(6) returned from rove. All in apparent good order.

2345 At the end of the watch, the vessel remained underway as before, with a fresh breeze, cloudy skies, moderate sea condition, and good visibility. W/O was properly relieved by 3/O (b)(6)

(b)(6)

September 22, 2024 23:45

Approver's Comments

Reviewer's Comments

Reviewed By

Date

Approved By

Date

Enclosure (2)

**Monday, September 23, 2024**

0001-0400

2345 As watch began, the vessel is underway in the Northern Arabian Sea, on voyage 14-2024. Vessel is keeping time zone (ZD-4). In STBD hand, steering various courses as per requirements of MODLOC and traffic therein. 50% BME. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as helmsman, lookout, and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations being observed throughout the watch.

**0008 W/O completed daily checks of GMDSS and DSC equipment IAW 47 CFR 80.409(e)(5). Results SAT. Daily radar performance monitor checked SAT for 3/3 radars.**

0105 A/B (b)(6) returned from rove. All in apparent good order.

0225 O/S (b)(6) returned from rove. All in apparent good order.

0335 A/B (b)(6) returned from rove. All in apparent good order.

0345 As the watch ended, vessel is underway as before in calm seas, light airs, and fair visibility. W/O is properly relieved by 2/O (b)(6)

(b)(6)

September 23, 2024 03:45

0400-0800

0345 As watch begins, the vessel is underway as before. Port steering unit in hand, steering on course 150° PGC, Checking 158°PSC, 60% on BME. On Watch: 2/O (b)(6) with A/B (b)(6) A/B (b)(6) O/S (b)(6) alternating as helmsman, lookout and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

0450 O/S (b)(6) reported completion of fire and security rounds, all in good apparent order.

0538 Sunrise observed.

0605 C/C to romeo corpen 345°PGC.

0620 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

0655 Captain (b)(6) has the conn.

**0700 Set UNREP Condition Two and the UNREP maneuvering detail. Team 1 to Sta.4, Team 2 to Sta. 2, Team 3 to Sta.6**

0710 All stations manned and ready. Romeo closed up to Port.

0727 USS Abraham Lincoln commenced approach to port.

0732 USS Abraham Lincoln alongside to Port.

0738 P&D Shotline in hand.

0739 Sta. 2 shotline in hand.

0740 P&D Messenger in hand.

0741 Sta. 4 shotline in hand.

0742 Sta. 2 & Sta. 6 Messenger in hand.

0743 CO-CO established SAT Comms; Emergency breakaway procedures discussed and understood.

0744 Sta. 4 Messenger in hand.

0745 As the watch comes to an end, the vessel is underway conducting UNREP operations with USS Abraham Lincoln, riding easy in calm sea with good visibility, clear sky, and a gentle SW'ly breeze. 2/O (b)(6) properly relieved by 3/O (b)(6)

(b)(6)

September 23, 2024 07:45

Enclosure (w)

**Monday, September 23, 2024**

0800-1200

0741 At watch began, the vessel was underway in the Northern Arabian Sea, on voyage 14-24 engaged in an underway replenishment with the USS Abraham Lincoln (CVN-72) to port. In port hand, on R/C 345 PGC, 55% BME. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) alternating as helmsman and O/S (b)(6) as lookout. Captain (b)(6) has the conn. Captain's Standing Orders, Night Orders, MSC and USCG rules observed and followed throughout the watch.

0746 STA 6, 4, & 2 comms established, emergency breakaway procedures discussed and understood.

0753 STA 2. Spanwire connected.

0754 STA 6. Spanwire connected. STA 4. Highline connected.

**0756 STA 6, 4 & 2. Spanwire tensioned.**

0758 A/B (b)(6) relieved A/B (b)(6) in after steering.

**0800 STA 2. Probe seated.**

**0802 STA 6. Probe seated.**

**0805 Commenced pumping JP-5 in position L: 19°05.8'N LONG: 058°44.1'E on STA 2 & 6.**

**0807 STA 4; First lift cargo.** JP-5 Clear and bright.

**0903 STA 4. Last lift cargo; First lift retro.**

**1020 Ceased pumping in position L: 19°35.2'N LONG: 058°36.2'E.**

1023 STA 6 & 2. UNREP completed.

1027 STA 6 & 2. De-tensioned.

1030 All lines clear on STA 6 & 2.

**1032 STA 4 Last lift retro.** STA 4. UNREP completed.

1036 STA 2. Secured for sea.

1039 STA 4. De-tensioned.

1042 All lines clear to port.

**1044 CVN-72 Away and clear to port.** Decreased speed to 44% ahead on both main engines.

1046 STA 4. Secured for sea.

**1048 Secured UNREP Condition Two and the UNREP maneuvering detail.**

1050 Increased speed to 60% ahead on both main engines.

1059 Decreased speed to 50% ahead on both main engines.

1105 STA 6. Secured for sea.

1107 Increased speed to 55% ahead on both main engines.

**1110 Set UNREP Condition one and the UNREP maneuvering detail. Team 1 & 2 to STA 7.**

1112 After steering reported M&R by A/B (b)(6) R/C set for course 235PGC.

1114 USS Okane (DDG-77) reported RADARs as sectored.

**1119 All stations reported manned and ready.** Romeo closed up to starboard.

**1129 USS Okane (DDG-77) commenced approach to starboard.**

1130 DDG-77 Bow to stern.

**1132 DDG-77 Alongside to starboard.**

1133 Shotlines across to starboard.

1136 P&D Messenger in hand.

1139 CO to CO comms established, emergency breakaway procedures discussed and understood.

1143 At the end of the watch, the vessel remained underway engaged in an UNREP with DDG-77 to starboard with a moderate breeze, clear skies, moderate sea condition, and good visibility. HSO is properly relieved by 3/O (b)(6)

(b)(6)

September 23, 2024 11:45

Enclosure (2)

1200-1600

**Monday, September 23, 2024**

1145 As watch began, vessel is underway as before engaged in underway replenishment with USS Okane (DDG-77) alongside to STBD. Master has the conn steering R/C 235° PGC, PORT hand, 55% ahead on BME. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as helmsman, lookout, and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

1149 STA. 7, spanwire hooked up and connected.

1151 STA. 7, spanwire tensioned.

1153 STA. 7, probe seated.

1155 A/B (b)(6) relieved by A/B (b)(6) in AFT steering.

1158 STA. 7, commenced pumping DFM in position LAT: 19°-32.5'N LONG: 058°-24.1'E

1203 STA. 7, commenced pumping JP-5.

1219 1/O (b)(6) assumed the conn.

1234 Captain (b)(6) assumed the conn.

1242 STA. 7, ceased pumping JP-5.

1308 C/C to new R/C 250° PGC.

1315 STA. 7, ceased pumping DFM in position LAT: 19°-24.3'N LONG: 058°-09.9'E

1323 STA. 7, UNREP completed.

1325 STA. 7, de-tensioned spanwire.

1327 STA. 7, all lines clear. S/C to 40% ahead on BME.

1332 P+D, secured for sea.

1333 STA. 7, secured for sea.

1335 Secured from UNREP condition one and the UNREP maneuvering detail. ERC dismissed at Chief Engineer's discretion. AFT steering dismissed.

1340 C/C to 320° PGC.

1344 Control of both main engines passed to ERC. S/C to 82% ahead on BME.

1356 Control of both main engines passed to the bridge.

1407 Vessel experienced violent rattling and vibrations. Vessel was steering 305° PGC

1409 Control of both main engines passed to ERC.

1413 Both main engines shutdown at Chief Engineer's recommendation. Steering pump and motor secured after failed attempt to regain steering in NFU and hand steering in both pumps from bridge control.

1417 Chief Engineer reported fuel leak from main engines.

1419 Set the sea and anchor detail.

1423 Both anchors ready to let go as per cargo officer on scene.

1427 Anchor detail manned and ready.

1437 Port anchor windlass disengaged.

1438 Port anchor reported as just above the water's edge.

1453 A/B (b)(6) relieved by A/B (b)(6) in after steering.

1455 Port wildcat disengaged. Wildcat re-engaged to lower one shot to the water's edge as a result of not being able to drop anchor with brake all the way off.

1456 Port anchor dropped in position LAT: 19°-29.933'N LONG: 057°-57.590'E

1501 Port anchor reported having four shots at the hawsepipe.

1502 Port anchor reported five shots at the water's edge.

1545 As the watch ended, vessel is anchored and still engaged in the sea and anchor maneuvering detail as damage control assesment is underway. W/O is properly relieved by 2/O (b)(6)

(b)(6)

September 23, 2024 15:45

1600-2000

Enclosure (20)

Generated by ShipsLog™

Report Date: Tuesday, October 01, 2024 16:10

**Monday, September 23, 2024**

1545 As watch began, the vessel is underway as before. In hand, steering on course 037°T. BME at 50%. On Watch: 2/O (b)(6) with A/B (b)(6) A/B (b)(6) O/S (b)(6) and Deck cadet (b)(6) alternating as helmsman, lookout, and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

1623 ERC Reports Bilge pump #3 lined up to for suction.

1630 O/S (b)(6) reported completion of fire and security rounds, all in good apparent order.

1700 ERC reports securing emergency bilge pump #3, failed to retain suction.

1759 Sunset observed. Watertight doors closed from bridge.

**1806 ERC reports re-commencement of bilge pump.**

1820 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

1930 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

1945 As the watch came to and end, the vessel is riding easy in calm sea, clear sky, good visibility with a fresh SE'ly breeze. 2/O (b)(6) properly relieved by 3/O (b)(6)

(b)(6)

September 23, 2024 19:45

1945-2000

As watch begins, the vessel is securely anchored with 5 shots at the water's edge. Undergoing damage control operations. Engine room flooding 80% contained. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as stand-by and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

2030 Mate on watch and Captain make round of main engine space. Flooding observed as contained. Engine space observed as manned.

2058 Pump room bilge level alarm sounded.

**2111 Mate on watch and O/S (b)(6) investigated pump room. Found to be flooding at approximately 1200 gallons per hour. Duty engineer and Captain informed.**

2120 Mate on watch and Captain made round of pumproom confirmed flooding.

2136 A/B (b)(6) reported air displaced from cargo tank 9C.

2138 Mate on watch observed rise in tank level TLIs and informed Cargo Mate and Captain.

**2200 Cargo tanks 9C & 10C confirmed by Cargo Mate and Cargo Engineer as rising at approximately 5000 gallons per hour apiece. Commenced De-Ballasting on the 8 Wing Tanks.**

2212 Commenced pumping 9C and 10C into 3C.

2215 Ceased pumping 10C into 3C. Pumping continues from 9C into 3C.

2224 Duqm Port Operations contacted and informed that we will be staying at anchor in location through the night.

2233 Commenced running hose from Oily Waste tank to 3S.

2239 Commenced pumping from Oily Waste to 3S.

2243 Cargo tank 10C no longer taking on water at 20". Pumping from 9C to 3C ceased.

2345 At the end of the watch, the vessel remained anchored as before in calm seas, light airs, and clear skies. DC efforts continued as follows: Engine room flooding contained with main bilge pump overboard, De-Ballasting 8 Wings, Pumping from Oily Waste Tank to the 3 Wings. Mate on watch 3/O (b)(6) is properly relieved by 2/O (b)(6) 3/O (b)(6).

(b)(6)

September 23, 2024 23:45

Approver's Comments

Enclosure (20)

Generated by ShipsLog™

Report Date: Tuesday, October 01, 2024 16:10

Monday, September 23, 2024

Reviewer's Comments

Reviewed By

Date

Approved By

Date

Enclosure (2)

Tuesday, September 24, 2024

0001-0400

2345 As watch begins, the vessel is securely anchored with 5 shots at the water's edge. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as stand-by and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch. 0000 W/O conducted round of the vessel on the tank deck, house, and weather deck spaces. All in apparent good order.

0110 Rover reported completion of fire and security rounds. All in apparent good order.

0200 W/O conducted round of the vessel on the tank deck, house, and weather deck spaces. All in apparent good order.

0210 Rover reported completion of fire and security rounds. All in apparent good order.

0300 W/O conducted round of the vessel on the tank deck, house, and weather deck spaces. All in apparent good order.

0330 Rover reported completion of fire and security rounds. All in apparent good order.

0345 As the watch ended, vessel is anchored as before in calm seas, light airs, and clear skies. W/O is properly relieved by 2/O (b)(6)

(b)(6)

September 24, 2024 03:45

0400-0800

0345 As watch begins, the vessel is at anchor. 5 shots out from the hawspipe. On Watch: 2/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as lookout and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

0400 Watch Officer made an round of the vessel. Inspected CCR, Main Deck, and the house.

0430 Watch Officer made an round of the vessel. Inspected CCR, Main Deck, and the house.

0450 O/S (b)(6) reported completion of fire and security rounds, all in good apparent order.

0500 Watch Officer made an round of the vessel. Inspected CCR, Main Deck, and the house.

0530 Watch Officer made an round of the vessel. Inspected CCR, Main Deck, and the house.

0555 Sunrise observed, Anchor lights extinguished.

0600 Watch Officer made an round of the vessel. Inspected CCR, Main Deck, and the house.

0620 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

0630 Watch Officer made an round of the vessel. Inspected CCR, Main Deck, and the house.

0730 A/B (b)(6) reported completion of fire and security rounds, all in good apparent order.

0745 As the watch comes to an end, the vessel is at anchor still in calm sea with good visibility, clear sky, and a gentle E'ly breeze. 2/O (b)(6) properly relieved by 3/O (b)(6)

(b)(6)

September 24, 2024 07:45

0800-1200

0745 As watch begins, the vessel remained securely anchored with 5 shots at the water's edge. Undergoing damage control operations. Engine room flooding contained, ongoing pumping into the 3 wing tanks from the oily waste tank, slow rise in cargo tank 3 center.. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as stand-by and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

Enclosure (20)

Generated by ShipsLog™

Report Date: Tuesday, October 01, 2024 16:10

**Tuesday, September 24, 2024**

0911 Pilot ladder rigged at 2M starboard side.

0920 Tugs GTOW Bieke and Multratugs 34 &amp; 31 in sight.

0928 Tug Captain and Captain (b)(6) review towing plan.

0950 Anchors ordered to come to short stay.

**0951 Deck department called forward and aft. Set Sea and Anchoring details. Bow reported manned and ready.**

0953 Commenced heaving around on anchor.

1002 Pilotboat observed portside drafts.

**1004 Stern reported as manned and ready.**

1006 Two shots reported at waters edge; brake set.

**1009 Pilot (b)(6) aboard.****1015 Master pilot exchange completed.**

1115 Commenced preparations to run hose from engine room to cargo tank 3 center.

1145 As the watch came to an end, the vessel remained at anchor in calm sea with good visibility, clear sky, and a light breeze; prepared to take tug lines for tow into port of Duqm Oman. 3/O (b)(6) properly relieved by 3/O (b)(6)

(b)(6)

September 24, 2024 11:45

1200-1600

1145 As watch begins, the vessel is securely anchored with 5 shots at the water's edge. Vessel is engaged in the sea and anchor detail preparing to be taken in tow. Helm stand-by and two lookouts are posted on the bridge. On Watch: 3/O (b)(6) with A/B (b)(6) A/B (b)(6) and O/S (b)(6) alternating as helm stand-by and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

**1220 Re-man fore and aft.**

1224 AFT tug made fast on the stern chock.

1229 FWD tug, made fast, STBD bow, 1 line.

1235 PORT anchor reported by the cargo officer to be 1 meter above the water's edge.

**1237 Anchor aweigh in position LAT: 19°-30.007'N LONG: 057°-57.560'E****1239 Arrival checklist completed. Master notified.**

1240 Anchor aweigh and free.

1241 Anchor brought home.

1245 Cargo officer reported both anchors ready to let go.

1320 Second tug made fast, STBD bow, 1 line.

**1357 W/O completed daily checks of GMDSS and DSC equipment IAW 47 CFR 80.409(e)(5). Results SAT. Daily radar performance monitor checked SAT for 3/3 radars.**

1545 As the watch ended, vessel is under-tow in transit to the Duqm breakwater. With moderate swell, light airs, and fair visibility. W/O is properly relieved by 2/O (b)(6)

(b)(6)

September 24, 2024 15:45

1600-2400

1545 Vessel is underway being towed by the assistance of three tugs, Pilot is onboard, with diamond day (20)

Tuesday, September 24, 2024

shapes being flown on the mast along with hotel flag. On Watch: 2/O (b)(6) with A/B (b)(6) A/B (b)(6) O/S (b)(6) alternating as helmsman, lookout, and rover. Captain's Standing Orders, Night Orders, MSC and USCG rules and regulations observed and followed throughout the watch.

1559 Vessel is passed the Duqm fairway bouy, pilot assumes the conn.

1706 Aft Tug "Ameerat" was made fast single line on the Starboard quarter.

1729 Stern reports they are even with the bow of AKE-6.

1740 First line shift colors.

1804 Pilot away.

1812 Vessel securely moored. In port watches commence in 30 minutes.

1924 Liberty is granted for all hands at the department heads discretion.

2030 Watch officer conducted a round of the vessel. All in apparent good order.

2145 A/B (b)(6) conducted a round of the vessel. All in apparent good order.

2230 Watch officer conducted a round of the vessel. All in apparent good order.

2345 As watch comes to an end, vessel is securely moored as before in calm harbor conditions, light SE winds, and fair visibility. 2/O (b)(6) is properly relieved by 3/O (b)(6)

(b)(6)

September 24, 2024 23:45

Approver's Comments

Reviewer's Comments

Reviewed By

Date

Approved By

Date

Enclosure (20)

22 September 2024

22 September 2024

- U/W Northern Arabian Sea
- 50% Ahead on Main Engines
- Mode 2, PTO1 PTO2 On line
- SSDG#3 On stand by
- EDG hydraulic start "A" valve is open / Auto.

09/22/2024 0001 AM status of the engine room are as follows:

- Starboard propulsion plant            On line
- SME LO service pumps                #1 online
- SME R/A LO Pumps                    #4 online
- SME Red Gear LO Pumps               #3 online
- STBD CPP Hydraulic Pumps            #3 online
- STBD Stern Tube LO Pumps            #3 online & #1 stby
  
- Port propulsion plant                 On line
- PME R/A LO Pumps                    #1 online
- PME LO Service Pumps                #2 online
- PME Red Gear LO Pumps               #2 online
- Port CPP Hydraulic Pumps             #2 online
- Port Stern Tube LO Pumps            #2 online & #4 stby
- FO Service Pum                        Secured
- ME JW Pumps                          #1 & #3 online
- #1 PTO                                  On line
- #2 PTO                                  On line
- #3 SSDG                                Off line, Standby
- #4 SSDG                                Off line
- No. 1 Aux Boiler                      Off line
- No. 2 Aux Boiler                      Off line
- Boiler Condensate Pump               Off line
- Ship's Service Air Compressor        #2 Lead #1 Lag
- Start Air Compressor                #1 Lead #2 Lag
- SW Cooling Pumps                    #1 & #2 online
- CFW Pumps                            #1 online
- A/C Compressors                    #1, #2, #3 online
- Reefer Compressor                    #2 Online
- LO Purifiers                          Off line
- FO Purifiers                          #3
- #1 EVAPORATOR                        On line
- #2 EVAPORATOR                        On line
- O.W.S                                  Off line
- EDG                                      Auto

09/22/2024 0001 The status of fuel, oil & water is as follows:

- Potable Water Suction                FWD Domestic Tank
- PORT CARGO POT WTR TK                Online
- RES FD TK                              Online
- MN FO SERVICE TK                    Online
- STBD CARGO POT WTR TK                Online
- MN FO SETTLER TK                    Online
- AUX FO SETTLER                        Online
- FWD AUX FO SER                        Online
- AFT AUX FO SER                        Online

0001 - Duty continuation.

Enclosure (21)

22 September 2024

- 0530 - Started Fuel Transfer, Main Settler Fill.
- 0545 - Blowdown SSDG3 and SSDG4
- 0550 - Three Generator paralleled.
- 0611 - Start SSDG3
- 0625 - Load SSDG3
- 0705 - Secured Fuel Transfer Fill Main Settling Tank from 3 P/S.
- 0800 - End of Duty. Relieved by 2A/E (b)(6)

(b)(6)

9/22/2024 8:00:00 AM

Chief Engineer approval met on 9/30/2024 3:00:50 PM by (b)(6)

Enclosure (21)

Page 2 of 13

22 September 2024

The vessel is currently underway.

9/22/2024 08:00:00 AM The status of the engine room is as follows:

- SME LO Service Pumps #3 Online
- SME R/A LO Pumps ONLINE
- SME Red Gear LO Pumps #3 Online
- Propulsion Plant Starboard ONLINE
- STBD CPP Hydraulic Pumps #1 Online
- STBD Stern Tube LO Pumps #3 Online
- Propulsion Plant Port ONLINE
- PME R/A LO Pumps #2 Online
- PME LO Service Pumps #2 Online
- PME Red Gear LO Pumps #2 Online
- Port CPP Hydraulic Pumps #4 Online
- Port Stern Tube LO Pumps #2 Online
- FO Service Pumps #2 & #3 Online - #1 Standby
- ME JW Pumps #1 & #3 Online - #2 Standby
- #1 PTO ONLINE
- #2 PTO ONLINE
- #3 SSDG ONLINE
- #4 SSDG STBY
- No. 1 Aux Boiler SECURED
- No. 2 Aux Boiler SECURED
- Boiler Condensate Pump OFFLINE
- Ship's Service Air Compressor #1 Lead #2 Lag
- Start Air Compressor #2 Online - #1 Standby
- SW Cooling Pumps #2 Online - #1 Standby
- CFW Pumps #2 Online
- A/C Compressors #1 Online #2 Online #3 Online
- Reefer Compressor #2 Online
- LO Purifiers SECURED
- FO Purifiers #3 Online
- #1 EVAPORATOR ONLINE
- #2 EVAPORATOR ONLINE
- O.W.S ONLINE
- Emergency Diesel Generator Auto

- 0800 - Assumed the Duty properly relieving 3 A/E (b)(6) The ship is current in unrep mode.
- 1150 - Secured from unrep detail.
- 1157 - SSDG 3 taken off the bus.
- 1205 - Secured SSDG 3.
- 1330 - Commence potable water transfer to CP tank S @ 4' from CP tank P @ 3'8". Cargo pot Brom Cart changed, opp test sat.
- 1450 - Secured Cargo pot xfer, CP S 6'8".
- 1645 - Unattended round complete, all conditions normal.
- 2028 - Alarm - STBD CPP SUMP HIGH. SUMP LEVEL NORM, OIL AROUND FILTER CLEANED.
- 2221 - STEERING TEST COMPLETED SAT. (b)(6)
- 2345 - Midnight round complete, all conditions normal.

(b)(6) 9/22/2024 11:59:00 PM

Chief Engineer approval met on 9/30/2024 3:01:02 PM by (b)(6)

Enclosure (21)

Page 3 of 13

23 September 2024

The vessel is currently underway.

9/23/2024 24:00:00 AM The status of the engine room is as follows:

- SME LO Service Pumps #3 Online
- SME R/A LO Pumps ONLINE
- SME Red Gear LO Pumps #3 Online
- Propulsion Plant Starboard ONLINE
- STBD CPP Hydraulic Pumps #1 Online
- STBD Stern Tube LO Pumps #3 Online
- Propulsion Plant Port ONLINE
- PME R/A LO Pumps #2 Online
- PME LO Service Pumps #2 Online
- PME Red Gear LO Pumps #2 Online
- Port CPP Hydraulic Pumps #4 Online
- Port Stern Tube LO Pumps #2 Online
- FO Service Pumps #2 & #3 Online - #1 Standby
- ME JW Pumps #1 & #3 Online - #2 Standby
- #1 PTO ONLINE
- #2 PTO ONLINE
- #3 SSDG STBY
- #4 SSDG STBY
- No. 1 Aux Boiler SECURED
- No. 2 Aux Boiler SECURED
- Boiler Condensate Pump OFFLINE
- Ship's Service Air Compressor #1 Lead #2 Lag
- Start Air Compressor #2 Online - #1 Standby
- SW Cooling Pumps #2 Online - #1 Standby
- CFW Pumps #2 Online
- A/C Compressors #1 Online #2 Online #3 Online
- Reefer Compressor #2 Online
- LO Purifiers SECURED
- FO Purifiers #3 Online
- #1 EVAPORATOR ONLINE
- #2 EVAPORATOR ONLINE
- O.W.S ONLINE
- Emergency Diesel Generator Auto

- 0000 - Log continuation.
- 0001 - ALARM - SME LO FILTER HIGH DIFF.
- 0007 - LO FILTER MANUALLY FLUSHED. HIGHT DIFF ALARM CLEARED.
- 0545 - SSDG 3&4 blow down completed.
- 0548 - Commence water transfer from CP P to aft potable tank.
- 0615 - Secured potable transfer.
- 0630 - SSDG 3 on the bus.
- 0745 - Properly relieved by 2 A/E (b)(6)

(b)(6) 9/23/2024 7:45:00 AM

Chief Engineer approval met on 9/30/2024 3:02:03 PM by (b)(6)

Enclosure (2)

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23 September 2024

23 September 2024

The Ship is underway at sea, Port and stbd main engine at 60% throttle with #1 pto and #2 pto and #3 ssdg online with #4 ssdg in stby. The EDG hydraulic start "A" valve is open and the engine mode selector switch in auto mode.

0800 - 2 A/E (b)(6) Properly relieved 2 A/E (b)(6) as Duty Engineer  
0800 - Unrep operation in progress  
1328 - #4 ssdg started  
1336 - #1 pto off bus and secured  
1337 - #4 ssdg on the bus  
1338 - Astern and ahead test, sat  
1338 - #2 pto off/bus  
1339 - Eot tested ,sat  
1349 - Port and stbd steering gear units tested, sat  
1340 to 1350 - Test ran the Edg, sat  
1407 - Felt rattling and vibrations and heard a loud banging noise , started investigating and noticed fuel pouring out of the cylinder fuel pump leak off reservoir .  
1409 - ERC takes control of both Main Engines  
1413 - Both P/S Main Engines were emergency stopped, and at Chief Engineer's recommendation :Steering pump secured after failed attempt to regain steering in NFU and hand steering in both pumps from bridge control  
1417 - Fuel oil leaking from both main engines was reported to the ERC. Information was relayed to the bridge. Fuel oil service pumps were secured.  
1418 - With Chief and first assistant engineers coordination started closing fuel valves and find out that the main contaminated drain tank was taking on water and noticed that the bilges was taking on water and with the help of the Deck dept. started pumping some the water in the aux storage tank and kept investigating and trying to locate the holes or cracks.  
1623 - #3 sw pump lined up for emergency bilge suction  
1830 - Started emergency bilge water suction, stbd high sea chest closed( only #2 s.w. pump online for suction)  
2030 - Captain made rounds of main engine space flooding observe as contained and engine space were manned  
2058 - Mate on watch reported flooding in the pump room, Dmac Marlon went to investigate same  
2120 - Captain made round of pump room and confirmed flooding  
2200 - Reported that tanks #9 center and #10 center taking on water, stated de ballasting #8 wings  
2212 - Commence pumping #9 center and #10 center into #3 center  
2223 - Jp #5 breaker #3 energized  
2239 - Mate on watch reported that starting pumping cargo oily waste tank to #3 stbd cargo fuel tanks  
2253 - Demac (b)(6) reported that motor #1, #2 and #3 clear ,no water  
2256 - Mate on watch reported deballasting still in progress, #10 center clear and #9 center still on observation  
2358 - Cargo stripping pumps #1 and #2 closed  
2345 - Vessel remained at anchor as before  
2358 - De watering the engine room and pump room in progress  
2359 - ENGINE ROOM ATTENDED

Enclosure (21)

Page 5 of 13

23 September 2024

9/23/2024 08:01 AM status of the engine room are as follows:

- **Starboard propulsion plant** Online
- SME LO service pumps #3 online & #1 stby
- SME R/A LO Pumps #3 online & #4 stby
- SME Red Gear LO Pumps #3 online & #1 stby
- STBD CPP Hydraulic Pumps #1 online & #3 stby
- STBD Stern Tube LO Pumps #3 online & #1 stby
  
- **Port propulsion plant** Online
- PME R/A LO Pumps #1 online & #2 stby
- PME LO Service Pumps #2 online & #4 stby
- PME Red Gear LO Pumps #2 online & #4 stby
- Port CPP Hydraulic Pumps #4 online & #2 stby
- Port Stern Tube LO Pumps #2 online & #4 stby
- FO Service Pumps #2 and #3 online and #1 stby
- ME JW Pumps #1 and #3 online & #2 stby
- #1 PTO Online
- #2 PTO Online
- #3 SSDG Online
- #4 SSDG Stby
- No. 1 Aux Boiler Secured
- No. 2 Aux Boiler Secured
- Boiler Condensate Pump Secured
- Ship's Service Air Compressor #2 lead & #1 lag
- Start Air Compressor #1 lead & #2 lag
- SW Cooling Pumps #2 online and #3 stby
- CFW Pumps #2 online & #1 stby
- A/C Compressors #1 & #2 & #3 online
- Reefer Compressor #2 online
- LO Purifiers Secure
- FO Purifiers #3 Online
- #1 EVAPORATOR Online
- #2 EVAPORATOR Online
- O.W.S Online
- EDG Auto

09/23/2024 08:01 AM The status of fuel, oil & water is as follows:

- Potable Water Suction Aft tank
- PORT CARGO POT WTR TK Filling
- RES FD TK Secured
- MN FO SERVICE TK Online
- STBD CARGO POT WTR TK Filling
- MN FO SETTLER TK Online
- AUX FO SETTLER Online

Enclosure (21)

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23 September 2024

- FWD AUX FO SER
- AFT AUX FO SER

Online  
Online

(b)(6)

9/23/2024 11:59:00 PM

Enclosure (21)

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24 September 2024

**24 SEPTEMBER 2024**

**USNS BIG HORN T-AO 198 IS CURRENTLY AT ANCHOR OFF COAST OF OMAN. #4 SSDG ONLINE, #3 IN STANDBY**

0001 SHIP IS TAKING ON WATER IN ENGINE ROOM AND PUMP ROOM. EMERGENCY BILGE SUCTION IS DISCHARGING OVER THE SIDE. ALL WASTE TANKS ARE FULL. DEWATERING IN PUMP ROOM USING OILY WASTE TRANSFER PUMPS AND DFM STRIPPING PUMPS GOING INTO CARGO 3 PORT AND 3 STBD. ALL ENGINE DEPARTMENT PERSONNEL ARE DOING WATCH ROTATIONS TO CONTROL FLOODING AND START CLEAN UP PROCESS.  
0100 ENGINE ROOM STILL MANNED TO CONTROL FLOODING

**9/24/2024 00:01 PM status of the engine room are as follows:**

- **Starboard propulsion plant** Offline
- SME LO service pumps Offline
- SME R/A LO Pumps Offline
- SME Red Gear LO Pumps #1 online
- STBD CPP Hydraulic Pumps Offline
- STBD Stern Tube LO Pumps #1 online & #3 stby
  
- **Port propulsion plant** Offline
- PME R/A LO Pumps Offline
- PME LO Service Pumps Offline
- PME Red Gear LO Pumps #4 online
- Port CPP Hydraulic Pumps Offline
- Port Stern Tube LO Pumps Offline
- FO Service Pum Offline
- ME JW Pumps #1 & #3 online
- #1 PTO Offline
- #2 PTO Offline
- #3 SSDG STANDBY
- #4 SSDG Online
- No. 1 Aux Boiler Offline
- No. 2 Aux Boiler Offline
- Boiler Condensate Pump Offline
- Ship's Service Air Compressor #2 online
- Start Air Compressor #2 online
- SW Cooling Pumps #2 online
- CFW Pumps #1 online
- A/C Compressors #1 , #2 and #3 online
- Reefer Compressor #2 online
- LO Purifiers Offline
- FO Purifiers Offline
- #1 EVAPORATOR Offline
- #2 EVAPORATOR Offline
- O.W.S Offline
- EDG Auto

**09/24/2024 00:01:00 AM The status of fuel, oil & water is as follows:**

- Potable Water Suction AFT domestic tank

Enclosure (21)

Page 8 of 13

24 September 2024

- PORT CARGO POT WTR TK            Secured
- RES FD TK                            Secured
- MN FO SERVICE TK                Secured
- STBD CARGO POT WTR TK        Secured
- MN FO SETTLER TK                Secured
- AUX FO SETTLER                    Offline
- FWD AUX FO SER                   Offline
- AFT AUX FO SER                    Online

2359 ENGINE ROOM REMAINS MANNED FOR FLOODING CONTROL AND DE WATERING

(b)(6)

9/24/2024 7:59:00 AM

Enclosure (21)

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24 September 2024

**24 SEPTEMBER 2024**

**USNS BIG HORN T-AO 198 IS CURRENTLY AT ANCHOR OFF COAST OF OMAN. #4 SSDG ONLINE, #3 IN STANDBY**

0800 SHIP IS TAKING ON WATER IN ENGINE ROOM AND PUMP ROOM. EMERGENCY BILGE SUCTION IS DISCHARGING OVER THE SIDE. ALL WASTE TANKS ARE FULL. DEWATERING IN PUMP ROOM USING OILY WASTE TRANSFER PUMPS AND DFM STRIPPING PUMPS GOING INTO CARGO 3 PORT AND 3 STBD. ALL ENGINE DEPARTMENT PERSONNEL ARE DOING WATCH ROTATIONS TO CONTROL FLOODING AND START CLEAN UP PROCESS.

0815 BLOW DOWN #4 SSDG

0900 START #3 SSDG

0905 #3 SSDG ONLINE

1130 ENGINE ROOM STILL MANNED TO CONTROL FLOODING

**9/21/2024 11:30 PM status of the engine room are as follows:**

- **Starboard propulsion plant** Offline
- SME LO service pumps Offline
- SME R/A LO Pumps Offline
- SME Red Gear LO Pumps #1 online
- STBD CPP Hydraulic Pumps Offline (DAMAGED)
- STBD Stern Tube LO Pumps #1 online & #3 stby
  
- **Port propulsion plant** Offline
- PME R/A LO Pumps Offline
- PME LO Service Pumps Offline
- PME Red Gear LO Pumps #4 online
- Port CPP Hydraulic Pumps Offline (DAMAGED)
- Port Stern Tube LO Pumps Offline
- FO Service Pum Offline
- ME JW Pumps #1 & #3 online
- #1 PTO Offline
- #2 PTO Offline
- #3 SSDG STANDBY
- #4 SSDG OFFLINE
- No. 1 Aux Boiler Offline
- No. 2 Aux Boiler Offline
- Boiler Condensate Pump Offline
- Ship's Service Air Compressor #2 online
- Start Air Compressor #2 online
- SW Cooling Pumps #3 online
- CFW Pumps #1 online
- A/C Compressors #1 and #2 online
- Reefer Compressor #1 online
- LO Purifiers Offline
- FO Purifiers Offline
- #1 EVAPORATOR Offline
- #2 EVAPORATOR Offline
- O.W.S Offline
- EDG Auto

**09/24/2024 11:30:00 AM The status of fuel, oil & water is as follows:**

- Potable Water Suction AFT domestic tank
- PORT CARGO POT WTR TK Secured
- RES FD TK Secured
- MN FO SERVICE TK Secured

Enclosure (2)

Page 10 of 13

24 September 2024

- STBD CARGO POT WTR TK      Secured
- MN FO SETTLER TK          Secured
- AUX FO SETTLER            Offline
- FWD AUX FO SER            Offline
- AFT AUX FO SER            Online

1200 PREP TO BE TOWED INTO PORT  
 1740 FIRST LINE  
 1812 SHIP SECURELY MOORED IN DUQM OMAN.  
 1820 #3 SSDG OFFLINE  
 1824 STOP #3 SSDG  
 1850 START LOADING POTABLE WATER FROM SHORE TO STBD CARGO POT. 1'5"  
 1900 DID ROUND OF AC AND REFRIGERATION PLANT, ALL SAT AND TEMPS IN NORMAL RANGE.  
 2100 START OFF LOADING OILY WASTE TO TRUCKS ON SHORE  
 2130 STOP LOADING CARGO POTABLE. 10,000 GAL  
 2359 ENGINE ROOM REMAINS MANNED FOR FLOODING CONTROL AND DEWATERING

(b)(6) 9/24/2024 11:58:00 PM

Chief Engineer approval met on 9/30/2024 3:02:56 PM by (b)(6)

Enclosure (2)

24 September 2024

**24 SEPTEMBER 2024**

**USNS BIG HORN T-AO 198 IS CURRENTLY AT ANCHOR OFF COAST OF OMAN. #4 SSDG ONLINE, #3 IN STANDBY**

0800 SHIP IS TAKING ON WATER IN ENGINE ROOM AND PUMP ROOM. EMERGENCY BILGE SUCTION IS DISCHARGING OVER THE SIDE. ALL WASTE TANKS ARE FULL. DEWATERING IN PUMP ROOM USING OILY WASTE TRANSFER PUMPS AND DFM STRIPPING PUMPS GOING INTO CARGO 3 PORT AND 3 STBD. ALL ENGINE DEPARTMENT PERSONNEL ARE DOING WATCH ROTATIONS TO CONTROL FLOODING AND START CLEAN UP PROCESS.

0815 BLOW DOWN #4 SSDG

0900 START #3 SSDG

0905 #3 SSDG ONLINE

1130 ENGINE ROOM STILL MANNED TO CONTROL FLOODING

**9/21/2024 11:30 PM status of the engine room are as follows:**

- **Starboard propulsion plant** Offline
- SME LO service pumps Offline
- SME R/A LO Pumps Offline
- SME Red Gear LO Pumps #1 online
- STBD CPP Hydraulic Pumps Offline (DAMAGED)
- STBD Stern Tube LO Pumps #1 online & #3 stby
  
- **Port propulsion plant** Offline
- PME R/A LO Pumps Offline
- PME LO Service Pumps Offline
- PME Red Gear LO Pumps #4 online
- Port CPP Hydraulic Pumps Offline (DAMAGED)
- Port Stern Tube LO Pumps Offline
- FO Service Pum Offline
- ME JW Pumps #1 & #3 online
- #1 PTO Offline
- #2 PTO Offline
- #3 SSDG STANDBY
- #4 SSDG OFFLINE
- No. 1 Aux Boiler Offline
- No. 2 Aux Boiler Offline
- Boiler Condensate Pump Offline
- Ship's Service Air Compressor #2 online
- Start Air Compressor #2 online
- SW Cooling Pumps #3 online
- CFW Pumps #1 online
- A/C Compressors #1 and #2 online
- Reefer Compressor #1 online
- LO Purifiers Offline
- FO Purifiers Offline
- #1 EVAPORATOR Offline
- #2 EVAPORATOR Offline
- O.W.S Offline
- EDG Auto

**09/24/2024 11:30:00 AM The status of fuel, oil & water is as follows:**

- Potable Water Suction AFT domestic tank
- PORT CARGO POT WTR TK Secured
- RES FD TK Secured
- MN FO SERVICE TK Secured

Enclosure (21)

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24 September 2024

- STBD CARGO POT WTR TK      Secured
- MN FO SETTLER TK          Secured
- AUX FO SETTLER            Offline
- FWD AUX FO SER           Offline
- AFT AUX FO SER           Online

1200 PREP TO BE TOWED INTO PORT  
 1740 FIRST LINE  
 1812 SHIP SECURELY MOORED IN DUQM OMAN.  
 1820 #3 SSDG OFFLINE  
 1824 STOP #3 SSDG  
 1900 DID ROUND OF AC AND REFRIGERATION PLANT, ALL SAT AND TEMPS IN NORMAL RANGE.  
 2359 ENGINE ROOM REMAINS MANNED FOR FLOODING CONTROL AND DEWATERING

(b)(6) 9/24/2024 11:59:00 PM

Chief Engineer approval met on 9/30/2024 3:04:11 PM by (b)(6)

Enclosure (A)



SHIP POSITION LOG

SHIP TYPE N A T-10				HULL NUMBER 99			YEAR 09	MONTH 09	ZONE 23	DAY 23	SHIP NAME USNS BIGHORN	STATION 77	CLASS 78	HANDL 79		
1	2	3	4	5	6	7	12	13	14	15	16	17	72	77	78	79

TIME	POSITION TYPE	CODE A	QUALITY CODE B	RESET	LATITUDE			LONGITUDE			REMARKS			
					DEG	MIN	N/S	DEG	MIN	E/W				
18 — 21	23	24	25	26	27	28	29	30 — 32	33	34 — 36	37 — 39	40	41	76
1200					17	18	01	N	05	7	34	00	E	ND: 304.2 NM
1300					17	27	06	N	05	8	06	03	E	
1400					17	37	03	N	05	8	14	00	E	
1500					17	46	04	N	05	8	21	03	E	
1600					17	58	01	N	05	8	28	01	E	
1700					18	06	02	N	05	8	36	07	E	
1800					18	15	05	N	05	8	44	04	E	
1900					18	24	07	N	05	8	52	04	E	
2000					18	36	07	N	05	8	54	09	E	
2100					18	37	03	N	05	8	53	07	E	
2200					18	34	06	N	05	8	59	09	E	
2300					18	25	04	N	05	9	07	04	E	
0000					18	35	09	N	05	9	06	04	E	23 SEPT 2009
0100					18	38	00	N	05	9	05	03	E	
0200					18	29	06	N	05	9	06	02	E	
0300					18	17	00	N	05	9	06	05	E	
0400					18	22	07	N	05	9	00	08	E	
0500					18	32	01	N	05	9	57	08	E	
0600					18	41	06	N	05	9	50	07	E	

Enclosure (2)

Page 1 of 2

SHIP TYPE N A T-10				SHIP TYPE		
1	2	3	4	77	78	79
TIME	POSITION TYPE					
18 — 21	23					
0800						
0900						
1000						
1100						
1200						
1300						
1400						
1414						
1537						
1600						
1700						
1800						
1900						
2000						
2100						
2200						
2300						
0000						
0100						
0200						
0300						
0400						
0500						
0600						



**REPORT of MARINE CASUALTY, COMMERCIAL DIVING CASUALTY, or OCS-RELATED CASUALTY**

**Section I - Reporting Vessel/Facility Information**

1. Vessel or Facility Name USNS BIGHORN TAO 198		2. Vessel Official Number or IMO Number 8812162		3. Vessel Flag UNITED STATES	
4. Vessel Length 677' 06" <input checked="" type="checkbox"/> Feet <input type="checkbox"/> Meters		5. Vessel Gross Tons 25742		6. Vessel Propulsion Type DIESEL	
7. Vessel or Facility Type TANKER		8. Vessel or Facility Service or Occupation UNDERWAY REPLENISHMENT OILER			
9. FOR TOWING ONLY	9a. Arrangement:	9b. Number of Vessels Towed:	9c. Maximum Size of Tow/Tow-Boat(s):		9d. Did one or more of the barges in the tow cause or sustain damage in the marine casualty? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>(If Yes complete and attach one or more CG-2692A forms to this report)</i>
	<input type="checkbox"/> Pushing Ahead <input type="checkbox"/> Towing Astern <input type="checkbox"/> Towing Alongside		Empty _____ Loaded _____ Total _____	Length _____ feet Width _____ feet	

**Section II - Reason for Submitting this Report (Check all that apply)**

10. The above vessel was involved in a Marine Casualty consisting in (46 CFR 4.05-1 and 4.05-10):
- 1. Unintended grounding or an unintended strike of (allision with) a bridge
  - 2. Intended grounding or intended strike of a bridge that created a hazard to navigation, the environment or the safety of the vessel, or that meets any of the criteria in 3 through 8 below
  - 3. Loss of main propulsion, primary steering, or any associated component or control system that reduces the maneuverability of the vessel
  - 4. Occurrence materially and adversely affected the vessel's seaworthiness or fitness for service or route
  - 5. Loss of life
  - 6. Injury that requires professional medical treatment (treatment beyond first aid) and, if the person is engaged or employed on board a vessel in commercial service, that renders the individual unfit to perform his or her routine duties
  - 7. Occurrence causing property damage in excess of \$75,000
  - 8. Occurrence involving significant harm to the environment
11. The above facility or vessel was involved in a Commercial Diving Casualty involving (46 CFR 197.484):
- 1. Loss of life
  - 2. Diving-related injury to any person causing incapacitation for more than 72 hours
  - 3. Diving-related injury to any person requiring hospitalization for more than 24 hours
12. The above facility or vessel was involved in an OCS Facility Casualty Resulting in (33 CFR 146.30 and 146.35):
- 1. Death
  - 2. Injury to 5 or more persons in a single incident
  - 3. Injury causing any person to be incapacitated for more than 72 hours
  - 4. OCS Facility only - Damage affecting the usefulness of primary lifesaving or firefighting equipment
  - 5. OCS Facility only - Damage to the facility exceeding \$25,000 resulting from a collision by a vessel with the facility
  - 6. OCS Facility only - Damage to a floating OCS facility exceeding \$25,000

**Section III - Associated Parties Information (Fill all fields that apply)**

13. Name of Owner U.S. NAVY		Telephone ----	14. Name of Operator or Manager MILITARY SEALIFT COMMAND		Telephone 757443-2700
Address  UKN		Email address  UKN	Address  471 EAST C STREET NORFOLK, VA, 23511		Email address
15. Name of Master or Person in Charge (Last, First, Middle) <b>(b)(6)</b>		Telephone <b>(b)(6)</b>	16. Name of Agent (Last, First, Middle) NA		Telephone NA
Address  USNS BIGHORN TAO 198 UNIT 100356 BOX 1 FPO AF 96633		Email address  <b>(b)(6)</b> CIVBIGHORN.NAVY.MIL	Address  NA		Email address  NA
17. Name of Dive Supervisor (Last, First, Middle) NA		Telephone NA	18. Name of Pilot (Last, First, Middle) NA		Telephone NA
Address  NA		Email address  NA	Address  NA		Email address  NA

**Section IV - Casualty Information**

19. Date/Time (local) of Occurrence 20211224 10:11 GMT		20. Location-Name of Body of Water or Waterway: Latitude: 19-29.4N River Mile Marker: Longitude: 057-58.6E OR	
21. Property Damage Estimated Damage Cost(s) to: Vessel: \$ UNK Cargo: \$ UNK Facility: \$ Other: \$ UNK		Describe the Extent of Property Damage NA	
22. Status of Involved Persons (If there are 1 or more injured, dead or missing persons complete and attach one or more CG-2692C forms to this report) Total Number of Persons: On Board the Vessel: 96 Injured: 0 Dead: 0 Missing: 0			

Enclosure (23)

Page 1 of 5

**INSTRUCTIONS FOR COMPLETION OF FORM CG-2692B**  
**Report of Chemical Testing Following a Serious Marine Incident Involving a Commercial Vessel**

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The Coast Guard estimates that the average burden for this report is .5 hours. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: Commandant (CG-INV), U.S. Coast Guard Stop 7501, 2703 Martin Luther King Jr Ave SE, Washington, DC 20593-7501 or Office of Management and Budget, Paperwork Reduction Project (1625-0001), Washington, DC 20503.

**WHEN TO USE THIS FORM**

1. This form, when submitted in conjunction with a CG-2692 or submitted alone, satisfies the requirement found in the Code of Federal Regulations for written reports of chemical drug and alcohol testing of individuals engaged or employed on board a commercial vessel who are identified as being directly involved in serious marine incidents consisting of one or more of the occurrences lists in block 4. Alcohol tests are to be conducted not later than 2 hours (unless there are safety concerns directly related to the casualty that need to be addressed by the individual(s)) and drug test specimens collected not later than 32 hours after a serious marine incident.

**INDIVIDUAL DIRECTLY INVOLVED IN A SERIOUS MARINE INCIDENT**

2. The term "individual Directly Involved in a Serious Marine Incident" means an individual whose order, action, or failure to act is determined to be, or cannot be ruled out as, a causative factor in the events leading to or causing a serious marine incident.

**COMPLETION OF THIS FORM**

3. In accordance with 46 CFR Subpart 4.06 this form shall be filled out as completely and accurately as possible. Please type or print clearly. Fill in all blanks that apply to the kind of accident that has occurred. If a block is not applicable, the abbreviation "NA" should be entered in that space. If the answer is unknown and cannot be obtained before the report has to be submitted (i.e. within 5 days of the accident), the abbreviation "UNK" should be entered in that block. If "NONE" is the correct response, enter it in the block.

4. If more than 10 individuals are directly involved in the Serious Marine Incident additional CG-2692Bs should be completed.

5. Once completed, deliver, email, or fax this form with a corresponding CG-2692 within 5 days of the casualty to the Coast Guard Sector, Marine Safety Unit, or Activity nearest the location of the casualty or, if at sea, nearest the arrival port. <https://www.uscg.mil/Units/Organization>

6. Upon receipt of a report of chemical test results. The marine employer shall submit a copy of the test results for each person listed in block 5a of this form to the Coast Guard Officer in Charge, Marine Inspection where the CG-2692B was submitted in accordance with 46 CFR §4.06-60(d).

7. Block 6d - Alcohol Test Result: When the alcohol test results are available, the alcohol concentration shall be expressed numerically in percent by weight (i.e. 0.04, 0.10, etc.); otherwise indicate positive for alcohol being present or negative for no alcohol present.

**NOTICE:** The information collected on this form is routinely available for public inspection. It is needed by the Coast Guard to carry out its responsibility to investigate marine casualties, to identify hazardous conditions or situations and to conduct statistical analysis. The information is used to determine whether new or revised safety initiatives are necessary for the protection of life or property in the marine environment.

Enclosure (23)

Page 2 of 5

**INSTRUCTIONS FOR COMPLETION OF FORM CG-2692**  
**REPORT OF MARINE CASUALTY, COMMERCIAL DIVING CASUALTY, OR OCS-RELATED CASUALTY**

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The Coast Guard estimates that the average burden for this report is 1 hour. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: Commandant (CG-INV), U.S. Coast Guard Stop 7501, 2703 Martin Luther King Jr Ave SE, Washington, DC 20593-7501 or Office of Management and Budget, Paperwork Reduction Project (1625-0001), Washington, DC 20503.

**WHEN TO USE THIS FORM**

1. This form satisfies the requirement for written reports of casualties and accidents found in the Code of Federal Regulations for vessels, commercial diving operations, and Outer Continental Shelf (OCS) facilities. Depending on the circumstances surrounding an incident, a written report may be required if it meets one or more of the conditions described in instructions 2 - 4.
2. **VESSELS.** If you are the owner, agent, master, operator, or person in charge of a vessel, other than a public vessel or an uninspected recreational or state-numbered vessel, you must submit a report if your vessel:
  - A. is involved in a marine casualty or accident that occurs upon the navigable waters of the United States, its territories or possessions and meets any of the criteria in block 10, or
  - B. is a United States vessel involved in a marine casualty or accident, wherever such casualty or accident occurs, that meets any of the criteria in block 10, or
  - C. is a foreign vessel engaged in OCS activities as defined in 33 CFR 140.10 and is involved in a marine casualty or accident that meets any of the criteria in block 10, or
  - D. is a foreign tank vessel operating in waters subject to the jurisdiction of the United States, including the Exclusive Economic Zone (EEZ), which involves significant harm to the environment or material damage affecting the seaworthiness or efficiency of the vessel.
3. **DIVING.**
  - A. **Commercial Diving.** If you are the master or person in charge of a vessel or facility from which a commercial diving operation is conducted: (1) at any deepwater port or the safety zone thereof as defined in 33 CFR Part 150; (2) from any artificial island, installation, or other device on the Outer Continental Shelf (OCS) and the waters adjacent thereto as defined in 33 CFR Part 147 or otherwise related to activities on the OCS; (3) from any vessel required to have a certificate of inspection issued by the Coast Guard, including mobile offshore drilling units, regardless of their geographic location; or (4) from any vessel connected with a deepwater port or within the deepwater port safety zone or from any vessel engaged in activities related to the OCS, you must submit a report if there is a diving casualty meeting the criteria in block 11, except if the diving operation is:
    1. performed solely for marine scientific research and development purposes by educational institutions,
    2. performed solely for research and development for the advancement of diving equipment and technology, or
    3. performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.
  - B: **All Other Diving.** Any occurrence of injury or loss of life to any person while diving from a vessel subject to instruction 2 and using underwater breathing apparatus must be reported under instruction 2.
4. **OUTER CONTINENTAL SHELF (OCS) FACILITIES.** If you are the owner, operator, or person in charge of an OCS facility engaged in OCS activities as defined in 33 CFR 140.10, you must submit a report if your facility is involved in a casualty or accident that meets any of the criteria in block 12.

**COMPLETION OF THIS FORM**

5. In accordance with 46 CFR §4.05-10, 46 CFR §197.486, and 33 CFR §146.35, this form shall be filled out as completely and accurately as possible. Please type or print clearly. Fill in all blanks that apply to the kind of accident that has occurred. If a block is not applicable, the abbreviation "NA" should be entered in that space. If the answer is unknown and cannot be obtained before the report has to be submitted (i.e. within 5 days of the accident), the abbreviation "UNK" should be entered in that block. If "NONE" is the correct response, enter it in the block.
6. Once completed, deliver, email, or fax this form within 5 days of the casualty to the Coast Guard Sector, Marine Safety Unit, or Activity nearest the location of the casualty or, if at sea, nearest the arrival port. <https://www.uscg.mil/Units/Organization/>
7. Tugs or towboats with tows under their control shall complete blocks 9a through 9d and, if one or more barges in their tow causes or sustains damage or meets any other reporting criteria, use the "Barge Addendum," CG-2692A to report information on the barge(s) involved.
8. If an incident involves multiple barges suffering or causing damage while moored or anchored (such as in a fleeting area), or breaking away from their moorage and causing or sustaining damage, enter the location of the moorage in Block 1 of the CG-2692 and complete the form except for blocks 2-8. Details for the barges will be entered on the CG-2692A. If a single barge is involved in a marine casualty while moored or anchored, it shall be documented as any other vessel using the CG-2692.
9. If the casualty meets the criteria for a serious marine incident as defined in 46 CFR §4.03, use the "Chemical Drug and Alcohol Testing Addendum," CG-2692B to report information on required drug and alcohol testing following a serious marine incident.
10. If one or more persons on the vessel or facility were injured, killed, or missing as a result of the casualty, use the "Personnel Casualty" Addendum," CG-2692C to report information on the extent of all personnel casualties.
11. For facilities and vessels engaged in OCS activities who are reporting a casualty in accordance with 33 CFR §146.35 or 33 CFR §146.303, use the "Involved Persons and Witnesses Addendum," CG-2692D to provide a list of all involved persons and witnesses to the casualty being reported. The CG-2692D may also be used to provide data on persons involved or witnessing a marine casualty or commercial diving casualty.
12. Block 20 - "Location": Always identify the body of water or waterway. Latitude and longitude to the nearest tenth of a minute should always be entered except in those rivers and waterways where a mile marker system is commonly used. In those cases, the mile number to the nearest tenth of a mile should be entered. If the latitude and longitude, or mile number, are unknown, reference to a known landmark or object (buoy, light, etc.) with distance and bearing to the object is permissible.

**Privacy Act Statement**

**Authority:** The authority for this collection is 46 U.S. Code 6101.

**Purpose:** The Coast Guard uses this information in gathering facts to determine causes surrounding reportable marine casualties. This information assists in promoting the safety of life, property, and the protection of the marine environment through preventing the reoccurrence of accidents.

**Routine Uses:** Reportable marine casualty information is needed for Coast Guard investigations of vessel casualties involving injury, death, property damage, environmental damage and dangerous conditions and for preparation and submission of data reports mandated by Congress (see 46 U.S.C. 6301). Information gathered is also used to determine whether new or revised safety laws, regulations, and policies are necessary. Additionally, chemical testing information is needed to improve Coast Guard detection and reduction of drug use by mariners. Any external disclosures of information within this record will be made in accordance with DHS/USCG-013 Marine Information for Safety and Law Enforcement, June 25, 2009, 74 FR 30305.

**Disclosure:** Furnishing this information is mandatory. Failure to furnish the requested information for occurrences that are reportable marine casualties, diving casualties, or OCS-related casualties may result in civil penalty.

Enclosure (23)

REPORT OF MANDATORY CHEMICAL TESTING FOLLOWING A SERIOUS MARINE INCIDENT INVOLVING VESSELS IN COMMERCIAL SERVICE

Note: This form shall be used to report data on persons directly involved in a serious marine incident involving a vessel in commercial service and the mandatory chemical drug and alcohol testing.

Section I - Reporting Vessel Information - Casualty Date/Time

1. Vessel Name: USNS BIG HORN T-AO 198; 2. Vessel Official Number or IMO Number: 8812162; 3. Date/Time (local) of Occurrence: 23 SEP 2024 / 1412

Section II - Reason for Submitting this Report (Check all that apply)

4. The above vessel is in commercial service and was involved in a Serious Marine Incident that resulted in (46 CFR 4.03-2):

- One or more deaths
An injury to a crewmember, passenger, or other person that requires professional medical treatment beyond first aid, and, in the case of a person employed on board a vessel in commercial service, which renders the individual unfit to perform routine vessel duties
[X] Damage to property in excess of \$200,000
Actual or constructive total loss of any vessel subject to inspection under 46 USC 3301
Actual or constructive total loss of any self-propelled vessel, not subject to inspection under 46 USC 3301, of 100 gross tons or more
A discharge of oil of 10,000 gallons or more into the navigable waters of the United States, as defined in 33 USC 1321
A discharge of a reportable quantity of a hazardous substance into the navigable waters of the United States
A release of a reportable quantity of a hazardous substance into the environment United States

Section III - Personnel and Testing Information

5. Individuals Directly Involved in Serious Marine Incident; 6. Drug and Alcohol Testing

Table with 6 columns: 5a. Name (Last, First, Middle), 5b. USCG Credentialed?, 6a. Drug Test Urine Sample Provided Within 32 Hours?, 6b. Alcohol Test Specimen Provided within 2 Hours?, 6c. Type of Alcohol Test Specimen Provided, 6d. Alcohol Test Results. Contains 10 rows of individual data.

7. Explanation of why test samples were not collected within required timeframes or not at all and/or why testing was not conducted (Required for each "No" checked in columns 6a or 6b)

Alcohol testing was not completed due to the feasibility of doing so in the prescribed time frame while ongoing emergency casualty mitigation and damage control efforts were being conducted involving all persons named above.

8. SAMHSA Accredited Laboratory Conducting Chemical Drug Tests
Name: US ARMY CDR FORENSOC TOX
Address: 2130 BALDWIN AVE CROFTON, MD, 21114, USA
Telephone: (301) 677-3731
Email: UNKN

9. Laboratory or Individual Conducting Alcohol Tests
Name: NA
Address: NA
Telephone: NA
Email: NA

Section IV - Person Making this Report

10. Name (PRINT) (Last, First, Middle): (b)(6); 11. Signature: (b)(6); 12. Date: 10/01/2024; 13. Title: MASTER; 14. Address: USNS BIG HORN T-AO 198 UNIT 100356 BOX 1, FPO AP 96693; 15. Telephone No.: (b)(6); 16. Email: BIGHORN\_MASTER@bighorn.navy.mil

**Section IV - Casualty Information (continued)**

23. Was This Casualty a Serious Marine Incident (SMI) as Defined in 46 CFR 4.03-2?

Yes    No    Not at this Time, But is Likely to Become an SMI   (If Yes or is Likely to Become an SMI complete/attach one or more CG-2692B forms to this report)

24a. Is there any evidence of alcohol or drug use by or intoxication of individuals directly involved in the casualty?

Yes    No   (If Yes, identify those individuals for whom evidence has been obtained and specify the method to obtain such evidence in block 24c)

24b. Did any individual directly involved in a casualty refuse to submit to, or cooperate in, the administration of a timely chemical test, when directed by a law enforcement officer or by the marine employer?

Yes    No   (If Yes, note the individual(s) who refused in block 24c)

24c. Individuals with evidence of drug or alcohol use, evidence of intoxication, or who refused to submit/cooperate in a timely chemical test (if more space is needed, continue in block 25c)

24d. Is there evidence that alcohol use contributed to this casualty?

Yes    No   (If Yes, discuss in block 25b)

25. Nature and Circumstance of the Casualty:

25a. Activity or Operation Being Conducted at the Time of the Casualty:

TRANSITING TO PORT OF DUQM OMAN FROM SEA

25b. Description of the Casualty (casualty events and the conditions and actions that were believed to be causal factors as well as any hazards created as a result of the casualty. Attach additional sheets if necessary.):

AT APPROX 1012 GMT ON SEPTEMBER 23RD 2024 USNS BIGHORN STRUCK AN UNKNOWN OBJECT OR OBJECTS IVO DUQM OMAN. MASTER WAS AT THE CONN WITH 3/O ASSISTING WITH BRM AND NAVIGATOR ON THE BRIDGE. MASTER CALLED FOR A HARD LEFT RUDDER COMMAND. REPORTS FROM THE ENGINE ROOM CALLED FOR AN IMMEDIATE SHUT DOWN OF THE MAIN ENGINES. STEERING WAS NOTED AS BEING AFFECTED AFTER ATTEMPS WERE MADE TO BRING RUDDER MIDSHIPS. VESSEL CALLED FOR PERSONNEL TO MAN THE ANCHOR STATION. CALLS CAME FROM THE ENGINE ROOM WITH REPORTS OF FLOODING. VESSEL DROPPED ANCHOR ENDING WITH 5 SHOTS IN APROX 20 METERS OF WATER. FLOODING CAUSALTIES MITIGATED BY CREW TO KEEP VIAL MACHINERY INTACT AND TO KEEP VESSEL IN SAFE CONDITION. VESSEL REQUIRES ASSISTANCE FROM PORT TO TRANSIT FROM OUR PRESENT LOCATION TO THE BERTH ASSIGNED.

25c. Any other comments, including with respect to use of or need for emergency response equipment:

**Section V - Person Making this Report**

26. Name (PRINT) (Last, First, Middle) <b>(b)(6)</b>	27. Signature: <b>(b)(6)</b>	28. Date 24 Sept 24
29. Title MASTER	30. Address USNS BIGHORN TAO 198 UNIT 100356 BOX 1 FPO AP 96698	
31. Telephone No. <b>(b)(6)</b>	32. Email <b>(b)(6)</b> @BIGHORN.NAVY.MIL	

Enclosure (2)

**23SEP24 ARRIVAL DUQM**  
 Trim and Stability Summary

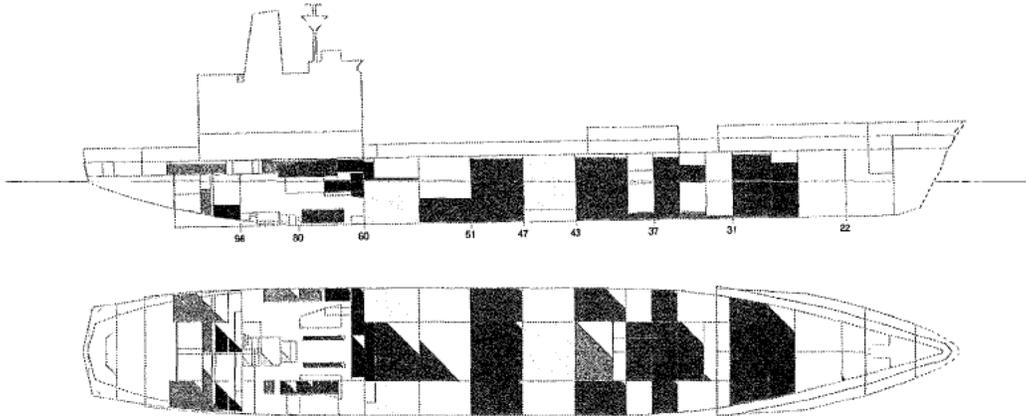


Loading		Trim	
Displacement	34,822.14 MT	Specific Gravity	1.0250
Deadweight	19,714.56 MT		
Avail Deadweight	8,240.97 MT	-SUMMER-	
Stability		Trim	
KMt	12.66 m	LCF Draft	9.18 m
VCG (Upright)	9.47 m	LCF	105.42A m-FP
GMt (Solid)	3.18 m	LCB	98.58A m-FP
FS Correction	1.10 m	LCG	101.11A m-FP
GMt (Corrected)	2.08 m	TP1cm	45 MT/cm
GMt Required	1.40 m	MT1cm	463 m-MT/cm
GMt Margin	0.68 m	Trim at Perps	1.90A m
-REQUIRED GM - 2 COMP DAMAGE-		Heel Angle	0.7P deg
		Propeller Immersion	155.30 %
Drafts - Perps		Drafts - Marks	
AP	10.08 m	Aft	9.18 m
MS	9.12 m	MS	9.12 m
FP	8.17 m	Fwd	8.17 m
Strength -At Sea-			
Shear (Min)	-2,255.69 MT	109.12A m-FP	28.25 %
Shear (Max)	993.30 MT	163.22A m-FP	23.61 %
Shear (Max %Allow)	-2,255.69 MT	109.12A m-FP	28.25 %
Moment (Max Hog)	46,905H m-MT	126.50A m-FP	- %
Moment (Max Sag)	6,357S m-MT	48.16A m-FP	6.00 %
Moment (Max %Allow)	26,336H m-MT	163.22A m-FP	42.98 %
Air Draft			
Actual	43.64 m		
Notes			
Drafts from Keel			
Hull from Tables			
Tanks from Tables			

Enclosure (24)

Page 1 of 12

**23SEP24 ARRIVAL DUQM**  
**Weight Summary**

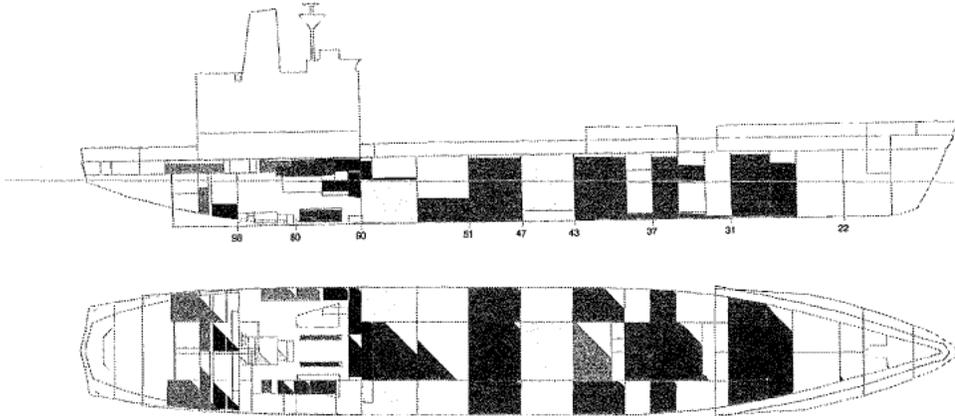


Group	Weight	VCG	LCG	TCG	FSt	Group Min FS
	LT	Ft-BL	Ft-FP	Ft-CL	ft-LT	
Lightship	15,054.11	42.99	381.83A	0.12P	0	
Lightship Alterations	0.00	-	-	-	0	
<b>Total Lightship:</b>	<b>15,054.11</b>	<b>42.99</b>	<b>381.83A</b>	<b>0.12P</b>	<b>0</b>	
Cargo DFM	6,138.96	20.65	333.33A	0.23S	29,871	
Cargo JP-5	4,416.26	19.23	251.91A	0.07S	29,760	
Fuel Oil	1,048.81	24.49	470.34A	7.52P	5,214	5,214
Lube Oil	154.27	34.61	478.24A	21.39S	132	31
Fresh Water	578.12	36.45	550.32A	6.53P	4,185	2,714
SW Ballast	7,694.50	23.18	260.36A	1.26S	22,250	
Misc. Tanks	77.74	8.93	423.26A	2.00S	9,455	
<b>Total Tanks:</b>	<b>20,108.67</b>	<b>22.02</b>	<b>302.37A</b>	<b>0.16S</b>	<b>100,867</b>	
Provisions	21.80	53.43	536.34A	12.20S	0	
Ammunition	2.20	86.46	438.68A	17.39S	0	
Crew and Effects	14.26	83.09	507.71A	1.51S	0	
Cargo Stores	256.00	63.93	111.55A	3.02P	0	
Containers	30.00	64.94	381.71A	2.50S	0	
Deck Loads	95.00	65.85	259.86A	0.00	0	
Misc. Weights	276.67	94.41	843.13A	1.09S	21,599	
<b>Displacement</b>	<b>35,858.71</b>	<b>31.88</b>	<b>338.73A</b>	<b>0.04S</b>	<b>122,466</b>	
<b>Deadweight</b>	<b>20,804.60</b>					
<b>Avail Deadweight</b>	<b>6,524.29</b>					<b>-SLL 36.0 FT-</b>

Enclosure (24)

Page 2 of 12

**23SEP24 ARRIVAL DUQM**  
**Trim and Stability Summary**



**Loading**

Displacement	35,858.71 LT	Specific Gravity	1.0250
Deadweight	20,804.60 LT		
Avail Deadweight	6,524.29 LT	-SLL 36.0 FT-	

**Stability**

KMt	41.32 Ft-BL	LCF Draft	31.30 ft
VCG (Upright)	31.88 Ft-BL	LCF	347.70A Ft-FP
GMt (Solid)	9.44 ft	LCB	324.47A Ft-FP
FS Correction	3.42 ft	LCG	338.73A Ft-FP
GMt (Corrected)	6.03 ft	TP1in	113 LT/in
GMt Required	5.49 ft	MT1in	3,900 ft-LT/in
GMt Margin	0.54 ft	Trim at Perps	10.92A ft
-REQUIRED GM - 2 COMP DAMGE-		Heel Angle	0.4S deg
		Propeller Immersion	169.76 %

**Drafts - Perps**

AP	36.38 (36-4.5) ft	Aft	35.56 (35-6.7) ft
MS	30.92 (30-11.0) ft	MS	30.92 (30-11.0) ft
FP	25.46 (25-5.5) ft	Fwd	25.82 (25-9.8) ft

**Drafts - Marks**

**Strength -At Sea-**

Shear (Min)	-1,962.82 LT	358.00A Ft-FP	24.97 %
Shear (Max)	683.79 LT	535.50A Ft-FP	16.52 %
Shear (Max %Allow)	-1,962.82 LT	358.00A Ft-FP	24.97 %
Moment (Max Hog)	90,300H ft-LT	474.13A Ft-FP	-- %
Moment (Max Sag)	26,637S ft-LT	158.00A Ft-FP	7.79 %
Moment (Max %Allow)	69,122H ft-LT	535.50A Ft-FP	34.94 %

**Air Draft**

Actual	141.07 ft
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**Notes**

- Drafts from Keel
- Hull from Tables
- Tanks from Tables

Enclosure (24)

Page 3 of 12

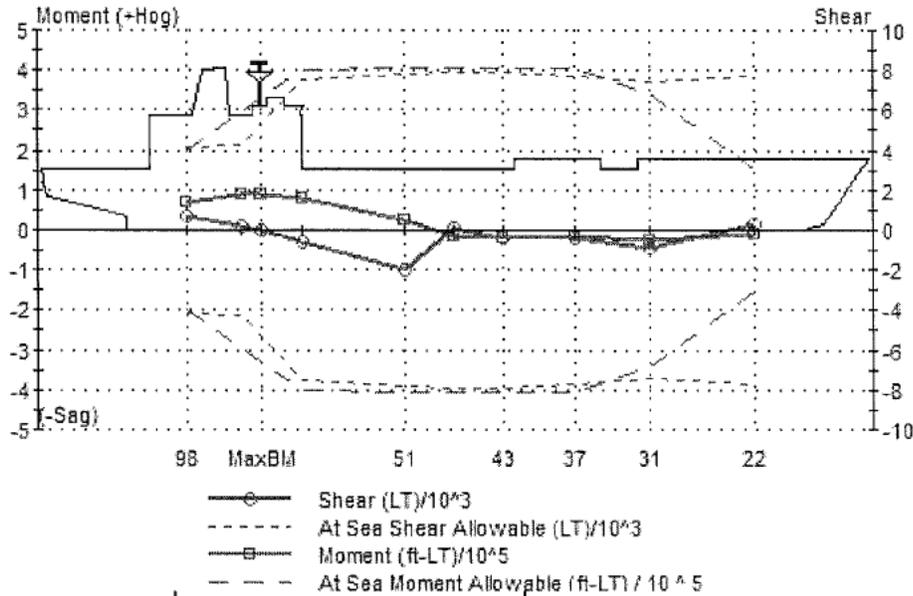
**23SEP24 ARRIVAL DUQM**  
**Alarms Summary**

No.	Status	Description	Attained	Pass If	Type
1	PASS	Calculation Status	OK	Status = OK	Requirement
2	PASS	Avail Deadweight	6,524.29 LT	AvDWT >= 0.00 LT	Requirement
3	PASS	Max BMom %Allow	34.94 %	-100.00 =< BM% <= 100.00	Requirement
4	PASS	Max Shear %Allow	24.97 %	-100.00 =< SF% <= 100.00	Requirement
5	PASS	Prop Immersion	169.76 %	PropImm >= 100.00	Requirement
6	PASS	GZ Criteria Status	PASS	GZStat = PASS	Requirement
7	PASS	GMt Margin	0.54 ft	GMtMarg >= 0.00 ft	Requirement

Enclosure (24)

Page 4 of 12

**23SEP24 ARRIVAL DUQM**  
**Strength Values Summary**

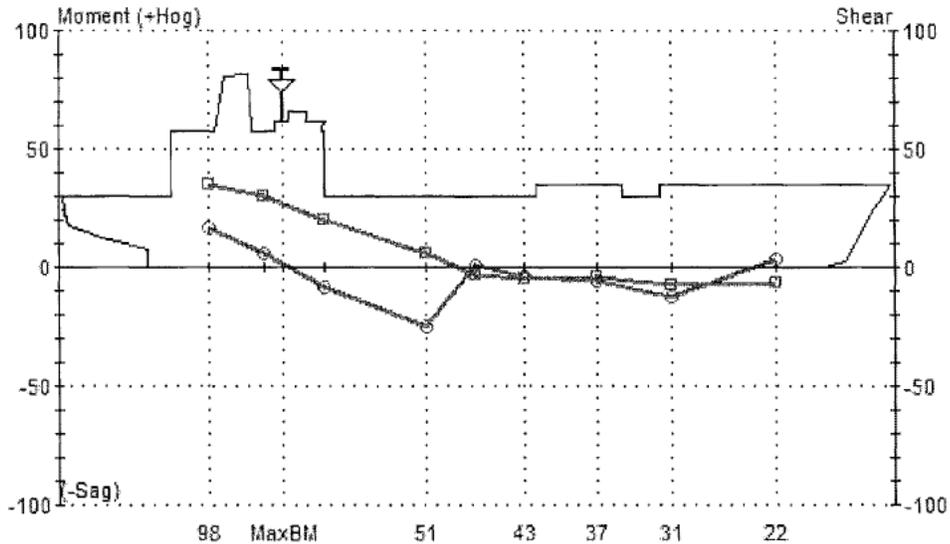


Name	Loc Ft-FP	Shear - At Sea			Bending - At Sea		
		Wt LT	Buoy LT	Shear LT	Wt Mom ft-LT	Buoy Mom ft-LT	Moment ft-LT
98	535.50A	3,441.03	2,757.24	683.79	167,424	98,302	69,122H
80	490.50A	5,790.73	5,556.66	234.07	370,101	281,565	88,537H
MaxBM	474.13A	6,774.23	6,764.05	10.19	472,806	382,506	90,300H
60	440.50A	8,850.21	9,451.40	-601.19	735,482	654,708	80,774H
51	358.00A	14,546.54	16,509.36	-1,962.82	1,747,707	1,724,263	23,444H
47	318.00A	19,970.02	19,909.04	60.97	2,438,309	2,452,975	14,666S
43	278.00A	22,878.47	23,228.27	-349.81	3,295,506	3,316,020	20,514S
37	218.00A	27,525.75	27,971.11	-445.36	4,836,551	4,853,709	17,159S
31	158.00A	31,099.19	31,999.86	-900.67	6,631,338	6,657,975	26,637S
22	72.00A	35,570.70	35,299.99	270.71	9,565,247	9,576,231	10,984S

Enclosure (24)

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**23SEP24 ARRIVAL DUQM**  
**Strength Allowables Summary**

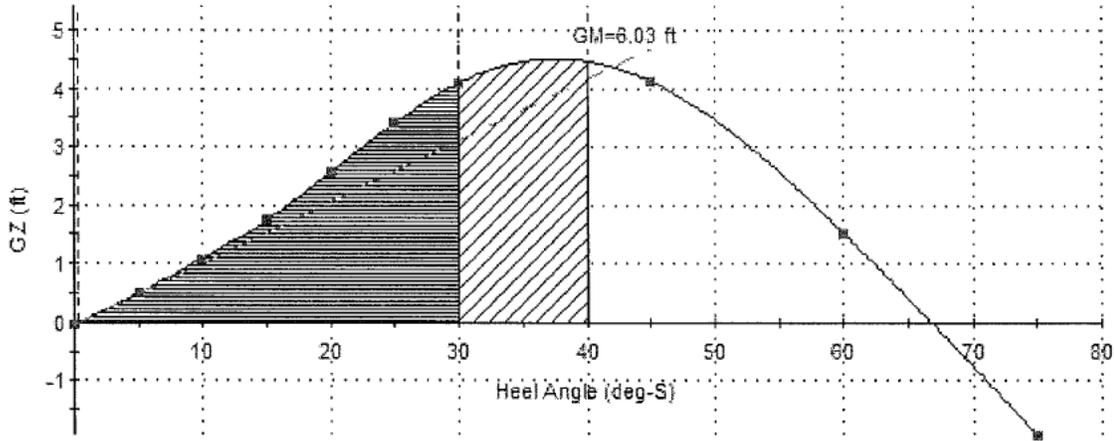


Name	Loc Ft-FP	Shear % Allowable Shear - At Sea			Moment % Allowable Bending - At Sea		
		Shear LT	Allow LT	% Allow	Moment ft-LT	Allow ft-LT	%Allow
98	535.50A	683.79	4,140.00	16.52	69,122H	197,840H	34.94
80	490.50A	234.07	4,270.00	5.48	88,537H	295,240H	29.99
MaxBM	474.13A	10.19	—	—	90,300H	—	—
60	440.50A	-601.19	-7,500.00	8.02	80,774H	403,450H	20.02
51	358.00A	-1,962.82	-7,860.00	24.97	23,444H	407,050H	5.76
47	318.00A	60.97	7,960.00	0.77	14,666S	407,050S	3.60
43	278.00A	-349.81	-7,960.00	4.39	20,514S	407,050S	5.04
37	218.00A	-445.36	-7,700.00	5.78	17,159S	407,050S	4.22
31	158.00A	-900.67	-7,450.00	12.09	26,637S	341,960S	7.79
22	72.00A	270.71	7,760.00	3.49	10,984S	155,830S	7.05

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**23SEP24 ARRIVAL DUQM**  
**Righting Arm Summary**  
**2008 IS Code 2.2 General Criteria**



<b>PASS</b>	<b>2008 IS Code 2.2 General Criteria</b>	<b>Value</b>	<b>Required</b>
-	Equilibrium Angle	deg 0.4	
<b>PASS</b>	Area to 30.0	ft-deg 56.42	$\geq 10.34$
<b>PASS</b>	Area to 40.0	ft-deg 100.39	$\geq 16.92$
<b>PASS</b>	Area 30.0 to 40.0	ft-deg 43.97	$\geq 5.64$
-	Angle to Downflooding	deg N/A	
<b>PASS</b>	Angle at Maximum GZ	deg 37.6	$\geq 25.0$
<b>PASS</b>	Maximum GZ Above 30 Deg	ft 4.50	$\geq 0.66$
<b>PASS</b>	Initial Metacentric Height	ft 6.03	$\geq 0.49$
-	Range of Positive GZ	deg 66.4	

<b>Angle (deg)</b>	0.0	5.0S	10.0S	15.0S	20.0S	25.0S	30.0S	45.0S	60.0S	75.0S
<b>GZ (ft)</b>	-0.04	0.49	1.09	1.74	2.55	3.39	4.09	4.12	1.52	-1.94

**Notes**

GZ Curve from KN Table  
 Tanks from Tables  
 Disp. of Hull = 35,858.71 LT

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23SEP24 ARRIVAL DUQM

Cargo DFM

Name	Short Name	%Full %	Volume ft3	Dens LT/ft3	Weight LT	Capacity Wt LT	VCG Ft-BL	LCG Ft-FP	TCG Ft-CL	FSt ft-LT	FSopt
CARGO #1 P	5-22-2	2.23	796.1	0.0236	18.80	842.50	1.29	92.82A	5.51P	174	STD
CARGO #1 S	5-22-1	1.09	387.3	0.0236	9.14	842.50	0.74	93.15A	4.86S	118	STD
CONV. #3 C	5-31-0	8.79	3,915.1	0.0226	88.36	1,005.34	2.26	168.01A	0.00P	3,428	STD
CARGO #3 P	5-31-2	2.68	984.4	0.0236	23.24	867.18	1.67	180.95A	27.51P	160	STD
CARGO #3 S	5-31-1	2.36	867.6	0.0236	20.48	867.18	1.52	181.06A	27.36S	147	STD
CARGO #5 P	5-37-2	1.65	393.0	0.0236	9.28	562.28	0.79	228.22A	29.87P	184	STD
CARGO #5 S	5-37-1	2.61	621.7	0.0236	14.68	562.28	1.15	228.21A	30.37S	233	STD
CONV. #7 C	5-43-0	87.90	78,304.6	0.0236	1,848.80	2,103.39	22.20	298.00A	0.00S	7,172	STD
CARGO #7 P	5-43-2	9.85	4,966.0	0.0236	117.25	1,189.94	3.20	298.07A	33.30P	1,140	STD
CARGO #7 S	5-43-1	17.56	8,848.4	0.0236	208.92	1,189.94	5.29	298.07A	34.10S	1,360	STD
CONV. #8 C	5-47-0	93.05	82,899.2	0.0226	1,871.03	2,010.70	23.51	338.00A	0.00S	6,856	STD
CARGO #9 P	5-51-2	1.68	838.2	0.0236	19.79	1,179.96	0.74	377.24A	30.67P	473	STD
CARGO #9 S	5-51-1	1.68	838.2	0.0236	19.79	1,179.96	0.74	377.24A	30.67S	473	STD
CARGO #10 P	5-55-2	63.30	32,193.2	0.0236	760.10	1,200.83	18.07	418.83A	34.50P	1,500	STD
CARGO #10 S	5-55-1	64.49	30,072.8	0.0236	710.03	1,100.95	17.46	417.64A	34.75S	1,336	STD
CARGO SETT	3-40-0	62.12	16,910.7	0.0236	399.27	642.70	34.44	263.18A	0.72P	5,119	STD
CARGO CONTAM	3-37-1	-	0.0	0.0232	0.00	131.64	32.40	233.87A	12.34S	0	STD
<b>Cargo DFM Totals</b>		<b>35.35</b>	<b>263,836.5</b>		<b>6,138.96</b>	<b>17,479.26</b>	<b>20.65</b>	<b>333.33A</b>	<b>0.23S</b>	<b>29,871</b>	

Cargo JP-5

Name	Short Name	%Full %	Volume ft3	Dens LT/ft3	Weight LT	Capacity Wt LT	VCG Ft-BL	LCG Ft-FP	TCG Ft-CL	FSt ft-LT	FSopt
JP-5 #2 C	5-26-0	82.29	98,175.7	0.0226	2,215.82	2,692.64	21.77	132.17A	0.00P	13,811	STD
JP-5 #9 C	5-51-0	36.89	32,864.0	0.0226	741.74	2,010.70	9.33	378.00A	0.00P	6,856	STD
JP-5 #10 C	5-55-0	67.90	51,420.0	0.0226	1,160.55	1,709.10	17.17	415.00A	0.00S	5,827	STD
JP-5 SETT	3-33-0	58.86	13,209.9	0.0226	298.15	506.54	32.91	193.33A	1.04S	3,266	STD
JP-5 CONTAM	3-36-2	-	0.0	0.0227	0.00	113.84	32.40	228.00A	16.25P	0	STD
<b>Cargo JP-5 Totals</b>		<b>62.80</b>	<b>195,669.6</b>		<b>4,416.26</b>	<b>7,032.81</b>	<b>19.23</b>	<b>251.91A</b>	<b>0.07S</b>	<b>29,760</b>	

Fuel Oil

Name	Short Name	%Full %	Volume ft3	Dens LT/ft3	Weight LT	Capacity Wt LT	VCG Ft-BL	LCG Ft-FP	TCG Ft-CL	FSt ft-LT	FSopt
DEEP TK #2 P	5-59-2	93.48	8,847.6	0.0232	205.55	219.89	23.65	436.25A	11.24P	187	STD
DEEP TK #2 S	5-59-1	93.48	8,847.6	0.0232	205.55	219.89	23.65	436.25A	11.24S	187	STD
DEEP TK #3 P	5-98-2	32.39	6,069.1	0.0232	141.00	435.37	15.78	544.77A	12.03P	1,416	STD
DEEP TK #3 S	5-98-1	33.81	6,336.5	0.0232	147.21	435.37	16.03	544.79A	12.22S	1,475	STD
SERVICE TK	3-60-2	94.58	3,060.2	0.0232	71.10	75.17	30.08	445.28A	21.44P	111	SLACK
SETTLING TK	3-60-0	75.63	4,449.3	0.0232	103.37	136.67	28.64	445.20A	3.75S	665	STD
AUX STOR	3-60-1	3.27	249.2	0.0232	5.79	177.09	25.25	450.46A	35.15S	629	STD
AUX SERV FWD	2-60-2	86.42	1,582.6	0.0232	36.77	42.55	44.53	445.50A	39.57P	121	STD
AUX SERV AFT	2-64-2	89.47	1,848.7	0.0232	42.95	48.00	44.72	460.50A	43.46P	45	STD
AUX SETT	3-60-4	66.89	3,853.5	0.0232	89.53	133.83	28.80	452.39A	41.73P	123	STD
<b>Fuel Oil Totals</b>		<b>54.52</b>	<b>45,144.3</b>		<b>1,048.81</b>	<b>1,923.83</b>	<b>24.49</b>	<b>470.34A</b>	<b>7.52P</b>	<b>4,959</b>	

Enclosure (24)

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### Lube Oil

Name	Short Name	%Full %	Volume ft3	Dens LT/ft3	Weight LT	Capacity Wt LT	VCG Ft-BL	LCG Ft-FP	TCG Ft-CL	FSt ft-LT	FSopt
RED GR SETT	2-68-1	95.68	636.2	0.0249	15.85	16.57	43.70	463.00A	27.65S	12	STD
CRP SETT	2-70-3	88.60	588.9	0.0239	14.10	15.91	43.23	468.00A	27.64S	12	STD
D.G. STOR	2-72-1	95.01	631.8	0.0250	15.81	16.64	43.65	473.00A	27.65S	12	STD
D.G. SETT	2-74-1	85.34	567.5	0.0250	14.20	16.64	43.02	478.00A	27.64S	12	STD
M.E. STOR	2-76-1	82.77	1,376.0	0.0250	34.44	41.60	42.85	486.75A	27.64S	30	STD
M.E. SETT	2-81-1	60.84	1,011.4	0.0249	25.20	41.42	41.42	499.25A	27.59S	30	STD
M.E. SUMP P	5-66-2	89.58	703.4	0.0249	17.53	19.56	6.26	468.16A	10.83P	12	STD
M.E. SUMP S	5-66-1	87.66	688.3	0.0249	17.15	19.56	6.21	468.09A	10.83S	12	STD
CARGO LO	5-59-3	-	0.0	0.0257	0.00	108.60	33.89	436.27A	30.75S	0	STD
<b>Lube Oil Totals</b>		<b>52.64</b>	<b>6,203.4</b>		<b>154.27</b>	<b>296.51</b>	<b>34.61</b>	<b>478.24A</b>	<b>21.39S</b>	<b>132</b>	

### Fresh Water

Name	Short Name	%Full %	Volume ft3	Dens LT/ft3	Weight LT	Capacity Wt LT	VCG Ft-BL	LCG Ft-FP	TCG Ft-CL	FSt ft-LT	FSopt
SHP POT FWD	2-73-2	89.00	1,458.9	0.0279	40.66	45.68	44.71	481.22A	43.65P	40	SLACK
SHP POT AFT	2-80-2	80.26	2,017.5	0.0279	56.23	70.06	44.30	504.58A	43.26P	60	SLACK
CARGO POT P	2-102-4	59.98	4,169.1	0.0279	116.19	193.71	44.91	565.70A	33.07P	1,028	STD
CARGO POT S	2-102-7	59.98	4,169.1	0.0279	116.19	193.71	44.91	565.70A	33.07S	1,028	STD
CARGO FEED P	5-107-2	65.33	4,233.3	0.0279	117.98	180.58	23.87	561.67A	14.60P	1,034	STD
CARGO FEED S	5-107-1	60.57	3,924.3	0.0279	109.37	180.58	23.23	561.66A	14.22S	975	STD
RESERVE FEED	2-88-1	96.23	771.7	0.0279	21.51	22.35	45.05	514.25A	27.75S	20	STD
<b>Fresh Water Totals</b>		<b>65.20</b>	<b>20,743.9</b>		<b>578.12</b>	<b>886.68</b>	<b>36.45</b>	<b>550.32A</b>	<b>6.53P</b>	<b>4,185</b>	

### SW Ballast

Name	Short Name	%Full %	Volume ft3	Dens LT/ft3	Weight LT	Capacity Wt LT	VCG Ft-BL	LCG Ft-FP	TCG Ft-CL	FSt ft-LT	FSopt
FOREPEAK	5-C-0	4.00	439.4	0.0286	12.55	313.81	6.31	29.58A	0.00S	10	STD
DEEP TK #1	5-18-0	5.00	1,747.7	0.0286	49.93	998.51	3.04	57.71A	0.00S	260	STD
BAL TK #2 P	5-28-2	95.17	17,465.3	0.0286	498.92	524.23	27.87	143.88A	28.33P	373	STD
BAL TK #2 S	5-28-1	95.17	17,465.3	0.0286	498.92	524.23	27.87	143.88A	28.33S	373	STD
BAL TK #4 P	5-35-2	90.80	20,250.6	0.0286	578.49	637.10	24.30	208.14A	33.79P	689	STD
BAL TK #4 S	5-35-1	93.00	20,741.3	0.0286	592.50	637.10	24.83	208.14A	33.81S	693	STD
BAL TK #6 P	5-39-2	75.50	37,527.6	0.0286	1,072.03	1,419.90	19.93	258.14A	35.03P	1,689	STD
BAL TK #6 S	5-39-1	93.70	46,573.9	0.0286	1,330.45	1,419.90	24.37	258.13A	35.13S	1,703	STD
BAL TK #8 P	5-47-2	95.00	47,936.0	0.0286	1,369.36	1,441.43	24.49	337.99A	35.34P	1,722	STD
BAL TK #8 S	5-47-1	95.00	47,936.0	0.0286	1,369.36	1,441.43	24.49	337.99A	35.34S	1,722	STD
AFT BALLAST	5-110-0	-	0.0	0.0286	0.00	227.58	20.27	574.39A	0.00	0	STD
AFT PEAK	5-119-0	-	0.0	0.0286	0.00	1,174.35	33.05	608.78A	0.00	0	STD
PUMP RM DB SWB	5-33-0	83.38	11,272.0	0.0286	322.00	386.20	2.21	208.00A	0.00P	13,016	STD
<b>SW Ballast Totals</b>		<b>69.04</b>	<b>269,355.1</b>		<b>7,694.50</b>	<b>11,145.77</b>	<b>23.18</b>	<b>260.36A</b>	<b>1.26S</b>	<b>22,250</b>	

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### Misc. Tanks

Name	Short Name	%Full	Volume	Dens	Weight	Capacity Wt	VCG	LCG	TCG	FSt	FSopt
		%	ft3	LT/ft3	LT	LT	Ft-BL	Ft-FP	Ft-CL	ft-LT	
CONTAM FO TK	5-60-0	—	0.0	0.0232	0.00	61.19	3.00	445.49A	0.00	0	STD
AUX CONTAM FO	5-67-2	5.97	67.6	0.0232	1.57	26.32	1.64	463.77A	20.29P	85	STD
OILY WASTE	5-67-1	33.16	375.8	0.0286	10.73	32.37	2.77	468.00A	21.85S	86	STD
SSG LO DRAIN	5-81-0	0.06	0.3	0.0257	0.01	11.05	0.63	493.71A	0.00S	0	STD
CRP LO DRAIN	5-83-2	40.66	105.3	0.0257	2.70	6.65	2.67	500.44A	3.49P	4	STD
R.G.R. LO DRN	5-83-0	18.83	102.8	0.0257	2.64	14.01	2.11	502.11A	1.92S	27	STD
WASTE OIL TK	5-86-0	31.20	914.8	0.0257	23.48	75.26	3.85	514.26A	0.00P	367	STD
LO PUR SLUDG	5-93-0	8.28	20.7	0.0257	0.53	6.42	7.66	525.50A	0.00P	91	STD
ME LO DRAIN	5-95-0	28.27	216.0	0.0257	5.55	19.62	5.19	531.41A	0.00P	97	STD
PUMP RM DB OW	5-39-0	9.87	903.6	0.0286	25.81	261.54	0.28	258.11A	0.00S	8,677	STD
FO PUR SLUDG	3-64-4	1.47	4.3	0.0232	0.10	6.75	22.52	460.91A	29.86P	14	STD
MOTOR BOAT DO	06-96-2	74.86	83.1	0.0232	1.93	2.58	111.98	531.75A	8.75P	2	STD
EMERG GEN DO	06-97-2	79.20	115.3	0.0232	2.68	3.38	112.10	534.25A	8.58P	4	STD
<b>Misc. Tanks Totals</b>		<b>14.71</b>	<b>2,909.6</b>		<b>77.74</b>	<b>527.14</b>	<b>8.93</b>	<b>423.26A</b>	<b>2.00S</b>	<b>9,455</b>	

### Provisions

Name	Weight	VCG	LCG	TCG	Aft	Fwd
	LT	Ft-BL	Ft-FP	Ft-CL	Ft-FP	Ft-FP
MEDICAL STRM	0.40	53.69	443.25A	4.25P	446.50A	440.50A
SHIP'S STORE	1.70	53.44	463.00A	39.50P	470.50A	455.50A
DRY STORE-89	2.20	53.44	519.25A	26.50S	527.75A	511.38A
DRY STORE-97	2.20	53.69	539.25A	7.50P	545.50A	533.00A
GALLEY DAILY	1.00	53.44	541.50A	5.00S	546.50A	536.50A
DAIRY BOX	0.60	53.44	539.25A	14.25S	544.00A	533.00A
CHILL BOX	1.90	53.19	539.25A	34.00S	544.00A	533.00A
FISH BOX	0.90	53.19	548.75A	31.75S	551.67A	545.50A
FREEZE BOX	3.00	53.19	556.50A	33.00S	565.50A	545.50A
AFT FLAM LIQ	2.50	53.64	603.40A	34.95S	609.50A	597.50A
MISC GEN.	5.40	53.44	525.50A	0.00	610.50A	440.50A
<b>Provisions Totals</b>	<b>21.80</b>	<b>53.43</b>	<b>536.34A</b>	<b>12.20S</b>		

### Ammunition

Name	Weight	VCG	LCG	TCG	Aft	Fwd
	LT	Ft-BL	Ft-FP	Ft-CL	Ft-FP	Ft-FP
CIWS MAG FWD	0.50	62.94	64.00A	12.50S	68.00A	58.00A
CIWS MAG AFT	1.10	109.44	548.00A	10.00S	553.00A	543.00A
SMALL ARMS	0.60	63.94	550.50A	35.00S	555.50A	545.50A
<b>Ammunition Totals</b>	<b>2.20</b>	<b>86.46</b>	<b>438.68A</b>	<b>17.39S</b>		

### Crew And Effects

Name	Weight	VCG	LCG	TCG	Aft	Fwd
	LT	Ft-BL	Ft-FP	Ft-CL	Ft-FP	Ft-FP
MINIMUM CREW (17)	2.26	81.55	504.68A	3.43S	570.50A	440.50A
ADDITIONAL CREW (120)	12.00	83.38	508.28A	1.15S	570.50A	440.50A
<b>Crew And Effects Totals</b>	<b>14.26</b>	<b>83.09</b>	<b>507.71A</b>	<b>1.51S</b>		

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### Cargo Stores

Name	Weight	VCG	LCG	TCG	Aft	Fwd
	LT	Ft-BL	Ft-FP	Ft-CL	Ft-FP	Ft-FP
GAS-O2/INERT	15.00	63.76	64.10A	15.11P	75.50A	54.00A
GAS-#1 INERT	30.00	64.05	80.71A	21.52S	89.00A	72.00A
GAS-#2 INERT	30.00	64.07	79.83A	23.93P	89.00A	70.00A
FLAM LIQ	20.00	64.05	94.07A	25.54P	99.00A	89.00A
DRY PROV. #1	60.00	64.02	103.92A	23.90S	118.00A	89.00A
DRY PROV. #2	50.00	64.01	124.35A	27.57P	156.50A	99.00A
LUBE OIL	24.00	63.99	143.46A	26.38S	168.00A	118.00A
GAS-FLAM	25.00	63.97	162.26A	27.11P	168.00A	156.50A
CARGO MAIL	2.00	53.69	473.00A	12.75S	475.50A	470.50A
<b>Cargo Stores Totals</b>	<b>256.00</b>	<b>63.93</b>	<b>111.55A</b>	<b>3.02P</b>		

### Containers

Name	Weight	VCG	LCG	TCG	Aft	Fwd
	LT	Ft-BL	Ft-FP	Ft-CL	Ft-FP	Ft-FP
CONTAINER #1 CONTENTS	3.00	64.94	427.83A	35.00P	437.83A	417.83A
CONTAINER #2 CONTENTS	3.00	64.94	427.83A	27.00P	437.83A	417.83A
CONTAINER #3 CONTENTS	3.00	64.94	427.37A	19.00P	437.83A	417.83A
CONTAINER #4 CONTENTS	3.00	64.94	427.37A	6.50S	437.83A	417.83A
CONTAINER #5 CONTENTS	3.00	64.94	427.37A	14.50S	437.83A	417.83A
CONTAINER #6 CONTENTS	3.00	64.94	427.37A	22.50S	437.83A	417.83A
CONTAINER #7 CONTENTS	3.00	64.94	348.00A	10.00S	358.00A	338.00A
CONTAINER #8 CONTENTS	3.00	64.94	348.00A	18.00S	358.00A	338.00A
CONTAINER #9 CONTENTS	3.00	64.94	348.00A	26.00S	358.00A	338.00A
CONTAINER #10 CONTENTS	3.00	64.94	208.00A	8.50S	218.00A	198.00A
<b>Containers Totals</b>	<b>30.00</b>	<b>64.94</b>	<b>381.71A</b>	<b>2.50S</b>		

### Deck Loads

Name	Weight	VCG	LCG	TCG
	LT	Ft-BL	Ft-FP	Ft-CL
02 LEVEL FWD	10.00	72.69	36.00A	0.00
02 LEVEL MID	20.00	72.69	120.00A	0.00
01 LEVEL FWD	20.00	62.69	243.00A	0.00
01 LEVEL MID	45.00	62.69	379.25A	0.00
01 LEVEL AFT	0.00	65.75	614.25A	0.00
<b>Deck Loads Totals</b>	<b>95.00</b>	<b>65.85</b>	<b>259.86A</b>	<b>0.00</b>

Enclosure (24)

Page 11 of 12

### Lightship Alterations

Name	Weight	VCG	LCG	TCG
	LT	Ft-BL	Ft-FP	Ft-CL
FY23 Alterations	0.00	0.00	325.00A	0.00
FY24 Alterations	0.00	0.00	325.00A	0.00
FY25 Alterations	0.00	0.00	325.00A	0.00
FY26 Alterations	0.00	0.00	325.00A	0.00
FY27 Alterations	0.00	0.00	325.00A	0.00
FY28 Alterations	0.00	0.00	325.00A	0.00
FY29 Alterations	0.00	0.00	325.00A	0.00
FY30 Alterations	0.00	0.00	325.00A	0.00
<b>Lightship Alterations Totals</b>	<b>0.00</b>	<b>-</b>	<b>-</b>	<b>-</b>

### Misc. Weights

Name	Weight	VCG	LCG	TCG
	LT	Ft-BL	Ft-FP	Ft-CL
PUMP ROOM DB	378.48	2.56	208.46A	0.07S
PUMP RM DB	112.94	1.11	257.79A	0.00
OFFICERS	3.57	100.51	491.50A	3.20S
NON-COMS	2.80	90.50	487.16A	3.79S
CREW	8.25	70.18	516.00A	3.43S
MILITARY	3.13	87.03	502.03A	6.73P
CIWS CREW	1.33	90.50	554.00A	0.00
FY22 Alterations	185.13	195.59	690.25A	5.50S
Lifeboats STBD 1 & 3	10.00	75.00	480.00A	40.00S
Stores	5.00	38.00	485.00A	25.00S
Forktrucks Moved	30.00	62.00	178.00A	25.00P
Forktrucks Lightship	-30.00	62.00	485.00A	10.00P
Phantom Weight	-433.95	31.58	23.56A	1.95S
<b>Misc. Weights Totals</b>	<b>276.67</b>	<b>94.41</b>	<b>843.13A</b>	<b>1.09S</b>

Enclosure (24)

Page 12 of 12



DEPARTMENT OF THE NAVY  
COMMANDER MILITARY SEALIFT COMMAND  
471 EAST C STREET  
NORFOLK VA 23511-2419

30 APR 24

MEMORANDUM

From: Director, Ship Management (DSM)  
To: Director, Maritime Operations (DMO)

Subj: READY FOR TASKING REPORT FOR USNS BIG HORN (T-AO 198)

Ref: (a) COMSC Readiness Manual N04.04A.3502.1-Q Dated 17 Aug 22

Encl: (1) N7 RFT Memo of 15 Apr 24  
(2) N6 RFT Memo of 16 Apr 24  
(3) ATA-R Completion report of 28 Mar 24  
(4) BRM Completion report of 01 Apr 24  
(5) SQTS Completion report of 22 Apr 24  
(6) NAV Assessment Completion report of 27 Sep 23  
(7) OPAV Completion report of 17 Mar 24

1. USNS BIG HORN is assessed as ready for tasking in accordance with reference (a) as noted in enclosures (1) through (7).

2. The following areas require additional training, mitigation, or investigation:

a. Equipment Issues, N7/N6:

(1) Per enclosure (1), N7 reports that all planned and contracted industrial assistance, maintenance and repair work was completed. Various non-critical steel work were rescheduled to future availabilities listed per enclosure (1). N7 considers BGN mission ready. Work Item 0502 - BOILER CONTROL UPGRADE T-Alt (TAO 187-1009) was deferred due to delayed GFM with no operational impact.

b. Per enclosure (2), N6 reports all systems (ET Bridge Navigation, Communications/IT networks) on all enclaves are fully operational.

(1) Radio is mission capable.

c. Training and Assessment Issues, N12 and N04A

(1) Per enclosures (3) through (5), N12A reports that all training and drill events were completed. Minor material issues were noted during training including expiration of FAS hoses. Hydro-testing of the hoses is required prior to use, until replacement hoses are installed.

Enclosure (25)

Page 1 of 15

Subj: READY FOR TASKING REPORT FOR USNS BIG HORN (T-AO 198)

(2) Per enclosures (6) and (7), N04A reports the ship has passed ass assessments and is ready for tasking.

(b)(6)



T.K Kiss

Copy to:  
DSM  
DMO  
TFM  
N7  
N6  
N04T  
PM1

April 15, 2024

From: N751 Engineering Type Desk

To: PM1

Subject: N7 READY FOR TASKING MESSAGE – FY24 MTA USNS BIG HORN (T-AO 198)

Enclosure: Cost by Work Item Final

1. USNS BIG HORN completed a MTA with Mitsubishi Heavy Industries, in Yokohama, Japan, from December 12, 2023 to March 14, 2024. Total Final Cost \$10,386,536.
2. Industrial assistance maintenance and repair work was completed during Big Horn's MTA which included maintenance of the Main Engine, SSDG, Flight Deck Preservation, Auxiliary Boiler Survey and Hydro, Main Engine Local Control Panel Service, Assorted Pump Overhauls, UNREP Hardware Refurbishment, UNREP Saddle Winch Repairs, Potable Water Tank preservation, Steel replacement and Annual Recertification of the vessel by ABS completed.
3. Deferred work:  
0502\_A\_BOILER CONTROL UPGRADE T-Alt (TAO 187-1009) was cancelled due to material and will be accomplished in FY25 ROH; no operational impact.
4. From a maintenance and repair perspective, N751 would consider the vessel mission ready.

Respectfully Submitted,

(b)(6)

N751 Type Desk

Enclosure (25)

Page 3 of 15

Enclosure: Cost by Work Item Final



BIG HORN FY24 MTA CostbyWI.pdf

Enclosure (25)

Page 4 of 15

**N6 READY FOR TASKING MESSAGE**

Date: 16 Apr 2024

From: N6411

To: PM1

Subject: USNS BIG HORN (T-AO 198) Vessel Readiness

1. Upon completion of all industrial assistance maintenance and repair work, all systems (Bridge Navigation, Communications IT and ET) are operational.

2. Additionally, the ship's management team (SMT) has reviewed work items that were either not accomplished, not planned during the availability or not completed during the dormant condition and reports the following:

- NIXIE System is OOC due to inoperative Control Panel. Awaiting PM1 to fund and N6 will coordinate scheduling of repairs through NUWC during next shipyard availability period.

3. Cyber-Security Readiness:

3.1 Cyber Readiness Scores:

NIPR AR2.1	74%	SIPR ACGv3	70.5%
------------	-----	------------	-------

GREEN - score is 90% or higher

YELLOW – score is 70-89%

RED – Score is below 70%

ISSM COMMENTS:

NIPR & SIPR Cyber Readiness scores are based on scan's dated 11 Apr 2024.

N/A

3.2 Communications Department Manning: BIG HORN

POSITION	EKMS Qualified Y/N	IAT/IAM	FILLED	Y/N
SCO	Y	NA	Y	

Enclosure (25)

Page 5 of 15

CRET	Y	NA	Y
CRET	Y	NA	Y
RET1	Y	NA	Y
RET2	N	NA	Y

4. Accordingly, from a technical/ perspective, N6 considers the vessel mission ready.

Respectfully submitted,

(b)(6)



Combat Logistics Force (PM1) C4S Supervisor (N6411)  
Military Sealift Command Norfolk

Enclosure (25)

Page 6 of 15

28 MAR 2024

From: (b)(6), DC Leader, Afloat Training Team  
To: (b)(6), Master, USNS BIG HORN (T-AO 198)  
CC: (b)(6), USN, MSC FAR EAST Area Commander  
(b)(6), Program Manager (PM1)  
(b)(6), Afloat Training Director (N12A)  
(b)(6), N12A1 Afloat Training Scheduling Coordinator

Subj: AFLOAT TRAINING AVAILABILITY- REFRESHER COMPLETION REPORT

Ref: (a) MSC Readiness Manual (COMSCINST 3502.2)  
(b) Afloat Training Availability- Refresher (Letter of Intent) (29 Feb 2024)  
(c) Ready to Train Message (Email) (07 Mar 2024)  
(d) USNS BIG HORN ATA-R Completion (Email) (28 Mar 2024)

1. In accordance with references (a) and (b), a Self-Assessed Afloat Training Availability- Refresher was completed on board USNS BIG HORN (T-AO 198) during the period 16-28 March 2024. All training and drill events listed in reference (b) were completed.
2. Material Issues : NTR
3. Personnel issues: BGN was manned with no missing critical billets and was completely able to meet basic requirements for firefighting, damage control, CBRD, etc.
4. General remarks (if any): NTR
5. Material deficiencies will be uploaded to SAMM for tracking until completion.
6. SMS Procedures were used to train and conduct the Afloat Training Availability.
  - SMS 2.1-001-ALL Confined Space Entry
  - SMS 2.1-014-ALL Fall Protection Program
  - SMS 2.1-019-ALL Operational Risk Management
  - SMS 2.1-020-ALL Ship's Gas Free Engineer
  - SMS 2.3-002-ALL Self-Contained Breathing Apparatus
  - SMS 6.1-001-01-ALL Drills
  - SMS 6.1-001-01-ALL Test, Drill, Inspection and Training Record
  - SMS 7.1-001-ALL Incident Reporting
  - SMS 8.1-001-ALL Emergency and Station Bills
  - SMS 8.2-001-ALL Abandon Ship
  - SMS 8.3-001-ALL Collision/Allision
  - SMS 8.5-001-ALL Firefighting (On-Ship)
  - SMS 8.13-001-AO Loss of Steering
  - SMS 8.15-001-ALL Man Overboard
  - Main Space Fire Doctrine; and SOLAS Training Manual.

Enclosure (25)

Page 7 of 15

7. USNS BIG HORN (T-AO 198) has satisfactorily completed all Afloat Training Availability training and drills. They shall be considered for their requisite "Ready For Tasking" recommendation.

/s/

(b)(6)

DC Team Leader  
Afloat Training Team, N12A1

3/28/2024

X

(b)(6)

(b)(6)

DC Team Leader

Signed by:

(b)(6)

Enclosure (2)

Page 8 of 15



# MILITARY SEALIFT COMMAND

N12 – CIVMAR Management and Afloat Training  
471 E C Street  
Norfolk, VA 23511

01 APR 2024

From: (b)(6) Afloat Training Scheduler  
To: Master, USNS BIG HORN  
Subj: Bridge Resource Management Completion Report

Ref: (a) MSC READINESS MANUAL (N04.04A.3502.1-Q)

1. In accordance with references (a), formal Bridge Resource Management training was conducted onboard USNS BIG HORN during the period 30-31 March 2024. All training and drill events listed in reference (a) were completed.
2. Materiel issues: None
3. Personnel issues: None
4. General remarks: None

Very Respectfully,

(b)(6)

Afloat Training Scheduler  
N12A

Enclosure (2)

Page 9 of 15

(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6) CIV USN COMSC NORFOLK VA (USA)  
**Sent:** Tuesday, October 15, 2024 12:50 PM  
**To:** (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Cc:** (b)(6) CIV USN COMSC NORFOLK VA (USA); (b)(6) CIV USN COMSC NORFOLK VA (USA)  
**Subject:** RE: BGN Certs  
**Signed By:** (b)(6) @us.navy.mil

CDRE (b)(6)

LDOs onboard for BGN's BRM 30-31 Mar 2024:

- Capt (b)(6)
- 1/O (b)(6)
- 2/O (b)(6)
- 2/O (b)(6)
- 3/O (b)(6)
- 3/O (b)(6)

V/R, (b)(6)

(b)(6)  
 N12A – Afloat Training  
 Afloat Training Scheduler  
 ATA - BRM - SQTs  
 Gov Cell: (b)(6)  
 NIPR: (b)(6) @us.navy.mil  
 SIPR\*: (b)(6) @navy.smil.mil  
 \*Please send a SIPR tipper

Military Sealift Command  
Norfolk, VA

**From:** (b)(6) CIV USN COMSC NORFOLK VA (USA) (b)(6) @us.navy.mil>  
**Sent:** Tuesday, October 15, 2024 12:48 PM  
**To:** (b)(6) ) CAPT USN COMSC LANT NORFOLK (USA) (b)(6) @us.navy.mil>; (b)(6) CIV USN COMSC NORFOLK VA (USA) (b)(6) @us.navy.mil>; (b)(6) CIV USN COMSC NORFOLK VA (USA) (b)(6) @us.navy.mil>; (b)(6) CIV USN COMSC NORFOLK VA (USA) (b)(6) @us.navy.mil>; (b)(6) CIV USN COMSC NORFOLK VA (USA) (b)(6) @us.navy.mil>; (b)(6) CIV USN COMSC NORFOLK VA (USA) (b)(6) @us.navy.mil>  
 <(b)(6) @us.navy.mil>; (b)(6) CIV USN COMSC NORFOLK VA (USA)

Enclosure (25)

April 15, 2024

From: N751 Engineering Type Desk

To: PM1

Subject: N7 READY FOR TASKING MESSAGE – FY24 MTA USNS BIG HORN (T-AO 198)

Enclosure: Cost by Work Item Final

1. USNS BIG HORN completed a MTA with Mitsubishi Heavy Industries, in Yokohama, Japan, from December 12, 2023 to March 14, 2024. Total Final Cost \$10,386,536.
2. Industrial assistance maintenance and repair work was completed during Big Horn's MTA which included maintenance of the Main Engine, SSDG, Flight Deck Preservation, Auxiliary Boiler Survey and Hydro, Main Engine Local Control Panel Service, Assorted Pump Overhauls, UNREP Hardware Refurbishment, UNREP Saddle Winch Repairs, Potable Water Tank preservation, Steel replacement and Annual Recertification of the vessel by ABS completed.
3. Deferred work:  
0502\_A\_BOILER CONTROL UPGRADE T-Alt (TAO 187-1009) was cancelled due to material and will be accomplished in FY25 ROH; no operational impact.
4. From a maintenance and repair perspective, N751 would consider the vessel mission ready.

Respectfully Submitted,

(b)(6)

(b)(6)

N751 Type Desk

Enclosure (25)

Page 11 of 15

3500  
N04A  
27 SEP 2023

MEMORANDUM

From: Commander, Military Sealift Command

To: (b)(6), Master, USNS BIG HORN

Subj: NAVIGATION ASSESSMENT COMPLETION REPORT

Ref: (a) COMSCINST 3501.4C (Tanker Environment Safety Program)

(b) COMSCINST 3502.2A (Military Sealift Command Readiness Manual)

1. Per references (a) and (b), USNS BIG HORN successfully completed a Navigation Assessment and Navigation Check Ride, conducted by Force Navigator (b)(6), from 15-20 Sept, 2023, achieving a final score of 88%.
2. As documented in the attached completed navigation assessment checklists, USNS BIG HORN has successfully completed the Navigation Assessment portion of the Commander's Readiness Evaluation (CRE) process and the Navigation Check Ride requirement of the Tanker Environment Safety Program.
3. This document should be retained aboard your vessel for five years.

9/28/2023

X

(b)(6)

(b)(6)

Director, Force Assessment and Certification

Signed by:

(b)(6)

(b)(6)

Director, Force Assessment and Certification (N04A)

Copy to:  
USNS BIG HORN  
PM1  
MSCFE  
N04A  
N04A2

Enclosure (25)

Page 12 of 15

DEPARTMENT OF THE NAVY  
MILITARY SEALIFT COMMAND  
AFLOAT ASSESSMENT TEAM  
2420 STALWART ROAD  
VIRGINIA BEACH, VA 23459-5522

3502  
Code/Ser 001  
17 MAR 24

From: ADCO (b)(6), OPAV Team Leader

To: Distribution

Subj: USNS BIG HORN OPERATIONAL ASSESSMENT VISIT (OPAV) REPORT, 12-17  
MAR 2024

Ref: (a) MSC READINESS MANUAL, N04.04A.3502.1-Q, Appendix E  
(b) Exercise Score Sheets [Ref (a), Tabs B-G]

Encl: (1). Tab B: Operational Readiness Assessment Evaluation  
(2). Tab C: C2W-4-MSC EMCON  
(3). Tab D: INT-2-MSC Visual Information Requirements  
(4). Tab E: CCC-10-MSC Flashing Light  
(5). Tab F: CCC-9-MSC Flaghoist Knowledge/Capabilities  
(6). Tab G: MIW-8.7-MSC Transit Swept Channel and Q-Route

1. Summary:

- a. Overall Score 1494.69 of 1650 (90.59%)
- b. Overall assessment: PASS.

2. Assessed items in detail in accordance with enclosures 1-6:

- a. EMCON, Information Collection and Dissemination - 490/530 (92.45%)
- b. Navigation - 149/160 (93.13%)
- c. Messages/Message Writing - 120/120 (100%)
- d. Visual Communications - 392/400 (97.92%)
- e. Training - 170/200 (85%)
- f. Mine Countermeasures - 80/120 (66.67%)
- g. Torpedo Countermeasures - 94/120 (78.33%)

N04A2

Enclosure 4: Shipboard Qualification Trials Completion Report

Date: 22 April 2024

From: Director, MSC Underway Replenishment Training Center (MUTC)  
To: Director, Training and Readiness  
Master, USNS BIG HORN T-AO 198

Subj: SHIPBOARD QUALIFICATION TRIALS (SQTS) COMPLETION REPORT

Ref: (a) SQT Letter of Intent Dated 09 February 2024  
(b) MSC READINESS MANUAL (N04.04A.3502.1-Q)  
(c) NAVY TACTICS, TECHNIQUES, AND PROCEDURES (NTTP 4-01.4)  
(d) NSTM CH.571  
(e) UNREP HARDWARE & EQUIPMENT MANUAL  
(f) COMSCLANTST/NFAF (E) INST 3505.1  
(g) SMS CHECKLIST (Pilot House CL for UNREP/Close-In Maneuvers)  
(h) SMS CHECKLIST (Engine Dept. CL for UNREP/Close-In Maneuvers)

1. As directed by reference (a) and in accordance with reference (b), Level II Shipboard Qualification Trials were conducted on board USNS BIG HORN during the period 14 through 17 APR 2024. All training, observations and evaluations listed in Appendix L of reference (b) were completed.
2. **Material deficiencies:** FAS hoses, to include Astern refueling hoses have surpassed their validity date.
3. **Personnel issues:** The USNS BIG HORN was fully manned with mariners meeting the requirements for CONREP and VERTREP (*Three (3) station manning*).
4. Supporting documentation available by request.
5. **General remarks:** Emergency Breakaway was not completed during UNREP SQT's.
6. **NATO Training applied:** MUTC and Key Players inspected all NATO specific gear and talked about the different arrangements that could apply. All NATO gear appears to be in good working order.
7. The USNS BIG HORN is capable of accomplishing its UNREP mission with the following limitations: Fuel hoses are expired, testing required prior to use.

Signed:

(b)(6)



-----Original Message-----

O 220405Z SEP 24 MID60010091060293S  
FM USNS BIG HORN  
TO CTF 53  
AMEMBASSY MUSCAT  
AMEMBASSY MANAMA  
AMEMBASSY ABU DHABI  
NAVSUPPACT BAHRAIN NSF DET UAE  
INFO COMUSNAVCENT  
COMFIFTHFLT  
CFMCC CENT  
COMLOGFORNAVCENT  
COMUSNAVEUR COMUSNAVAF NAPLES IT  
COMLOGFORNAVCENT PLE DET ABU DHABI AE  
AMCONSUL DUBAI  
COMUSFLTFORCOM NORFOLK VA  
NAVSUP FLT LOG CTR NORFOLK VA  
NAVSUP FLT LOG CTR MANAMA BAHRAIN  
NAVSUP FLT LOG CTR SIGONELLA IT  
NAVSUPPACT BAHRAIN  
COMSC NORFOLK VA  
COMSC CENTRAL BAHRAIN  
MSC SSU MANAMA BAHRAIN  
MSC SSU SAN DIEGO CA  
MSC SSU SINGAPORE SN  
SURFOPS NAVSUPPACT BAHRAIN  
MATCONOFFNAVCENT  
CTFSBS  
CTGSBS UAE  
CJTF HOA  
CTF 51  
CTF 55  
CTF 56  
CTG 56.7  
CTG 56.11  
CTU 56.7.4  
NAVCRIMINVSERVFO MIDDLE EAST BAHRAIN  
FISC SIGONELLA DET DUBAI  
NMCLANT DET BAHRAIN  
USS LEWIS B PULLER  
USNS ALAN SHEPARD  
USNS AMELIA EARHART  
USNS CATAWBA  
USNS BIG HORN  
BT  
UNCLAS  
PASS TO OFFICE CODES:  
NAVSUPPACT BAHRAIN//N31/N40//  
AMEMBASSY MANAMA//QMC//  
MSGID/GENADMIN/USNS BIG HORN/-/SEP//  
SUBJ/CHG 2 ARRIVAL AND DEPARTURE LOGREQ FOR DUQM, OMAN//  
REF/A/DOC/CNO/DEC2020//  
REF/B/DOC/COMUSNAVCENT/02FEB23//  
REF/C/DOC/COMUSNAVCENT/22JUN22//  
REF/D/GENADMIN/C5F/260545ZJUN19//  
REF/E/GENADMIN/CTF 53/191343ZSEP24//  
REF/F/GENADMIN/CTF 53/270721ZAUG24//  
REF/G/MSG/BGN/271505ZAUG24//  
REF/H/MSG/BGN/271525ZAUG24//

Enclosure (26)

Page 1 of 2

REF/I/MSG/BGN/160720ZSEP24//  
NARR/REF A IS OPERATIONAL REPORTS NTRP 1-03.1.  
REF B IS COMUSNAVCENT OPOD 1000-23.  
REF C IS COMUSNAVCENT OPOD 20-01, FORCE PROTECTION.  
REF D IS C5F LOGREQ AND PORT VISIT GUIDANCE MESSAGE.  
REF E IS CTF 53 REPLENISHMENT SOE.  
REF F IS DIPLOMATIC CLEARANCE REQUEST FOR USNS BIG HORN TO DUQM.  
REF G IS CLASSIFIED ARRIVAL AND DEPARTURE LOGREQ FOR DUQM, OMAN.  
REF H IS UNCLAS ARRIVAL AND DEPARTURE LOGREQ FOR DUQM, OMAN.  
REF I IS CHG 1 ARRIVAL AND DEPARTURE LOGREQ FOR DUQM, OMAN.//  
POC/ (b)(6) /OPSCHEIF/USNS BIG HORN/TEL: (b)(6)  
/EMAIL: (b)(6) (AT) BIGHORN.NAVY.MIL  
/EMAIL: (b)(6) (AT) BIGHORN.NAVY.SMIL.MIL//  
AKNLDG/YES/LOGREQ REPLY REQUESTED.//  
RMKS/1. INFORMATION CONCERNING U.S. SHIPS OPERATIONS, MOVEMENTS  
AND ACTIVITIES ARE POTENTIALLY SENSITIVE AND SHALL BE PASSED ONLY  
TO THE INDIVIDUALS WHO MUST KNOW IT IN THE PERFORMANCE OF THEIR  
DUTIES. ONLY THE MINIMUM REQUIRED INFORMATION SHOULD BE SHARED.  
2. THE FOLLOWING CHG 2 SUBMITTED TO REF "G" AND ALL OTHER ITEMS  
REMAIN THE SAME:  
COUNTRY: OMAN  
PORT: DUQM  
SHIP: USNS BIG HORN (T-AO 198)  
LOCATION: PIERSIDE

-----  
ALPHA: (1) ETA: 23 SEP 2024, 1500 LOCAL PILOT PICK-UP.//  
-----

BT

Enclosure (2C)

Page 2 of 2

## Mina Raysut—Contact Information

Hours	24 hours
-------	----------

**Anchorage.**—Designated anchorage areas, best be seen on the chart, have been established SE of Mina Raysut. They are used, as follows:

1. Area A—Inbound small vessels waiting for a berth.
2. Area B—Vessels requiring offshore services.
3. Area C—Vessels carrying hazardous cargo and ship-to-ship operations.
4. Area D—Inbound large vessels waiting for a berth.
5. Contingency Anchorage—For vessels in an emergency condition.
6. North Anchorage—For vessels with a draft of 9m or less and an loa of 150m or less

The bottom in these anchorages is sandy. Depths in these anchorages range from 23 to 42m. The anchorages are reported to have good holding ground, except during the Southwest Monsoon, when ship-to-ship operations and boat services are suspended. The anchorages are exposed; dragging anchors have been experienced.

**Caution.**—It is reported (1997) that wave recorder buoys are often moored within 1.5 miles SE of the E breakwater head.

A prohibited area, into which entry is prohibited and which is best seen on the chart, lies NE of Mina Raysut, on the N side of Bandar Raysut.

Buoys in the vicinity of the port and its approaches may be moved or changed as breakwater construction progresses. Vessels are advised to navigate with caution and consult with local authorities for the latest information.

During the monsoon season (June to August), ship-to-ship and small boat operations may be suspended in the anchorages.

It has been reported (2010) that vessels may have to maneuver around the numerous fishing buoys which are located throughout the approach to the port.

It has been reported (2012) numerous dhows and other small craft are anchored N of the approach and the approach channel to the port.

It has been reported (2012) that depths of as little as 8m extend about 275 yards NW from the oil pier to Lighted Buoy No. 2.

Two wrecks, best seen on the chart, lie 3 and 8 miles W of the port close to the shoreline.

**9.26** The coast between Ras Raysut and Dahariz, 10 miles ENE, is marked by green fields, coconut trees, and buildings. From Dahariz to Khawr Taqah, 14 miles E, the land is swampy and covered with mangroves, but from there to Mirbat, about 18 miles farther E, the coast is fronted by a series of limestone cliffs, 30m high. The surf generally breaks along this coast even in calm weather.

Good anchorage can generally be taken off this section of coast, in depths of 9 to 13m, and about 0.5 mile offshore.

**Awqad** (17°00'N., 54°03'E.), a village with a lagoon in its vicinity, stands 4.5 miles NNE of Ras Raysut. A similar village stands about 1 mile farther NE.

**Salalah** (17°01'N., 54°06'E.), the principal trading center of this area, stands 3 miles E of Awqad. The town consists of

stone houses surrounded by a grove of palm trees. The Governor's Palace and a white fort front the town.

Three radio masts stand, at an elevation of 25m, about 1 mile W of the palace. A stone tower, standing 0.9 mile W of the radio masts, is small but prominent. It is reported (1998) that a conspicuous mosque is situated 0.6 mile WNW of this tower.

An aeronautical radio beacon is situated in the vicinity of an airfield, about 2 miles N of the palace.

**Caution.**—A prohibited area, the limits of which may best be seen on the chart, fronts the town of Salalah and extends up to 2 miles seaward.

**Dahariz** (17°01'N., 54°11'E.) fronts the coast and is surrounded by watch towers A grove of coconut trees and some cotton fields are located on the W side of the village and a lagoon lies on the E side. A fort in ruins stands about 2 miles E of the village.

**9.27 Ras Marbat** (16°59'N., 54°41'E.), fronted by foul ground, is a low rocky point, which is reported to be radar conspicuous. The ruins of a tomb stand close ESE of the point, but are only visible from W.

Some inhabitants of the area dwell in large caves, which are situated on the precipices of the cliffs extending along parts of the coast to the W of the point. Lights from these caves may sometimes be distinguished along the coast at night.

**Marbat** (16°59'N., 54°41'E.), a town composed of stone houses and huts, stands on the E side of a bay lying N of Ras Marbat. A conspicuous fort, with a flagstaff, stands near the shore at the N end of the town. A white mosque, with a dome, stands close SE of the fort. The town is fronted by a small craft harbor, which is protected by a breakwater.

Vessels can anchor in the bay about 0.7 mile N of Ras Marbat, sheltered from winds except those from between S and W, in depths of 12 to 14m.

Jabal Ali, a conspicuous hill, is 116m high and rises about 1.4 miles NNE of Ras Marbat. A prominent radio mast stands close SSW of the summit.

Jabal Dawan, 1,136m high, rises 5.5 miles N of Ras Marbat and is the best landmark in this area.

A cone-shaped peak rises about 8 miles E of Jabal Dawan and near the E end of the same part of the range. This peak is conspicuous, but it is not as high as the rest of the range.

**Caution.**—It was reported that a current sets NNW toward the shore at a rate of 1.5 knots in the vicinity of Ras Marbat.

Mirbat Firing Practice Area lies S and SE of Ras Marbat. For further information, see **Oman—Firing Areas** in Pub. 160, Sailing Directions (Planning Guide) South Atlantic Ocean and Indian Ocean.

**9.28** Between Ras Marbat and Ras Naws, 39 miles ENE, the low rocky coast is backed by a low barren plain with a few hills of moderate height.

**Bandar Jinjari** (17°00'N., 55°00'E.), 19 miles E of Ras Marbat, provides anchorage to small vessels with local knowledge, in depths of 14 to 29m, rock and sand. This bay provides shelter from NE and E winds.

**Jabal Jinjari** (17°02'N., 55°01'E.), rising on the N side of Bandar Jinjari and 1 mile inland, is a conspicuous conical hill, 522m high.

Jabal Musayrat (Jabal Musajira), 660m high and conspicu-

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ous, stands close to the coast about 14 miles NE of Jabal Jinjari.

**Ras Nuss** (Ras Naws) (17°15'N., 55°19'E.), located about 21 miles NE of Bandar Jinjari, is low, rocky, and prominent. A prominent radio mast is reported (1998) to stand about 2.5 miles WNW of this point.

**Jabal Naws** (Jabal Nuss) (17°14'N., 55°17'E.), rising about 6 miles NE of Jabal Musayrat, forms the E extremity of Jabal Samhan range. This hill is wedge-shaped and its tallest and most precipitous part, which appears like a bluff, stands closest to the sea and attains a height of 894m. This peak is higher and more conspicuous than Jabal Musayrat especially when viewed from E.

**9.29 Juzur al Hallaniyat** (Kuria Maria Islands) (Jazair Kuriya Muriya) (17°30'N., 56°00'E.), five in number, consists of Al Hasikiyah, As Sawda, Al Hallaniyah, Qarzewit, and Al Jubaylah (Al Qibliyah). These bold and rocky islands, which rise to regular conical peaks, lie parallel to the N shore of Khalij Khuriya Muriya and about 22 miles S.

The tidal current S of these islands sets E during the flood, while N of the islands the current sets W.

**Al Hasikiyah** (17°27'N., 55°37'E.), lying 21 miles NE of Ras Naws, is the W of the group. It is rocky, barren, and colored white by guano. Two conical peaks standing at its S end rise to heights of 155m. Two small bays indent the E side of the island. A rocky shoal, which dries, lies about 0.5 mile off the NW side.

**As Sawda** (17°29'N., 55°51'E.), lying about 13 miles E of Al Hasikiyah, slopes irregularly to the coasts from its summit, 399m high, near the middle of the island. This island is barren, except for some grass and moss near the summit. Many small reef-fringed points extend from the shore and form coves suitable for use by small craft with local knowledge. The island is fronted by foul ground and is radar conspicuous.

**Al Hallaniyah** (17°30'N., 56°02'E.), lying about 5 miles E of As Sawda, is generally rugged and barren, except for some tamarisk trees and a little grass on its E side. The middle part of the island rises to granite chimney peaks standing close together. The tallest peak rises to a height of about 495m. The island is radar conspicuous.

The E and W ends of the island terminate in comparatively low points. Ras al Hallaniyah, the summit and N end of the island, is a bold projecting bluff, 501m high. The coast up to 1 mile on either side of this bluff consists of an almost vertical cliff. The island is fringed by foul ground and shallow rocks lie within 2.5 miles W of its W end.

A shoal patch, with a depth of 18m, was reported (1958) to lie about 5 miles E of Ras Sayyir, the E extremity.

Shoal patches, with depths of 16.5m, 15.0m, 4.9m, and 14.9m, lie about 2 miles NNW, 3 miles NNE, 3.4 miles NE, and 3.5 miles NE, respectively, of Ras al Hallaniyah, the N extremity.

The best anchorage off Al Hallaniyah is in depths of 14.6 to 22m, about 4 miles WSW of the N extremity of the island and about 0.5 mile off a small sandy cove. This anchorage is open to winds from E through N to W. A vessel reported approaching this anchorage on a course of 150°, with the bottom shelving gradually.

A stranded wreck lies in the vicinity of a bay on the NE side

of the island.

**Caution.**—Qarzewit Firing Practice Area extends NE from the NE side of Al Hallaniyah. For further information, see **Oman—Firing Areas** in Pub. 160, Sailing Directions (Planning Guide) South Atlantic Ocean and Indian Ocean.

**9.30 Qarzewit** (17°36'N., 56°09'E.), lying about 6 miles NE of Ras al Hallaniyah, is rocky and has a double peak, 70 m high. The base of this islet consists of four red granite rocks lying close together. The islet is fringed by foul ground and two above-water rocks lie close together off its E end.

**Al Jubaylah** (Al Qibliyah) (17°30'N., 56°20'E.), the E island of the group, lies 13 miles E of Al Hallaniyah and is radar conspicuous. This rocky, barren island is topped by several limestone peaks. A small sandy bay indents the NW side of the island. The tallest peak rises to a height of 171m and is visible from all directions. A light, with an AIS, is located on the SE side of the island.

**Four Peaked Rock** (17°29'N., 56°20'E.), about 30m high, lies 1 mile NNW of the NW extremity of Al Jubaylah; the intervening channel has depths of 3.7 to 5.5m. A rocky ledge, marked by some above-water rocks, extends about 0.5 mile NW from Four Peaked Rock.

**Well Rock** (17°29'N., 56°19'E.), a small above-water danger, lies about 0.5 mile SSW of the SW extremity of Al Jubaylah (Al Qibliyah).

**Tilly Rock** (17°30'N., 56°25'E.), with a depth of 5.5m, lies about 2 miles E of Al Jubaylah (Al Qibliyah). A small drying rock, over which the sea usually breaks, lies about 2 miles farther E. Four Peaked Rock, well open N of Al Jubaylah (Al Qibliyah), and bearing less than 280°, leads N of these rocks.

A wide berth should be given these rocks when a vessel is rounding the E side of the island at night, as they are steep-to and the depths around them are irregular.

Anchorage can be taken off the N side of Al Jubaylah (Al Qibliyah). As the holding ground of coral is indifferent, a long scope of chain is required.

Small vessels with local knowledge can anchor, in a depth of 22m, off the S side of Al Jubaylah (Al Qibliyah), with Well Rock bearing 248° and the W extremity of the island bearing 293°.

**9.31 Khalij Khuriya Muriya** (Kuria Muriya Bay) (Khalij al Hallaniyat) (17°39'N., 55°53'E.), entered between Ras Nuss (Ras Naws) and Ras Sharbithat, 71 miles NE, is bordered by lines of limestone cliffs and sandy beaches. The depths in the central part of the bay range from 36 to 86m, shoaling gradually toward the coast and the five previously-described islands. The bottom is generally sand and coral, but occasionally rock is found.

**Winds—Weather.**—The winds and weather in the bay appear more violent and variable than anywhere along this coast. The N wind is strong. Changes of wind may be sudden and without any warning. In the vicinity of this bay, the Southwest Monsoon is reported to set in with heavy squalls, rain, and thunderstorms. During this period, many of the local vessels do not sail. The larger craft sail in early June, after the first burst of the monsoon, and at the end of August, when the monsoon is considered to be over.

**Bandar Naws** (Bandar Nuss) (17°15'N., 55°19'E.), entered

between Ras Nuss (Ras Naws) and a low rocky point about 3 miles to the N, provides sheltered anchorage from S and W winds, in a depth of 16.5m, about 0.5 mile offshore. A village stands at the head of this bay. A tomb, in ruins, stands in a valley about 5 miles N of Ras Nuss (Ras Naws) and 1 mile inland.

**Ras Hasik** (17°23'N., 55°20'E.), about 10 miles NNE of Ras Nuss (Ras Naws), is small, low, and rocky. The coast in this vicinity is very striking. The unbroken limestone mountains with the sharp peaks of the granite ranges are very prominent. Though the coast appears barren from seaward, the valleys are well-wooded and watered.

**Bandar Hasik** (17°24'N., 55°20'E.), on the N side of Ras Hasik, provides sheltered anchorage from S winds to small vessels with local knowledge, in depths of 9 to 22m, close offshore. A village stands in a valley a short distance from the head of this bay.

**9.32 Ghubbat ad Dawm** (17°30'N., 55°20'E.) is entered between Ras Hasik and Ras Muntajib, about 18 miles NNE. The coast between Ras Hasik and Ras Tiharr, a low sandy point about 4 miles NNW, is irregular.

The remaining part of the coast is backed by a high, steep tableland with three conspicuous valleys. A sandy spot lies close N of Ras Attabarran, about 8 miles NNW of Ras Tiharr.

A valley, fronted by a sandy cove about 2 miles NNW of Ras Hasik, is reported to extend quite a distance W.

**Ras Muntajib** (17°39'N., 55°24'E.), a bluff headland with a rugged peak about 2 miles N of it, stands 8 miles NE of Ras Attabarran. The peak is difficult to identify.

The coast NE of Ras Muntajib consists of steep cliffs for a distance of 8 miles. The high land then recedes 2 to 3 miles inland and parallels the coast to the **Dark Point of Shuwaymiyah** (17°54'N., 55°45'E.), located 22 miles NE of Ras Muntajib, where it again approaches the coast. A white stone building stands about 4 miles WNW of the Dark Point of Shuwaymiyah.

Bandar Qanawt, an abandoned fishing village, stands 8.5 mile NNE of Ras Muntajib. A prominent white sand hill is piled up against the cliff at its W end.

The village of Shuwaymiyah, with a prominent minaret at its W end, stands 12 miles ENE of Bandar Qanawt.

A conspicuous stranded wreck fronts the shore 5 miles ENE of Bandar Qanawt.

The coast from the Dark Point of Shuwaymiyah, a bluff headland which should not be confused with **Ras Mutaykaf** (Ras ash Shuwaymiyah) (17°54'N., 55°54'E.), about 10 miles E, is an unbroken line of cliffs which form the sea front of a tableland, 183 to 224m high. This line of cliffs extends about 26 miles E from the Dark Point of Shuwaymiyah.

There are overfalls between the latter point and Ras Mutaykaf. A vessel anchored, in a depth of 20m, about 0.5 mile offshore, with the Dark Point of Shuwaymiyah bearing 082°, distant 3 miles. Between this position and the shore, the depths decrease rapidly; overfalls are also located off this section of the coast.

**9.33 Ras Minji** (17°53'N., 56°05'E.), located about 13 miles E of Ras Mutaykaf, is a small projecting bluff, 213m high.

About 2 miles E of Ras Minji, the cliffs gradually decrease

in height for about 2 miles and terminate about 1 mile inland. The cliffs begin to rise again about 7 miles to the E.

**Ras Qarwaw** (17°53'N., 56°21'E.), a steep bluff tableland about 244m high, stands 13 miles E of Ras Minji and 3 miles E of Ras Sharbithat. The cliffs W of this point are fronted by a strip of low land, with a small bright red lake at its W end.

A vessel anchored, in a depth of 12.8m, about 6 miles E of Ras Minji and 1 mile offshore. Small vessels with local knowledge can anchor, in depths of 9 to 18m, off the low sandy coast W of Ras Qarwaw.

**Ras Sharbithat** (17°53'N., 56°18'E.), the NE entrance point of Khalij Khuriya Muriya, is a steep bluff with a flat top, with a deep notch in its face. It has been reported to be radar conspicuous.

Between Ras Sharbithat and Ras Sawqirah, about 20 miles NE, the coast is bordered by steep limestone cliffs about 180m high. When the sun shines on these cliffs, they appear to be made of clay.

**Funnel Hill** (Tower Hill) (18°32'N., 56°29'E.), about 39 miles NNE of Ras Sharbithat and 10 miles inland, is the summit of a high tableland and, although it appears detached when seen from a distance, the tableland extends S to the coast and gradually E for a distance of about 50 miles. This hill has been reported to appear as a light brown sugarloaf against the light background and to be inconspicuous.

**Ras Sawqirah** (18°08'N., 56°36'E.), a prominent headland, appears as a perfect bluff when viewed from the NE. This headland has been reported to be radar conspicuous.

**Caution.**—A dangerous wreck, marked by a light, is located about 12 miles NE of Ras Sawqirah.

**Ghubbat Sawqirah** (Dawhat Sawqirah) (18°35'N., 57°16'E.), entered between Ras Sawqirah and Ras Khushayyim, about 88 miles NE, has a low, sandy coast sparsely covered with mangrove bushes.

During the Northeast Monsoon, a heavy swell and surf makes up in the bay and along the coast.

**Ruqq al Jazir** (18°34'N., 56°51'E.), a shoal with depths of less than 20m and over which there is usually a strong ripple, borders the coast of this bay from a position about 7 miles NNE of Ras Sawqirah to Ras Khushayyim, near the NE entrance point of the bay. The inner part of this shoal dries in places. Less water than charted was reported (1987) in this vicinity.

**9.34 Ras Khushayyim** (18°58'N., 57°48'E.), a dark slightly projecting vertical bluff, lies at the S end of a range of flat-topped hills which extends about 11 miles W from Ras al Madrakah. A prominent nipple-shaped feature, formed of eroded sandstone, stands at an elevation of 91m on the summit of a coastal hill near the point. This feature appears especially conspicuous with the sun on it.

**Bandar Jazirah** (18°57'N., 57°47'E.), bordered by a sandy beach, lies close E of Ras Khushayyim. Small vessels with local knowledge can anchor anywhere within this bay over a bottom of sand and mud.

If the wind shifts and blows hard from the SW, which frequently occurs during the Northeast Monsoon, it is advisable to shift to the anchorage on the N side of Ras al Madrakah.

**Ras al Madrakah** (19°00'N., 57°51'E.), about 3 miles NE of

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Ras Khushayyim and marked by a light, with a rocky islet lying close NE of it, is a dark cape which appears as an island when viewed from seaward. When viewed from a distance, the land in the vicinity of the cape appears to be small detached hummocks, but closer in it is seen to be connected with a remarkable circular hummock and the summit of the cape, about 0.2 mile W of its extremity.

Black volcanic peaks, with flat-topped hills about 122m high, stand in the background. Ras al Madrasah has been reported to be radar conspicuous.

During the Southwest Monsoon, good anchorage can be taken, in a depth of 9.4m, coral, with the NE extremity of the islet NE of Ras al Madrasah bearing 181°, distant about 0.5 mile; or in depths of 10 to 11m, about 0.5 mile SSE of this berth.

Smaller vessels with local knowledge can anchor closer in, but a long swell sets in.

Stranded wrecks front the coast about 1.5 and 5.0 miles NNW of Ras al Madrasah.

**9.35 Khalij al Masirah (Khalij Masirah) (Gulf of Misirah)** (19°39'N., 58°17'E.), fouled by numerous shoals and banks, is entered between Ras al Madrasah and Ras abu Rasas, the S end of Al Masirah, about 83 miles NE.

Vessels should give this area a wide berth because of the numerous dangers and the strong onshore set sometimes experienced when passing. During strong winds, a heavy swell is experienced in the gulf and the sea breaks over many shoals.

Thick fog, which appears to come down rapidly with a sudden N wind, is prevalent in the vicinity of this gulf during the Northeast Monsoon.

**Tides—Currents.**—In Khalij al Masirah, the tidal currents set between NNE and NW at a rate of 1.5 knots during the flood and in the opposite direction on the ebb at the same rate.

Outside the 200m curve, the tidal current sets parallel with the coast, but is probably lost in the prevailing current.

**Caution.**—Lesser depths than charted have been reported (2015) in the N approach to Khalij al Masirah.

**9.36 Off-lying islands and banks.—Jazirat Hamar an Nafur** (19°48'N., 57°49'E.), lying about 47 miles N of Ras al Madrasah and 3 miles offshore, is 99m high, with vertical limestone cliffs. Its summit is flat and split in all directions. Some sunken rocks lie close off both its E and W sides. The passage between this small islet and the coast has depths of about 5 to 11m in the fairway and is free of known dangers.

**Shib Kadun** (San Carlos Banks) (19°29'N., 58°00'E.), which consists of several coral banks with sunken rocks on them, extends about 18 miles NE from a position about 21 miles N of Ras al Madrasah. A heavy swell breaks over these banks during foul weather. A depth of 16.5m was reported (1975) to lie about 15 miles SE of Shib Kadun. Another shoal depth of 24m was reported (2001) to lie 4 miles further E; less water than charted exists in this entire area.

**Shib Bu Sayfah** (19°56'N., 58°15'E.) extends about 11 miles N and NE from a position about 23 miles E of Jazirat Hamar an Nafur. Rocks, with depths of less than 1.8m, lie near the edge of this reef.

**Shib al Ghubab** (20°11'N., 58°00'E.), which breaks, lies about 26 miles NNE of Jazirat Hamar an Nafur and 6 miles offshore. Depths of less than 1.8m exist over this reef.

A reef, with depths of less than 1.8m, lies about midway between this reef and Shib Bu Sayfah. A similar reef lies about 18 miles NNE of Jazirat Hamar an Nafur and 7 miles offshore.

**9.37** The coast between Ras al Madrasah and Ras ad Dil, about 3.5 miles to the NNW, is sandy and backed by hills.

**Ras ad Dil** (19°06'N., 57°50'E.), a small rocky projection 143m high, is the S limit of a uniform line of tableland which extends about 34 miles N to Ras ad Duqm (Ras Duqm). This tableland descends to the coast in vertical cliffs from 70 to 146m high.

A small bight is entered between Ras Markaz, about 5 miles N of Ras ad Dil, and Ras Khaysat ai Liyukh, about 3 miles farther NW. The latter point is a bluff which is difficult to make out until close to it.

Vessels with local knowledge can anchor in this bight, in depths of 11 to 12.8m, sand, sheltered from S and SW winds.

A dangerous wreck is reported to lie (position approximate) about 7 miles SE of Ras Duqm.

**Ghubbat Quwayrat** (19°41'N., 57°44'E.), entered between Ras Duqm and a low rocky point, with two rocky islets close off it, about 10 miles N, is clear of dangers. It provides anchorage to small craft with local knowledge close NW of Ras Duqm. Sheltered anchorage is provided from SW winds. A low peninsula, easily identified by a small mound at its N end, extends N from Ras Duqm.

**9.38 Duqm** (19°40'N., 57°42'E.), close W of Ras Duqm, is being developed as Oman's first major ship-repair facility. Two drydocks can accommodate vessels up to 600,000 dwt. A floating dock, for vessels up to 80,000 dwt, is also planned for the facility.

<b>Duqm Home Page</b>
<a href="http://www.portduqm.com">http://www.portduqm.com</a>

<b>Oman Drydock Company Home Page</b>
<a href="http://www.omandrydock.com">http://www.omandrydock.com</a>

**Tides—Currents.**—Off Duqm the currents, which are strong and variable, are influenced by the prevailing wind. From April to November the current sets NE parallel to the coast at a rate of about 2 knots.

**Depths—Limitations.**—The charted Deep-Draft Route has a depth of 19m at the lowest astronomical tide.

The approach channel, marked by lighted buoys and dredged (2012) to a depth of 19m, leads generally W and SSW for about 6 miles to the harbor entrance. It has been reported (2014) the dredged depth is only 18m. It has been reported (2018) the channel between the outer buoy set and buoy set 5/6 is narrower than charted.

The area W of the Commercial Quays has been dredged (2012) to a depth of 18m. The area E of the Government Berths and extending SE to the dry docks has been dredged (2012) to a depth of 10m.

**Pilotage.**—Pilotage, which is available 24 hours, is compulsory for all vessels greater than 200 gross tons and can be provided with a 2-hour notice. The pilot boards, as follows:

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1. Vessels with a draft greater than 8.5m—About 1 mile ESE of Fairway Lighted Buoy.

2. Vessels with a draft less than 8.5m—Position 19°42.5'N, 57°46.3'E.

Only the vessel's agent can order pilots for departure. However, vessels are required to send an e-mail notification (pilot@portduqm.com), as follows:

1. Oman Dry Dock facilities—48 hours, 24 hours, 12 hours, 6 hours, and 3 hours prior to departure.

2. Commercial Quay—Upon arrival and 3 hours prior to departure. Vessels also notify Port Control 2 hours prior to departure on VHF channel 14.

**Regulations.**—Vessels should send their ETA 48 hours, 24 hours, 12 hours, and 6 hours in advance via e-mail (pilot@portduqm.com) and 2 hours in advance on VHF channel 16. The ETA should also be confirmed on VHF channel 14. The 48-hour ETA message should contain the following information:

1. Vessel name.
2. Call sign.
3. Flag.
4. IMO number.
5. MMSI number.
6. Length overall.
7. Arrival draft.
8. Gross tons and net tons.
9. Displacement.
10. Last port-of-call.
11. Next port-of-call.
12. IMDG class, UN number, and quantity.
13. ETA at pilot station.
14. Name of vessel's agent.

The 24-hour, 12-hour, and 6-hour notices should contain the following information:

1. Vessel name.
2. Call sign.
3. MMSI Number.
4. ETA at the pilot station.

Vessels should send their ETD, as follows:

1. Oman Drydock facilities—48 hours, 24 hours, 12 hours, 6 hours, and 3 hours in advance.

2. Commercial Quay—Upon arrival and 3 hours and 2 hours in advance. The 2-hour notice should be sent on VHF channel 14.

In case of emergencies, vessel in port should contact Port Control on VHF channel 16.

The following VHF restrictions are in effect:

1. VHF channel 6 is used exclusively by the Commercial Quay Master or the mooring masters of the Commercial Port and the pilots and/or tugs.

2. VHF channel 8 is used exclusively by the Dry Dock Master or the mooring masters of the Oman Drydock Company and the pilots and/or tugs.

All deep-draft vessels bound to and from Duqm are recommended to use the charted Deep-Water Route and keep clear of all shoals with depths of less than 19m.

**Contact Information.**—See the table titled **Duqm—Contact Information**.

**Anchorage.**—Ten designated anchorage areas, with depths of 21.3m to 27.4m, sand, are charted S and N of the Deep-draft Route and the entrance channel. All anchorages are circular;

Areas A and B have a radius of 0.25 mile while Areas C through K have a radius of 0.5 mile. Berths are allocated by the harbormaster according to vessel size, draft, type of vessel, cargo, and length of stay.

<b>Duqm—Contact Information</b>	
<b>Port Control</b>	
Call sign	Duqm Port Control
VHF	VHF channels 6, 8, 14, and 16
Telephone	968-24342888
	968-92784673 (mobile)
Facsimile	968-24587343
E-mail	vt@portduqm.com
	info@portofduqm.com
Hours	24 hours
<b>Pilots</b>	
VHF	VHF channels 6 and 8
E-mail	vt@portduqm.com
Hours	24 hours
<p><b>Note.</b>—It has been reported (2014) the pilots can also be contacted on VHF channel 14.</p>	

Other anchorage areas, best seen on the chart, have been established about 10.8 miles ENE and about 9.3 miles ESE, respectively, of the head of the East Breakwater.

**Caution.**—Khalij al Masirah is frequented by humpback whales. Mariners are requested to keep a sharp lookout to prevent collisions and take measures to reduce noise. Vessels bound to or from Duqm shall use the recommended Deep-Draft Route.

It has been reported (2020) numerous fishing vessels and small craft may be located in the channel; these vessels may not move out of the way of larger vessels using the channel.

**9.39** The coast between the N entrance of Ghubbat Quwayrat and Ras Sidarah, about 4 miles to the N is alternately sandy and cliffy. A village and a grove of trees stand on the latter point, which is low and inconspicuous.

Several groups of conical hills stand close inland of Ras Sidarah.

**Ras Naqrair** (Ras Nakhrayr) (Ras Nakharir) (19°58'N., 57°49'E.). about 5 miles N of Ras Sidarah, is a steep bluff rising to a height of 142m. The coast up to 2 miles S of this bluff is cliffy.

The coast between Ras Naqrair and Ras Sirab (Ras Sarab), about 12 miles N, consists of sandy beach backed by a range of high hills.

A village stands on Ras Sirab, which is low, sandy, and inconspicuous. Ghubbat Sirab (Ghubbat Sarab), a slight indentation, lies between Ras Sirab and Ras Bintawt (Ras Bintut), about 13 miles NE. A rock, with less than 1.8m, lies about 0.3 mile ENE of Ras Bintawt.

**Jabal ash Shubatayn** (Jabal ash Shabatayn) (20°18'N.,

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57°43'E.), a 123m high conspicuous peak, stands about 9 miles W of Ras Bintawt.

**Ghubbat Bintawt** (Ghubbat Bintut) (20°22'N., 58°02'E.), entered between Ras Bintawt and Ras Abana, a low rocky point about 9 miles NE, is bordered by sandy beach and is free of known dangers. A low range of hills, which rises from Ras Abana, extends to the WSW.

**9.40 Ghubbat Hashish** (20°30'N., 58°10'E.) is entered between Ras Abana and Ras ash Shajarat, about 8 miles E. The low, sandy shores of the bay are backed by a low range of hills on the W side. A pyramidal hill, 37m high, stands about 2 miles N of Ras Abana.

The mud-fringed head of the bay is divided into two parts by a spit which extends about 7 miles to the S. Three small rocky islets stand on this spit. A small village stands on the middle islet. A small rocky patch, with a depth of less than 1.8m, lies about 2 miles ESE of Ras Abana.

During the flood within the bay, the tidal current sets NNW at a rate of 0.7 knot and in the opposite direction, during the ebb, at the same rate.

A vessel has anchored, in a depth of 12.8m, with Abb, a rocky islet lying at the S end of the above spit, bearing 097° and Raqq, a rocky islet lying about 5 miles NNW, bearing 007°.

A vessel anchored, in a depth of 8.5m, with Abb bearing 137°. This anchorage was approached with the E extremity of Ras Abana bearing 336°, and when Raqq, the rocky islet about 5 miles NNW of Abb, bore 005°, course was altered for the anchorage. From this anchorage, the rocks SW of Mahawt were about 0.5 mile distant and clearly visible.

**Barr al Hikman** (20°30'N., 58°24'E.), the peninsula lying between Ghubbat Hashish and Al Masirah, the island located to the E, is very low, sandy, and brush-covered. A lagoon, reported to be non-existent, lies about 1 mile N of the S end of the peninsula.

Kinasat Hikman, a shoal with a least depth of 2.6m, extends up to 6 miles off the S end of Barr al Hikman. Several patches, with depths of less than 11m, lie within 11 miles S of the peninsula. There are occasional overfalls between Kinasat Hikman and Shib Bu Sayfah, to the S.

### Jazirat Masirah

**9.41 East coast.—Jazirat Masirah** (20°26'N., 58°48'E.), lying centered about 12 miles off the E side of Barr al Hikman, is generally hilly, especially on its E side. The hills along the E side of the island are separated from the island coast by a narrow sandy plain; they run nearly its entire length. Jazirat Masirah has been reported to be radar conspicuous.

A steep plateau stands in the middle of the range on the NE side of the island. Along the W side of the island, between its S end and a position about 7 miles from its N end, there are a few low hills separated from the E range by an extensive sandy plain marked by several hillocks.

The climate of the island is agreeable and healthy between November and March, but hot and unhealthy during the Southeast Monsoon.

**Jabal Madhrub** (20°33'N., 58°53'E.), 256m high and conspicuous when viewed from the N or NE, stands about 8 miles

S of the N end of the island.

**Caution.**—Abu Rasas Firing Practice Area extends about 30 miles SW of Ras Abu Rasas, the SW extremity of Al Masirah. For further information, see **Oman—Firing Areas** in Pub. 160, Sailing Directions (Planning Guide) South Atlantic Ocean and Indian Ocean.

**9.42 Ras Abu Rasas** (20°10'N., 58°39'E.), the S extremity of Jazirat Masirah, is low and rocky. Jabal al Hilm (Jabal Suwayr) (South Cone), a conspicuous conical hill, rises to a height of 153m, about 2 miles NNE of Ras Abu Rasas. A light is shown from South Peak, about 0.5 mile S of Jabal al Hilm.

Between Ras Abu Rasas and Ras Kaydah, about 11 miles NE, the coast is indented by small sandy bays fringed by rocks.

**Ras Kaydah** (20°17'N., 58°47'E.), small and rocky, has a conspicuous, conical hill about 20m high nearby. When viewed from the E, this hill shows two peaks. A shoal, with a least depth of 5.1m, lies about 2 miles E of Ras Kaydah. The sea breaks heavily on this shoal with the slightest swell but when the sea is smooth there is no indication of shoal water.

Islets, which dry, exist respectively, 0.4 mile E, and 0.2 mile offshore 2.5 miles N of Ras Kaydah.

The coast between Ras Kaydah and Ras Zafarnat, about 17 miles NE, is regular with a few small rounded projections and a low rocky beach. Qaryat Haql (Hakkan), a small village in a grove of trees, lies close to the shore about 5 miles N of Ras Kaydah.

**Ras Zafarnat** (20°30'N., 58°58'E.) is rocky, with hills rising abruptly.

**Caution.**—Shoal water, which breaks in calm weather, extends up to 3 miles WSW and ESE of Ras Abu Rasas, and up to about 2 miles off the coast between it and Ras Kaydah.

Isolated pinnacle rocks, with depths of as little as 5.5m, have been reported to lie up to 10 miles WSW of Ras Abu Rasas. Uncharted coral heads lie within the 10m depth contour. Several wrecks are charted in the vicinity of Ras Abu Rasas.

**9.43 Ras al Ya** (20°31'N., 58°59'E.), about 2 miles NE of Ras Zafarnat, is the E extremity of the island and consists of a prominent bluff rising to a ridge of hills which extend W to the middle of the island.

A conspicuous peak, 99m high, stands about 2 miles WNW of Ras al Ya. Jabal Madhrub rises about 3 miles farther WNW. A rock, which dries, lies about 0.3 mile offshore about 0.5 mile SSW of Ras al Ya.

**Ras al Jazirah** (20°34'N., 58°57'E.), about 4 miles NNW of Ras al Ya, is rocky and well-marked by a black patch on its S side. A sharp peak, rising to a height of 95m, stands about 2 miles W of this point.

A 9.0m patch lies about 2 miles SE of Ras al Jazirah. Jazirat Thukhayr, a sandy islet close N of Ras al Jazirah, lies on a drying reef connected to the shore.

Drying rocks extend up to 0.2 mile off the E extremity of the islet. The coast between Ras al Jazirah and Ras Qudufah, the NE extremity of the island, about 7 miles NNW, is indented by a bay and is fringed by shoals, with depths of less than 10m, which extend up to 2 miles offshore in places.

A 4.6m rocky patch with a rock, awash, on its SW side, lies inside the 10m curve, about 3 miles NNW of Ras al Jazirah. The sea breaks on this patch and rock with a moderate swell.

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A 3.7m patch and a 9.7m patch, lie 0.8 mile NNW and 1.5 miles NE, respectively, of the rock.

**Ras Qudufah** (20°41'N., 58°55'E.), consisting of two rocky projections about 0.5 mile apart, rises to Jabal Qudufah, about 64m high, a short distance inland. A small monument stands close SW of Ras Qudufah

The reef bordering this point extends about 0.5 mile offshore. Depths of less than 5.5m lie within about 0.5 mile of the point. A cairn stands on a hill close S of Jabal Qudufah.

**9.44** The coast between Ras Qudufah and Ras Hilf, about 3 miles W, is fringed by a reef; shoals, with depths of less than 5.5m, extend up to 0.5 mile offshore along this part of the coast.

**Island Reef** (20°42'N., 58°53'E.), which dries 2.2m, lies about 1 mile NE of Ras Hilf; the sea breaks over this reef with a moderate swell. A dangerous wreck, awash at HW, lies close NE of the reef. Several shoal patches, with depths ranging from 3.2 to 5m, lie NE and NW of Island Reef and are best seen on the chart.

A tanker mooring buoy berth, connected to the shore by a submarine pipeline, lies about 2 miles NNW of Ras Qudufah. Tankers berth on a heading of 110° using both anchors and with the stern secured to two mooring buoys located close W of the outer end of the submarine pipeline.

**Ras Hilf** (20°41'N., 58°52'E.) is low and sandy. It has been reported that a bank, with depths of less than 1.8m fronts the W side of the point. Considerable shoaling occurs off this point, accompanied by rapid changes in the coastline.

A jetty extends about 0.1 mile W from a position about 0.1 mile S of Ras Hilf.

A conspicuous tank farm stands on Ras Hilf. Several radio masts stand about 2 miles ESE of Ras Hilf; a conspicuous building with an aluminum roof stands about 2 miles ESE of the same point.

An airfield hangar stands 1.5 miles SSE of Ras Hilf; close NE is an airfield and a wind sock.

No pilots are available but a marine officer from the air station will board vessels on request to advise on local conditions.

Anchorage can be taken, in a charted depth of 11m, about 0.5 mile WSW of Ras Hilf, and, in a depth of 7.3m, about 0.5 mile farther E; the bottom is sand over coral. Caution should be exercised in anchoring, as the holding ground at both anchorages is poor, and the tidal currents are strong. A submarine cable, marked by buoys, lies close E of the anchorage.

**Directions.**—Vessels bound for the inner anchorage WSW of Ras Hilf should not enter without local knowledge. The N approach, which is marked by lighted buoys with radar reflectors, is not recommended for vessels with a draft exceeding 4m.

**9.45 Hilf** (20°40'N., 58°52'E.) is a small modern commercial town and fishing port located about 2 miles S of Ras Hilf. The port is formed by a rubble breakwater which extends about 0.3 mile NW from the shore from a position close S of the town; the breakwater then curves N and then E to form a small harbor serving the fish factory located at the root of the breakwater. The fish factory is a low black building with a conspicuous black tower.

A T-head pier, used by fishing trawlers and small coastal

vessels, extends NW from the outer knuckle of the breakwater. A charted depth of 3.5m lies close NW of the head of the pier. The pier and the outer end of the breakwater are marked by lights.

**Jabal Hilf** (20°39'N., 58°53'E.), a prominent blackish hill about 74m high, stands about 0.5 mile SW of the hangar. Two conspicuous radar scanners stand close N of the summit.

**9.46 West coast.**—Between Ras Abu Rasas and **Ras Kalban** (20°21'N., 58°38'E.), about 11 miles to the N, the coast is low and sandy. Several sandy bays, fringed by rocks, lie along this section of coast. Numerous shoals, with depths of 1.2 to 24m, lie within 4 miles WSW through W of Ras Abu Rasas.

**Jibal Qarin** (20°22'N., 58°41'E.), a double-peaked hill 104m high, stands 3.5 miles NE of Ras Kalban; this hill is not easily identified from S.

The coast between Ras al Khatum, a point about 7 miles NE of Ras Kalban and Ras Shaghaf, about 7 miles farther NE, forms a bight which is almost filled by a drying bank extending about 5 miles NNE from the S shore of the bight.

Jazirat Shaghaf, low and sandy and covered with scrub and low bushes, stands on this drying bank. An inlet, 1.8 to 5.5m deep and 0.2 to 0.4 mile wide, leads in between the bank and the E shore of this bight to Umm Rusays.

A shoal, with a depth of less than 0.9m, was reported to extend about 0.3 mile WNW from the shore at Umm Rusays, but a small sandy beach close S of this village provides good landing. Umm Rusays consists of a few stone houses and huts, and a ruined tower.

**Jabal Safaiq** (20°28'N., 58°48'E.), a flat-topped conical hill, 55m high, stands 1.5 miles S of Umm Rusays. This hill shows up well from W. Small vessels with local knowledge can anchor, in a depth of 5.5m, N of Jazirat Shaghaf, with the ruined tower bearing 142° and Jabal Khiran bearing 207°.

There are depths of about 7.3 to 8.2m a little bit farther offshore.

Anchorage can also be taken, in depths of 7.3 to 9.1m, from 1 to 1.5 miles W of Ras Shaghaf.

The coast between Ras Shaghaf and Ras Hilf, about 11 miles NNE, is bordered by a narrow reef which extends up to 0.7 mile offshore.

**Dawwah** (20°33'N., 58°48'E.), the principal village on Jazirat Masirah, stands in a grove of trees about 3 miles NNE of Ras Shaghaf and close inland.

Anchorage can be taken, in a depth of 5.5m, close offshore, with the trees close N of Dawwah bearing 112°. Two other villages stand between Dawwah and Ras Hilf.

### Khawr al Masirah (Masirah Channel)

**9.47 Khawr al Masirah** (20°30'N., 58°40'E.), lying between the W side of Jazirat Masirah and the mainland coast, is used by small vessels with local knowledge. The channel is fouled by numerous dangers.

The tidal currents in the S entrance set N with the flood and S during the ebb, attaining rates at springs of up to 3 knots. Off the N entrance, the N current can reach 3 knots, while the S current can reach 2 knots.

At a position about 1.5 miles N of Ras Qudufah, the current

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# THE ARABIAN SEA HUMPBACK WHALE

## ⚠ ADVISORY NOTICE

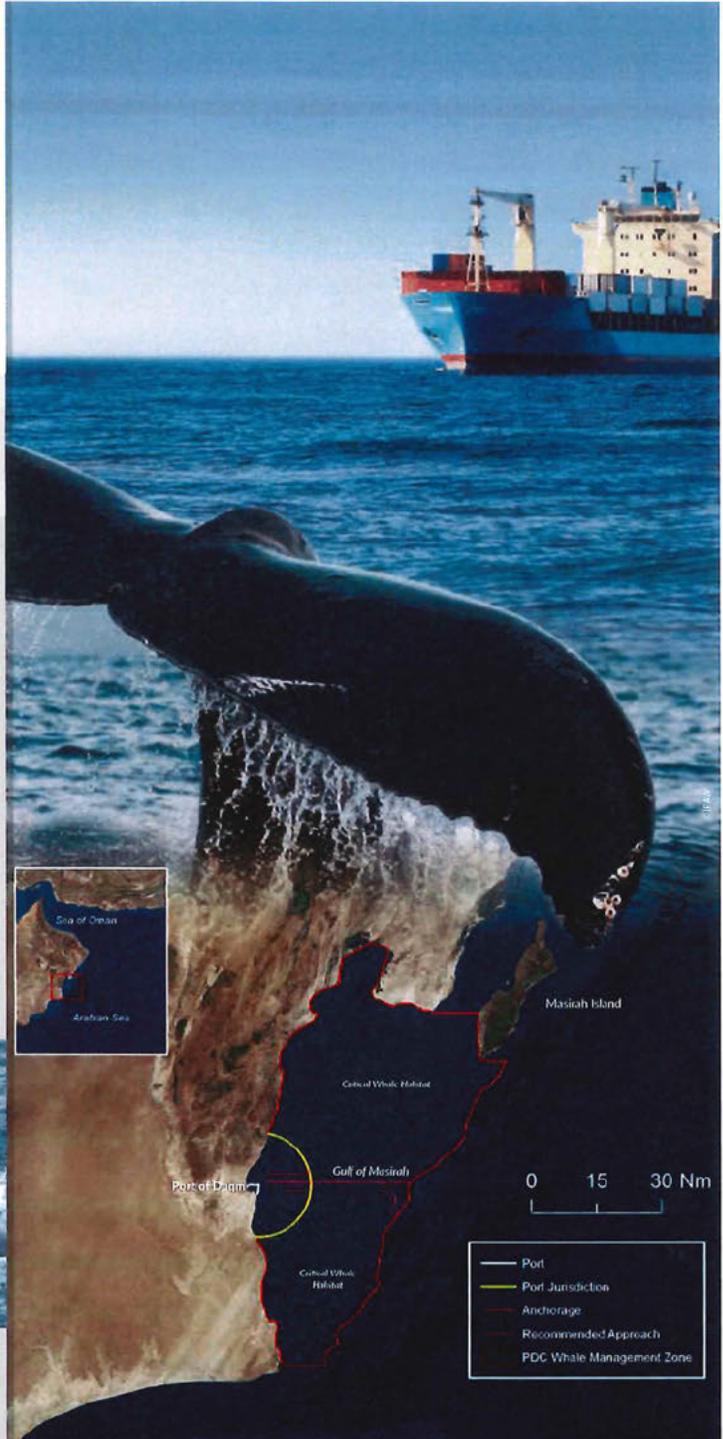
The Arabian Sea Humpback Whale is one of the most endangered whale populations in the world, thought to number less than 100 individuals within Oman.

These whales have been isolated in the Northern India Ocean for over 70,000 years. Uniquely, calving and feeding occur within the same waters. The breeding season is between January and May with a peak in March, but whales may be present year round.

### PDC Whale Management and Mitigation Plan

PDC operates a whale management programme to help reduce the risk of mortality and disturbance to whales from port activities, especially the risk of ship strikes. The programme seeks to minimise impacts through a 'Detect-Report-Respond' system operated by trained personnel.

Report all whale sightings and seek further advice from Port Control.



## Speed and Strike Risk

Effects of ship speed on whale fatality rates

**10** At 10 knots (19 km/hr) **3/10 whales** die in the event of a collision

**14** At 14 knots (26 km/hr) **7/10 whales** die in the event of a collision

**18** At 18 knots (33 km/hr) **9/10 whales** die in the event of a collision

©IAW

## Critical Whale Habitat

Keep speed to <10kts

Keep a continuous watch

**10**

Report sightings VHF Ch14

Avoid whales 1km for vessels <300Gt 2km for vessels >300Gt

**SHIP STRIKES CAN BE FATAL!**

SOES WHALE MANAGEMENT SYSTEM



**REPORT SIGHTINGS**



2458787



VHF - Channel 14



whale@portduqm.com

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O

(b)(6)

Trainee: Captain

(b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
<b>1</b>	<b>INITIAL PREPARATION</b>		
1.1	Establish if the vessel is approved to use ECDIS for navigation	<i>Navigation primarily via corrected paper charts is MSC policy. ECDIS supports...</i>	Y
1.2	Establish whether there are Company Navigational Procedures concerning the use of the equipment and ensure that these are followed	In accordance with SMS and Masters Standing Orders.	Y
1.3	Establish whether any passwords are needed for the management of the system and, if so, obtain the details from the Master (if appropriate - see page one note)	N/A	Y
1.4	Establish whether there is an onboard-approved Familiarization training package for the equipment, whether as computer based training, an inbuilt training mode or as a book or digital image of a book (e.g. PDF file). Use this before completing the checklist items here	<i>The MSC ECDIS Familiarization Program consists of this checklist as its base and is defined in the related procedure (XX-XXX-ALL)</i>	Y
1.5	Identify the primary ECDIS equipment and the facilities for back-up. If the back-up is a second ECDIS of a different type to that of the primary installation, then Sections 2 to 6 of this Familiarization checklist must be repeated for both systems	Master ECDIS in the Bridge, stbd side, secondary unit is located on the bridge, FWD.	Y
1.6	Understand ship procedures in event that the ECDIS and its back-up fail	As of Aug 2016 the ECDIS system is BGN's secondary means of navigation. Primary means of navigation remain the use of paper charts.	Y
1.7	Determine where the user manuals for ECDIS and its backup are located – an electronic version of these may be available on each unit	The user manuals are located in the cabinet below the operations board on the port side of the chart room.	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O

(b)(6)

Trainee: Captain

(b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
1.8	Determine where Base and Update CDs are stored on the ship (if appropriate)	N/A All update CDs are maintained aboard in the black cd case in port side bookcase.	Y
1.9	Determine the procedures to obtain additional chart permits (if appropriate)	mscsupport@geodesicx.com	Y
1.10	Determine and understand the position-fix systems that feed the ECDIS. Determine the method of switching between sources, such as primary and secondary position-fix systems	Main Screen –task list-sensor tab-ships position. Inputs include: Primary input; 2-way toggle switch. GPS1 & GPS on toggle, GPS is "GPS-2" on ECDIS	Y
1.11	Determine what other systems feed into the ECDIS, such as radar (acquired targets, Radar picture overlay), AIS, water speed logs, echo sounders, etc. For each, establish the reference framework, e.g. ground-, water- or ship stabilized (relative)	Main Screen-Task list-sensors tab-ships position-ships position & speed: Fed by GPS. Heading: from Gyros or manual input. Echo Sounder: Echo sounder 1 LAZ5100, SAAB-AIS Wind Tracker Radar plotted fix (ARPA)	Y
1.12	Determine where to find maintenance records related to the ECDIS and service reports, non-conformity reports & inspection, validation reports (if appropriate)	SAMMS	Y
1.13	Determine the power supply modes and their specifications such as UPS duration	AC from ships power, 1EP:15 UPS provides power for 30 mins located in the black cabinet in gyro room 06-70-2.	Y
<b>2</b>	<b>BASIC OPERATION</b>		
2.1	Determine how to switch the ECDIS on and off	button located on the CPU below the display console.	Y
2.2	Establish the function(s), position and general operation of the physical controls	Adjust the track ball to position the cursor as desired. The left most click button will select what	Enclosure (29) Y

## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O

(b)(6)

Trainee: Captain

(b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
	and switches, including cursor control, and the access and selection of menu items	the cursor is on. The large click on the right side will de-select any menus.	Y
2.3	Understand how to access the main menu and select menu options	Main Menu will always be at the bottom right of the chart panel and is labeled [Main] Other menu options originate from the task list or from the Menu bar on the right side of the screen.	Y
2.4	Determine the methods for setting day/night viewing modes, brightness, contrast and color correction (if available)	1. Main screen-control panel right side to the brilliance tab. 2. On the keyboard select the brill	Y
2.5	Determine how to switch between the use of traditional and simplified symbols	Main Screen-Task list-charts-ENC Tab-Points: Select either Paper charts or simplified	Y
2.6	Determine how to put equipment in route-monitoring mode and route-planning mode	RTE on top then - Route editor- OR RTE , route monitor, load route	Y
2.7	Determine the methods for scrolling and zooming charts, including determining the current scale of displayed charts and setting the display to a particular scale	On the control Panel there are tabs indicating the name and scale of the displayed charts.	Y
2.8	Determine how to select the Display Base and Standard Display	Main screen-STD or Base display on lower toolbar	Y
2.9	Determine how to display other information from ENCs, including the display of All Other Information	Main Screen- -charts-settings-display categories options include: Base/Standard/Custom/All	Y
2.10	Determine how to check that information concerning own ship, such as dimensions are correct	Main Screen-system-commissioning	Y
2.11	Determine how to select the safety contour and safety depth	Main screen-charts-depths Enclosure (29)	Y

# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O (b)(6)

Trainee: Captain (b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
2.12	Determine how to select two- or four-color contour mode	Main Screen-charts-chart settings symbology	Y
2.13	Determine how to select deep and shallow area display options	Main Screen-charts-chart settings symbology	Y
2.14	Determine how to set all other parameters concerning the safety domain	Main Screen-charts-depths and heights	Y
2.15	Establish how alarms and other alerts are given by the ECDIS and understand the procedure needed to acknowledge them	In the upper right of the chart panel there are three colored symbols Red/Orange/Yellow by right clicking- you may view all current alarms.	Y
<b>3</b>	<b>CHARTS</b>		
3.1	Determine how to access the chart directory and to identify whether charts are ENC's, RNC's or unofficial	Charts-chart tools -import to load chart handler or Upper tool bar, then S-57	Y
3.2	Determine how to select a chart for display on the screen	Main screen-top, select chart to display	Y
3.3	Determine how to load new chart license keys (if appropriate)	Charts-chart tools -import to load chart handler, then load permit	Y
3.4	Determine how to load base data (if appropriate)	Charts-chart tools -import to load chart handler, then load cd	Y
3.5	Determine how to check the update status of loaded charts	Charts-chart tools -import to load chart handler, then load permit	Y
3.6	Determine how to update charts using the normal cumulative update procedures (if appropriate)	Charts-chart tools -import to load chart handler, then load	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O (b)(6)

Trainee: Captain (b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
3.7	If applicable, determine how to apply non-cumulative or electronically-transmitted updates	N/A	Y
3.8	Determine how to apply manual updates (if appropriate)	Main screen-charts- manual updates	Y
<b>4</b>	<b>NAVIGATION TOOLS AND FUNCTIONS</b>		
4.1	Determine how to display the legend of general information e.g. units for depths & heights, datum etc.	System-options or lower toolbar (pick)	Y
4.2	Determine how to select information about an object (Pick report)	Right click, pick report	Y
4.3	Determine how Zone of Confidence (CATZOC) information can be displayed	Chart settings-symbology "accuracy"	Y
4.4	Determine how to access the Presentation Library	Charts-chart 1	Y
4.5	Determine what Marine Information Overlays (MIOs) are available and how to access them. (Radar and AIS covered in Section 6 below)	Main Screen-chart settings, symbology "AIO" or base chart	Y
4.6	Determine the single operator action needed to remove MIOs from the display	Base display	Y
4.7	Determine the single operator action needed to set the Standard Display setting	Std display on Lower tool bar	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O (b)(6) Trainee: Captain (b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
4.8	Determine how to view, add, edit and delete Mariners' Notes	Main screen-charts-apply manual corrections	✓
4.9	Determine how to access all navigational elements and parameters, such as past track, vectors, position lines, etc.	Nav tools-ownship history	✓
4.10	Establish the facilities provided for the measurement of range and bearing (e.g. EBLs and VRMs) and determine their use.	Right click, ebl/VRM OR physical button on keyboard	✓
4.11	Determine the method(s) used for inserting Parallel Index lines	Nav tools-parallel lines	✓
4.12	Determine what other navigational tools are available and how to access them	Main-Nav tools	✓
4.13	Determine how to change to using the ECDIS back-up system	Walk to back up	✓
4.14	Determine the procedure for identifying and reacting to sensor/GNSS failure	Alarm and position and ship will turn yellow. Auto switch to valid input or the 1-2 switch by GPS units	✓
4.15	Determine how to switch Chart Text (text for charted objects) on and off	Main Screen-charts-chart settings	✓
<b>5</b>	<b>ROUTE PLANNING</b> (If appropriate to the Watch Officer's position)		
5.1	Determine how to load existing routes and enable for editing	Main Screen-RTE-route planning-load	✓
5.2	Determine how to initiate a new route plan	Right click, press enter waypoint Main-Routes-Edit/new	✓
			Enclosure (29)

# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O

(b)(6)

Trainee: Captain

(b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
5.3	Determine how to initiate and plan alternate routes	N/A	Y
5.4	Determine how to save route plan	Main screen-RTE-route planning-select desired route you wished to be saved ensure that you name your route then click save.	Y
5.5	Determine how to add, delete and adjust graphically the position of waypoints	Right click, click add WP, or drag existing WP.	Y
5.6	Determine how to add, edit and delete critical points	Main screen-RTE-route planning, critical point tab	Y
5.7	Determine how to display time varying objects relevant for the timing of the planned voyage	ETA calculator, RTE Calculator, Required speed, Speed plan	Y
5.8	Establish all the features available for planning routes, such as use of straight and curved segments, wheel over positions, turn radii, and inserting pilotage aids	Main, Routes, Edit CP's	Y
5.9	Determine the ship's procedures for displaying MSI, T&P Notices and other relevant notes into the voyage plan	Manual chart corrections, received via NAVTES INMARSAT C VHF OR EMAIL	Y
5.10	Determine how to use the facilities for checking the planned route	Route planner auto checks route, press danger tab to view	Y
5.11	Determine how to load the planned route and alternatives into the back-up system	RTE , route monitor, load route	Y
5.12	If available, determine how to use RCDS mode where ENC's are not available and as appropriate.	N/A	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O

(b)(6)

Trainee: Captain

(b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
<b>6</b>	<b>ROUTE MONITORING</b>		
6.1	Determine how to load a pre-planned route	RTE , route monitor, load route	✓
6.2	Determine how to select the primary or an alternate route and how to distinguish between them on the display	LOAD RTE BY FILENAME OR DATED EDITED	✓
6.3	Determine the single operator action that selects the charted display of own ship's position	Press CENTER button on bottom bar	✓
6.4	Determine the available display orientation modes and how to switch between them (e.g., North Up, Head Up, Course Up)	On the top bar select either the Nup/Cup	✓
6.5	Determine the available display motion modes and how to select them and change the parameters, such as the position of own ship on the display when Relative Motion is selected	On the top bar select either the RM/TM.	✓
6.6	If Radar or AIS targets can be displayed on the ECDIS, determine what target vector modes are available and how to switch between and differentiate them	On the top of the control panel below the overlays will have a tab where you can indicate the length of your target vectors in relation to time. Button with dot and dashes upper tool bar	✓
6.7	Determine how to create time labels along the ship's track	Main Screen – nav tools ownship history	✓
6.8	Establish familiarity with the Route Monitoring display, including the display of position, heading, course, speed and time	On the top bar Taskbar route tab	✓
6.9	Determine how to set the length of own ship's vector and intermediate time marks	On the top of the control panel below the overlays will have a tab where you can indicate	✓

# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry VM 15.3.0.31 Instructor: 2/O

(b)(6)

Trainee: Captain

(b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
		the length of your target vectors in relation to time.	Y
6.10	Determine how to display Radar and AIS MIOs, if available	On the top of the control panel below the overlays will have a button to turn on or off overlay Button with dot and dashes upper tool bar	Y
6.11	Determine how to use the ECDIS as the input to a track keeping autopilot. This will also need reference to the autopilot handbook	N/A	Y
6.12	Determine how to input LOP to form the reference for an estimated position	Nav tools-LOP	Y
6.13	Determine how to configure the ECDIS to use this reference (6.12) for subsequent EPs	Sensors-position-LOP. Enter bearing lat/long accept fix	Y
6.14	Determine how to switch to DR mode and to identify when the ECDIS is in DR mode	Sensors-position-DR	Y
6.15	Determine how to use the review facilities of the voyage recorder (if appropriate and not essential knowledge prior to sailing)	System-diagnostics-detail log	Y

Ship Name: USNS BIG HORN

Completion Date: Oct 4 2023

Instructor

(b)(6)

(Sign)

Trainee:

(b)(6)

(Sign)

Enclosure (29)

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: SPERRY VM

Instructor: Z/G (b)(6)

Trainee: 1/0 (b)(6)

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
<b>1</b>	<b>INITIAL PREPARATION</b>		
1.1	Establish if the vessel is approved to use ECDIS for navigation	<i>Navigation primarily via corrected paper charts is MSC policy. ECDIS supports...</i>	Y
1.2	Establish whether there are Company Navigational Procedures concerning the use of the equipment and ensure that these are followed		Y
1.3	Establish whether any passwords are needed for the management of the system and, if so, obtain the details from the Master (if appropriate - see page one note)		Y
1.4	Establish whether there is an onboard-approved Familiarization training package for the equipment, whether as computer based training, an inbuilt training mode or as a book or digital image of a book (e.g. PDF file). Use this before completing the checklist items here	<i>The MSC ECDIS Familiarization Program consists of this checklist as its base and is defined in the related procedure (XX-XXX-ALL)</i>	Y
1.5	Identify the primary ECDIS equipment and the facilities for back-up. If the back-up is a second ECDIS of a different type to that of the primary installation, then Sections 2 to 6 of this Familiarization checklist must be repeated for both systems		Y
1.6	Understand ship procedures in event that the ECDIS and its back-up fail		Y
1.7	Determine where the user manuals for ECDIS and its backup are located – an electronic version of these may be available on each unit	<i>Enclosure (30)</i>	Y
1.8	Determine where Base and Update CDs are stored on the ship (if appropriate)	<i>Page 1 of 9</i>	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
1.9	Determine the procedures to obtain additional chart permits (if appropriate)		Y
1.10	Determine and understand the position-fix systems that feed the ECDIS. Determine the method of switching between sources, such as primary and secondary position-fix systems		Y
1.11	Determine what other systems feed into the ECDIS, such as radar (acquired targets, Radar picture overlay), AIS, water speed logs, echo sounders, etc. For each, establish the reference framework, e.g. ground-, water- or ship stabilized (relative)		Y
1.12	Determine where to find maintenance records related to the ECDIS and service reports, non-conformity reports & inspection, validation reports (if appropriate)		Y
1.13	Determine the power supply modes and their specifications such as UPS duration		Y
<b>2</b>	<b>BASIC OPERATION</b>		
2.1	Determine how to switch the ECDIS on and off		Y
2.2	Establish the function(s), position and general operation of the physical controls and switches, including cursor control, and the access and selection of menu items	Enclosure (30)	Y
2.3	Understand how to access the main menu and select menu options	Page 2 of 9	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
2.4	Determine the methods for setting day/night viewing modes, brightness, contrast and color correction (if available)		Y
2.5	Determine how to switch between the use of traditional and simplified symbols		Y
2.6	Determine how to put equipment in route-monitoring mode and route-planning mode		Y
2.7	Determine the methods for scrolling and zooming charts, including determining the current scale of displayed charts and setting the display to a particular scale		Y
2.8	Determine how to select the Display Base and Standard Display		Y
2.9	Determine how to display other information from ENC's, including the display of All Other Information		Y
2.10	Determine how to check that information concerning own ship, such as dimensions are correct		Y
2.11	Determine how to select the safety contour and safety depth		Y
2.12	Determine how to select two- or four-color contour mode		Y
2.13	Determine how to select deep and shallow area display options	Enclosure (30)	Y
Page 3 of 9			
2.14	Determine how to set all other parameters concerning the safety domain		Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
2.15	Establish how alarms and other alerts are given by the ECDIS and understand the procedure needed to acknowledge them		Y
<b>3</b>	<b>CHARTS</b>		
3.1	Determine how to access the chart directory and to identify whether charts are ENCs, RNCs or unofficial		Y
3.2	Determine how to select a chart for display on the screen		Y
3.3	Determine how to load new chart license keys (if appropriate)		Y
3.4	Determine how to load base data (if appropriate)		Y
3.5	Determine how to check the update status of loaded charts		Y
3.6	Determine how to update charts using the normal cumulative update procedures (if appropriate)		Y
3.7	If applicable, determine how to apply non-cumulative or electronically-transmitted updates		Y
3.8	Determine how to apply manual updates (if appropriate)		Y
<i>Enclosure (30)</i>			
<b>4</b>	<b>NAVIGATION TOOLS AND FUNCTIONS</b>		
4.1	Determine how to display the legend of general information e.g. units for depths & heights, datum etc.		Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex:1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive		Comments	Y/N
4.2	Determine how to select information about an object (Pick report)		Y
4.3	Determine how Zone of Confidence (CATZOC) information can be displayed		Y
4.4	Determine how to access the Presentation Library		Y
4.5	Determine what Marine Information Overlays (MIOs) are available and how to access them. (Radar and AIS covered in Section 6 below)		Y
4.6	Determine the single operator action needed to remove MIOs from the display		Y
4.7	Determine the single operator action needed to set the Standard Display setting		Y
4.8	Determine how to view, add, edit and delete Mariners' Notes		Y
4.9	Determine how to access all navigational elements and parameters, such as past track, vectors, position lines, etc.		Y
4.10	Establish the facilities provided for the measurement of range and bearing (e.g. EBLs and VRMs) and determine their use.		Y
Enclosure (36)			
4.11	Determine the method(s) used for inserting Parallel Index lines	Page 5 of 9	Y

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ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
4.12	Determine what other navigational tools are available and how to access them		Y
4.13	Determine how to change to using the ECDIS back-up system		Y
4.14	Determine the procedure for identifying and reacting to sensor/GNSS failure		Y
4.15	Determine how to switch Chart Text (text for charted objects) on and off		Y
<b>5</b>	<b>ROUTE PLANNING</b> (If appropriate to the Watch Officer's position)		
5.1	Determine how to load existing routes and enable for editing		Y
5.2	Determine how to initiate a new route plan		Y
5.3	Determine how to initiate and plan alternate routes		Y
5.4	Determine how to save route plan		Y
5.5	Determine how to add, delete and adjust graphically the position of waypoints		Y
5.6	Determine how to add, edit and delete critical points	Enclosure (30)	Y
5.7	Determine how to display time varying objects relevant for the timing of the planned voyage	Page 6 of 9	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
5.8	Establish all the features available for planning routes, such as use of straight and curved segments, wheel over positions, turn radii, and inserting pilotage aids		Y
5.9	Determine the ship's procedures for displaying MSI, T&P Notices and other relevant notes into the voyage plan		Y
5.10	Determine how to use the facilities for checking the planned route		Y
5.11	Determine how to load the planned route and alternatives into the back-up system		Y
5.12	If available, determine how to use RCDS mode where ENC's are not available and as appropriate.		Y
<b>6</b>	<b>ROUTE MONITORING</b>		
6.1	Determine how to load a pre-planned route		Y
6.2	Determine how to select the primary or an alternate route and how to distinguish between them on the display		Y
6.3	Determine the single operator action that selects the charted display of own ship's position		Y
6.4	Determine the available display orientation modes and how to switch between them (e.g., North Up, Head Up, Course Up)		Y
<i>Enclosure (3b)</i>			
6.5	Determine the available display motion modes and how to select them and change the parameters, such as the position of own ship on the display when Relative Motion is selected	<i>Page 2 of 9</i>	Y

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## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
6.6	If Radar or AIS targets can be displayed on the ECDIS, determine what target vector modes are available and how to switch between and differentiate them		Y
6.7	Determine how to create time labels along the ship's track		Y
6.8	Establish familiarity with the Route Monitoring display, including the display of position, heading, course, speed and time		Y
6.9	Determine how to set the length of own ship's vector and intermediate time marks		Y
6.10	Determine how to display Radar and AIS MIOs, if available		Y
6.11	Determine how to use the ECDIS as the input to a track keeping autopilot. This will also need reference to the autopilot handbook		Y
6.12	Determine how to input LOP to form the reference for an estimated position		Y
6.13	Determine how to configure the ECDIS to use this reference (6.12) for subsequent EPs		Y
6.14	Determine how to switch to DR mode and to identify when the ECDIS is in DR mode	Enclosure (30)	Y
6.15	Determine how to use the review facilities of the voyage recorder (if appropriate and not essential knowledge prior to sailing)	Page <u>8</u> of <u>9</u>	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive	Comments	Y/N

Notes:

Companies are responsible for ensuring watch keepers adequately demonstrate knowledge of all identified issues to comply with the Familiarization requirements of the ISM Code.

Tasks identified in this Annex were originally developed for, and more information can be found in, the book 'ECDIS and POSITIONING', written by Dr. Andy Norris FNI and published by The Nautical Institute. ISBN 978 1 906915 11 7

This checklist is annexed to 'Industry Recommendations for ECDIS Familiarization' [www.nautinst.org/ECDIStraining](http://www.nautinst.org/ECDIStraining)

Ship Name: USNS BIBAON

Completion Date: 15 SEP 2024      Instructor: (b)(6) \_\_\_\_\_  
(Sign)      Trainee: (b)(6)

Enclosure (3)

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: Sperry

Instructor: Z/O

Trainee: Z/O

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
<b>1</b>	<b>INITIAL PREPARATION</b>		
1.1	Establish if the vessel is approved to use ECDIS for navigation	<i>Navigation primarily via corrected paper charts is MSC policy. ECDIS supports...</i>	Y
1.2	Establish whether there are Company Navigational Procedures concerning the use of the equipment and ensure that these are followed		Y
1.3	Establish whether any passwords are needed for the management of the system and, if so, obtain the details from the Master (if appropriate - see page one note)		Y
1.4	Establish whether there is an onboard-approved Familiarization training package for the equipment, whether as computer based training, an inbuilt training mode or as a book or digital image of a book (e.g. PDF file). Use this before completing the checklist items here	<i>The MSC ECDIS Familiarization Program consists of this checklist as its base and is defined in the related procedure (XX-XXX-ALL)</i>	Y
1.5	Identify the primary ECDIS equipment and the facilities for back-up. If the back-up is a second ECDIS of a different type to that of the primary installation, then Sections 2 to 6 of this Familiarization checklist must be repeated for both systems		Y
1.6	Understand ship procedures in event that the ECDIS and its back-up fail		Y
1.7	Determine where the user manuals for ECDIS and its backup are located – an electronic version of these may be available on each unit		Y
		<b>Enclosure (3/)</b>	
1.8	Determine where Base and Update CDs are stored on the ship (if appropriate)	<b>Page <u>1</u> of <u>9</u></b>	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
1.9	Determine the procedures to obtain additional chart permits (if appropriate)		Y
1.10	Determine and understand the position-fix systems that feed the ECDIS. Determine the method of switching between sources, such as primary and secondary position-fix systems		Y
1.11	Determine what other systems feed into the ECDIS, such as radar (acquired targets, Radar picture overlay), AIS, water speed logs, echo sounders, etc. For each, establish the reference framework, e.g. ground-, water- or ship stabilized (relative)		Y
1.12	Determine where to find maintenance records related to the ECDIS and service reports, non-conformity reports & inspection, validation reports (if appropriate)		Y
1.13	Determine the power supply modes and their specifications such as UPS duration		Y
<b>2</b>	<b>BASIC OPERATION</b>		
2.1	Determine how to switch the ECDIS on and off		Y
2.2	Establish the function(s), position and general operation of the physical controls and switches, including cursor control, and the access and selection of menu items		Y
<b>Enclosure (3/)</b>			
2.3	Understand how to access the main menu and select menu options	Page <u>2</u> of <u>9</u>	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
2.4	Determine the methods for setting day/night viewing modes, brightness, contrast and color correction (if available)		Y
2.5	Determine how to switch between the use of traditional and simplified symbols		Y
2.6	Determine how to put equipment in route-monitoring mode and route-planning mode		Y
2.7	Determine the methods for scrolling and zooming charts, including determining the current scale of displayed charts and setting the display to a particular scale		Y
2.8	Determine how to select the Display Base and Standard Display		Y
2.9	Determine how to display other information from ENCs, including the display of All Other Information		Y
2.10	Determine how to check that information concerning own ship, such as dimensions are correct		Y
2.11	Determine how to select the safety contour and safety depth		Y
2.12	Determine how to select two- or four-color contour mode		Y
2.13	Determine how to select deep and shallow area display options	Enclosure (3/)	Y
2.14	Determine how to set all other parameters concerning the safety domain	Page <u>3</u> of <u>9</u>	Y

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## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
2.15	Establish how alarms and other alerts are given by the ECDIS and understand the procedure needed to acknowledge them		Y
<b>3</b>	<b>CHARTS</b>		
3.1	Determine how to access the chart directory and to identify whether charts are ENC's, RNC's or unofficial		Y
3.2	Determine how to select a chart for display on the screen		Y
3.3	Determine how to load new chart license keys (if appropriate)		Y
3.4	Determine how to load base data (if appropriate)		Y
3.5	Determine how to check the update status of loaded charts		Y
3.6	Determine how to update charts using the normal cumulative update procedures (if appropriate)		Y
3.7	If applicable, determine how to apply non-cumulative or electronically-transmitted updates		Y
3.8	Determine how to apply manual updates (if appropriate)		Y
		Enclosure (31)	
<b>4</b>	<b>NAVIGATION TOOLS AND FUNCTIONS</b>		
4.1	Determine how to display the legend of general information e.g. units for depths & heights, datum etc.		Y

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## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
4.2	Determine how to select information about an object (Pick report)		Y
4.3	Determine how Zone of Confidence (CATZOC) information can be displayed		Y
4.4	Determine how to access the Presentation Library		Y
4.5	Determine what Marine Information Overlays (MIOs) are available and how to access them. (Radar and AIS covered in Section 6 below)		Y
4.6	Determine the single operator action needed to remove MIOs from the display		Y
4.7	Determine the single operator action needed to set the Standard Display setting		Y
4.8	Determine how to view, add, edit and delete Mariners' Notes		Y
4.9	Determine how to access all navigational elements and parameters, such as past track, vectors, position lines, etc.		Y
4.10	Establish the facilities provided for the measurement of range and bearing (e.g. EBLs and VRMs) and determine their use.		Y
Enclosure (31)			
4.11	Determine the method(s) used for inserting Parallel Index lines	Page <u>5</u> of <u>9</u>	Y

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## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
4.12	Determine what other navigational tools are available and how to access them		Y
4.13	Determine how to change to using the ECDIS back-up system		Y
4.14	Determine the procedure for identifying and reacting to sensor/GNSS failure		Y
4.15	Determine how to switch Chart Text (text for charted objects) on and off		Y
<b>5</b>	<b>ROUTE PLANNING</b> (If appropriate to the Watch Officer's position)		
5.1	Determine how to load existing routes and enable for editing		Y
5.2	Determine how to initiate a new route plan		Y
5.3	Determine how to initiate and plan alternate routes		Y
5.4	Determine how to save route plan		Y
5.5	Determine how to add, delete and adjust graphically the position of waypoints		Y
5.6	Determine how to add, edit and delete critical points		Y
5.7	Determine how to display time varying objects relevant for the timing of the planned voyage	Enclosure (31)  Page 6 of 9	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
5.8	Establish all the features available for planning routes, such as use of straight and curved segments, wheel over positions, turn radii, and inserting pilotage aids		Y
5.9	Determine the ship's procedures for displaying MSI, T&P Notices and other relevant notes into the voyage plan		Y
5.10	Determine how to use the facilities for checking the planned route		Y
5.11	Determine how to load the planned route and alternatives into the back-up system		Y
5.12	If available, determine how to use RCDS mode where ENC's are not available and as appropriate.		Y
<b>6</b>	<b>ROUTE MONITORING</b>		
6.1	Determine how to load a pre-planned route		Y
6.2	Determine how to select the primary or an alternate route and how to distinguish between them on the display		Y
6.3	Determine the single operator action that selects the charted display of own ship's position		Y
6.4	Determine the available display orientation modes and how to switch between them (e.g., North Up, Head Up, Course Up)		Y
6.5	Determine the available display motion modes and how to select them and change the parameters, such as the position of own ship on the display when Relative Motion is selected	Enclosure (31)  Page <u>7</u> of <u>9</u>	Y

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## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
6.6	If Radar or AIS targets can be displayed on the ECDIS, determine what target vector modes are available and how to switch between and differentiate them		Y
6.7	Determine how to create time labels along the ship's track		Y
6.8	Establish familiarity with the Route Monitoring display, including the display of position, heading, course, speed and time		Y
6.9	Determine how to set the length of own ship's vector and intermediate time marks		Y
6.10	Determine how to display Radar and AIS MIOs, if available		Y
6.11	Determine how to use the ECDIS as the input to a track keeping autopilot. This will also need reference to the autopilot handbook		Y
6.12	Determine how to input LOP to form the reference for an estimated position		Y
6.13	Determine how to configure the ECDIS to use this reference (6.12) for subsequent EPs		Y
6.14	Determine how to switch to DR mode and to identify when the ECDIS is in DR mode	Enclosure (31)	Y
6.15	Determine how to use the review facilities of the voyage recorder (if appropriate and not essential knowledge prior to sailing)	Page <u>8</u> of <u>9</u>	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

Proficiency Directive	Comments	Y/N

Notes:

Companies are responsible for ensuring watch keepers adequately demonstrate knowledge of all identified issues to comply with the Familiarization requirements of the ISM Code.

Tasks identified in this Annex were originally developed for, and more information can be found in, the book 'ECDIS and POSITIONING', written by Dr. Andy Norris FNI and published by The Nautical Institute. ISBN 978 1 906915 11 7

This checklist is annexed to 'Industry Recommendations for ECDIS Familiarization' [www.nautinst.org/ECDIStraining](http://www.nautinst.org/ECDIStraining)

Ship Name: USNS BIG HORN

Completion Date: 31 AUG 2024 Instructor: (b)(6) Trainee: (b)(6)  
(Sign)

Enclosure (3)

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: SPERRY VISION Instructor: 2/0 (b)(6) Trainee: 3/0 (b)(6)  
MASTER FT

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
<b>1</b>	<b>INITIAL PREPARATION</b>		
1.1	Establish if the vessel is approved to use ECDIS for navigation	<i>Navigation primarily via corrected paper charts is MSC policy. ECDIS supports...</i>	Y
1.2	Establish whether there are Company Navigational Procedures concerning the use of the equipment and ensure that these are followed		N
1.3	Establish whether any passwords are needed for the management of the system and, if so, obtain the details from the Master (if appropriate - see page one note)		Y
1.4	Establish whether there is an onboard-approved Familiarization training package for the equipment, whether as computer based training, an inbuilt training mode or as a book or digital image of a book (e.g. PDF file). Use this before completing the checklist items here	<i>The MSC ECDIS Familiarization Program consists of this checklist as its base and is defined in the related procedure (XX-XXX-ALL)</i>	Y
1.5	Identify the primary ECDIS equipment and the facilities for back-up. If the back-up is a second ECDIS of a different type to that of the primary installation, then Sections 2 to 6 of this Familiarization checklist must be repeated for both systems		N
1.6	Understand ship procedures in event that the ECDIS and its back-up fail		Y
1.7	Determine where the user manuals for ECDIS and its backup are located – an electronic version of these may be available on each unit	<b>Enclosure (32)</b>	Y
1.8	Determine where Base and Update CDs are stored on the ship (if appropriate)	Page <u>1</u> of <u>9</u>	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
1.9	Determine the procedures to obtain additional chart permits (if appropriate)		Y
1.10	Determine and understand the position-fix systems that feed the ECDIS. Determine the method of switching between sources, such as primary and secondary position-fix systems		Y
1.11	Determine what other systems feed into the ECDIS, such as radar (acquired targets, Radar picture overlay), AIS, water speed logs, echo sounders, etc. For each, establish the reference framework, e.g. ground-, water- or ship stabilized (relative)		Y
1.12	Determine where to find maintenance records related to the ECDIS and service reports, non-conformity reports & inspection, validation reports (if appropriate)		Y
1.13	Determine the power supply modes and their specifications such as UPS duration		Y
<b>2</b>	<b>BASIC OPERATION</b>		
2.1	Determine how to switch the ECDIS on and off		Y
2.2	Establish the function(s), position and general operation of the physical controls and switches, including cursor control, and the access and selection of menu items		Y
<b>Enclosure (32)</b>			
2.3	Understand how to access the main menu and select menu options	<b>Page 2 of 9</b>	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
2.4	Determine the methods for setting day/night viewing modes, brightness, contrast and color correction (if available)		Y
2.5	Determine how to switch between the use of traditional and simplified symbols		Y
2.6	Determine how to put equipment in route-monitoring mode and route-planning mode		Y
2.7	Determine the methods for scrolling and zooming charts, including determining the current scale of displayed charts and setting the display to a particular scale		Y
2.8	Determine how to select the Display Base and Standard Display		Y
2.9	Determine how to display other information from ENCs, including the display of All Other Information		Y
2.10	Determine how to check that information concerning own ship, such as dimensions are correct		Y
2.11	Determine how to select the safety contour and safety depth		Y
2.12	Determine how to select two- or four-color contour mode		Y
2.13	Determine how to select deep and shallow area display options	Enclosure (3)	Y
2.14	Determine how to set all other parameters concerning the safety domain	Page 3 of 9	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
2.15	Establish how alarms and other alerts are given by the ECDIS and understand the procedure needed to acknowledge them		Y
<b>3</b>	<b>CHARTS</b>		
3.1	Determine how to access the chart directory and to identify whether charts are ENC, RNC or unofficial		Y
3.2	Determine how to select a chart for display on the screen		Y
3.3	Determine how to load new chart license keys (if appropriate)		Y
3.4	Determine how to load base data (if appropriate)		Y
3.5	Determine how to check the update status of loaded charts		Y
3.6	Determine how to update charts using the normal cumulative update procedures (if appropriate)		Y
3.7	If applicable, determine how to apply non-cumulative or electronically-transmitted updates		Y
3.8	Determine how to apply manual updates (if appropriate)		Y
<b>Enclosure (32)</b>			
<b>4</b>	<b>NAVIGATION TOOLS AND FUNCTIONS</b>		
4.1	Determine how to display the legend of general information e.g. units for depths & heights, datum etc.		Y

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## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
4.2	Determine how to select information about an object (Pick report)		A
4.3	Determine how Zone of Confidence (CATZOC) information can be displayed		A
4.4	Determine how to access the Presentation Library		A
4.5	Determine what Marine Information Overlays (MIOs) are available and how to access them. (Radar and AIS covered in Section 6 below)		A
4.6	Determine the single operator action needed to remove MIOs from the display		A
4.7	Determine the single operator action needed to set the Standard Display setting		A
4.8	Determine how to view, add, edit and delete Mariners' Notes		A
4.9	Determine how to access all navigational elements and parameters, such as past track, vectors, position lines, etc.		A
4.10	Establish the facilities provided for the measurement of range and bearing (e.g. EBLs and VRMs) and determine their use.		A
		Enclosure (3A)	
4.11	Determine the method(s) used for inserting Parallel Index lines	Page <u>5</u> of <u>9</u>	A

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## Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
4.12	Determine what other navigational tools are available and how to access them		✓
4.13	Determine how to change to using the ECDIS back-up system		✓
4.14	Determine the procedure for identifying and reacting to sensor/GNSS failure		✓
4.15	Determine how to switch Chart Text (text for charted objects) on and off		✓
<b>5</b>	<b>ROUTE PLANNING</b> (If appropriate to the Watch Officer's position)		
5.1	Determine how to load existing routes and enable for editing		✓
5.2	Determine how to initiate a new route plan		✓
5.3	Determine how to initiate and plan alternate routes		✓
5.4	Determine how to save route plan		✓
5.5	Determine how to add, delete and adjust graphically the position of waypoints		✓
5.6	Determine how to add, edit and delete critical points		✓
5.7	Determine how to display time varying objects relevant for the timing of the planned voyage	Enclosure (3L) Page 6 of 9	✓

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
5.8	Establish all the features available for planning routes, such as use of straight and curved segments, wheel over positions, turn radii, and inserting pilotage aids		✓
5.9	Determine the ship's procedures for displaying MSI, T&P Notices and other relevant notes into the voyage plan		✓
5.10	Determine how to use the facilities for checking the planned route		✓
5.11	Determine how to load the planned route and alternatives into the back-up system		✓
5.12	If available, determine how to use RCDS mode where ENCs are not available and as appropriate.		✓
<b>6</b>	<b>ROUTE MONITORING</b>		
6.1	Determine how to load a pre-planned route		✓
6.2	Determine how to select the primary or an alternate route and how to distinguish between them on the display		✓
6.3	Determine the single operator action that selects the charted display of own ship's position		✓
6.4	Determine the available display orientation modes and how to switch between them (e.g., North Up, Head Up, Course Up)		✓
<i>Enclosure (2)</i>			
6.5	Determine the available display motion modes and how to select them and change the parameters, such as the position of own ship on the display when Relative Motion is selected	Page <u>7</u> of <u>9</u>	✓

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

(This checklist is based on the Annex 1: ECDIS Familiarization Checklist approved by OCIMF and distributed via The Nautical Institute.)

	Proficiency Directive	Comments	Y/N
6.6	If Radar or AIS targets can be displayed on the ECDIS, determine what target vector modes are available and how to switch between and differentiate them		Y
6.7	Determine how to create time labels along the ship's track		Y
6.8	Establish familiarity with the Route Monitoring display, including the display of position, heading, course, speed and time		Y
6.9	Determine how to set the length of own ship's vector and intermediate time marks		Y
6.10	Determine how to display Radar and AIS MIOs, if available		Y
6.11	Determine how to use the ECDIS as the input to a track keeping autopilot. This will also need reference to the autopilot handbook		Y
6.12	Determine how to input LOP to form the reference for an estimated position		Y
6.13	Determine how to configure the ECDIS to use this reference (6.12) for subsequent EPs		Y
6.14	Determine how to switch to DR mode and to identify when the ECDIS is in DR mode	Enclosure (3)	Y
6.15	Determine how to use the review facilities of the voyage recorder (if appropriate and not essential knowledge prior to sailing)	Page 8 of 9	Y

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# Electronic Chart Display and Information System Familiarization Checklist

ECDIS Model: \_\_\_\_\_ Instructor: \_\_\_\_\_ Trainee: \_\_\_\_\_

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Proficiency Directive	Comments	Y/N

Notes:

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This checklist is annexed to 'Industry Recommendations for ECDIS Familiarization' [www.nautinst.org/ECDIStraining](http://www.nautinst.org/ECDIStraining)

Ship Name: USNS BIG HORN

Completion Date: 15 SEP 2024

Instructor: (b)(6)  
\_\_\_\_\_  
(Sign)

Trainee: 310 (b)(6)  
\_\_\_\_\_  
(Sign)

Enclosure (3)

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Person Full Name	Position Title	Valid From	Valid To	Competence Name	Level	Level Meaning	Remarks
(b)(6)	101.Master.T-AO.BIG HORN	21-Feb-2021		CORE.COVID Vaccination Series	1	Completed	
(b)(6)	101.Master.T-AO.BIG HORN	22-Mar-2022		CORE.Medical Fitness	1	Fit For Duty	
(b)(6)	101.Master.T-AO.BIG HORN	20-Oct-2011		CORE.PDA	3	Cleared	
(b)(6)	101.Master.T-AO.BIG HORN	01-Sep-2019		CORE.Security Clearance	8	Top Secret	CE ENROLLED
(b)(6)	101.Master.T-AO.BIG HORN	11-Dec-2020	10-Dec-2030	CORE.US Passport (Blue)	2	Acquired	566881981
(b)(6)	101.Master.T-AO.BIG HORN	30-Oct-2023	30-Oct-2026	CRED.CAC (Common Access Card)	1	Acquired	1299445824
(b)(6)	101.Master.T-AO.BIG HORN	29-Dec-2005		CRED.FCC GMDSS Operator	1	Acquired	0014469282
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.MMC - Deck	5	Able Seaman Unlimited	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.MMC - Stewards Department (Food Handler)	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.MMC - Tankerman	3	Tankerman PIC (DL)	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.MMD - Lifeboatman	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.MMD - Wiper	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Able Seafarer-Deck	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Advanced Chemical Tanker Cargo Operation	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Advanced Firefighting	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Advanced Oil Tanker Cargo Operations	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Basic Training	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Deck Officer	3	Master	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-GMDSS - Operator	2	GMDSS Operator	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Medical First-Aid Provider	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-OIC Navigation Watch - No Restrictions	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Proficiency in Fast Rescue Boat (FRB)	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Proficient in Survive Craft & Rescue Boats Other than FRB	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Ratings Forming Part of a Navigation Watch (RFPNW)	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Security Awareness (IAW USCG MOA & 33CFR104.110(a))	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Vessel Personnel with Designated Security	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.STCW-Vessel Security Officer	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.USCG Deck License	4	Master any Gross Tons upon Oceans	2622908
(b)(6)	101.Master.T-AO.BIG HORN	22-Feb-2022	22-Feb-2027	CRED.USCG Radar Observer Endorsement	1	Acquired	2622908
(b)(6)	101.Master.T-AO.BIG HORN	10-Aug-2014		OTHER.CAC Reader	2	Mailed to Ship	

Enclosure (3)

(b)(6)	101.Master.T-AO.BIG HORN	19-Aug-2014		OTHER.TDP Acknowledgment Letter	1	Acquired	
(b)(6)	101.Master.T-AO.BIG HORN	05-Apr-2007		OTHER.Veterans Preference	1	NP - No Preference	
(b)(6)	101.Master.T-AO.BIG HORN	19-Oct-2023	19-Oct-2024	TRNG.Active Shooter	1	Acquired	

Enclosure (33)

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Person Full Name	Position Title	Valid From	Valid To	Competence Name	Level	Level Meaning	Remarks
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	24-Sep-2024		CORE.COVID Vaccination Series	2	Not Completed	
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	30-Mar-2023		CORE.Medical Fitness	1	Fit For Duty	
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	16-May-2022		CORE.Security	6	Secret	CE ENROLLED
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	17-Jun-2020	16-Jun-2030	CORE.US Passport (Blue)	2	Acquired	653914448
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	26-Sep-2022	26-Sep-2027	CORE.USCG Medical	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	31-Mar-2023	30-Mar-2026	CRED.CAC (Common)	1	Acquired	1572308002
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	04-May-2022		CRED.FCC GMDSS	1	Acquired	DO00020958
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.MMC - Deck	5	Able Seaman Unlimited	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	Department (Food Handler)	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.MMC - Tankerman	3	Tankerman PIC (DL)	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.MMD -	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.MMD - Wiper	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.STCW-Able	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	Tnk Cargo Ops Limit Main&Repair of Cargo	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	Tank Cargo Ops Limit Main&Repair of Cargo	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.STCW-Advanced	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.STCW-Basic	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.STCW-GMDSS - Operator	2	GMDSS Operator	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.STCW-Medical First-Aid Provider	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	Navigation Watch - No Restrictions	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	In Survive Craft&Rescue Boats Other than FRB	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	Forming Part of a Navigation Watch	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	Awareness (IAW USCG MOA &	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	Personnel with Designated Security	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.STCW-Vessel	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.USCG Deck License	1	3rd Mate any Gross Tons upon Oceans	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	27-Jan-2023	27-Jan-2028	CRED.USCG Radar Observer Endorsement	1	Acquired	8426139
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	31-Oct-2022		OTHER.Veterans Preference	1	NP - No Preference	
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	11-Apr-2023	11-Apr-2028	TRNG.CBR-D Basic	1	Acquired	
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	17-Jan-2024	17-Jan-2025	Awareness Challenge 2024	1	Acquired	
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	10-Apr-2023	10-Apr-2025	TRNG.Fall Protection Authorized Person	1	Acquired	
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	20-Apr-2023	20-Apr-2028	TRNG.Helicopter Fire	1	Acquired	
(b)(6)	105.2ND OFFICER (D),T-AO.BIG HORN	18-Apr-2023	18-Apr-2026	TRNG.Ship's Reaction	1	Acquired	

Enclosure (34)

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Person Full Name	Position Title	Valid From	Valid To	Competence Name	Level	Level Meaning	Remarks
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	24-Sep-2024		CORE.COVID Vaccination Series	2	Not Completed	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	07-Nov-2023		CORE.Medical Fitness	1	Fit For Duty	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	22-Jan-2024	22-Jan-2029	CORE.Security Clearance	6	Secret	CE enrolled-mkm
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	11-May-2019	10-May-2029	CORE.US Passport (Blue)	2	Acquired	647414594
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	07-Nov-2023	08-Nov-2026	CRED.CAC (Common Access Card)	1	Acquired	1614305769
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	13-Mar-2023		CRED.FCC GMDSS Operator	1	Acquired	DO00021327
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.MMC - Deck	5	Able Seaman Unlimited	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.MMC - Stewards Department (Food Handler)	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.MMC - Tankerman	3	Tankerman PIC (DL)	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.MMD - Lfboatman	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.MMD - Wiper	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Able Seafarer-Deck	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Advanced Firefighting	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Advanced Oil Tanker Cargo Operations	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Basic Chemical Tanker Cargo Operations	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Basic Oil Tanker Cargo Operations	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Basic Training	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-GMDSS - Operator	2	GMDSS Operator	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Medical First-Aid Provider	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-OIC Navigation Watch - No Restrictions	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Proficient In Survive Craft&Rescue Boats Other than FRB	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Ratings Forming Part of a Navigation Watch (RFPNW)	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Security Awareness (IAW USCG MOA & 33CFR104.110(a))	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Vessel Personnel with Designated Security Duties	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.STCW-Vessel Security Officer	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	11-Sep-2023	11-Sep-2028	CRED.TWC (Transportation Worker Identification	1	Acquired	27471271
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.USCG Deck License	1	3rd Mate any Gross Tons upon Ocean	8395179

Enclosure (3)

(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	29-Sep-2023	29-Sep-2028	CRED.USCG Radar Observer Endorsement	1	Acquired	8395179
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	10-May-2022		OTHER.Veterans Preference	1	NP - No Preference	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	05-Feb-2024	05-Feb-2025	TRNG.Active Shooter	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	30-Apr-2024	30-Apr-2025	TRNG.Anti-Terrorism Force Protection - Level 1	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	06-Feb-2024	06-Feb-2025	TRNG.Basic Electrical Safety / High Voltage Safety	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	07-Mar-2024	07-Mar-2029	TRNG.Basic Operations Course (BOC)	1	Acquired	

Enclosure (35)

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Person Full Name	Position Title	Valid From	Valid To	Competence Name	Level	Level Meaning	Remarks
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	24-Sep-2024		CORE.COVID Vaccination Series	2	Not Completed	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	01-Aug-2023		CORE.Medical Fitness	1	Fit For Duty	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	21-Mar-2022		CORE.Security Clearance	6	Secret	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	14-Oct-2020	13-Oct-2030	CORE.US Passport (Blue)	2	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	10-Feb-2023	10-Feb-2028	CORE.USCG Medical Cert-National	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	04-Aug-2023	03-Aug-2025	CRED.CAC (Common Access Card)	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	02-May-2023		CRED.FCC GMDSS Operator	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.MMC - Deck	5	Able Seaman Unlimited	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.MMC - Stewards Department (Food Handler)	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.MMC - Tankerman	3	Tankerman PIC (DL)	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.MMD - Lifeboatman	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.MMD - Wiper	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Able Seafarer-Deck	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Adv Oil Tank Cargo Ops Limit Main&Repair of Cargo Equip	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Advanced Firefighting	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Basic Training	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-GMDSS - Operator	2	GMDSS Operator	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Medical First-Aid Provider	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-OIC Navigation Watch - No Restrictions	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Proficient in Survive Craft&Rescue Boats Other than FRB	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Ratings Forming Part of a Navigation Watch (RFPNW)	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Security Awareness (IAW USCG MOA & 33CFR104\,110(a))	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Vessel Personnel with Designated Security Duties	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.STCW-Vessel Security Officer	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.USCG Deck License	4	Master any Gross Tons upon Oceans	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	17-Jun-2023	17-Jun-2028	CRED.USCG Radar Observer Endorsement	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	30-Dec-2021		OTHER.Veterans Preference	1	NP - No Preference	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	08-Sep-2023	08-Sep-2028	TRNG.Basic Operations Course (BOC)	1	Acquired	

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(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	30-May-2024	30-May-2025	TRNG.Baton Usage	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	20-Sep-2023	20-Sep-2028	TRNG.Bridge Resource Management (BRM)	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	22-Aug-2023	22-Aug-2028	TRNG.CBR-D Basic	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	18-Apr-2024		TRNG.CMEO Afloat Training-Deck	1	Acquired	
(b)(6)	108.3RD OFFICER (W).T-AO.BIG HORN	26-Aug-2023	26-Aug-2025	TRNG.Code of Conduct Level B SERE 100	1	Acquired	

Enclosure (36)

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BGN OPREP-3 Initial, DTG 231725ZSEP24

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Enclosure (37)

Page 1 of 1

BGN OPREP-3 Update, DTG 101220Z OCT 24

CONFIDENTIAL

Enclosure (38)

Page 1 of 1



DEPARTMENT OF THE NAVY  
FLEET WEATHER CENTER SAN DIEGO  
NAVAL BASE CORONADO  
P. O. BOX 357076  
SAN DIEGO CALIFORNIA 92135-7076

3142  
Ser N00/126  
2 Oct 24

From: Commanding Officer, Fleet Weather Center San Diego  
To: Commander, Naval Meteorology and Oceanography Command

Subj: METEOROLOGICAL DATA CAPTURE FOR USNS BIG HORN ALLISION ON  
23 SEPTEMBER 2024

Ref: (a) CNMOC BWC ICO Data Capture Request for USNS Big Horn Allision dtd Sep 24  
(b) COMNAVMETOCCOMINST 3120.1F

Encl: (1) Meteorological Data Capture Request for USNS BIG HORN ON 23 September 2024

1. As directed in reference (a) and in accordance with reference (b), Fleet Weather Center San Diego conducted a data collect for USNS BIG HORN striking an unknown object below the keel.
2. At the time of the mishap, weather conditions were forecasted to be favorable. Sky conditions were partly cloudy, visibility was unrestricted with temporary periods of haze, reducing visibility to 5-7 nautical miles. Surface winds in the region were forecasted to be between 15-20 knots from the Southwest. The synoptic situation of Southwest Monsoonal flow was the predominant weather feature, generating seas of 4-6 feet north of the 19 degrees northern latitude line.
3. The findings of the data collect indicate that the text forecast generated for the Arabian Sea were consistent with the closest available observations. All information collected can be found in enclosure (1), slides (6-7). Based on the data, there is no indication that this event was meteorologically related.
4. Please direct follow-on inquiries to CDR (b)(6) Operations Officer, Fleet Weather Center San Diego at (b)(6)@us.navy.mil or (b)(6).

Copy to:  
NAVCENT (Oceanographer)  
FWC Maritime Component Bahrain (CPOIC)

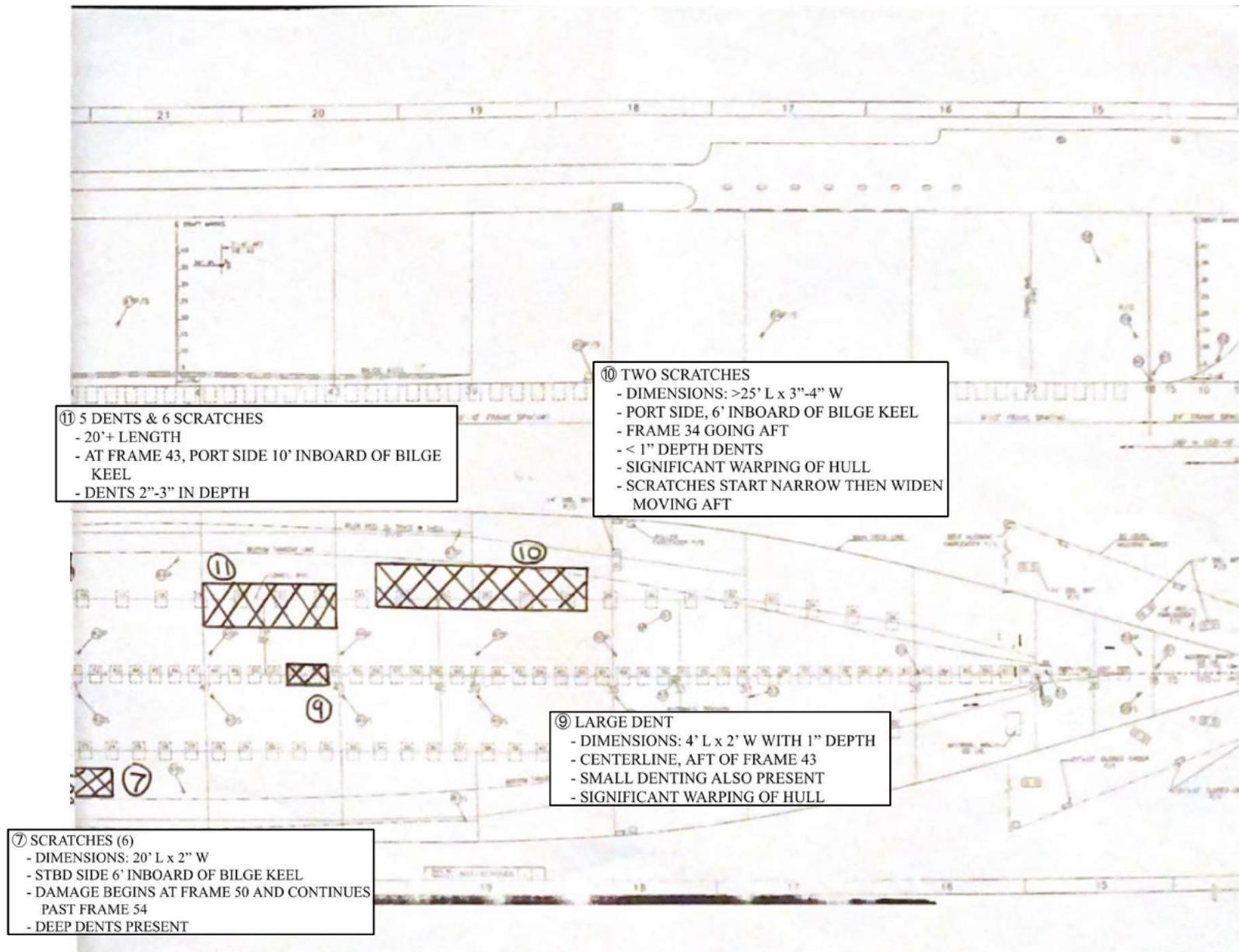
Enclosure (39)

Page    /    of    /

USNS BIG HORN  
Command Investigation  
CTF 56 Dive Report and  
Photos

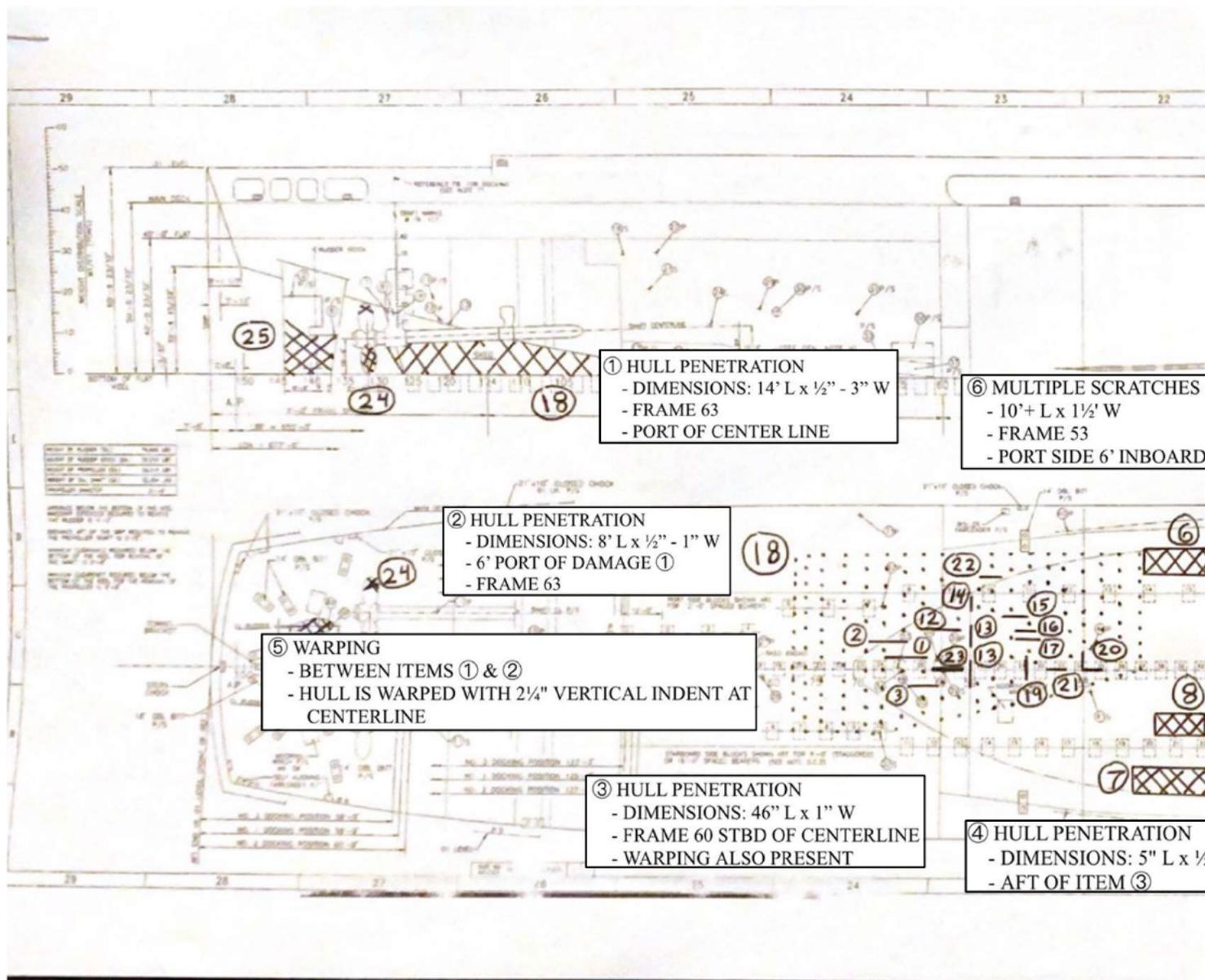
27SEP24

# CTF 56<sup>CUI</sup> Dive Report



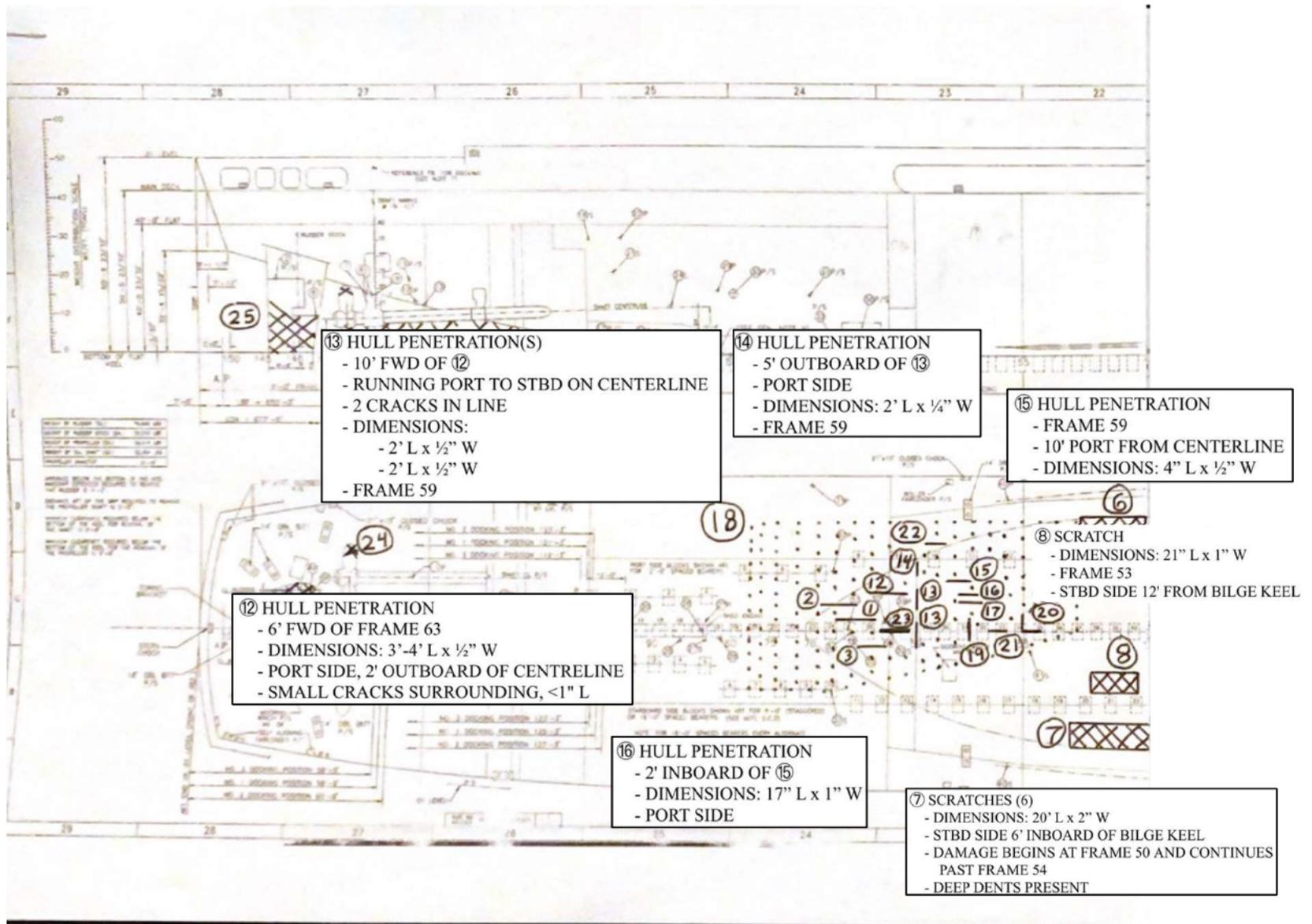
CUI

# CTF 56 Dive Report



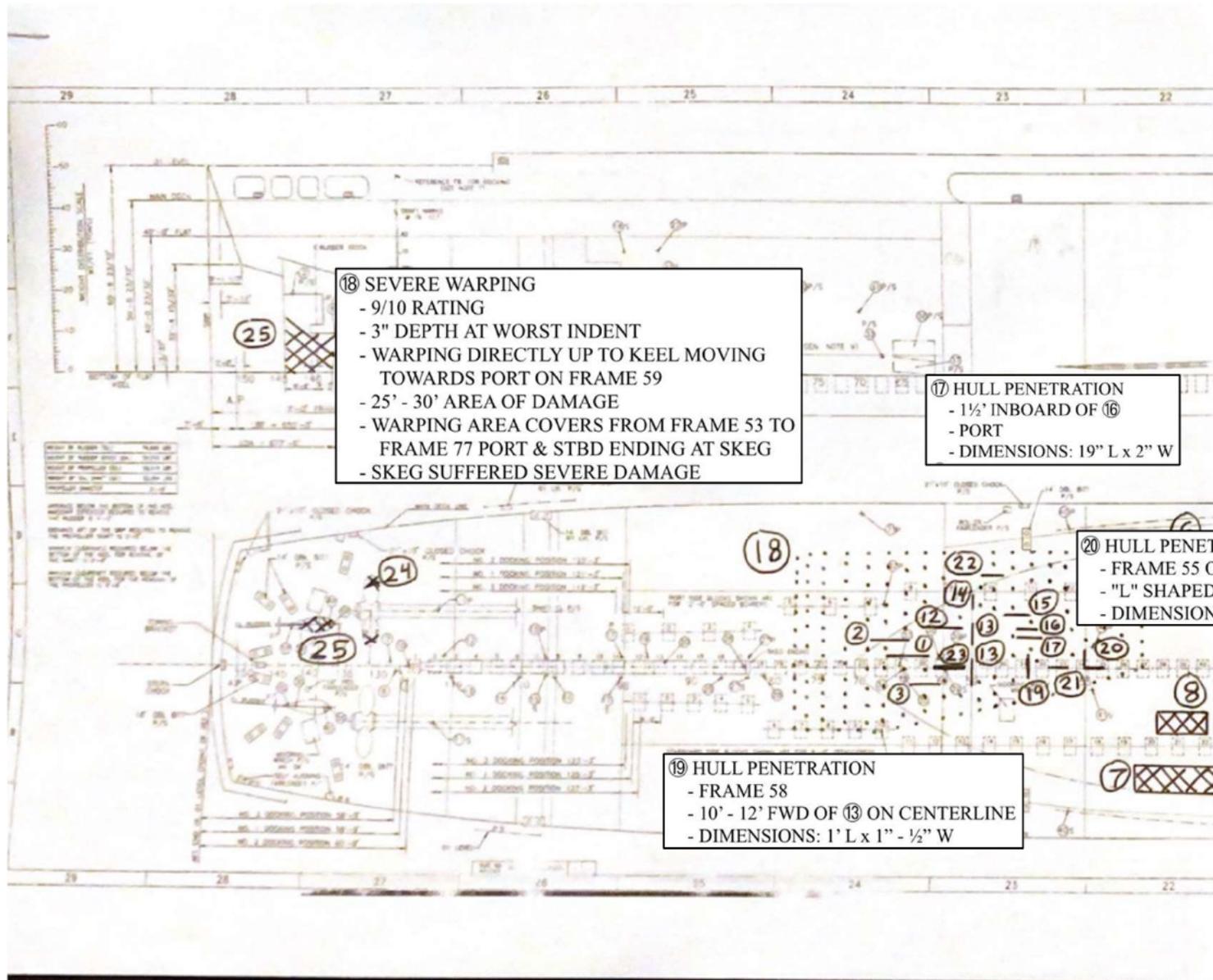
CUI

# CTF 56 Dive Report



CUI

# CTF 56 Dive Report



18 SEVERE WARPING  
 - 9/10 RATING  
 - 3" DEPTH AT WORST INDENT  
 - WARPING DIRECTLY UP TO KEEL MOVING TOWARDS PORT ON FRAME 59  
 - 25' - 30' AREA OF DAMAGE  
 - WARPING AREA COVERS FROM FRAME 53 TO FRAME 77 PORT & STBD ENDING AT SKEG  
 - SKEG SUFFERED SEVERE DAMAGE

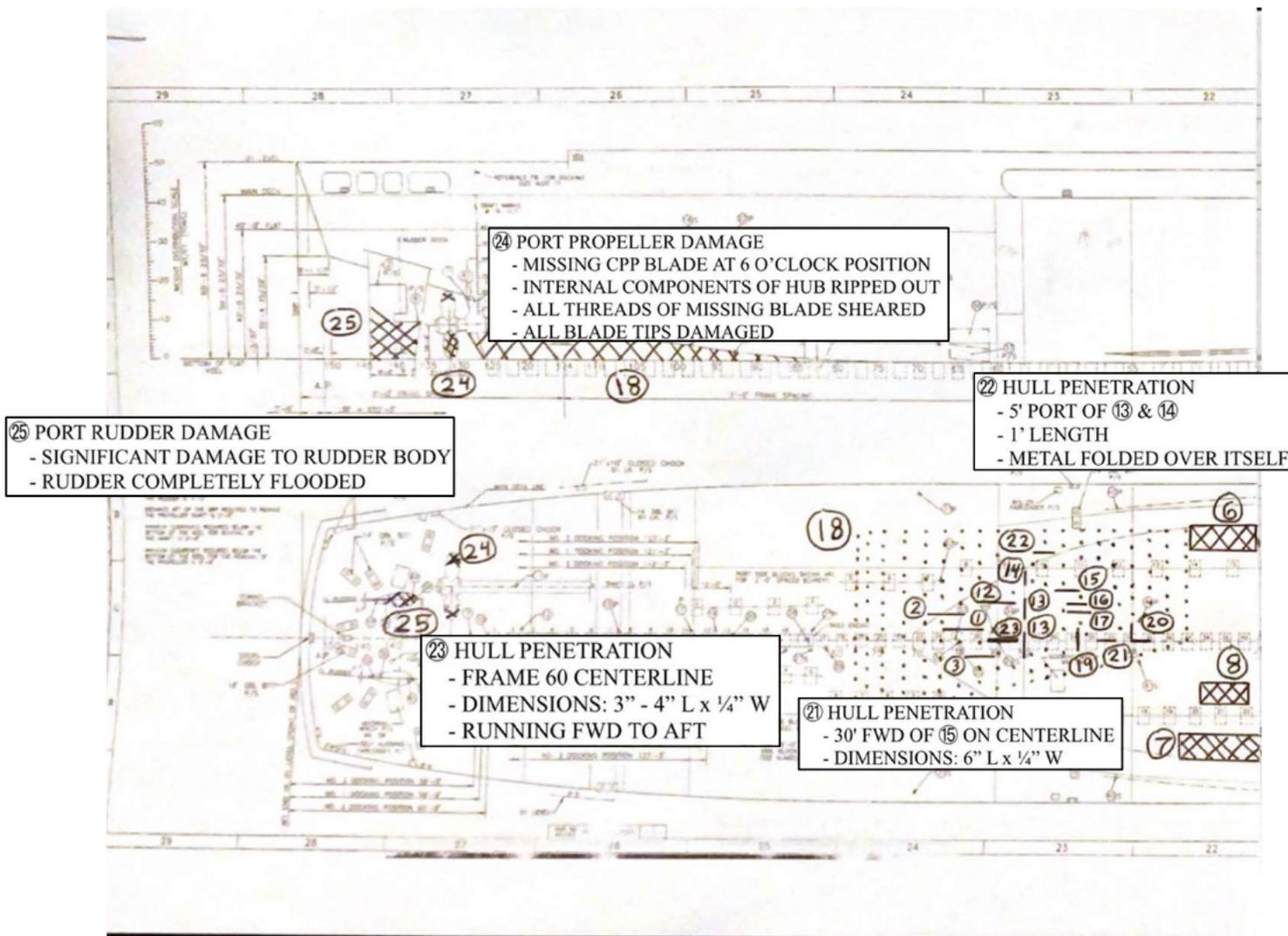
17 HULL PENETRATION  
 - 1½' INBOARD OF 16  
 - PORT  
 - DIMENSIONS: 19" L x 2" W

20 HULL PENETRATION  
 - FRAME 55 ON CENTERLINE  
 - "L" SHAPED CRACK  
 - DIMENSIONS: 2" L x ½" W

19 HULL PENETRATION  
 - FRAME 58  
 - 10' - 12' FWD OF 13 ON CENTERLINE  
 - DIMENSIONS: 1' L x 1" - ½" W

CUI

# CTF 56 Dive Report



CUI

CUI

# Port Rudder Post Collar – Bolts Sheared / Collar Misaligned



CUI

# Port Rudder<sup>CUI</sup>

Facing Aft, Vertical/Bottom Interface



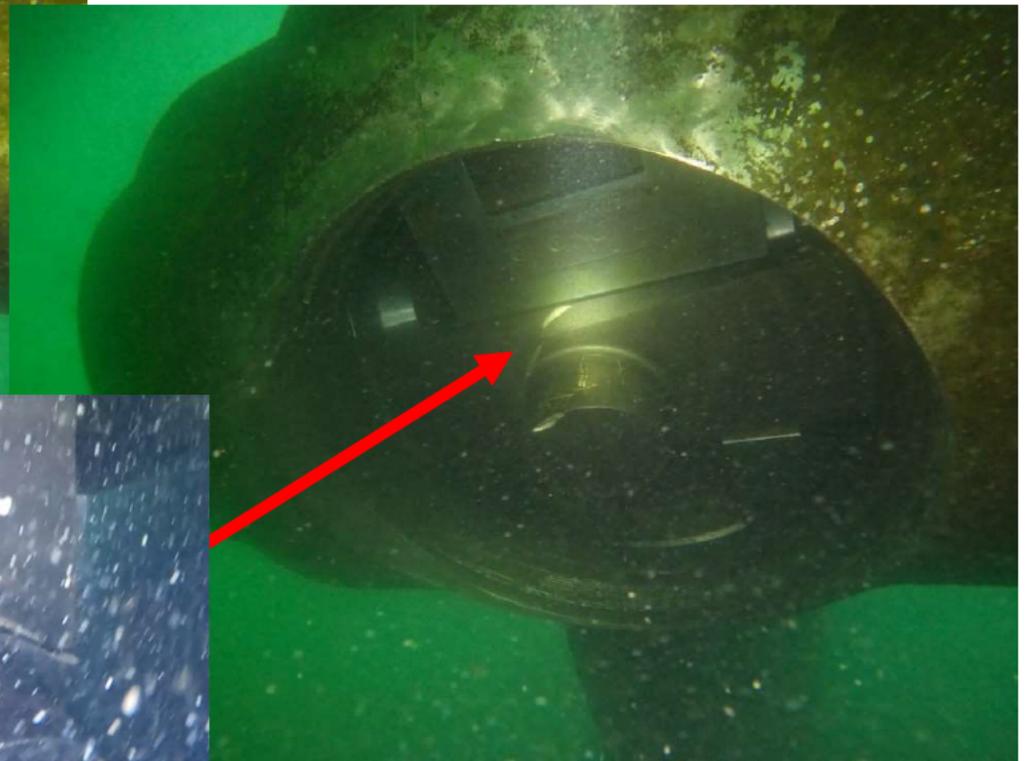
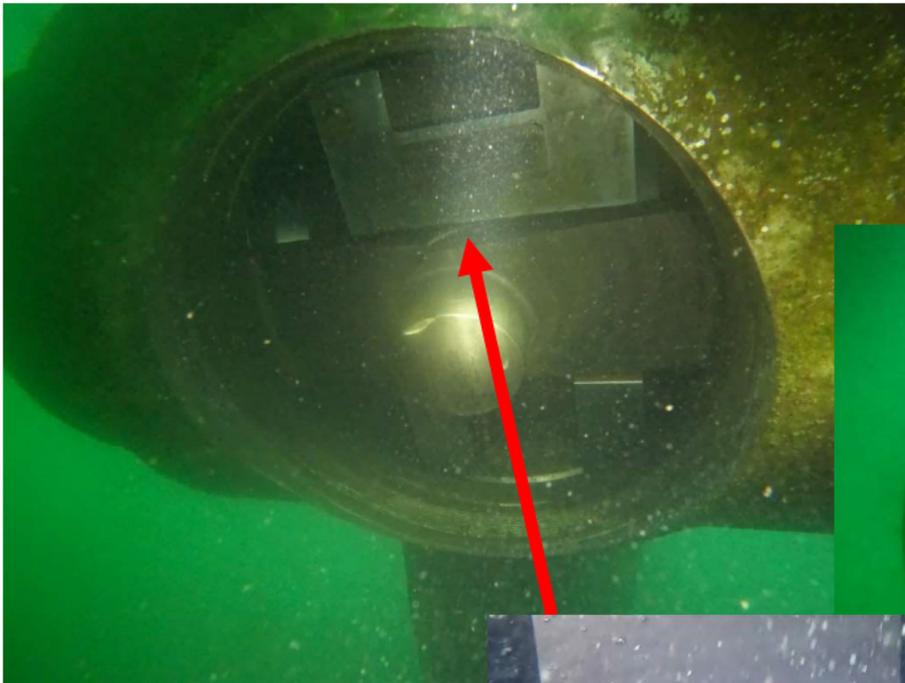
Bottom of rudder



CUI

CUI

# Port Hub with Missing Blade, Retaining Ring and Cracked Internals



Crack in block assembly



CUI

# Examples of hull cracks / deformation



CUI

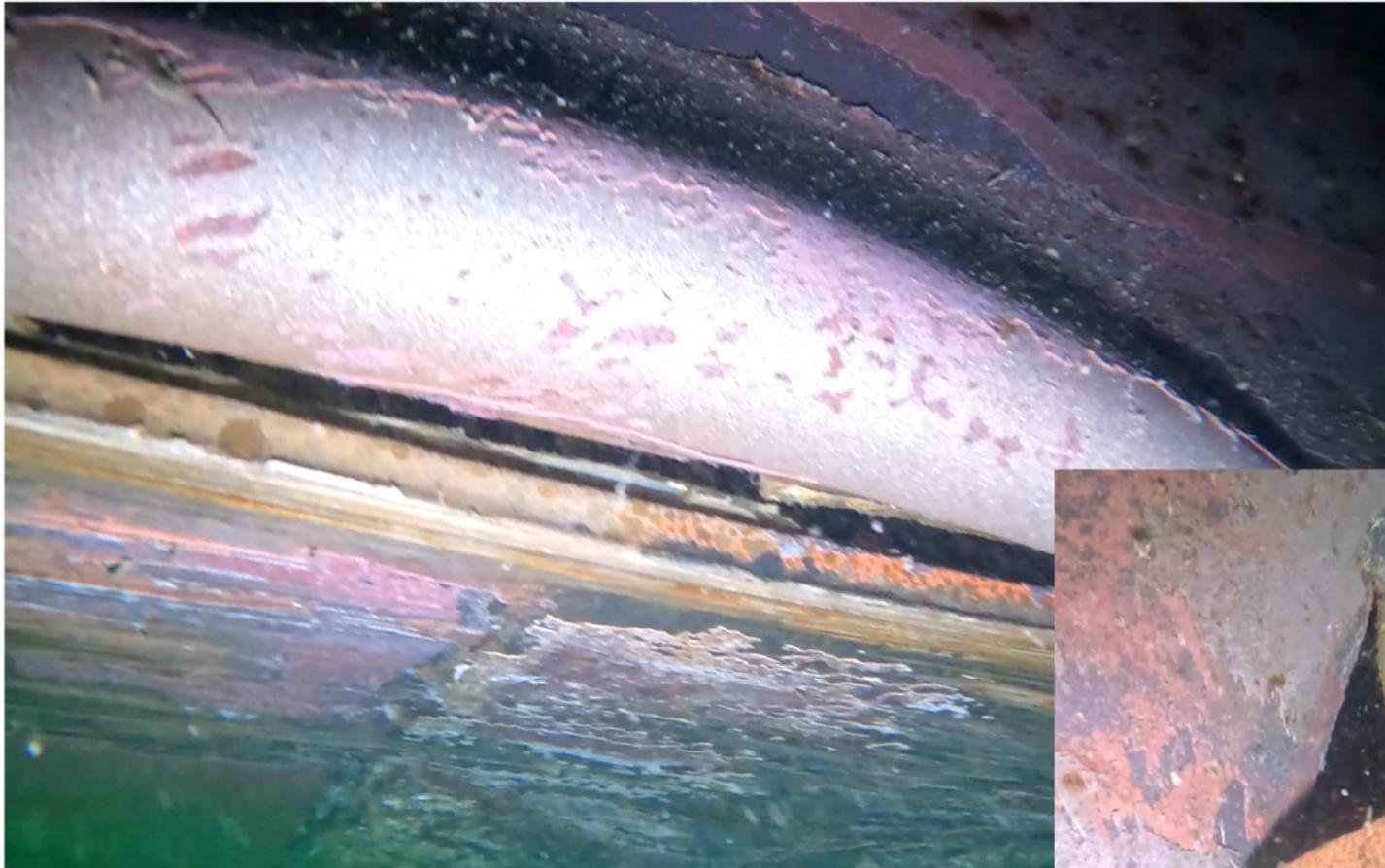
# Examples of hull cracks / deformation Con't



CUI

CUI

# Skeg



CUI

CUI

# Gap between propeller hub and strut barrel

Port

Stbd



CUI

CUI

# Example of damage to 3 remaining propeller blades



CUI

CUI

# Example of underwater damage control efforts



CUI

## USNS BIG HORN VDR Transcript and Timeline from VDR, 23SEP24.

Time	Event	
11:15	On course 235T (R CORP), preparing for OKN RAS NAV preparing track to Duqm, using 18kts SOA for planning Track intercepts 20m contour north of San Carlos Bank - Warning Present: Indication of Crossing Safety Contour on both ECDIS 4 and 5 FWD Port ECDIS (VDR ECDIS 5) is at 1:500,000 scale ECDIS Stbd of SCC (VDR ECDIS 4) is at 1:300,000 scale ECDIS is in "Silent Mode"	ECDIS 5 is main Capt / watch stander display
11:28	OKN commences approach	
11:31	OKN alongside	
11:35	P/D Messenger in hand	
11:36	STA 7 shotline in hand	
11:38	P/D comms established / emergency breakaway procedure review	
11:50	Tensioning STA 7	
11:53	Probe seated STA 7	
11:56	Ukn comment, "let's give her [OKN] gas, and let's haul ass"	
11:58	ECDIS 5 shifted to 1:151,000 scale, 20m contour visible	
12:03	Conversation between Nav and 3/O (b)(6)	
	Nav: "Double checking my work bro, covering my ass."	
	3/O: "That looks pretty good."	
	Nav: "I don't trust it, I prefer to take it from over here"	
	3/O: "The deep water route?"	
	Nav: "Yeah, and avoid all of this"	
	3/O: "What does it look like on the paper chart?"	
	Nav: "Looks like this, just like this"	
	3/O: "What does El Captain say?"	
	Nav: "I don't know. If we finish here [turnpoint on ECDIS 5], maybe just come straight north and do the deep water route."	
	3/O: "It is recommended"	
	Nav: "It is recommended"	
	Nav: "I just don't want to run aground"	
	3/O: "Remember low tide is 1.5m above the table."	
	Nav: "That's in Duqm, not in the middle of the ocean. You think it can be that close that we can cut it that close?"	
	Nav: "So you think the tide will take effect (unheard)"	
	3/O: "Probably not, that's a good point."	
	3/O: "It would be safe to just do the deep water route, although, I think that will probably fine too." [track on ECDIS 5 1200]	
	3/O: "What is our deep draft"	
	Unheard further discussion of water depth and draft.	
	3/O: "How much extra distance is it"	
12:06	Discussion of measuring distance on ECDIS	
12:07	Nav working track to head due north post-RAS and use deep water route to Duqm. [ECDIS 5]	

USNS BIG HORN VDR Transcript and Timeline from VDR, 23SEP24.

12:08:40	Nav: "I'm just scared of right here...scared of these shallow points. Granted it's more than enough, but it's just...you know what I'm trying to say?"	
	Nav: "We can take the safe route, guaranteed, but it will take more time or we can take a shortcut and be a little bit more riskier. Know what I'm trying to say?"	
	3/O: "I know exactly what you are trying to say."	
	Nav: "What's the risk? Is it really worth it?"	
	3/O: "I say ask the Captain and say, this route is about 10 miles shorter, but goes through this, do you feel comfortable?" (b)(6) probably say yes."	
12:10	Saving Duqm A (shorter route just north of San Carlos Banks) and Duqm B (Deep water route)	
12:13	Ukn: "It will be interesting to see what (b)(6) [capt] goes with"	
12:14	3/O: "I'll bet all the fishing boats hang out by the reefs"	
	3/O: "Realistically, add a meter to that...that's not nothings...you got 18' under the keel and that's if you go over that sounding which we probably wouldn't."	
12:15	80min standby RAS w/ OKN (announced over radio)	
	3/O: "This changes the entire equation"	
	Nav begins to work new route based on estimated position at new end-of-RAS posit	
12:18	3/O (b)(6) "I'm looking at the ECDIS and it's crazy how many shallow spots there are outside the harbor."	
	Nav: "that's what we are looking out for."	
12:19:31	Chief Mate has the conn	
12:26:13	Conversation between Captain and Nav	
	Nav: "We have a draft of about 10m and I'm wondering which..."	
	Captain: "Shoot the gap"	
	Nav: "that's what I was going to ask you if you wanted to shoot the gap"	
	Capt: "Yep, plenty of space here"	
	Nav: "Rgr we'll work it"	
	Capt: "Line up the 24s" [referring to 24m soundings on chart]. That's the deepest, safest water."	
	Nav: "There is also a different route over here [referring to "Duqm B, track due north to deep water route]"	
	Capt: "What is the distance between the two?"	
	Nav: "5-6 miles"	
	Capt: "That could be an hour if we were doing 5 kts"	
	Nav: "Speed required is not that bad"	
	Capt: "Let's try to shoot the gap there"	
	Nav: "OK, rgr that sir. I verified on the chart more than enough UKC"	
12:27:26	Capt: "Rad"	
12:31	Nav and 3/O (b)(6) Start of conversation difficult to hear.	
	3/O: "But (b)(6) aid through here"	
	Nav: (b)(6) said through here."	
	3/O: "I don't care as long as it's no through one of these dark blues."	

Enclosure (41)

## USNS BIG HORN VDR Transcript and Timeline from VDR, 23SEP24.

	Nav: "More than enough UKC."	
	3/O: "We could go over a 14.5 flat out and still be witin the MSC safety lines."	
12:32	60min standby RAS w/ OKN (announced over radio)	
12:30	ECDIS 4 scale 1:300,000, ECDIS 5 scale 1:200,000	
12:33	Captain has conn	
12:53	BGN starts coordination for CORP N to right, recommending C/C 250T	
12:54	25min standby RAS w/ OKN (announced over radio)	
12:56	C/C 236T (Start of CORP N)	
12:57	C/C 238T	
1300	ECDIS 4 Scale 1:300,000, ECDIS 5 scale 1:200,000	
13:00	C/C 240T	
13:02	C/C 242T	
13:03	C/C 244T	
13:05	C/C 246T	
13:06	C/C 248T	
13:07	C/C 250T	
13:08	CORP N complete	
13:08	Track planning for route south of San Carlos Bank begins on ECDIS 5 using 1:80,000 scale. 20m contour and 11m sounding visible. Chart warning / information visible.	
13:10	UKN Female voice, "how are we looking?"	
	Nav: "Looking good, but we are gonna have to haul ass though, haul ass."	
13:11	First "shoot the gap" track established on ECDIS 5. [known as DUQM A]	
13:12	10min standby RAS w/ OKN (announced over radio)	
	Nav starts trying to contact Duqm Port Control	
13:15	ECDIS 4 Scale 1:300,000, ECDIS 5 Scale 1:150,000 (20m contour and chart warning not visible)	
13:15	Cease pumping STA 7	
13:16	Nav continues trying to reach Duqm Port Control. BGN over 30nm from port.	
13:20	Nav: "We gotta haul ass, it's up to 17kts, we're not making it on time."	
	3/O (b)(6) "It's a big squat"	
	Nav: "It's a big squat"	
1325	De-tension STA 7	
13:26	All lines clear	
	Nav continues trying to reach Duqm Port Control	
13:27	C/C 348T	
13:28	All lines clear to STBD	
	C/S 50 on 2	
	C/C 246T	
	C/C 244T	
13:29	Chief Mate: "What is our speed required?"	
	Nav: "17.5"	
	CM: "Jesus!"	
13:29	C/S 40 on 2	
13:30	ECDIS 4 Scale 1:300,000, ECDIS 5 Scale 1:150,000 (20m contour and chart warning not visible)	

Enclosure (4/)

## USNS BIG HORN VDR Transcript and Timeline from VDR, 23SEP24.

13:30	Nav confirms a 1500L pilot pick up	
13:31	R30R	
13:33	RAS	
	C/M Departs Pilothouse	
13:34	C/S 60 on 2	
13:34	L10R	
13:34	C/C 312	
13:35	C/C 320. Base course of track is 331.2T	
13:35	Xfer thrust control to ERC	
	Commence pre-port entry engine tests (ahead/astern)	
13:38	C/S 80 on 2 (in increments)	
13:41	Commence pre-port entry steering checks (various rudder changes)	
13:46	Discussion about steering test progress between Capt and 3/O and status of test:	
	Capt: "Didn't they just do that? Fucking Christ let's get this done."	
	Capt: "I need to come over to the left"	
	Capt: " I need to come over to 310T"	
13:47	Ship heading approx. 326T	
	P15R,	
	Nav: "Need to get this shit done"	
13:48	End of steering test. Logged as SAT.	
13:49	C/C 310. Base course of track is 331.2T. BGN 460, right of track.	
13:50:30	Capt (to 3/O (b)(6)) "just help me on BRM and look outing and we'll just fucking gun in through this thing together. You and me buddy."	
13:53:54	C/C 306T	
13:54:30	ECDIS 4 zooms in to scale 1:54,800. 20m contour visible. 11m sounding visible. Chart information warning visible.	
13:55	Cross 50m contour	
13:56:30	Engine control shifted to Pilothouse	
13:56:41	C/S 82 on 2	
14:00	C: 306 (Base course 331.2T), S: 82 on 2 (17.7 SOG), Fatho: 24.5m, 1780yds left of track. ECDIS 4 on Scale 1:54,800, ECDIS 5 on Scale 1:150,000	
14:02	C: 306 (Base course 331.2T), S: 82 on 2 (17.7 SOG), Fatho: 27m, 1480yds left of track. ECDIS 4 on Scale 1:54,800, ECDIS 5 on Scale 1:150,000	
14:03	C: 306 (Base course 281.4T), S: 82 on 2 (17.7 SOG), Fatho: 23m, 1240yds left of track. ECDIS 4 on Scale 1:54,800, ECDIS 5 on Scale 1:150,000	
14:04	C: 306 (Base course 281.4T), S: 82 on 2 (17.1 SOG), Fatho: 12.2m, 1,012yds left of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:04:35	Nav: " Capt it looks like 1105 or 1505 we will be at the sea buoy"	
	Capt: "If we cut the corners we'll get there"	
	Nav: "Yes, sir!"	
14:04:33	Cross 20m contour (by chart). Fatho: 12.7m	
14:05	C: 306 (Base course 281.4T), S: 82 on 2 (17.2 SOG), Fatho: 11.5m, 778yds left of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:06	C: 306 (Base course 281.4T), S: 82 on 2 (17.2 SOG), Fatho: 11.5m, 549yds left of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	

Enclosure (9/)

## USNS BIG HORN VDR Transcript and Timeline from VDR, 23SEP24.

14:06:47	C/C 305T	
14:07	C: 305 (Base course 281.4T), S: 82 on 2 (17.3 SOG), Fatho: 11m, 312yds left of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:08	C: 305 (Base course 281.4T), S: 82 on 2 (17.5 SOG), Fatho: 16.2m, 91yds left of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:09	C: 305 (Base course 281.4T), S: 82 on 2 (17.7 SOG), Fatho: 19.7m, 141yds right of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:10	C: 305 (Base course 281.4T), S: 82 on 2 (17.7 SOG), Fatho: 7.5m, 273yds right of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:11	C: 305 (Base course 281.4T), S: 82 on 2 (17.4 SOG), Fatho: 15.2m, 606yds right of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:11:05	Fatho 13.5m	
14:11:20	Fatho 10.5m	
14:11:30	Fatho 6.7m	
14:11:40	Fatho 11m	
14:11:44	ECDIS 5 charts shifts to reveal 20m contour with no scale change.	
14:11:50	Fatho 10.7	
14:12	C: 305 (Base course 281.4T), S: 82 on 2 (16.9 SOG), Fatho: 9m, 825yds right of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:150,000	
14:12:10	Fatho 6.2m	
14:12:20	Fatho 4.5m	
14:12:24	Fatho 4.5m	
14:12:25	First vibrations / First contact with seafloor Posit: 19 29.2438N, 057 59.0399E, heading 305T Fatho reads "*" (no reading or error)	
14:12:35	HLR, Capt: "Slow down, slow down, slow down"	
14:12:46	Vibrations end	
14:12:49	All Stop	
14:12:44	ECDIS 5 changes scale to 1:8,000	
14:13:01	UKN: "What the heck was that"	
	Capt: "Don't know. What's the fathometer reading?"	
14:13	C: No ordered course, S: A/S (13.1 SOG), Fatho: no reading, 1,030yds right of track. ECDIS 4 on Scale 1:80,000, ECDIS 5 on Scale 1:8,000	
14:13:45	Chief Mate on bridge, "What was that?"	
14:13:47	Engine control passed to ERC. BGN approx. 1,000 yds from shoal water to stbd.	
14:13:54	Ease rudder to L15R	
14:14	C: No ordered course, S: A/S (10.5 SOG), Fatho: no reading, 1,100yds right of track. ECDIS 4 on Scale 1:40,000, ECDIS 5 on Scale 1:30,000	
14:14:06	Fatho displays 6.2m	
	Nav: "Capt can I show you something over here?"	
14:14:28	RAS	
14:14:35	Nav: "We have 13m UKC, Capt"	

Enclosure (4/)

CUI

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## USNS BIG HORN VDR Transcript and Timeline from VDR, 23SEP24.

	Capt: "We must have hit a shallow spot somewhere, but there is nothing on the chart."	
14:14:42	Cross 20m contour	
14:15	ERC reports to CHENG fuel leaking from drains and vents. (via radio)	
14:15	C: No ordered course, S: A/S (8.5 SOG), Fatho: 16m, 1,080yds right of track. ECDIS 4 on Scale 1:40,000, ECDIS 5 on Scale 1:8,000	
14:15:34	ERC reports fuel leaks on port and stbd engines	
14:16	C: No ordered course, S: A/S (7.4 SOG), Fatho: 17.7, 1,100yds right of track. ECDIS 4 on Scale 1:40,000, ECDIS 5 on Scale 1:8,000	
14:16:13	Captain gives permission to secure main engines. Approx. 1400 yds to shoal on right.	
14:16:42	Capt: "Fathometer shot up. We must have hit a shallow spot. We must have hit a sand bank."	
14:17	C: No ordered course, S: A/S (6.4 SOG), Fatho: 18.7, 1,160yds right of track. ECDIS 4 on Scale 1:40,000, ECDIS 5 on Scale 1:8,000	
14:18:10	I want to go back and see the history because if you look at the safety contour...but it wasn't on the chart"	
14:18:29	HLR	
14:18:43	Capt: "Give me (b)(6) Cargo Mate] and the anchor detail to the bow immediately"	
14:19	Set sea and anchor detail	
14:23:12	Anchor detail manned and ready	
14:24:40	Bridge tries to move rudder to amidships from bridge with no response. Unclear of Capt hears this action.	
14:25	No rudder response, shifting units, no response in NFU or hand	
14:25:53	Aft Steering ordered to take control and place rudder A/S	
14:29:08	Anchor detail requests engineer to engage anchor windlass	
14:29:10	Capt (on phone with CHENG): "I think we must of. I looked at the safety contour and it showed a super shallow decline, but there was nothing on the chart. Good charted water, no charted sand bank."	
14:30:15	Capt: [to CHENG on phone] "Let's get an anchor down as soon as possible and let's go from there."	
14:35:28	Capt gives order to walk port anchor out to water's edge	
14:37:56	Auto-watertight doors closed from bridge	
14:38:26	Port anchor at water's edge	
14:43:45	Capt: "Drop first two shots"	
14:53:32	Foc'sle reports one shot at water's edge. 1 shot = 90'. Depth of water 17.2m (56'). No recognition of being "anchored" by either foc'sle or bridge.	
14:55:05	Trying to freefall anchor that is already on sea floor.	
14:56	Anchored, 17.5M water depth	

- Several conversations on the VDR are difficult to hear due to various overlapping audio from VHF radio, ERC reports, bridge wing wind noise, and others. This timeline is replicated to the best of my abilities given limitations of the VDR software. If the conversation is listed in this timeline, it is clear and apparent what is being said.

Enclosure (41)

USNS BIG HORN VDR Transcript and Timeline from VDR, 23SEP24.

- This timeline is inclusive of events pertinent to the investigation and related to the navigation of the ship. It is not a complete transcript of every conversation occurring on the pilothouse during this timeframe. Several other conversations can be overheard regarding personal events, meals, staterooms, etc. These conversations had no bearing on the grounding, other than to highlight the general complacency and lack of formality in watchstanding while conducting RAS operations.
- This timeline is true and accurate to the best of my knowledge.

(b)(6)

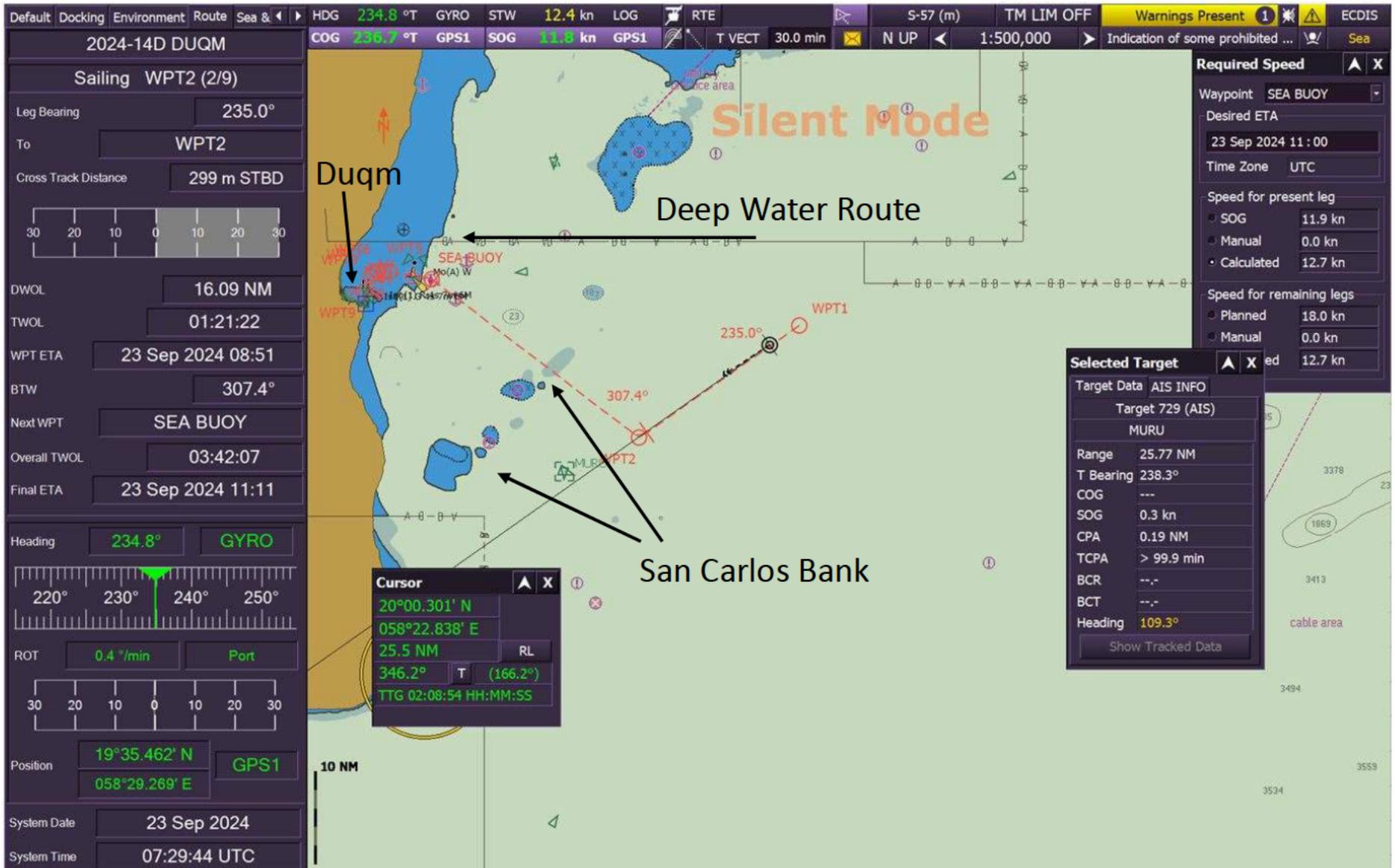
J. A. Murdock

USNS BIG HORN  
Command Investigation  
ECDIS Screen Captures

23SEP24

Taken from Voyage Data  
Recorder

# 1130L – RAS Start, ECDIS 5



CUI

# 12:19:44 – Difference in charts ECDIS 4 and 5

The image displays two screenshots of an ECDIS interface, illustrating a difference in chart data between two versions (4 and 5). Both screenshots show a route plan with waypoints WPT1, WPT2, and WPT3. A red circle highlights a specific point on the route in both views. A red arrow points from the top screenshot to the bottom one, indicating the change in chart data.

**Top Screenshot (Chart 4):**

- Time: 12:19:44
- Chart: 23001
- Route: 2024-14D DUQMB
- Waypoint WPT2: 236.5° bearing, 152 m STBD distance.
- Waypoint WPT3: 03:49:07, 23 Sep 2024 12:08.
- Cursor coordinates: 19°30.046' N, 058°20.980' E.
- Cursor data: 23 Sep 2024, 08:19:29 UTC.

**Bottom Screenshot (Chart 5):**

- Time: 12:19:44
- Chart: 23001
- Route: 2024-14D DUQMB
- Waypoint WPT2: 234.8° bearing, 152 m STBD distance.
- Waypoint WPT3: 03:48:33, 23 Sep 2024 12:08.
- Cursor coordinates: 19°42.642' N, 058°19.378' E.
- Cursor data: 23 Sep 2024, 08:19:44 UTC.

**Cursor Data (Bottom Screenshot):**

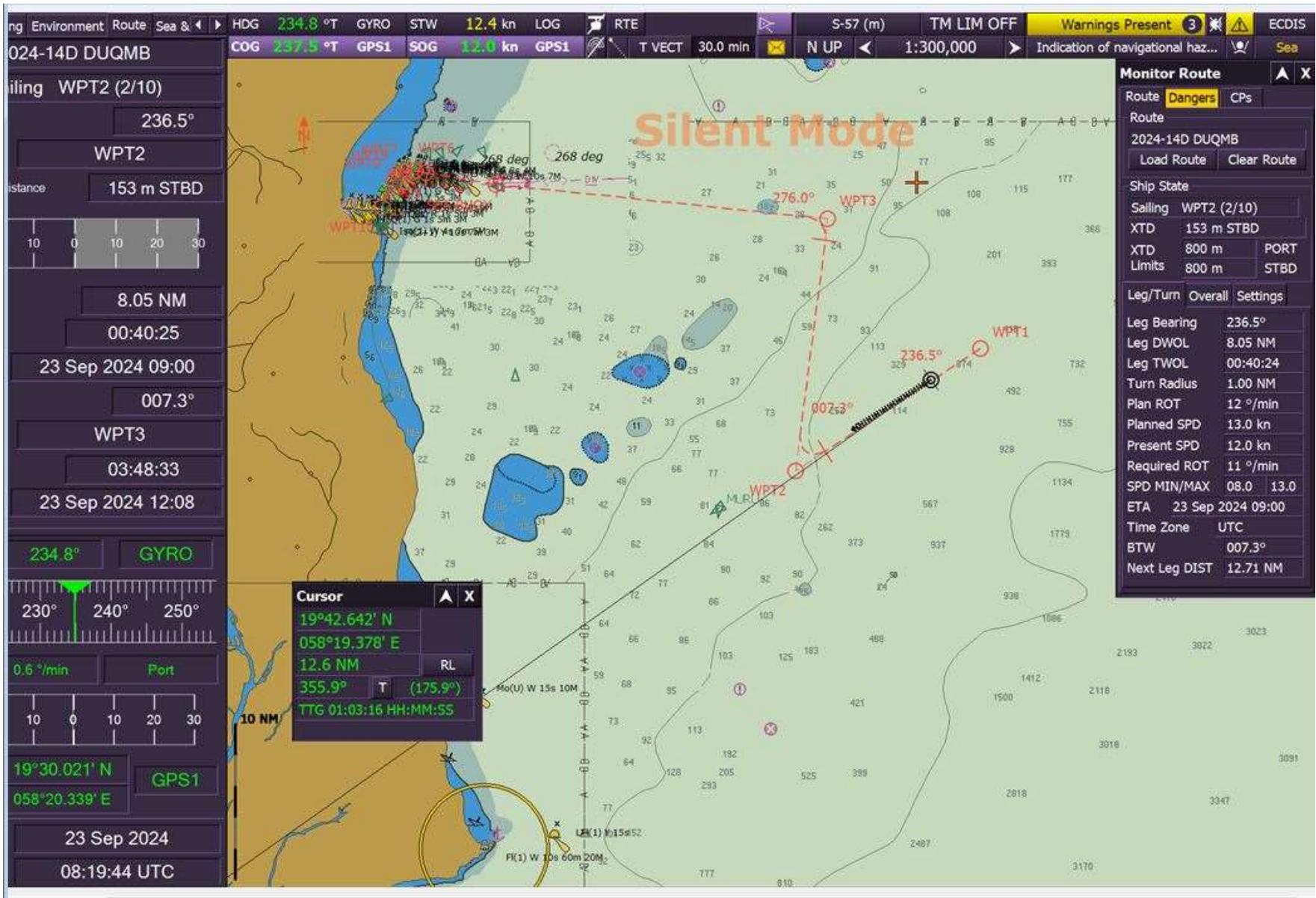
Cursor	19°42.642' N
	058°19.378' E
	12.6 NM
	355.9° T (175.9°)
	TTG 01:03:16 HH:MM:SS

**Monitor Route Panel (Right Side):**

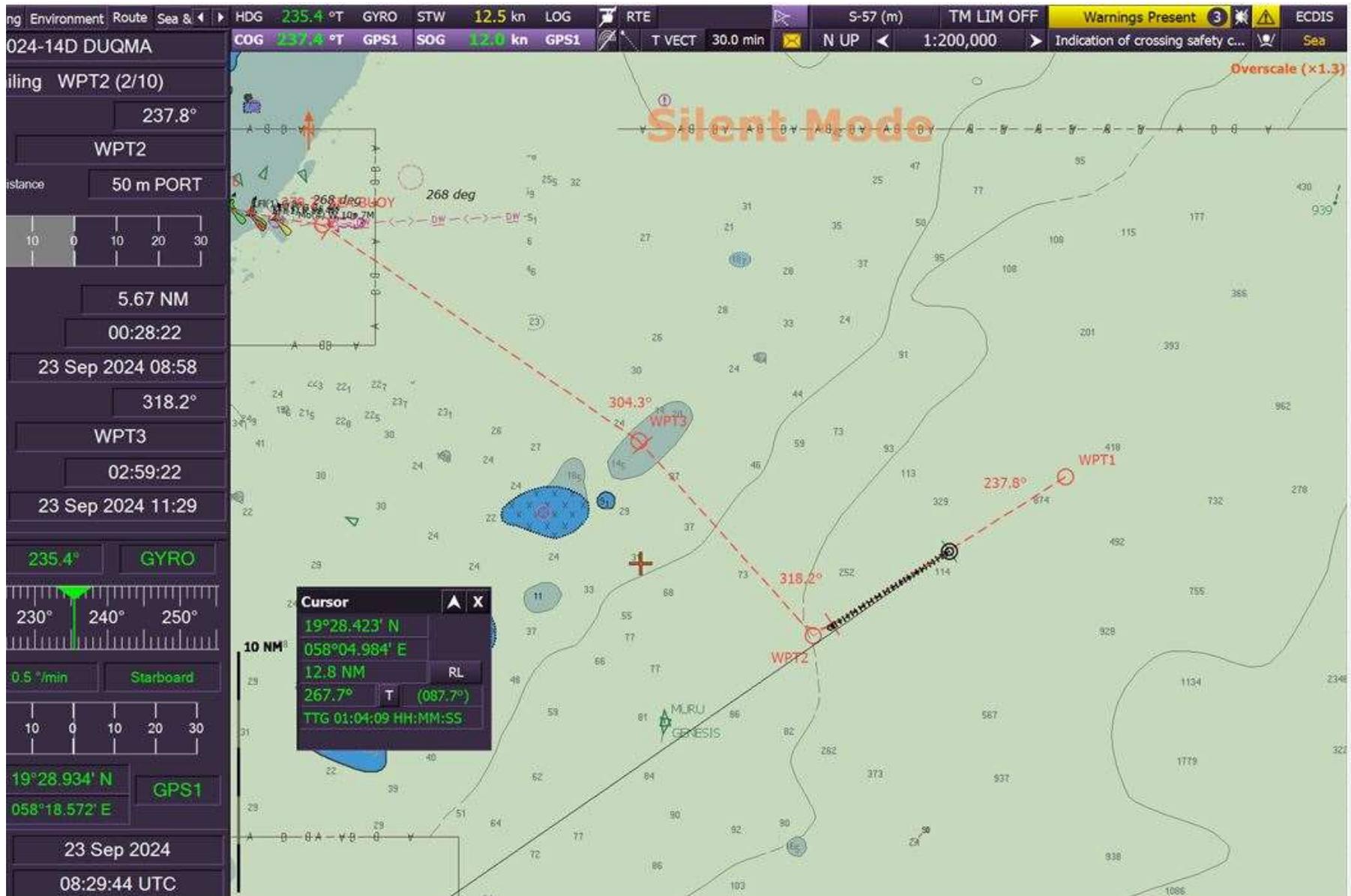
Route	2024-14D DUQMB
Load Route	Clear Route
Ship State	Sailing WPT2 (2/10)
XTD	153 m STBD
XTD	800 m PORT
Limits	800 m STBD
Leg/Turn	Overall Settings
Leg Bearing	236.5°
Leg DWOL	8.05 NM
Leg TWOL	00:40:24
Turn Radius	1.00 NM
Plan ROT	12 °/min
Planned SPD	13.0 kn
Present SPD	12.0 kn
Required ROT	11 °/min
SPD MIN/MAX	08.0 13.0
ETA	23 Sep 2024 09:00
Time Zone	UTC
BTW	007.3°
Next Leg DIST	12.71 NM

CUI

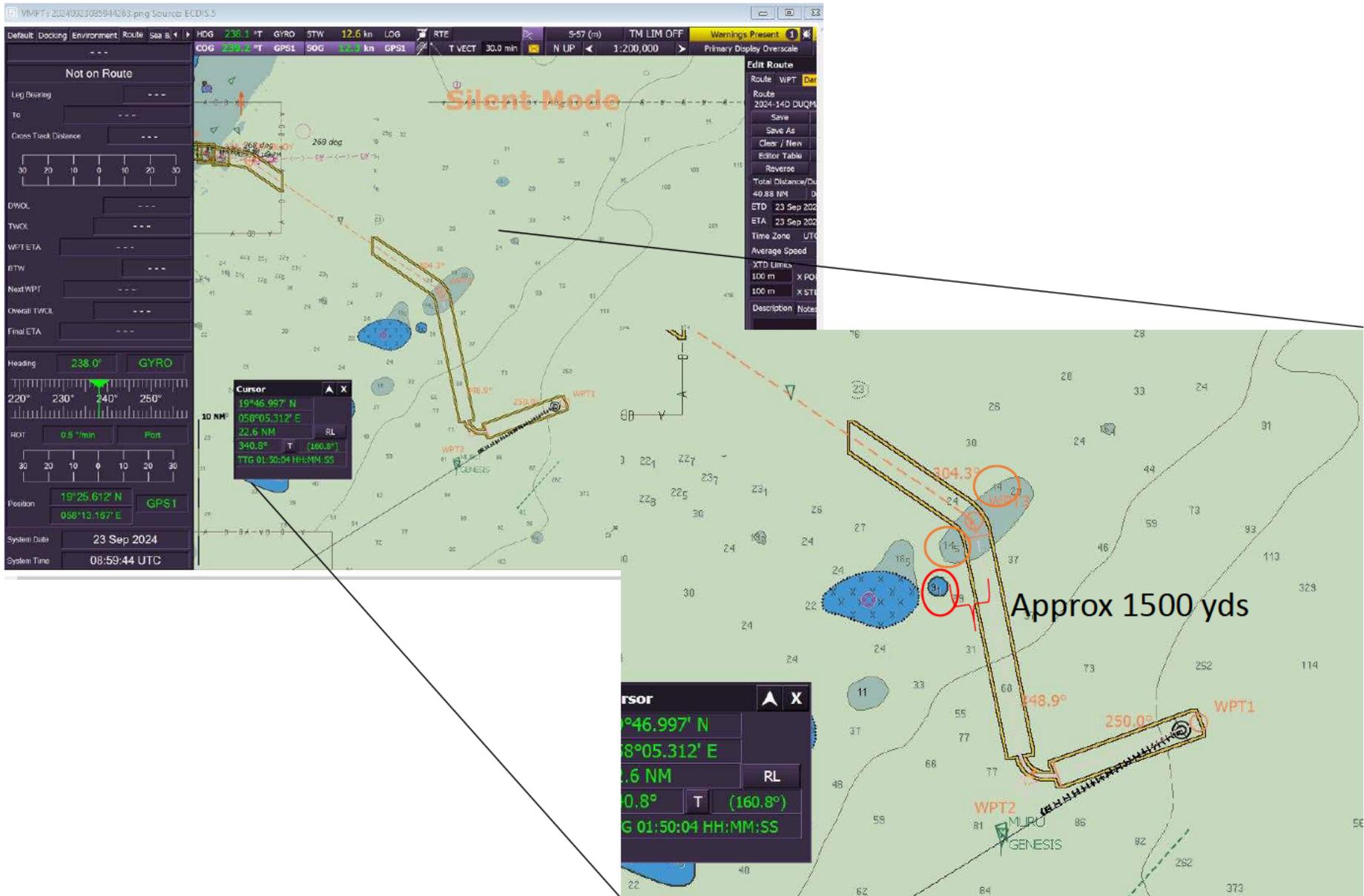
# 1219L – Duqm B ECDIS 5



# 1230L – Original Duqm A ECDIS 5



# 1300L – Duqm A Rev 1



CUI

1308L – Dugm A Rev 2 planning starts. Scale 1:80k  
 20m contour, 11m sounding, chart information and warnings all visible

The screenshot displays the ECDIS software interface for route planning. The top status bar shows vessel information: VMFT: 20240923090844200.png Source: ECDIS.5. The main menu includes Default, Docking, Environment, Route, Sea & Wind, HDG (250.0 °T), GYRO, STW (12.5 kn), LOG, RTE, S-57 (m), TM LIM OFF, and Warnings Pres. The bottom status bar shows COG (251.7 °T), GPS1, SOG (12.4 kn), GPS1, T VECT, 30.0 min, N UP, 1:80,000, and Indication of some p.

The left sidebar contains a 'Not on Route' section with fields for Leg Bearing, To, Cross Track Distance, DWOL, TWOL, WPT ETA, BTW, Next WPT, Overall TWOL, and Final ETA. Below this is a heading scale from 30° to 260° with a current heading of 249.9° GYRO. The bottom left shows the system date (23 Sep 2024) and system time (09:08:44 UTC).

The central map area shows a route with waypoints WPT2 and WPT3. A 'Cursor' window is open over the map, displaying the following data:

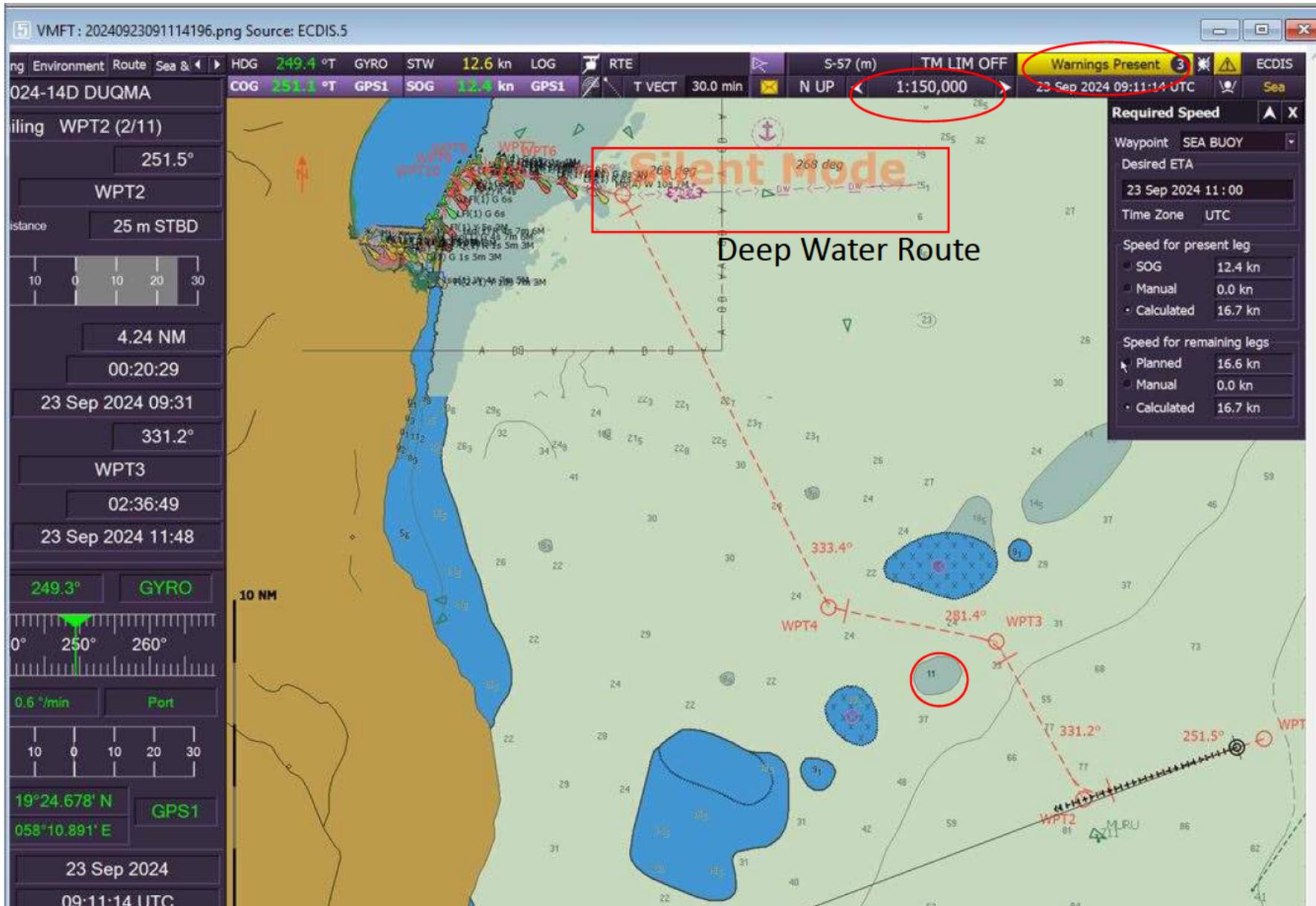
- 19°26.152' N
- 058°00.030' E
- 10.83 NM
- 276.9° T (096.9°)
- TTG 00:52:34 HH:MM:SS

The bottom right section features a 'Route Editor Table' with the following data:

ID	Label	ETA (UTC)	Latitude	Longitude	Turn Rate	Turn Radius	Distance	Bearing	Speed	MIN Speed	MAX Speed
2	WPT2	23 Sep 2024 09:30	19°22.998' N	058°05.650' E	12 °/min	1.00 NM			13.0 kn	8.0 kn	13.0 kn
2 - 3							7.21 NM	303.2°	13.0 kn	8.0 kn	13.0 kn
3	WPT3	23 Sep 2024 10:02	19°26.899' N	057°59.370' E	14 °/min	1.24 NM			18.0 kn	8.0 kn	18.0 kn

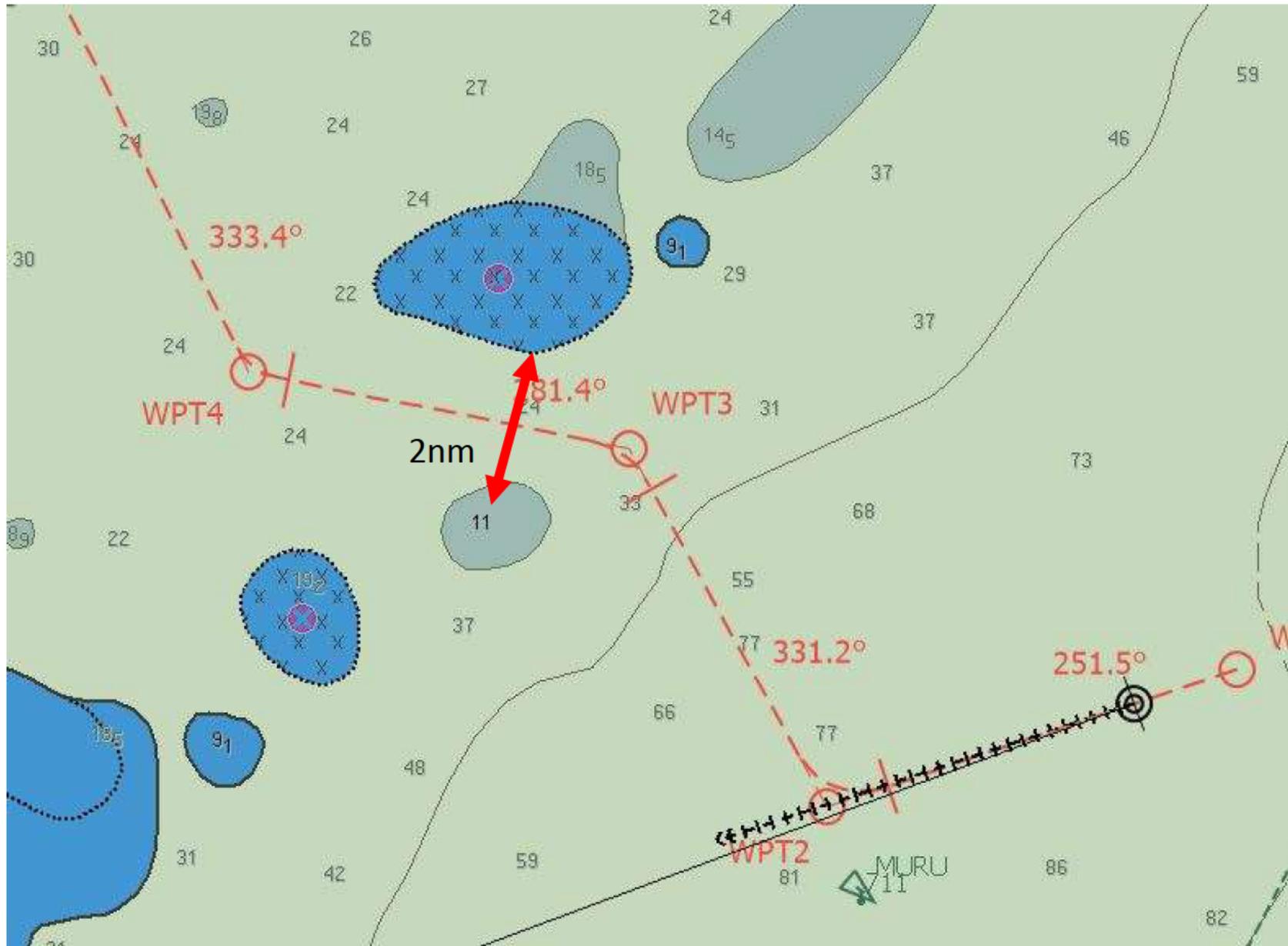
CUI

# 1311L – Duqm A Rev 2

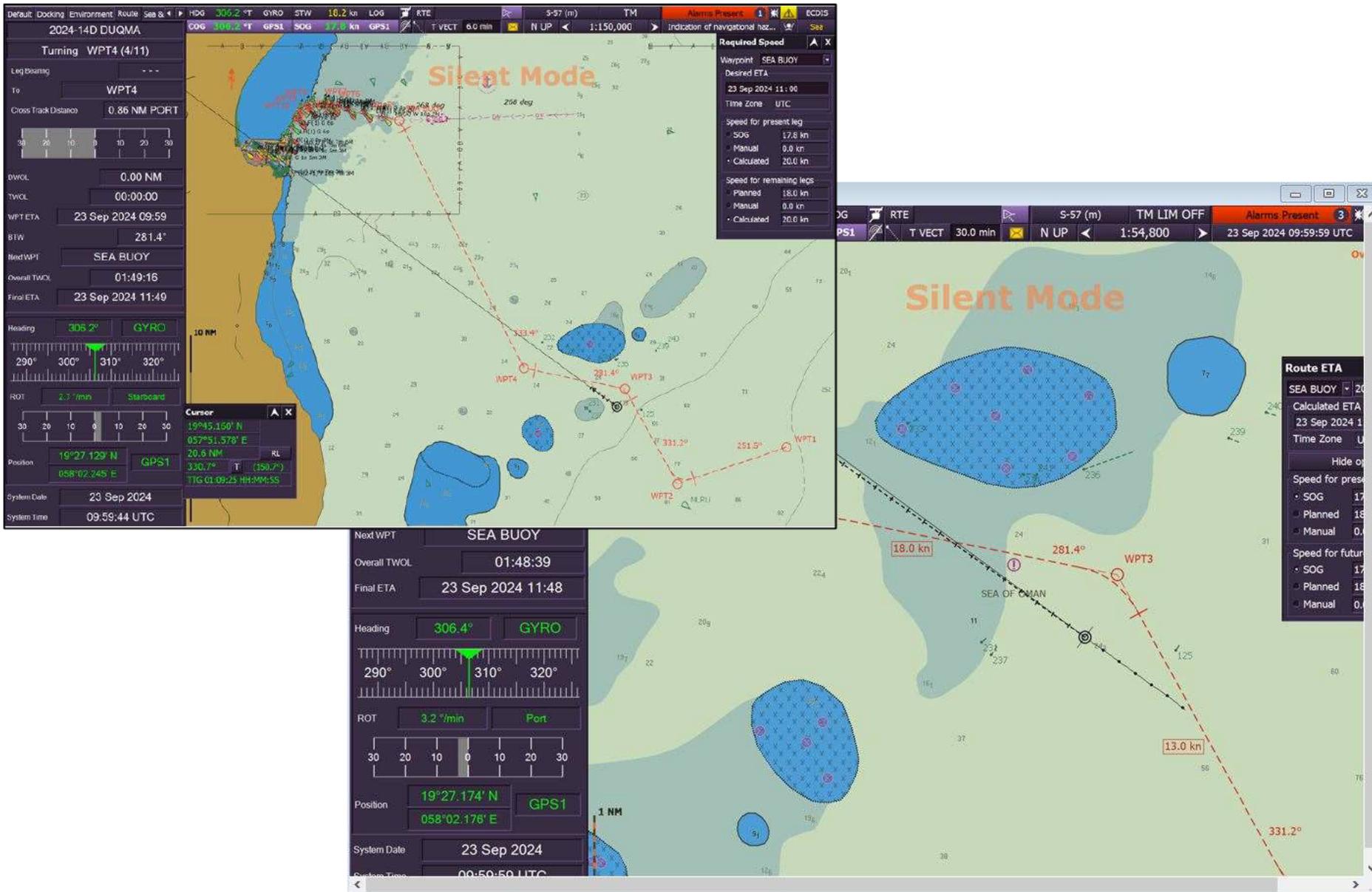


CUI

# 1311L Duqm A Rev 2 – Zoomed from 1:150,000 scale

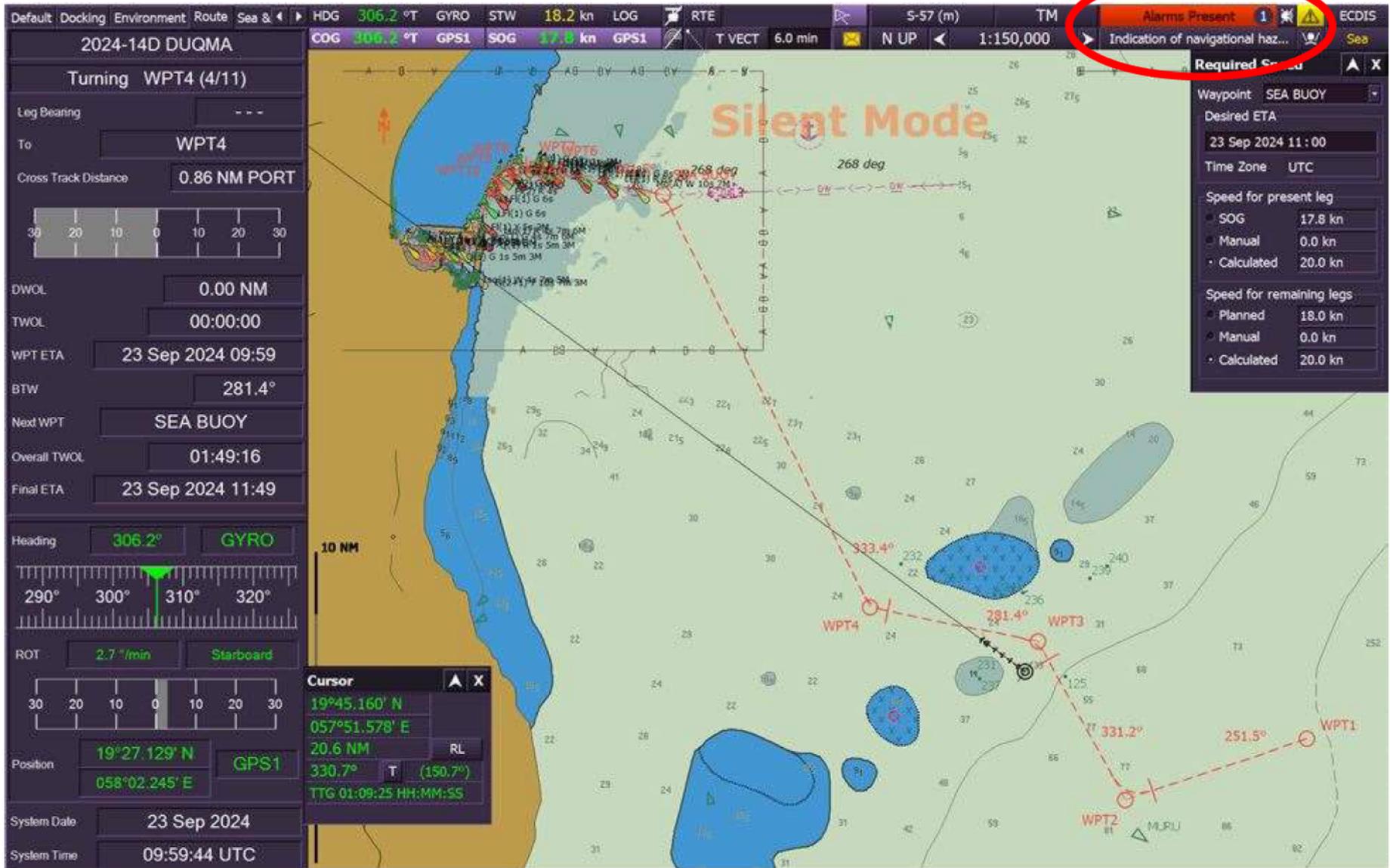


# 1400L ECDIS 5 (top) ECDIS 4 (bottom)

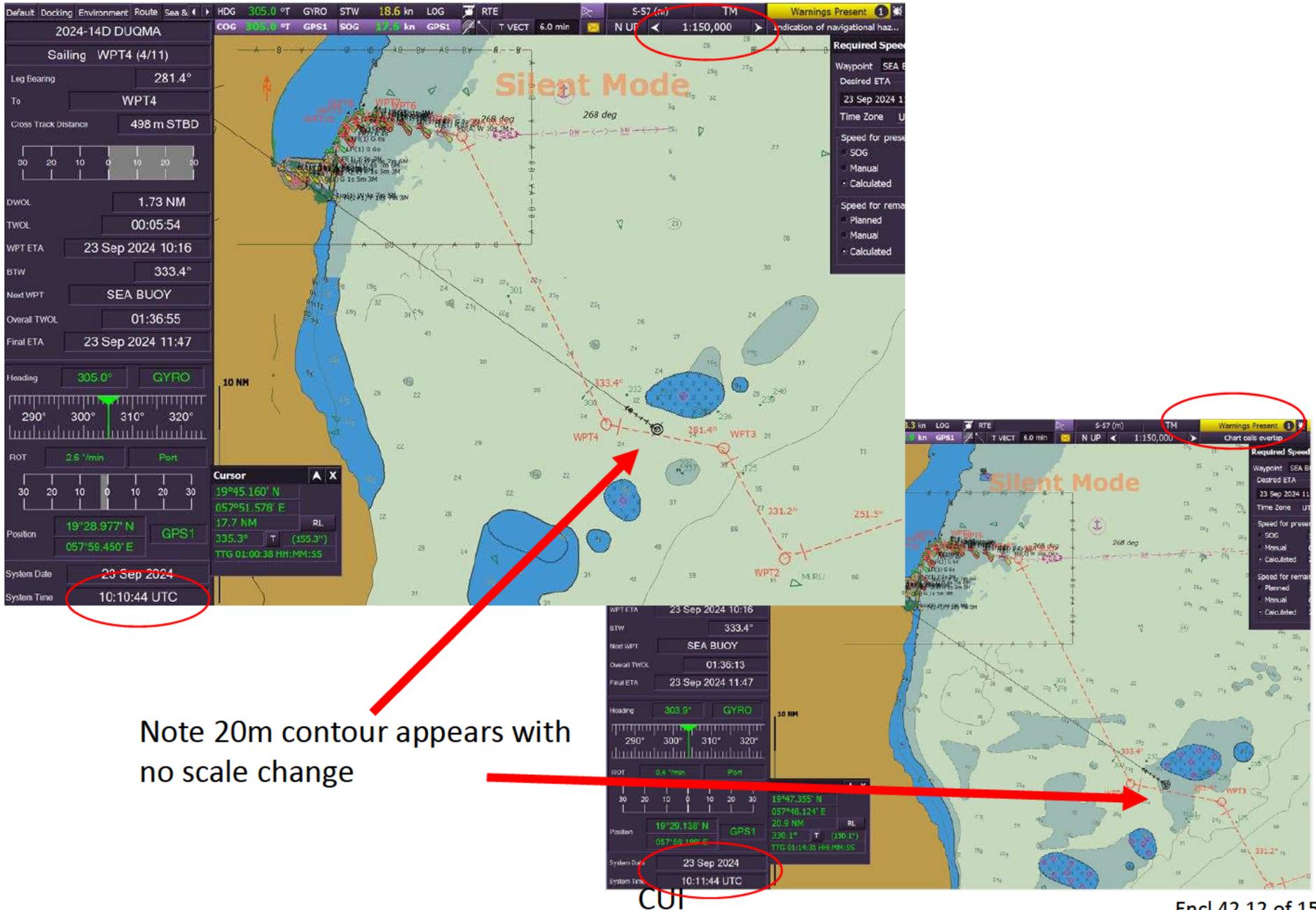


CUI

# 1400L – ECDIS 5



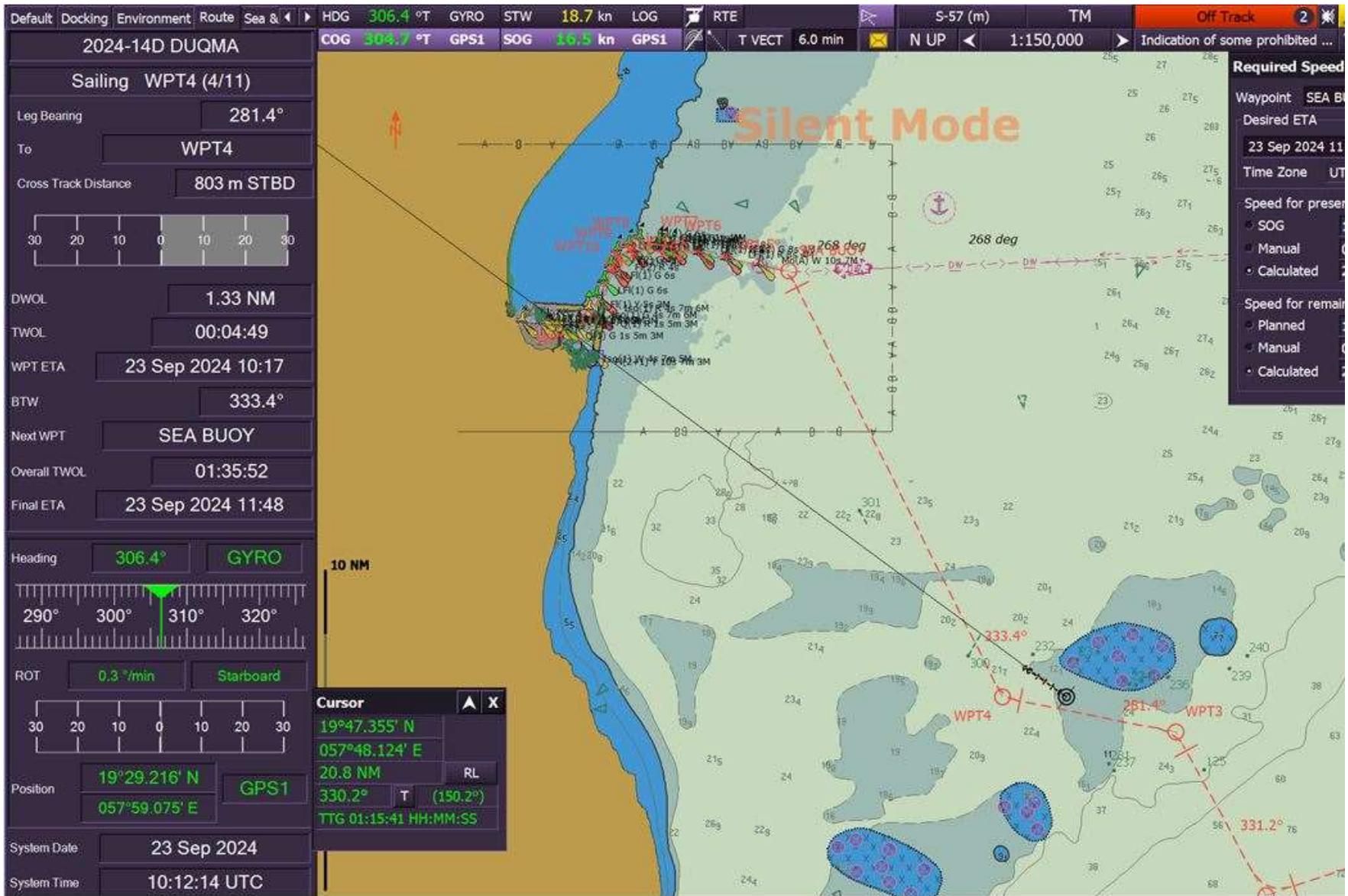
# ECDIS 5 Chart Shift at 14:11:44



Note 20m contour appears with no scale change

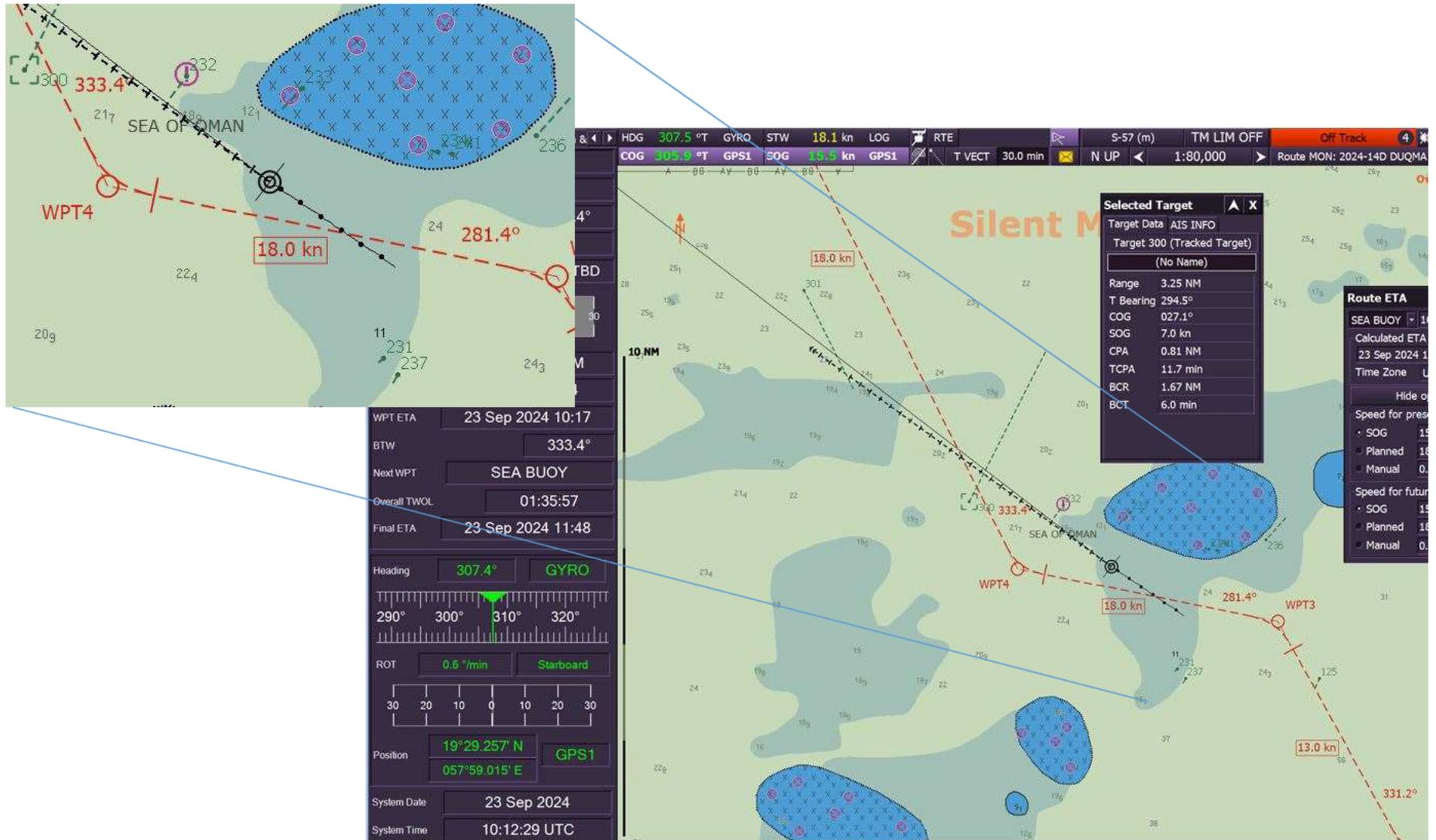
CUI

# ECDIS 5 – 11 Seconds Before Grounding Captain's ECDIS View

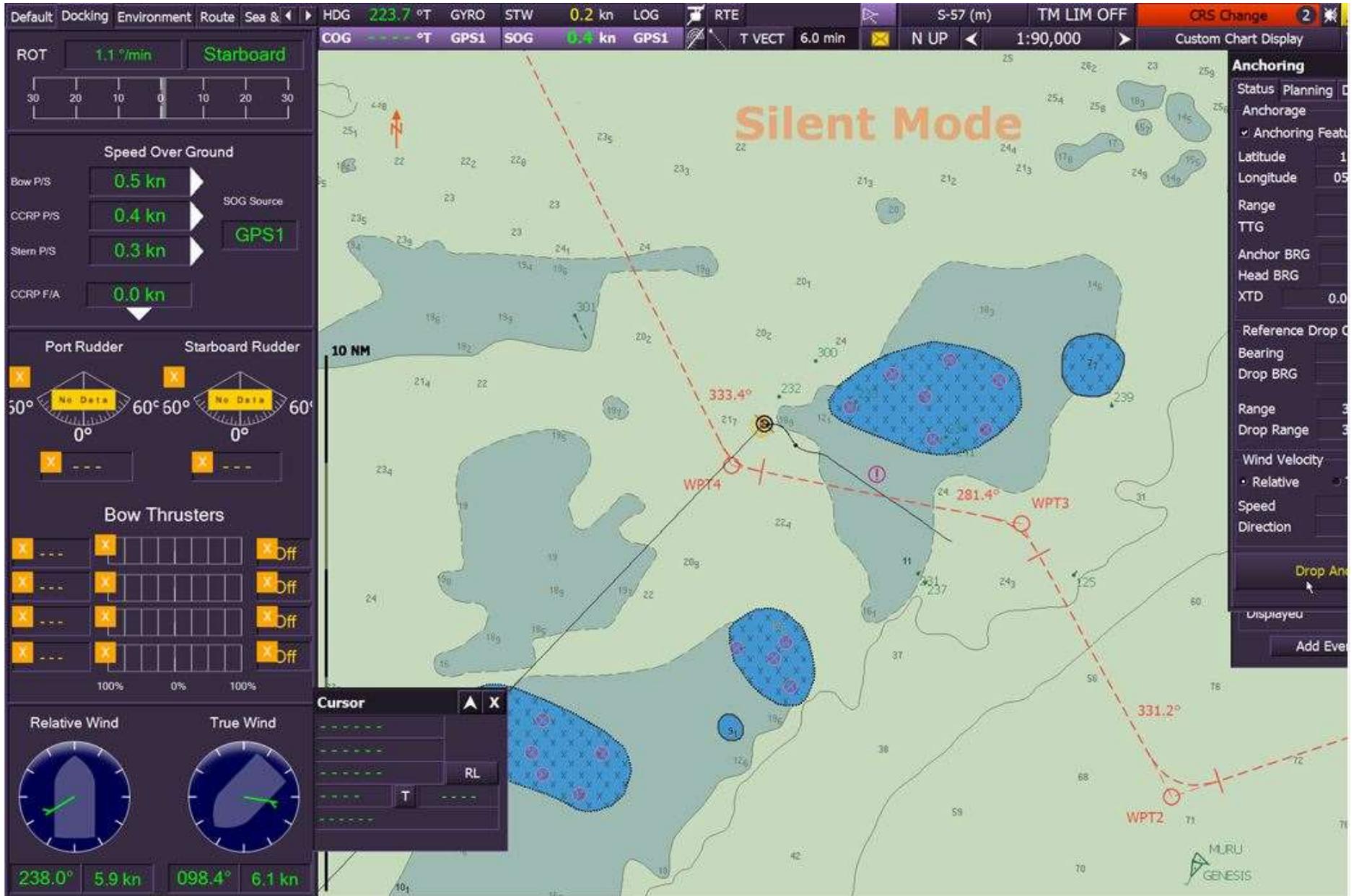


CUI

# 1412:29 ECDIS 4 – BGN Strikes Sea Floor



# 1456 ECDIS 5 – BGN Anchored



CUI

3502  
N04T  
February 17, 2021

MEMORANDUM

From: Commander, Military Sealift Command

To: Master, USNS BIG HORN

Subj: ELECTRONIC NAVIGATION CERTIFICATION

Ref: (a) COMSCINST 3530.1

1. Per reference (a), USNS BIG HORN has successfully completed the Electronic Navigation Certification assessment and is certified to navigate utilizing ECDIS as the primary plot.
2. Paper charts will be used as the backup to the Electronic Chart Display Information System (ECDIS). Charts retained must be in compliance with the International Convention for the Safety of Life at Sea (SOLAS). After the proper installation of your second independent ECDIS, paper charts may remain onboard to be used as a situational awareness tool at the Master's discretion until such time as they are canceled by the National Geospatial-Intelligence Agency (NGA).
3. Your vessel must comply with the standards outlined in reference (a). All Licensed Deck Officers are required to be familiarized with the ECDIS equipment installed on board PRIOR to their first watch in accordance with STCW.7/Circ.24.
4. This certification is only valid when using official Electronic Navigation Charts (ENCs) that conform to International Hydrographic Office (IHO) standards and meet the chart carriage requirements outlined in 33 CFR 164.33.

(b)(6)

Director, Afloat Training and Readiness (N04T)

Copy to:  
Program Manager  
N04T  
N04T3

Enclosure (44)

Page 1 of 1



DEPARTMENT OF THE NAVY  
NAVAL SEA SYSTEMS COMMAND  
1333 ISAAC HULL AVE, SE  
WASHINGTON NAVY YARD, DC 20376-0001

TECHNICAL MEMO

From: (b)(6) NAVSEA 00C24  
To: N72, MILITARY SEALIFT COMMAND  
Date: 21 October 2024  
Subj: USNS BIG HORN (T-AO 198) PATCHING PLAN ISO SEP 2024  
CASUALTY RESPONSE  
Ref: a) T-AO 187 Class Longitudinal Strength Calculations,  
NAVSEA Dwg #835-6580176, Rev -.  
Encl: 1) USNS BIG HORN - Patching Plan, SMIT Salvage, Rev 1,  
dtd 21 OCT 2024.

1. USNS BIG HORN (T-AO 198) was involved in a casualty on 23 September 2024 resulting in flooding and structural damage. Flooding has been controlled and most damaged spaces have been emptied, ventilated, and inspected internally. It is intended to internally seal damaged areas and maintain loading within allowable structural limits of residual hull girder capacity for tow to a repair facility. Enclosure (1) is the SMIT Salvage plan for patching and structural assessment, this memo summarizes the plan and SUPSALV independent assessment.
2. The only currently uninspected tanks are Cargo Tank 7C and the Pump Room Double Bottom Oily Waste Tank which has had a slow leak that has recently been stopped; those spaces are being cleaned and ventilated with the entry expected in the next few days. A similar patching methodology is anticipated in those tanks and will be determined once they are inspected.
3. Internal structural damage is primarily on the port side from centerline to approximately 20' to port from Frames 51 to 80. Both the keel and 22.5' longitudinal bulkhead are intact. There is lesser damage on the starboard side

Enclosure (4)

Page 1 of 4

approximately 16' off centerline. Damage consists of tripped longitudinal stiffeners, bowed bottom plate, and buckled vertical members (bulkheads, girders, and floors). The extent of damage to vertical members is limited to approximately 2' above the bottom plate. Enclosure (1), Section 3.1 provides a representative description and pictures of the internal damage.

4. Bottom damage has been externally patched to stop water ingress. This patching is not sufficient for transit. In order to improve watertight integrity for transit locations of identified or suspected water ingress will be sealed with high density grout. This is common practice in salvage and provides a watertight internal cap over the external patching.
5. Following a structural damage assessment residual strength has been determined sufficient for a tow to a repair facility. Enclosure (1) includes the SMIT naval architecture assessment of the maximum allowable bending moment of the damaged structure and loading condition to stay well within these limits.
6. SUPSALV has performed a similar independent assessment of residual strength. The method and results for this assessment follow:
  - a. Maximum Allowable Shear and Bending Moment in At-Sea and In-Harbor conditions were taken from Ref a.
  - b. Using the In-Harbor allowables the maximum stress on the intact section was calculated.
  - c. Additionally, the "Wave Induced Moment" was extracted from Ref a.
  - d. The residual section modulus at the damaged locations at Frame 55 and 59 was determined by:
    - i. Applying a 10% corrosion allowance to all plating to account for the age of the vessel
    - ii. Rendering ineffective all damaged structural components.
    - iii. Note: Frames 55 and 59 were selected as they have the lowest intact section modulus, largest amount of damage, and the highest bending moments within the damaged area. Residual strength aft of Frame 60 in the Engine Room was reviewed but not included as it has substantially more strength due to the tightly woven girders and floors in the void area.

Enclosure (45)

- e. Still water bending moment for the Min-Op loading condition from Ref a was taken as the design condition closest to the likely final tow condition.
- f. The Wave Induced Moment was added to the Min Op still water moment to produce At-Sea loading.
- g. Using the new At-Sea loading and maximum allowable stress the minimum residual section modulus required was calculated.
- h. Residual section modulus was compared against required damaged section modulus.

Allowable Shear and BM (Dwg #6580176)						I-H Keel Stress (LT/ft2)	Wave Induced Moment (ft-LT)
FR	Loc (ft-FP)	At-Sea		In-Harbor			
		SF (LT)	BM (ft-LT)	SF (LT)	BM (ft-LT)		
22	72	7,760	155,830	8,760	334,111	2,162	178,281
31	158	7,450	328,056	8,760	703,376	1,917	375,320
37	218	7,700	390,500	8,760	856,188	1,907	465,688
43	278	7,960	390,500	8,760	856,188	1,801	465,688
47	318	7,960	390,500	8,760	856,188	1,829	465,688
51	358	7,860	390,500	8,760	856,188	1,831	465,688
60	440.5	7,500	403,450	8,760	865,021	2,664	461,571
80	490.5	4,270	295,240	5,520	633,000	2,030	337,760
98	535.5	4,140	197,840	5,060	424,181	2,002	226,341

Min Op Shear and BM (Dwg #6580176)				+ WIM (ft-LT)	SMb Req (ft3)	SMb Dam (ft3)
FR	Loc (ft-FP)	Still Water				
		SF (LT)	BM (ft-LT)			
22	72	405	17,672	195,953	90.62	-
31	158	1,241	71,570	446,890	233.16	-
37	218	1,323	170,149	635,837	333.37	-
43	278	371	211,440	677,128	376.04	-
47	318	521	239,091	704,779	385.43	-
51	358	1,223	281,855	747,543	408.16	-
55	401.66	-426	261891	725400	332.37	362.75
59	432	-1571	248018	710013	279.70	304.48
60	440.5	-1,892	244,131	705,702	264.94	-
80	490.5	-1,783	152,129	489,889	241.35	-
98	535.5	-1,297	84,511	310,852	155.27	-

7. This analysis concurs with SMIT's analysis and shows that residual strength is sufficient for tow. Additionally, it

Enclosure (45)

is considered a conservative assessment for the following reasons:

- a. Residual section modulus was calculated by rendering damaged members (longitudinals and shell plate) fully ineffective. It can be visually seen that they are all partially intact and will provide additional strength.
  - b. The Wave Induced Moment applied is the design factor for unlimited service. Any tow will have strict weather limits to further reduce seaway stresses.
  - c. It is possible to ballast the ship to a condition that further reduces still water bending moments to approximately half of the design Min Op condition. That is the condition proposed in Enclosure (1).
8. This is not a final plan as there will be variations as additional inspections are completed and operational risk assessments and trade-offs are performed. Possible changes and future considerations include but are not limited to:
- a. The use of Cargo Tanks 10 P/S for ballast greatly reduces bending moments but increases operational challenges of cleaning the tank and adding salt water ballast.
  - b. The loading condition in Enclosure (1) was optimized to limit bending moments in the damaged locations but results in a larger trim than is optimal for towing.
  - c. Additional areas for application of grout may be identified to ensure all locations of potential ingress are covered.
9. If there are any questions or concerns please contact me at (b)(6) @us.navy.mil or (b)(6).

Enclosure (46)

Page 4 of 4



**DEPARTMENT OF THE NAVY**  
NAVAL SEA SYSTEMS COMMAND  
1333 ISAAC HULL AVE, SE  
WASHINGTON NAVY YARD, DC 20376-0001

TECHNICAL MEMO

From: (b)(6) NAVSEA 00C24  
To: N72, MILITARY SEALIFT COMMAND  
Date: 21 October 2024  
Subj: USNS BIG HORN (T-AO 198) PATCHING PLAN ISO SEP 2024  
CASUALTY RESPONSE  
Ref: a) T-AO 187 Class Longitudinal Strength Calculations,  
NAVSEA Dwg #835-6580176, Rev -.  
Encl: 1) USNS BIG HORN - Patching Plan, SMIT Salvage, Rev 1,  
dtd 21 OCT 2024.

1. USNS BIG HORN (T-AO 198) was involved in a casualty on 23 September 2024 resulting in flooding and structural damage. Flooding has been controlled and most damaged spaces have been emptied, ventilated, and inspected internally. It is intended to internally seal damaged areas and maintain loading within allowable structural limits of residual hull girder capacity for tow to a repair facility. Enclosure (1) is the SMIT Salvage plan for patching and structural assessment, this memo summarizes the plan and SUPSALV independent assessment.
2. The only currently uninspected tanks are Cargo Tank 7C and the Pump Room Double Bottom Oily Waste Tank which has had a slow leak that has recently been stopped; those spaces are being cleaned and ventilated with the entry expected in the next few days. A similar patching methodology is anticipated in those tanks and will be determined once they are inspected.
3. Internal structural damage is primarily on the port side from centerline to approximately 20' to port from Frames 51 to 80. Both the keel and 22.5' longitudinal bulkhead are intact. There is lesser damage on the starboard side

approximately 16' off centerline. Damage consists of tripped longitudinal stiffeners, bowed bottom plate, and buckled vertical members (bulkheads, girders, and floors). The extent of damage to vertical members is limited to approximately 2' above the bottom plate. Enclosure (1), Section 3.1 provides a representative description and pictures of the internal damage.

4. Bottom damage has been externally patched to stop water ingress. This patching is not sufficient for transit. In order to improve watertight integrity for transit locations of identified or suspected water ingress will be sealed with high density grout. This is common practice in salvage and provides a watertight internal cap over the external patching.
5. Following a structural damage assessment residual strength has been determined sufficient for a tow to a repair facility. Enclosure (1) includes the SMIT naval architecture assessment of the maximum allowable bending moment of the damaged structure and loading condition to stay well within these limits.
6. SUPSALV has performed a similar independent assessment of residual strength. The method and results for this assessment follow:
  - a. Maximum Allowable Shear and Bending Moment in At-Sea and In-Harbor conditions were taken from Ref a.
  - b. Using the In-Harbor allowables the maximum stress on the intact section was calculated.
  - c. Additionally, the "Wave Induced Moment" was extracted from Ref a.
  - d. The residual section modulus at the damaged locations at Frame 55 and 59 was determined by:
    - i. Applying a 10% corrosion allowance to all plating to account for the age of the vessel
    - ii. Rendering ineffective all damaged structural components.
    - iii. Note: Frames 55 and 59 were selected as they have the lowest intact section modulus, largest amount of damage, and the highest bending moments within the damaged area. Residual strength aft of Frame 60 in the Engine Room was reviewed but not included as it has substantially more strength due to the tightly woven girders and floors in the void area.

- e. Still water bending moment for the Min-Op loading condition from Ref a was taken as the design condition closest to the likely final tow condition.
- f. The Wave Induced Moment was added to the Min Op still water moment to produce At-Sea loading.
- g. Using the new At-Sea loading and maximum allowable stress the minimum residual section modulus required was calculated.
- h. Residual section modulus was compared against required damaged section modulus.

Allowable Shear and BM (Dwg #6580176)						I-H Keel Stress (LT/ft <sup>2</sup> )	Wave Induced Moment (ft-LT)
		At-Sea		In-Harbor			
FR	Loc (ft-FP)	SF (LT)	BM (ft-LT)	SF (LT)	BM (ft-LT)		
22	72	7,760	155,830	8,760	334,111	2,162	178,281
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Min Op Shear and BM (Dwg #6580176)				+ WIM (ft-LT)	SMb Req (ft <sup>3</sup> )	SMb Dam (ft <sup>3</sup> )
		Still Water				
FR	Loc (ft-FP)	SF (LT)	BM (ft-LT)			
22	72	405	17,672	195,953	90.62	-
31	158	1,241	71,570	446,890	233.16	-
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43	278	371	211,440	677,128	376.04	-
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55	401.66	-426	261891	725400	332.37	362.75
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98	535.5	-1,297	84,511	310,852	155.27	-

7. This analysis concurs with SMIT's analysis and shows that residual strength is sufficient for tow. Additionally, it

is considered a conservative assessment for the following reasons:

- a. Residual section modulus was calculated by rendering damaged members (longitudinals and shell plate) fully ineffective. It can be visually seen that they are all partially intact and will provide additional strength.
  - b. The Wave Induced Moment applied is the design factor for unlimited service. Any tow will have strict weather limits to further reduce seaway stresses.
  - c. It is possible to ballast the ship to a condition that further reduces still water bending moments to approximately half of the design Min Op condition. That is the condition proposed in Enclosure (1).
8. This is not a final plan as there will be variations as additional inspections are completed and operational risk assessments and trade-offs are performed. Possible changes and future considerations include but are not limited to:
- a. The use of Cargo Tanks 10 P/S for ballast greatly reduces bending moments but increases operational challenges of cleaning the tank and adding salt water ballast.
  - b. The loading condition in Enclosure (1) was optimized to limit bending moments in the damaged locations but results in a larger trim than is optimal for towing.
  - c. Additional areas for application of grout may be identified to ensure all locations of potential ingress are covered.
9. If there are any questions or concern (b)(6) tact me at (b)(6) [@us.navy.mil](mailto:us.navy.mil) or (b)(6).

Enclosure 1:

USNS BIG HORN - Patching Plan, SMIT Salvage, Rev 1



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# USNS BIG HORN - Patching Plan

**PROJECT NAME:** USNS BIG HORN  
**PROJECT NUMBER:** SSG242134  
**CLIENT NAME:** SUPSALV  
**CLIENT REFERENCE:** N0002424F4F01

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## DOCUMENT CONTROL

### Revision Status

Rev	Issue Date	Reason for Issue	Prepared	Checked	Approved
A	Oct-21-2024	Issued for Review			
B	MM-DD-YYYY	Issued for			
0	MM-DD-YYYY	Issued for Tender			



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Project Number:	SSG242134
Client Name:	USN Supervisor of Salvage
Client Reference:	N0002424F4F01
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Prepared By:	(b)(6)	Role: Salvage Superintendent
Input By:	(b)(6)	Role: Naval Architect
Approved By:		Role:

Change log		
Revision	Section	Change
Rev.1	All	New issue



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## **GENERAL**

### **1.1. Introduction**

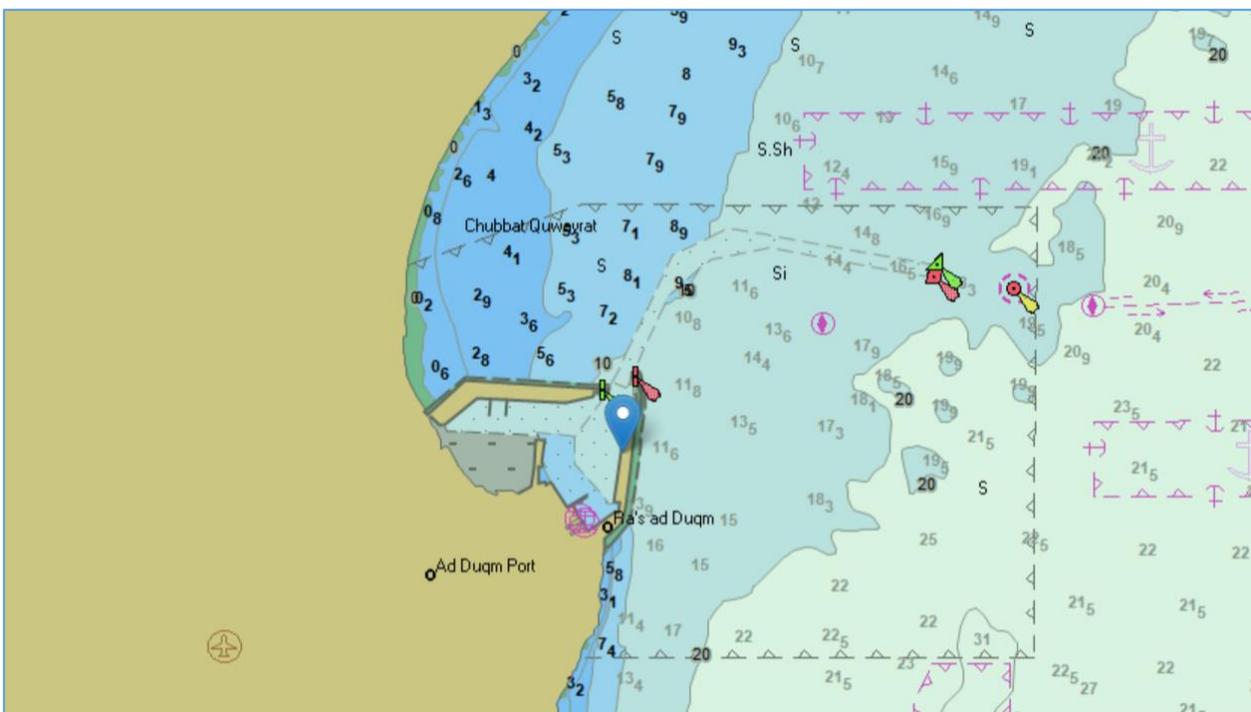
On 23<sup>rd</sup> of September 2024 during routine operations the USNS BIG HORN suffered a grounding event. Damages to the ship's hull and running gear were sustained. Ship was subsequently towed and berthed in Port Duqm container terminal for damage control to abate water ingress as well as perform comprehensive structural and mechanical assessments.

The USNS BIG HORN is owned and operated by Military Sealift Command ("MSC") and operates as directed by the United States Navy.

On 5<sup>th</sup> of October 2024 the United States Navy Supervisor of Salvage ("SUPSALV") engaged SMIT Salvage to assist with providing structural assessments for towing operations as well patching solutions. This document will detail patching plan methodology and the desired vessel stability conditions for towing preparation. The vessel towing and voyage plan will be detailed in a separate document.

### **1.2. Project Location**

Project Location. 19°40'43.0"N 57°43'32.7"E (Port Duqm, Oman – Container Terminal)





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### 1.3. Vessel Specification

	Specifications	Unit
IMO Number	8812162	
Year Built	1992	
LSW	15,296	mt
Type	T-A0 187 Class Fleet Oiler	
LOA	207	m
LPP	198.12	m
Max depth	15.24	m
Breadth	30	m
Deadweight	27,955	mt

### 1.4. Condition of Cargo and ROB

	Quantity (After Slop Discharge)	Quantity (Optimal Bending Moment)	Unit
Deadweight	27513	27513	LT
Diesel Oil	784	590	LT
LO	121	121	LT
FW	524	524	LT
Ballast Water	4061	5244	LT

### 1.5. Assumptions

- From the identified structural damage in Cargo tank #9C, Cargo tank #10C, Deep Tank #2P, Contaminated FO Tank and Engine Room Void the most substantial damage is present in Cargo tank #10C. An analysis was carried out by the Naval Architect based on the known structural damage in Cargo tank #9C and Cargo tank #10C. This analysis focused on reducing the allowable Bending Moments and Shear Forces in way of the damaged sections based on the observed structural damage. Based on this analysis, it was determined that the ship can be put in a loading condition that meets the reduced (damaged) allowable Bending Moments and Shear Forces without requiring structural reinforcements.
- Ongoing internal assessments are being performed but are somewhat limited by accessibility for inspection due to the continued presence of active water ingress. Once water ingress is fully abated and the affected areas can be pumped dry a comprehensive assessment will be finalized.



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- Procurement of grout services as well as application methodology i.e. mixing and pumping is being refined and included in ongoing on-site considerations.
- Welding and fabrication support may be required for patching work where applications of grout is not possible.

**2. PATCHING OPERATIONS**

**2.1. Method**

Temporary subsea patching is currently ongoing. Divers have utilized wedges and epoxy where water ingress has been observed at the bottom hull. Latest known condition of the tanks as follow:

SN	Space	Condition	Remarks
1	Engine Rm Void Space Tank	Hull penetration observed	Tank assessment in progress
2	Contaminated Fuel Oil Tank	Hull penetration observed	“ “
3	#2Deep Fuel Oil Tank	To check for hull penetration	“ “
4	#10 Center Cargo Tank	Hull penetration observed	“ “
5	#9 Center Cargo Tank	To check for hull penetration	“ “
6	#7 Center Cargo Tank	To check for hull penetration	“ “
7	DB Oily Waste Tank	To check for hull penetration	“ “

Once water ingress is stopped completely, the affected spaces will be pumped dry. Only once the tanks are pumped dry can interior tank assessments confirm the locations where interior patching will be required. It is envisioned that interior tank patching and sealing will be achieved by utilizing grout. However, in places where grout cannot be reasonably applied it will be necessary to weld in the affected areas. Welding will be performed to either seal the hull penetration directly, or to seal off the specific frame and longitudinal intersection.

With regards to grout methodology, a combination of mixing and pumping equipment will be utilized to place the grout in the desired locations. Locations such as the Engine Room Void pose particular challenges with regards to egress and access. These spaces may require the previously mentioned welding or mixing grout by hand at the tank access hatch and transfer into the void via personnel and placed in the desired zones. This is anticipated to be very time consuming in preparation as well as operationally.

Naval architects have modeled the potential impacts of the grout placement in the vessels tanks with regards to vessel stability and subsequent ballast requirements and no negative impact of concern is observed. Reference section 3 below.





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**2.1.1. Description of Methodology**

To date, the primary method for removing the water ingress has been the utilization of the cargo transfer pumps located within Cargo tank #10C and Cargo Tank #9C. Due to compromised bulkheads between tanks the cargo transfer pumps are the most effective pumps to mitigate water ingress for spaces including the ER Void, FO Contamination, and #2 Deep tank. To ensure pumping ability remains in effect for those spaces, we will begin with internal patching efforts in the aft most affected areas. Work will progress forward so that when the aft bulkhead of cargo tank #10C (Frame – 59) is sealed, it will be with confidence that no water ingress further aft will occur which requires the pumping capacity of the cargo tank pumps in #10C and #9C.

The forward most tank requiring interior patching is tank #7C, which will require interior patching at the bulkhead shared with the double bottom oily waste tank (frame 43 longitudinal 7P). Ships crew are performing tank washing and ventilation to improve atmospheric conditions and make safe for entry. Once tank is safe for entry interior assessments will be performed to confirm the location of the ingress point. Based on previously mitigated ingress volumes it is expected that the hull penetration is relatively small. Patching methodology will remain the same as the other affected tanks.

The specific desired properties of the grout to be utilized is still being evaluated. Considerations regarding engineering requirements as well as locally available resources are contributing factors. Until such engineering specifics can be identified the volume of grout required is currently assumed. The below table is the current presumed quantities required and is subject to change.

Space	Estimated Grout Volume [m <sup>3</sup> ]
Cargo tank #10C	46.3
Deep tank #2P	17.6
Cont. FO Tank	76.5
Engine Room Void	21.5
<b>Total</b>	<b>161.9</b>

The below images illustrate the areas that are presumed to require sealing by welding or grout patching. The areas where patching is expected to be required are indicated in orange color. Until water ingress is fully stopped by divers, areas pumped dry and made gas free, the planning and patching locations is based on numerous assumptions and is subject to change.

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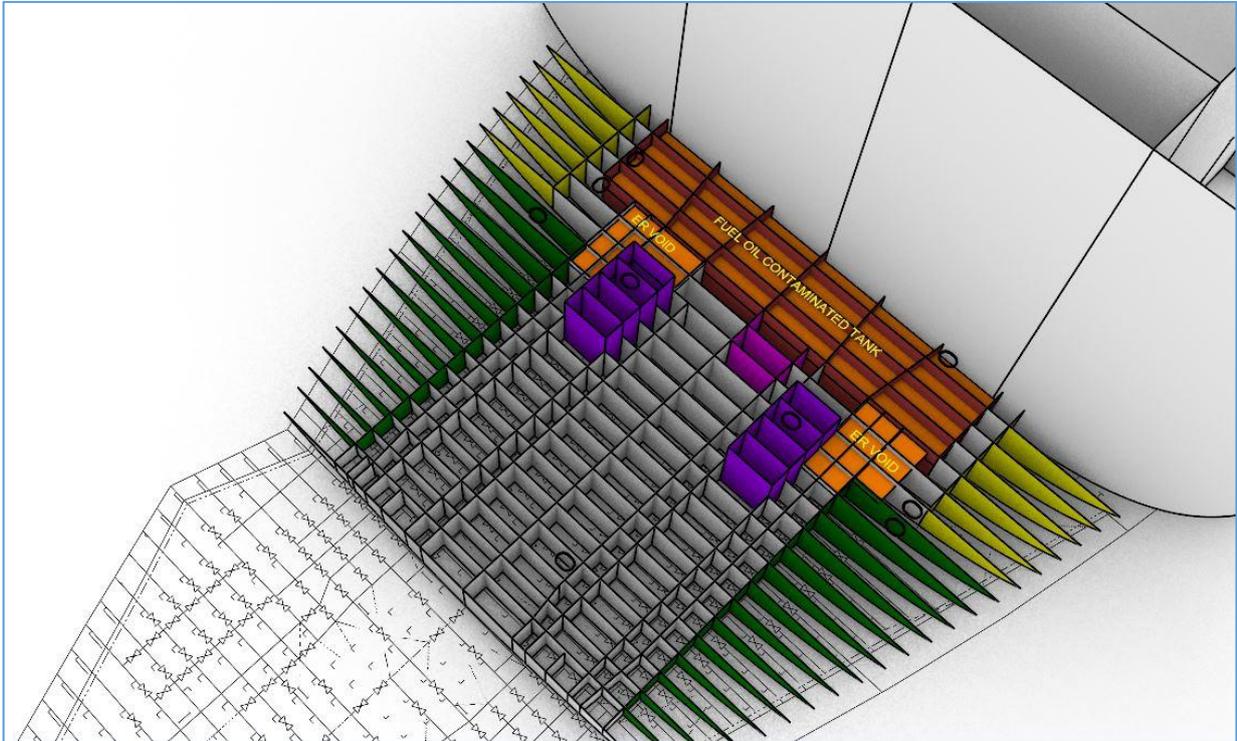


Figure 1 - Illustrates patching required in FO Contamination Tank and Engine Room Void in orange

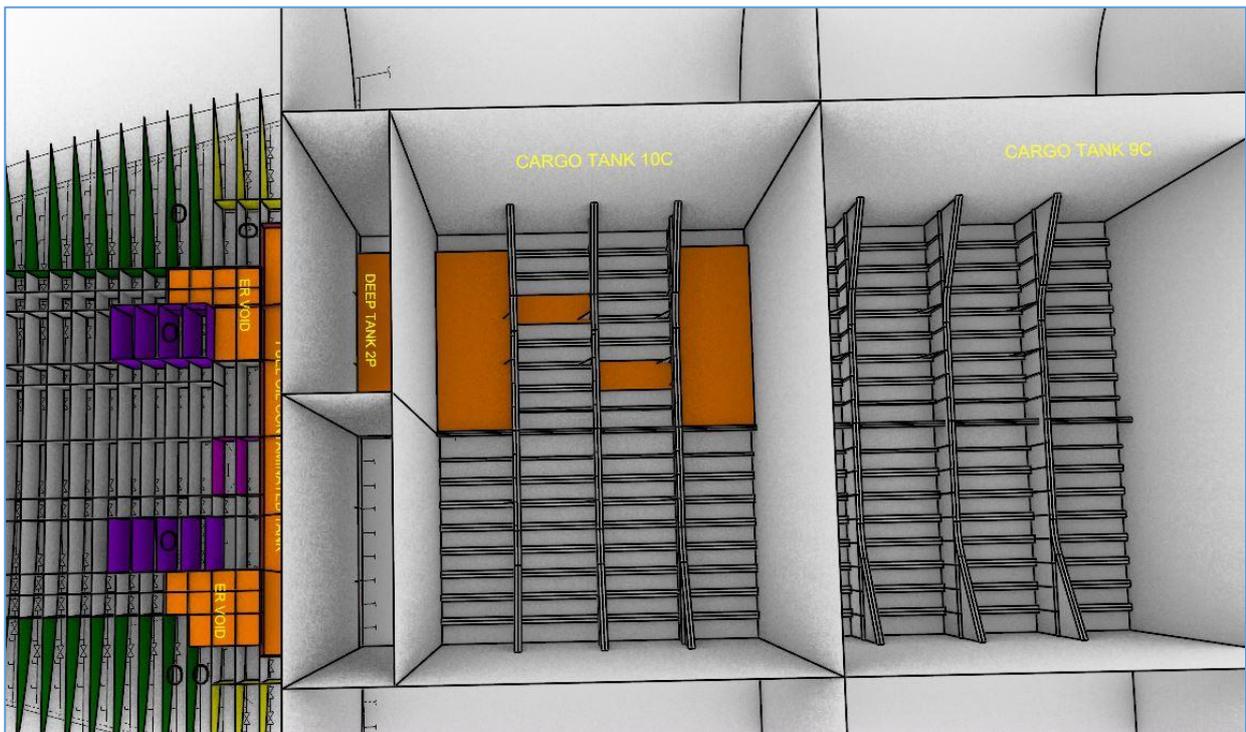


Figure 2 - Illustrates patching required in Cargo Tank #10C and #2 Deep Fuel Oil Tank in orange



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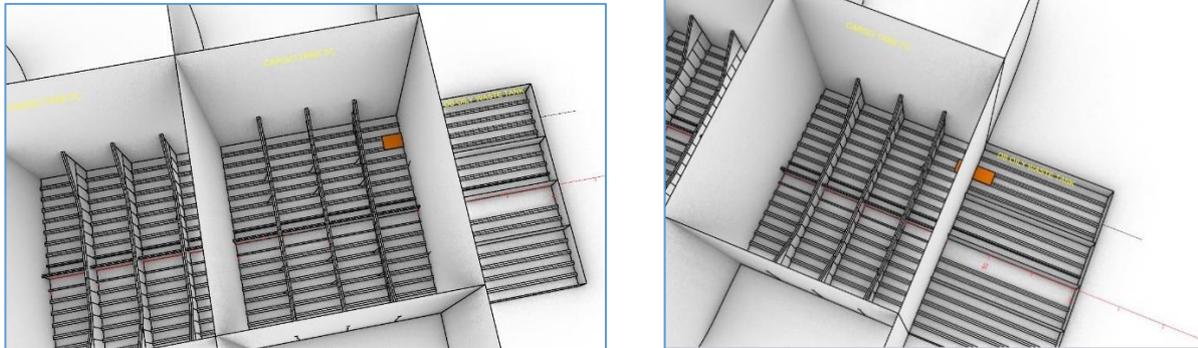


Figure 3 Illustrates patching required in cargo tank #7C and DB Oily Waste Tank at bulkhead in orange

### **2.1.2. Surface Preparation**

#### **Surfaces Preparation**

To ensure proper adhesion of the grout to the steel surfaces, the areas of application will be inspected for heavy debris and oil/fuel residues. Where debris and residues are present the salvage team will clean in preparation for the grout application. Debris are to be removed and degreaser agents with a pressure washer are to be utilized to disperse any present residues. Diaphragm stripping pumps will be used to collect and discharge any washing solution to an appropriately designated tank.

Areas where welding is required will undergo additional considerations for hot work. Salvage team members will clean and ventilate tanks prior to any hot work beginning. Marine Chemist to verify tanks are safe for intended work. Coordination with ship crew will be performed to satisfy any necessary permitting. Fire watches and firefighting systems will be in place, ready and available.

### **2.1.3. Delivery Method for Grout Material**

#### **Delivery method for grout mixture to patching zones and locations**

Two methods are envisioned to be employed for delivery of grout mixture to the patching zones and locations. One method is to utilize a mobile pump truck to pump the mixture directly to patching locations. The second method is for the mobile pump truck to pump the mixture to a portable grouting pump (assumed situated on deck of the Ship) to deliver the mixture to patching location. Each chosen method will depend on in-situ situation and requirements, and in view of the pumping distance and ease of accessibility.

Adequate length of high-pressure grouting hoses connected to the either grouting pump and/or pump truck will be utilized to deliver the grout mixture to the patching zones and location. Specific openings may need to be created in way of specific tank frames or bulkhead(s), to provide accessibility.



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A cement grouting specialist contractor (GEO Supply LLC) has been identified to provide a cement grout solution to support our envisaged grouting requirement. The contractor is in the process of preparing a grouting proposal package. Refer to Appendices for the company profile of GEO Supply.

Meanwhile, below is a summarized description of the recommended cement grout application:

1. Depending on final preference and requirement, the cement grout can be supplied either in bags which can be hand-mixed at site or it can be premixed in mixer trucks at a batching plant facilities.
2. Prior to any commencement of grouting activities, a grouting machine will be prepared at site. The machine should be placed onto a water-tight platform whereby any residual cement waste material emanating from the machine will be accumulated. Thereafter, the residual can be collected and disposed in a proper manner. Thus, any pollution to the surrounding environment will be avoided.
3. At time of grouting activities, the cement grout admixtures will be loaded into the grouting machine, and pumped through high pressure hoses (inner diameter between 1 to 2 inches) to each targeted patching location.
4. The grouting operation will require a carefully planned coordination and delivery sequence for distributing batches of cement grout to each patching location. This will ensure a smooth operation and to avoid any premature hardening and/or wastage of the grout mixture.

**2.1.4. Resources**

To perform the above-mentioned operations, third party subcontractors will be engaged as follows:

- Grout vendors to provide materials and labor as well as mixing and pumping solutions.
- Welding vendors to supply qualified welding team, welding machines, and consumables.

**2.1.5. Equipment**

The envisaged equipment will consist of the following items.

Quantity	Full meaning
1 lot	Gas detectors and analyzer equipment
1 lot	Water pumps, hoses and supporting machineries
1 lot	Washing, cleaning & degreaser equipment & material
1 lot	Grouting material
1 lot	Pumping equipment for grout
1 lot	Grout mixer trucks and mobile pump truck(s)
1 lot	Welding, gas cutting and fabrication equipment
1 lot	Patching tools and material (steel plates, gaskets, sealing compounds & material)
1 lot	Rigging gears, general work tools & material



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Quantity	Full meaning
1 lot	PPE, gas masks, chemical suits, etc
1 lot	Radios, telecom communication equipment
1	<i>*Additional necessary equipment as required</i>

When available, specifications of the equipment spread will be provided in due course.

### 2.1.6. Personnel

The on-site project team will consist of the following key personnel.

Quantity	Full meaning
1	Salvage Master
1	Shore Coordinator
1	Salvage Naval Architect
1	Salvage Officer / Safety
1	Salvage Superintendent
1	Salvage Supervisor
1	Salvage Foreman
2	Salvage Diver/Rigger
1	Salvage Rigger
8	Welder / Fabricators (1 x Supervisor, 1 HSE officer, 4 x qualified Welders + 2 Fitters), for general welding & fabrication works, for patching up at locations whereby grouting application is not possible or unsuitable.
4	Grouting Team – operators & assistants for operating grout pump(s)
9	Welding Team (1 x Supervisor + 8 x qualified Welders). Only require, if reinforcement are needed at i.w.o damaged tank's bulkheads and longitudinal frames, etc. These welding personnel maybe supplement from above-mentioned Welder / Fabricators team.



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### 3. NAVAL ARCHITECTURE

In support of the proposed salvage operations the following engineering has been carried out by the on-site Naval Architect.

#### 3.1. **Structural Damage**

Typical damage in Cargo Tank 9C and Cargo Tank 10C is depicted in below figures. For these tanks the main damaged area is on PS between Longitudinal 2 and Longitudinal 7 where Cargo Tank 10C has more damage compared to Cargo Tank 9C.





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### 3.2. Damaged Allowable Bending Moment and Shear Force

From a structural perspective the cross sections in way of frame 55 and frame 59 are analyzed such that the effect of the structural damage can be translated into a reduction of the allowable Bending Moment and Shear Force for the at-sea going loading condition.

For the reduction in Bending Moment and Shear Force the in-port allowable is used as a reference to calculate the allowable stress with the intact Section Modulus/Shear Area of a specific frame. Subsequently, the allowable in-port BM and SF are calculated for the damaged condition using the damaged Section Modulus/Shear Area of a specific frame. Thereafter, the difference between the intact in-port condition and the intact at-sea, which is considered as the design Wave Induced Bending Moment/Shear Force, is subtracted from the damaged allowable in-port which finally results in the (reduced) allowable damaged Bending Moment and Shear Force at-sea for a specific frame.

The structural damage results in a reduction of allowable BM and SF at frame 55 and frame 59 which are inserted in the allowable table to create the 'Damaged allowable SM and SF'.

Fr.	LCG [ft-FP]	Bending Moment [LT-ft]		Shear Force [LT]	
		In-Port	At-sea	In-Port	At-sea
22	72	334110	155830	8760	7760
31	158	703376	328056	8760	7450
37	218	856188	390500	8760	7700
43	278	856188	390500	8760	7960
47	318	856188	390500	8760	7960
51	358	856188	390500	8760	7860
55	398	693867	228179	8272	7372
59	432	800633	205608	8270	7370
60	440.5	865021	403450	8760	7500
80	490.5	633000	295240	5520	4270
98	535.5	424181	197840	5060	4140

Table 1 - Damaged Allowable Bending Moments and Shear Forces

More detail of the Bending Moment and Shear Force reduction calculations can be found under Appendices.

### 3.3. Proposed Damaged Loading Condition with Minimum Bending Moments

The damaged allowable Bending Moment and Shear Force are implemented in the HecSalv model which was received from SupSalv. This model with reduced strength is then used to determine an optimal loading condition where the Bending Moments are kept at a minimum aft of Frame 51 as this is considered where the majority of the structural damage is.

In this optimal loading condition, the following is assumed:





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- All slops are discharged
- All intact cargo is discharged
- Deep Tank #2S is discharged to avoid risk of any potential oil spill as damage may be expected inside this tank
- Grout weights have been added to the model at the preliminary defined locations but are subject to change

The ballast tanks which are situated most aft (8P, 8S, 6P, 6S) are used to reduce the Bending Moment aft of Frame 51. The bending moment could be further reduced if the most aft intact tanks (Cargo tank #10P and Cargo tank #10S) were used. It should however be noted that these tanks currently contain DFM and should be discharged to avoid any potential oil spill if anything were to happen. Cargo tank #10P and Cargo tank #10S should then be thoroughly cleaned to ensure that ballast water can be taken in without risk of contamination, allowing for its normal discharge in the future.

It should be noted that it is assumed that intact cargo/fuel oil is discharged as this loading condition could potentially be used for towing as per requested by SUPSALV but is subject to change (additional ballasting etc.). This loading condition opens the consideration of using/cleaning the Cargo Tank #10P and Cargo tank #10S as ballast tanks to reduce Bending Moments in way of the structural damaged locations in the future.

Furthermore, this loading condition shows that even without structural reinforcements the occurring Bending Moments/Shear Forces at-sea can be reduced to be less than the damaged allowable Bending Moments/Shear Forces.

<b>Optimal loading condition USNS BIG HORN for reduced Bending Moments</b>		
<b>Item</b>	<b>Value</b>	<b>Unit</b>
Displacement	26.341	LT
Heel Angle	0.09	Degrees
Trim Angle	2.72	Degrees
Trim at Perpendiculars	30.83	Ft
GMt	9.36	ft
Max. Bending Moment % Damaged Allowable At-sea	49.53	%
Max. Shear Force % Damaged Allowable At-sea	16.38	%

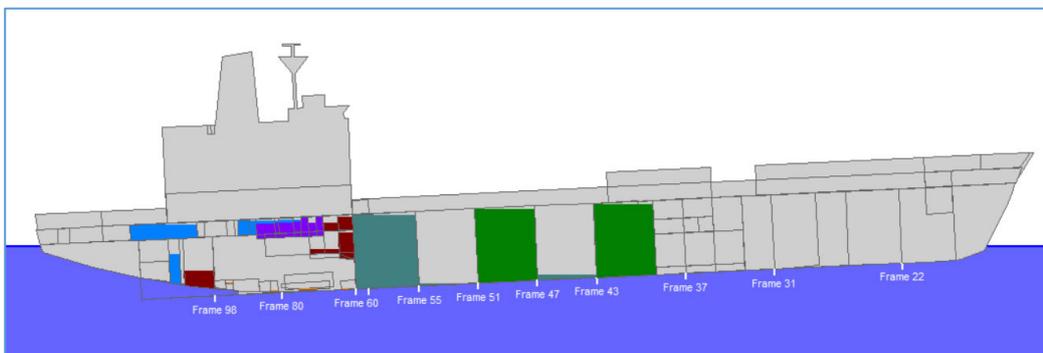


Figure 4 - USNS BIG HORN Loading Condition where Bending Moments are kept at a minimum

The engineering to support the salvage operations is a continuous process and following developments.



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**4. TIMELINE**

**4.1. Planning**

The estimation of the duration of the operation is based on the following assumptions;

- 12 hours operation;
- 24 hours operation when required;
- No allowance for unworkable weather;
- No allowance for delays beyond SMIT’s control such as local circumstances.

D	Description	Days, to be confirmed
1	Obtaining approval & permits from Duqm Port Authority for mobilization of contractors personnel, equipment & material to BIG HORN.	
2	Mobilization equipment & material for tanks cleaning, water blaster, detergent, etc,	
3	Tanks cleaning prior grouting operation.	
4	Mobilization of grouting contractors, equipment & material	
5	Preparation activities for grouting operation	
6	Grout operation	
7	Completion of activities.	
8		

A detailed timeline can be scheduled in due course when the appropriate information are available.

**4.2. Reporting**

A Daily Progress Report (DPR) will be prepared and distributed to SMIT’s and client’s office on a daily basis.

The DPR typically details;

- Weather;
- Progress during the last reporting period;
- Planning for the next 24 hours of operation;
- Personnel and resources on location;
- Considerations.

SMIT will communicate all relevant information to the client. All questions from client to SMIT can be directed to the Papendrecht Office or to SMIT’s Salvage Master on site.



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## 5. **SHE-Q**

This section intends to provide an overview of the management systems in use within SMIT Salvage as a Boskalis company. More detailed information is available upon request.

### 5.1. **General**

Our people are our most valuable assets. The aim of is to ensure that all employees can carry out their in healthy and safe conditions. As our work affects and more people and our projects become bigger more complex, the importance of safety will continue increase. For these reasons, safety is a top priority at and a vital part of our corporate strategy.



SMIT  
work  
more  
and  
to  
SMIT

### 5.2. **NINA Program**

Sophisticated, well-maintained equipment and our management systems, which are based on ISO 45001, ISO 14001 and ISO 9001, IMO and ISM, are important elements that contribute to safety. However, we believe that, in the end, our employees hold the key to a safe performance. That is why our NINA (No Injuries, No Accidents) safety programme has a strong focus on people. Ultimately, safety is about getting everyone to work safely, not because they've been told to, but because that is the way they want to work and that is the way they know how to work.

Our SHE Policy Statement clearly states that situations which may result in personal accidents and damage to equipment, property and the environment are to be avoided on all our operations. We will strive to reduce the level of accidents, incidents and damages in each year of operation.

The ultimate aims of our SHE Policy are:

- Zero personal accidents
- Zero damage to equipment and property
- Zero incidents with environmental impact

### 5.3. **Way of Working**

SMIT has developed and implemented the Way of Working, being our integrated management system that provides a harmonized approach in tenders and projects. The Way of Working is based on four principles and on four aspects describing our identity.



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Our Way of Working Policy Statement clearly expresses what we stand for with regards to quality:  
*“The Way of Working is our integrated quality management system, designed to give our staff the best possible support in achieving operational excellence. It is aimed at offering a consistent client approach, with a clear focus on providing safe and sustainable solutions. The Way of Working management system is compliant with the international ISO 45001, ISO 14001 and ISO 9001 standards and is assessed and certified by an independent external auditor. We monitor our compliance and identify opportunities to further improve our performance by conducting regular internal audits, inspections and management reviews”*



**5.4. Certification**

The management system of SMIT Salvage is certified in accordance with:

- ISO 9001: 2015: - Organization Quality Management System Standard  
 A quality assurance standard to demonstrate our ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements demonstrate our ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements.
- ISO 14001:2015: - Environmental Management System Standard  
 An environmental assurance standard to demonstrate our ability to consistently enhance environmental performance, fulfil compliance obligations and achieve environmental objectives.
- ISO 45001:2018: - Occupational Health and System Standard  
 A standard for assurance and continual improvement of working conditions and –factors that affect the wellbeing of employees, subcontractors, personnel, visitors and any other person in the workplace. Normal text.

**6. REFERENCES, ABBREVIATIONS, DEFINITIONS**

**6.1. Abbreviations**

Abbreviation	Full meaning
WoW	Way of Working
BM	Bending Moment
SF	Shear Force



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## 7. **APPENDICES**

### 7.1. **Appendix A - USNS BIG HORN Damaged BM/SF Allowable and Loading Condition.**



SMIT Salvage BV – P.O. Box 43, 3350 AA Papendrecht, The Netherlands

<b>ORIGIN:</b>	(b)(6)	<b>DATE:</b>	18 <sup>th</sup> October, 2024
<b>CHECKED:</b>	(b)(6)	<b>REF. NO.</b>	SSG 242134
<b>PROJECT:</b>	USNS BIG HORN	<b>REV:</b>	Interim Report, rev 0
<b>SUBJECT:</b>	USNS BIG HORN Damaged BM/SF Allowable and Loading Condition		

## 1. Introduction

The USNS BIG HORN was involved in a grounding and was immediately refloated. She was berthed at Duqm port, Oman. Several tanks were breached and subsequently patched.

The USNS BIG HORN suffered structural damage as a result from the grounding. An initial visual inspection of the damage showed that the majority of the damage is aft of frame 55. There are tripped longitudinal stiffeners along with deformation of the bottom plating. From the initial visual inspection of accessible tanks/voids, the confirmed damage extends to the Skeg, Cargo Tank 9C, Cargo Tank 10C, Deep Tank 2P, Contaminated Fuel Oil Tank and Engine Room Void.

Specifications	Unit
IMO Number	8812162
Year Built	1992
Type	T-AO 187 Class 198 series Fleet Oiler
LOA	677'-6"
LPP	650'-0"
Max depth	50'-6"
Breadth	97'-6"
Deadweight @Summer Load Line	27513.62
LSW	15054
	LT
	LT

## 2. Observed Structural Damage

Typical damage in Cargo Tank 9C and Cargo Tank 10C is depicted in below figures. For these tanks the main damaged area is on PS between Longitudinal 2 and Longitudinal 7 where Cargo Tank 10C has more damage compared to Cargo Tank 9C.



Figure 1 - PS CT 10C Frame 59 looking aft



Figure 2 - PS CT 10C Frame 58 looking aft



Figure 3 - PS CT 10C Frame 57 looking aft

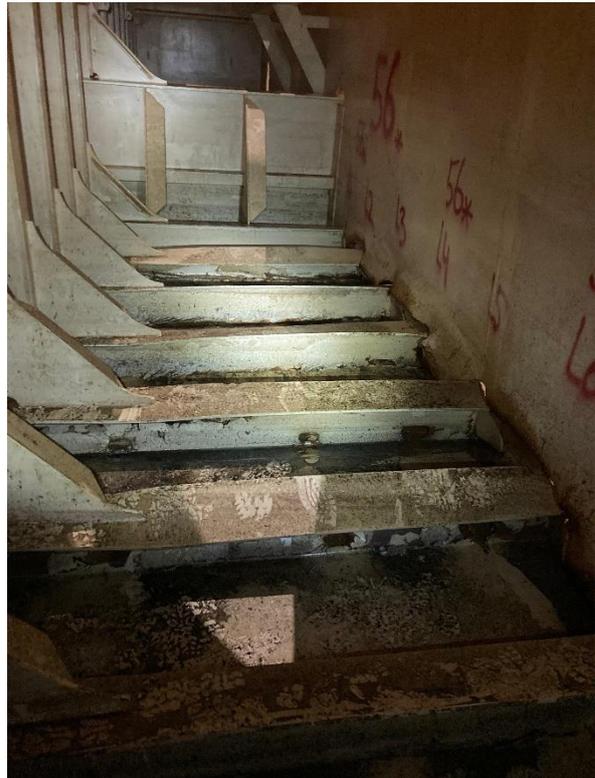


Figure 4 - PS CT 10C Frame 56 looking aft



Figure 5 - PS CT 9C Frame 55 looking aft



Figure 6 - PS CT 9C Frame 54 looking aft



Figure 7 - PS CT 9C Frame 53 looking aft



Figure 8 - PS CT 9C Frame 52 looking aft

### 3. Structural Strength Reduction

From a structural perspective the cross sections in way of frame 55 and frame 59 are analyzed such that the effect of the structural damage can be translated into a reduction of the allowable Bending Moment for the at-sea going loading condition.

For the reduction in Bending Moment the in-port allowable Bending Moment is used as a reference to calculate the allowable stress with the intact Section Modulus of a specific frame. Subsequently, the allowable in-port Bending Moment is calculated for the damaged condition using the damaged Section Modulus of a specific frame. Thereafter, the difference between the intact in-port condition and the intact at-sea, which is considered as the design Wave Induced Bending Moment, is subtracted from the damaged allowable in-port Bending Moment which finally results in the (reduced) allowable damaged Bending Moment at-sea for a specific frame. The reduced at-sea BM reduction for a specific frame is calculated using the bottom Section Modulus and top Section Modulus. Whichever is lower will be assumed as new BM (at-sea) for the specific corroded and damaged frame.

For the reduction in Shear Force the in-port allowable Shear Force is used as a reference to calculate the allowable shear stress with the intact Shear Area (For Vertical Shear) for a specific frame. Subsequently, the allowable in-port Bending Moment is calculated for the damaged condition using the damaged Shear Area (For Vertical Shear) for a specific frame. Thereafter, the difference between the intact in-port condition and the intact at-sea, which is considered as the design Wave Induced Shear Force, is subtracted from the damaged allowable in-port Shear Force which finally results in the (reduced) allowable damaged Shear Force at-sea for the specific frame.

The damaged Sections assume the following damages:

- Damaged Longitudinal 2 to Longitudinal 7 on PS
- Damaged Bottom plating in way of Longitudinal 2 to Longitudinal 7 on PS
- Damaged Longitudinal 6 and Longitudinal 7 on SB
- Damaged Bottom plating in way of Longitudinal 6 to Longitudinal 7 on SB

Furthermore, as the ship was built in 1992 there is 10% corrosion applied on the Shell/Bottom plating which is not considered damaged.

Above-described damage is considered conservative as no residual strength is considered for the damaged structural members of the cross section.

Below table indicates the intact allowable Bending Moment and Shear Forces.

Fr.	LCG [ft-FP]	Bending Moment [LT-ft]		Shear Force [LT]	
		In-Port	At-sea	In-Port	At-sea
22	72.00	334110	155830	8760	7760
31	158.00	703376	328056	8760	7450
37	218.00	856188	390500	8760	7700
43	278.00	856188	390500	8760	7960
47	318.00	856188	390500	8760	7960
51	358.00	856188	390500	8760	7860
60	440.50	865021	403450	8760	7500
80	490.50	633000	295240	5520	4270
98	535.50	424181	197840	5060	4140

**Table 1 – Intact Allowable Bending Moment and Shear Force**

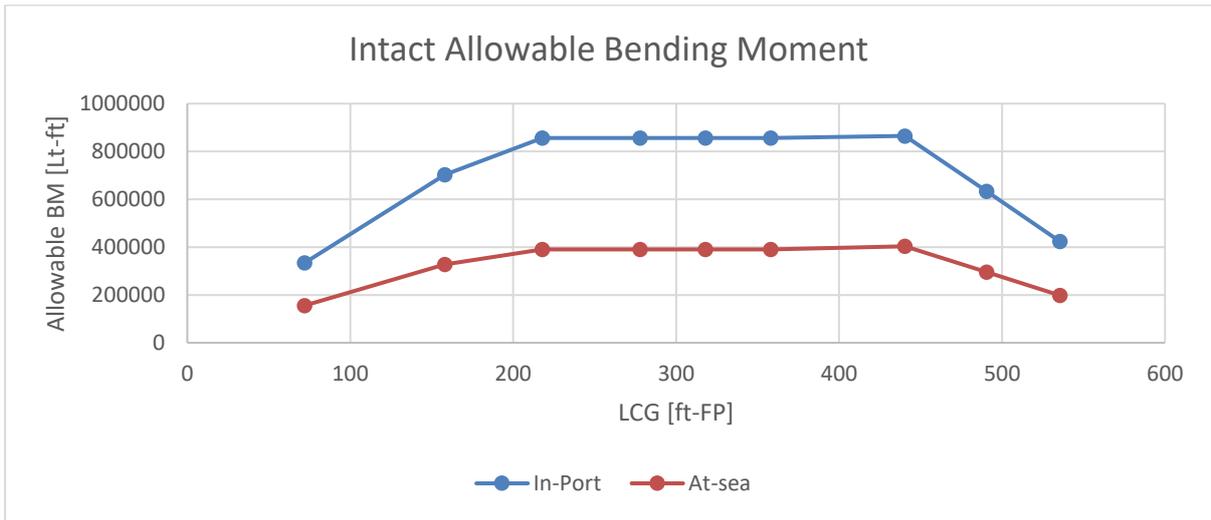


Figure 9 – Intact Allowable Bending Moment for In-Port and At-sea

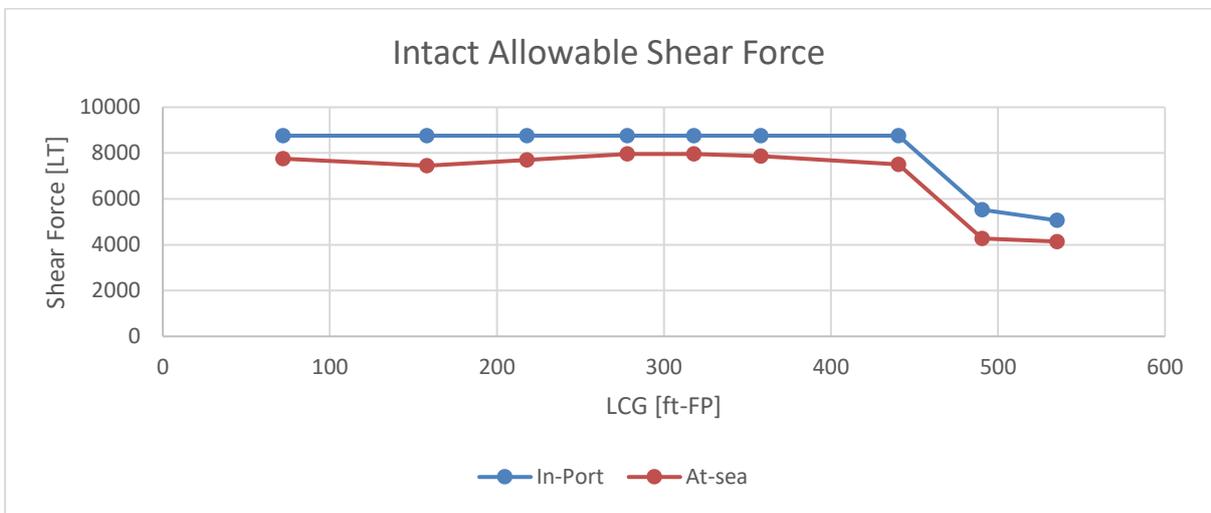


Figure 10 - Intact Allowable Shear Force for In-Port and At-sea

### 3.1 Frame 55

Below figure indicates the damaged structural members in red and the corroded Shell/Bottom plating in orange at frame 55.

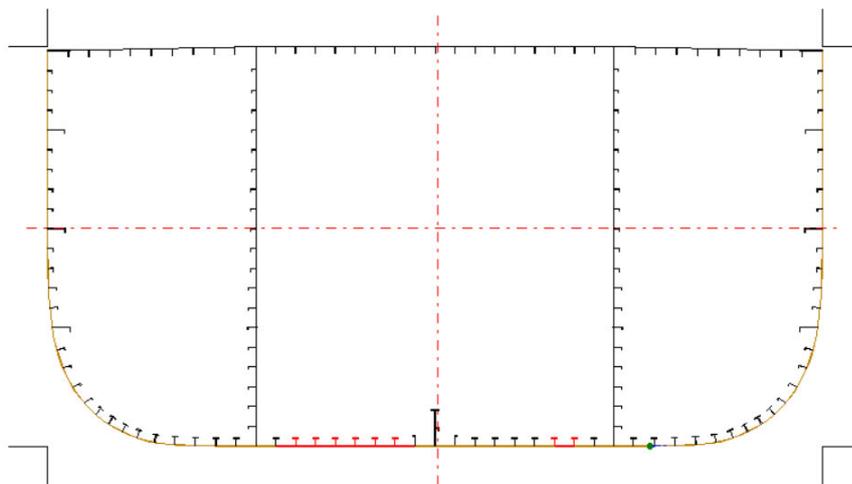


Figure 11 - Frame 55 Cross Section Looking Fwd with Damage and Corrosion

The section properties for frame 55 are depicted in the figure below.

Equivalent Mild Steel							
Section Properties	Units	Intact		Corroded		Damaged	
Total Area	m <sup>2</sup>	1511525053		4351510571	3%	2855717952	9%
Weight	MT/m	3969628342		3979898092	3%	3248949363	9%
		Height	1/2 Breadth	Height	1/2 Breadth	Height	1/2 Breadth
Neutral Axis	m	7.78158024	0	7.88235698	0	8.39356972	0
<b>About Horizontal Axis</b>							
Shear Area (for Vert. Shear)	m <sup>2</sup>	1.28681768		1.24118023	4%	1.21514505	6%
Inertia - Ixx	m <sup>4</sup>	98.8569287		96.1278966	3%	86.4014681	13%
<b>Top</b>							
Extreme Fiber Distance	m	7.62986975	(Calc)	7.52909301	(Calc)	7.01788027	(Calc)
Section Modulus	m <sup>3</sup>	12.9565683		12.7675267	1%	12.3116190	5%
<b>Bottom</b>							
Extreme Fiber Distance	m	7.79936024	(Calc)	7.90013698	(Calc)	8.41134972	(Calc)
Section Modulus	m <sup>3</sup>	12.6750048		12.1678771	4%	10.2720099	19%
<b>About Vertical Axis</b>							
Shear Area (for Horz. Shear)	m <sup>2</sup>	1.34329746		1.30521001	3%	1.17917056	12%
Inertia - Iyy	m <sup>4</sup>	240.803052		229.219880	5%	226.844665	6%
<b>Left</b>							
Extreme Fiber Distance	m	14.8752792	(Calc)	14.8657170	(Calc)	14.9970296	(Calc)
Section Modulus	m <sup>3</sup>	16.1881366		15.4193624	5%	15.1259729	7%
<b>Right</b>							
Extreme Fiber Distance	m	14.8747247	(Calc)	14.8842869	(Calc)	14.7529743	(Calc)
Section Modulus	m <sup>3</sup>	16.1887400		15.4001250	5%	15.3761987	5%
<b>Polar</b>							
Inertia - Ixy	m <sup>4</sup>	-0.00178378		0.18204240	10,305%	-2.32378738	-130,173%
Torsional Rigidity - J	m <sup>4</sup>	0.00019843		0.00018179	8%	0.00017034	14%
Inertia - Irr	m <sup>4</sup>	339.659981		325.347776	4%	313.246133	8%

Figure 12 - Frame 55 Section Properties

### 3.1.1 Frame 55 Reduced BM at-sea

The allowable damaged Bending Moment at-sea is calculated as per explained above. For this calculation the following formula is used:

$$SM = \frac{BM}{f_p} \quad \text{Where:}$$

- SM = Section Modulus [mm<sup>3</sup>]
- BM= Bending Moment [Nmm]
- f = Nominal Design Permissible Stress [N/mm<sup>2</sup>]

The reduced at-sea BM reduction is calculated for the bottom Section Modulus and top Section Modulus. Whichever is lower will be assumed as new BM (at-sea) for corroded and damaged frame 55.

The intact in-port BM is determined from the allowable BM table for the frame nearest to frame 55, either forward or aft, selecting the lower value.

Fr55 Assessment for reduced BM at sea using bottom Section Modulus.		
BM <sub>port,fr55 intact</sub>	856188	Maximum BM in port intact @Fr55 [LT-ft]
BM <sub>port,fr55 intact</sub>	265154	Maximum BM in port intact @Fr55 [tm]
BM <sub>port,fr55 intact</sub>	2601159	Maximum BM in port intact @Fr55 [kNm]
BM <sub>port,fr55 intact</sub>	2.60116E+12	Maximum BM in port @Fr55 [Nmm]
f <sub>intact_bottom</sub>	205.2	Bending stress in bottom intact in port condition [N/mm <sup>2</sup> ]

$f_{\text{intact bottom}}$	29765	Bending stress in bottom intact in port condition [psi]
$BM_{\text{port, fr55 damaged}}$	2.10802E+12	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [Nmm]
$BM_{\text{port, fr55 damaged}}$	2108017	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [kNm]
$BM_{\text{port, fr55 damaged}}$	214885	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [tm]
$BM_{\text{port, fr55 damaged}}$	693867	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [LT-ft]
In-port BM reduction (Bottom)	18.96%	Reduction in still water BM (in-port) of corroded and damaged compared to intact for frame 55
Wave induced BM [tm]	144219	Wave induced BM @Fr55 (difference of intact in-port and at-sea BM allowable).
Wave induced BM [LT-ft]	465688	Wave induced BM @Fr55 (difference of intact in-port and at-sea BM allowable).
$BM_{\text{sea, fr59 damaged [tm]}}$	70665	Maximum BM at-sea corroded and damaged @Fr55 [tm]
$BM_{\text{sea, fr59 damaged [LT-ft]}}$	228179	Maximum BM at sea corroded and damaged @Fr55 [LT-ft]
At-sea BM reduction (Bottom)	42%	Reduction in BM (at-sea) of corroded and damaged compared to intact for frame 55

<b>Fr55 Assessment for reduced BM at sea using top Section Modulus.</b>		
$BM_{\text{port,fr55 intact}}$	856188	Maximum BM in port intact @Fr55 [LT-ft]
$BM_{\text{port,fr55 intact}}$	265154	Maximum BM in port intact @Fr55 [tm]
$BM_{\text{port,fr55 intact}}$	2601159	Maximum BM in port intact @Fr55 [kNm]
$BM_{\text{port,fr55 intact}}$	2.60116E+12	Maximum BM in port @Fr55 [Nmm]
$f_{\text{intact bottom}}$	200.8	Bending stress at top intact in port condition [N/mm <sup>2</sup> ]
$f_{\text{intact bottom}}$	29118	Bending stress at top intact in port condition [psi]
$BM_{\text{port, fr55 damaged}}$	2.47168E+12	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [Nmm]
$BM_{\text{port, fr55 damaged}}$	2471679	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [kNm]
$BM_{\text{port, fr55 damaged}}$	251955	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [tm]
$BM_{\text{port fr55 damaged}}$	813569	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr55 [LT-ft]
In-port BM reduction (Top)	5%	Reduction in still water BM (in-port) of corroded and damaged compared to intact for frame 55
Wave induced BM [tm]	144219	Wave induced BM @Fr55 (difference of intact in-port and at-sea BM allowable).
Wave induced BM [LT-ft]	465688	Wave induced BM @Fr55 (difference of intact in-port and at-sea BM allowable).

BM <sub>sea, fr55 damaged</sub> [tm]	107736	Maximum BM at-sea corroded and damaged @Fr55 [tm]
BM <sub>sea, fr55 damaged</sub> [LT-ft]	347881	Maximum BM at sea corroded and damaged @Fr55 [LT-ft]
At-sea BM reduction (Top)	11%	Reduction in BM (at-sea) of corroded and damaged compared to intact for frame 55

### 3.1.2 Frame 55 Reduced SF at-sea

The allowable damaged Shear Force at-sea is calculated as per explained above. For this calculation the following formula is used:

$$\tau = \frac{SF}{A} \text{ Where:}$$

- $\tau$  = Shear stress [N/mm<sup>2</sup>]
- SF= Shear Force [N]
- A = Shear Area (For Vertical Shear) [mm<sup>2</sup>]

Fr55 Assessment for reduced SF at sea		
F <sub>port,fr55 intact</sub>	8760	Maximum SF in port intact @Fr55 [LT]
F <sub>port,fr55 intact</sub>	8901	Maximum SF in port intact @Fr55 [mt]
T <sub>intact</sub>	67.85	Shear stress intact in port condition [N/mm <sup>2</sup> ]
T <sub>intact</sub>	9841	Shear stress intact in port condition [psi]
F <sub>port, fr55 damaged</sub>	82451397	Maximum still water SF in loading condition corroded and damaged @Fr55 [N]
F <sub>port, fr55 damaged</sub>	8405	Maximum still water SF in loading condition corroded and damaged @Fr55 [mt]
F <sub>port, fr55 damaged</sub>	8272	Maximum still water SF in loading condition corroded and damaged @Fr55 [LT]
Reduction	6%	Reduction in still water SF (in-port) of corroded and damaged compared to intact for frame 55
Wave induced SF [mt]	914	Wave induced SF @Fr55 (difference of intact in-port and at-sea SF allowable)
Wave induced SF [LT]	900	Wave induced SF @Fr55 (difference of intact in-port and at-sea SF allowable)
SF <sub>sea, fr55 damaged</sub> [mt]	7490	Maximum SF at-sea corroded and damaged @Fr55 [mt]
SF <sub>sea, fr55 damaged</sub> [LT]	7372	Maximum SF at sea corroded and damaged @Fr55 [LT]
At-sea SF reduction	6%	Reduction in SF (at-sea) of corroded and damaged compared to intact for frame 55

### 3.2 Frame 59

Below figure indicates the damaged structural members in red and the corroded Shell/Bottom plating in orange at frame 59.

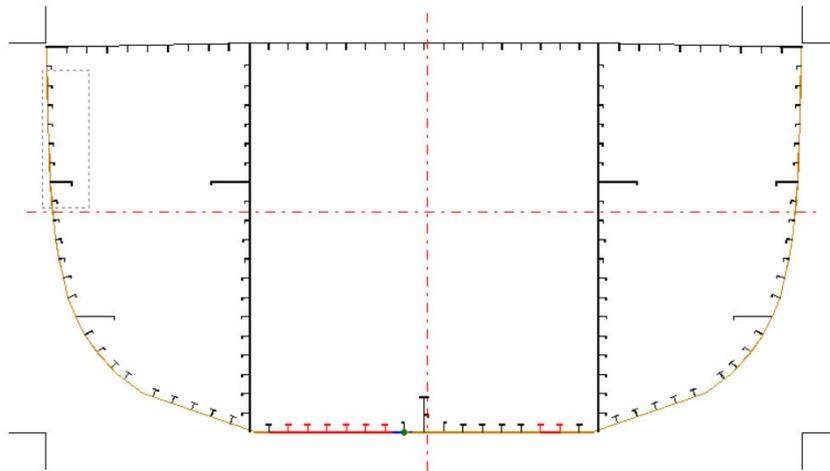


Figure 13 - Frame 59 Cross Section Looking Fwd with Damage and Corrosion

The section properties for frame 55 are depicted in the figure below.

Equivalent Mild Steel Section Properties	Units	Intact		Corroded		Damaged	
Total Area	m <sup>2</sup>	3969728537		3279800272	3%	1695636989	9%
Weight	MT/m	7985722696		2574870282	3%	1150863093	9%
		Height	1/2 Breadth	Height	1/2 Breadth	Height	1/2 Breadth
Neutral Axis	m	8.03900216	0	8.12438666	0	8.71278156	0
<b>About Horizontal Axis</b>							
Shear Area (for Vert. Shear)	m <sup>2</sup>	1.25443528		1.21043020	4%	1.18420560	6%
Inertia - I <sub>xx</sub>	m <sup>4</sup>	88.6075346		86.3227842	3%	75.2824877	15%
<b>Top</b>							
Extreme Fiber Distance	m	7.36939983	(Calc)	7.28401533	(Calc)	6.69562043	(Calc)
Section Modulus	m <sup>3</sup>	12.0237111		11.8509888	1%	11.2435417	6%
<b>Bottom</b>							
Extreme Fiber Distance	m	8.05729016	(Calc)	8.14267466	(Calc)	8.73106956	(Calc)
Section Modulus	m <sup>3</sup>	10.9971879		10.6012812	4%	8.62236718	22%
<b>About Vertical Axis</b>							
Shear Area (for Horz. Shear)	m <sup>2</sup>	1.30741626		1.27133864	3%	1.13627271	13%
Inertia - I <sub>yy</sub>	m <sup>4</sup>	214.713562		204.998235	5%	202.472879	6%
<b>Left</b>							
Extreme Fiber Distance	m	14.8596680	(Calc)	14.8487358	(Calc)	14.9969364	(Calc)
Section Modulus	m <sup>3</sup>	14.4494185		13.8057701	4%	13.5009492	7%
<b>Right</b>							
Extreme Fiber Distance	m	14.8589263	(Calc)	14.8698585	(Calc)	14.7216579	(Calc)
Section Modulus	m <sup>3</sup>	14.4501397		13.7861591	5%	13.7534019	5%
<b>Polar</b>							
Inertia - I <sub>xy</sub>	m <sup>4</sup>	-0.00213272		0.20498716	9,712%	-2.58352982	-121,037%
Torsional Rigidity - J	m <sup>4</sup>	0.00017796		0.00016376	8%	0.00014982	16%
Inertia - I <sub>rr</sub>	m <sup>4</sup>	303.321097		291.321019	4%	277.755366	8%

Figure 14 - Frame 59 Section Properties

### 3.2.1 Frame 59 Reduced BM at-sea

The allowable damaged Bending Moment at-sea is calculated as per explained above. For this calculation the following formula is used:

$$SM = \frac{BM}{f_p} \quad \text{Where:}$$

- SM = Section Modulus [mm<sup>3</sup>]
- BM= Bending Moment [Nmm]
- f = Nominal Design Permissible Stress [N/mm<sup>2</sup>]

The reduced at-sea BM reduction is calculated using the bottom Section Modulus and top Section Modulus. Whichever is lower will be assumed as new BM (at-sea) for corroded and damaged frame 59.

The intact in-port BM is determined from the allowable BM table for the frame nearest to frame 59, either forward or aft, selecting the lower value.

<b>Fr59 Assessment for reduced BM at sea using bottom Section Modulus.</b>		
BM <sub>port,fr59 intact</sub>	856188	Maximum BM in port intact @Fr59 [LT-ft]
BM <sub>port,fr59 intact</sub>	265154	Maximum BM in port intact @Fr59 [tm]
BM <sub>port,fr59 intact</sub>	2601159	Maximum BM in port intact @Fr59 [kNm]
BM <sub>port,fr59 intact</sub>	2.60116E+12	Maximum BM in port @Fr59 [Nmm]
f <sub>intact bottom</sub>	236.5	Bending stress in bottom intact in port condition [N/mm <sup>2</sup> ]
f <sub>intact bottom</sub>	34306	Bending stress in bottom intact in port condition [psi]
BM <sub>port, fr59 damaged</sub>	2.03944E+12	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [Nmm]
BM <sub>port, fr59 damaged</sub>	2039444	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [kNm]
BM <sub>port, fr59 damaged</sub>	207894	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [tm]
BM <sub>port fr59 damaged</sub>	671296	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [LT-ft]
In-port BM reduction (Bottom)	21.59%	Reduction in still water BM (in-port) of corroded and damaged compared to intact for frame 59
Wave induced BM [tm]	144219	Wave induced BM @Fr59 (difference of intact in-port and at-sea BM allowable).
Wave induced BM [LT-ft]	465688	Wave induced BM @Fr59 (difference of intact in-port and at-sea BM allowable).
BM <sub>sea, fr59 damaged</sub> [tm]	63675	Maximum BM at-sea corroded and damaged @Fr59 [tm]
BM <sub>sea, fr59 damaged</sub> [LT-ft]	205608	Maximum BM at sea corroded and damaged @Fr59 [LT-ft]
At-sea BM reduction (Bottom)	47%	Reduction in BM (at-sea) of corroded and damaged compared to intact for frame 59

<b>Fr59 Assessment for reduced BM at sea using top Section Modulus.</b>		
BM <sub>port,fr59 intact</sub>	856188	Maximum BM in port intact @Fr59 [LT-ft]
BM <sub>port,fr59 intact</sub>	265154	Maximum BM in port intact @Fr59 [tm]
BM <sub>port,fr59 intact</sub>	2601159	Maximum BM in port intact @Fr59 [kNm]
BM <sub>port,fr59 intact</sub>	2.60116E+12	Maximum BM in port @Fr59 [Nmm]
f <sub>intact bottom</sub>	216.3	Bending stress at top intact in port condition [N/mm <sup>2</sup> ]
f <sub>intact bottom</sub>	31377	Bending stress at top intact in port condition [psi]
BM <sub>port, fr59 damaged</sub>	2.43238E+12	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [Nmm]
BM <sub>port, fr59 damaged</sub>	2432380	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [kNm]
BM <sub>port, fr59 damaged</sub>	247949	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [tm]
BM <sub>port fr59 damaged</sub>	800633	Maximum still water (in-port) BM in loading condition corroded and damaged @Fr59 [LT-ft]
In-port BM reduction (Top)	6%	Reduction in still water BM (in-port) of corroded and damaged compared to intact for frame 59
Wave induced BM [tm]	144219	Wave induced BM @Fr59 (difference of intact in-port and at-sea BM allowable).
Wave induced BM [LT-ft]	465688	Wave induced BM @Fr59 (difference of intact in-port and at-sea BM allowable).
BM <sub>sea, fr59 damaged</sub> [tm]	103730	Maximum BM at-sea corroded and damaged @Fr59 [tm]
BM <sub>sea, fr59 damaged</sub> [LT-ft]	334945	Maximum BM at sea corroded and damaged @Fr59 [LT-ft]
At-sea BM reduction (Top)	14%	Reduction in BM (at-sea) of corroded and damaged compared to intact for frame 59

### 3.2.2 Frame 59 Reduced SF at-sea

The allowable damaged Shear Force at-sea is calculated as per explained above. For this calculation the following formula is used:

$$\tau = \frac{SF}{A} \text{ Where:}$$

- $\tau$  = Shear stress [N/mm<sup>2</sup>]
- SF= Shear Force [N]
- A = Shear Area (For Vertical Shear) [mm<sup>2</sup>]

<b>Fr59 Assessment for reduced SF at sea</b>		
$F_{port,fr59 \text{ intact}}$	8760	Maximum SF in port intact @Fr59 [LT]
$F_{port,fr59 \text{ intact}}$	8901	Maximum SF in port intact @Fr59 [mt]
$T_{intact}$	69.60	Shear stress intact in port condition [N/mm <sup>2</sup> ]
$T_{intact}$	10095	Shear stress intact in port condition [psi]
$F_{port, fr59 \text{ damaged}}$	82426292	Maximum still water SF in loading condition corroded and damaged @Fr59 [N]
$F_{port, fr59 \text{ damaged}}$	8402	Maximum still water SF in loading condition corroded and damaged @Fr59 [mt]
$F_{port, fr59 \text{ damaged}}$	8270	Maximum still water SF in loading condition corroded and damaged @Fr59 [LT]
Reduction	6%	Reduction in still water SF (in-port) of corroded and damaged compared to intact for frame 59
Wave induced SF [mt]	914	Wave induced SF @Fr59 (difference of intact in-port and at-sea SF allowable)
Wave induced SF [LT]	900	Wave induced SF @Fr59 (difference of intact in-port and at-sea SF allowable)
$SF_{sea, fr59 \text{ damaged [mt]}}$	7488	Maximum SF at-sea corroded and damaged @Fr59 [mt]
$SF_{sea, fr59 \text{ damaged [LT]}}$	7370	Maximum SF at sea corroded and damaged @Fr59 [LT]
At-sea SF reduction	6%	Reduction in SF (at-sea) of corroded and damaged compared to intact for frame 59

#### 4. Damaged Allowable BM and SF

With the obtained damaged in-port and at-sea BM and SF for the considered damaged frames the allowable table is updated where the damaged frame 55 and frame 59 are inserted. The damaged allowable BM for both frames is selected as the lowest obtained value for damaged BM for either the top or bottom calculation, which for both frames is the bottom calculation.

Fr.	LCG [ft-FP]	Bending Moment [LT-ft]		Shear Force [LT]	
		In-Port	At-sea	In-Port	At-sea
22	72	334110	155830	8760	7760
31	158	703376	328056	8760	7450
37	218	856188	390500	8760	7700
43	278	856188	390500	8760	7960
47	318	856188	390500	8760	7960
51	358	856188	390500	8760	7860
55	398	693867	228179	8272	7372
59	432	800633	205608	8270	7370
60	440.5	865021	403450	8760	7500
80	490.5	633000	295240	5520	4270
98	535.5	424181	197840	5060	4140

Table 2 - Damaged Allowable Bending Moment and Shear Force

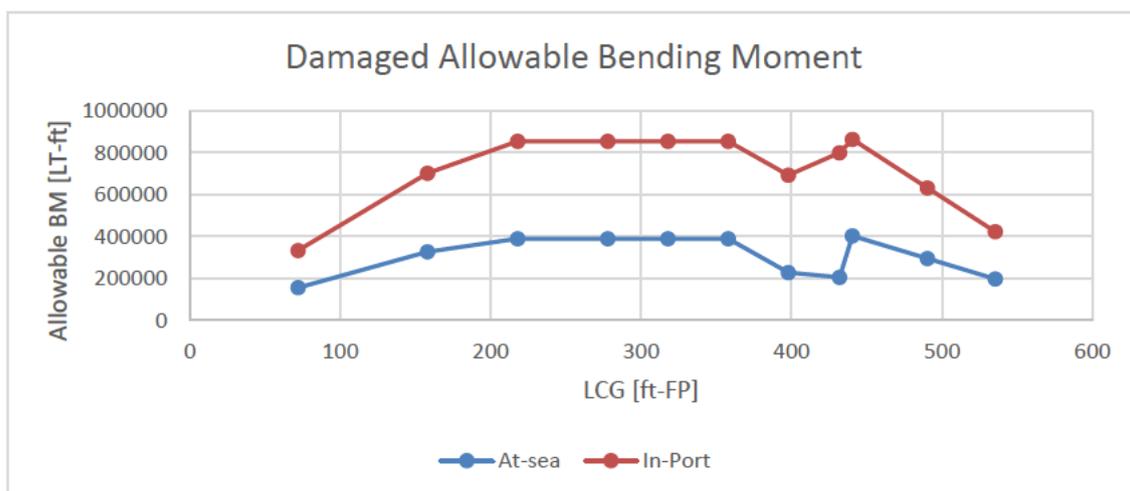


Figure 15 - Damaged Allowable Bending Moment for In-Port and At-sea

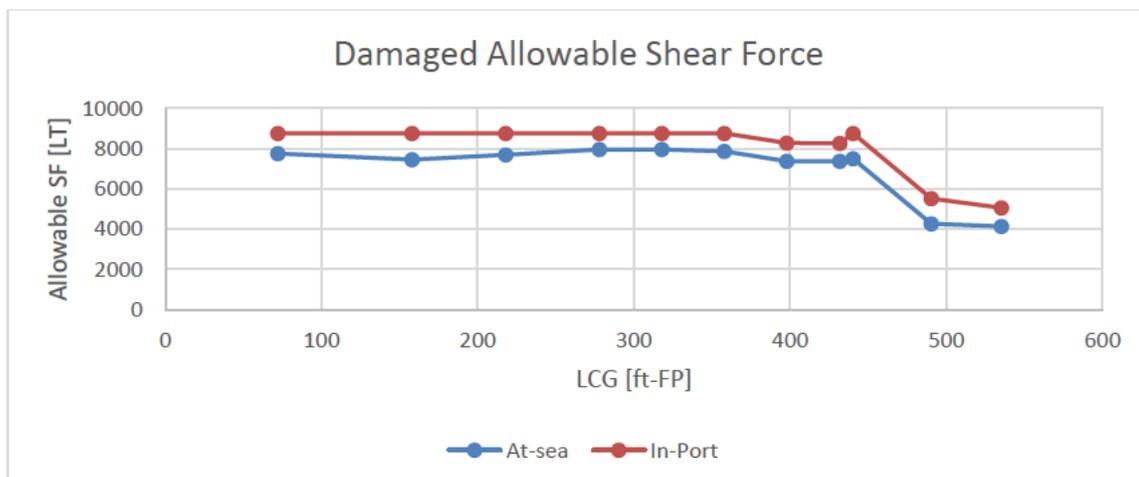


Figure 16 - Damaged Allowable Shear Force for In-Port and At-sea

## 5. Proposed Damaged Loading Condition with Minimum Bending Moments

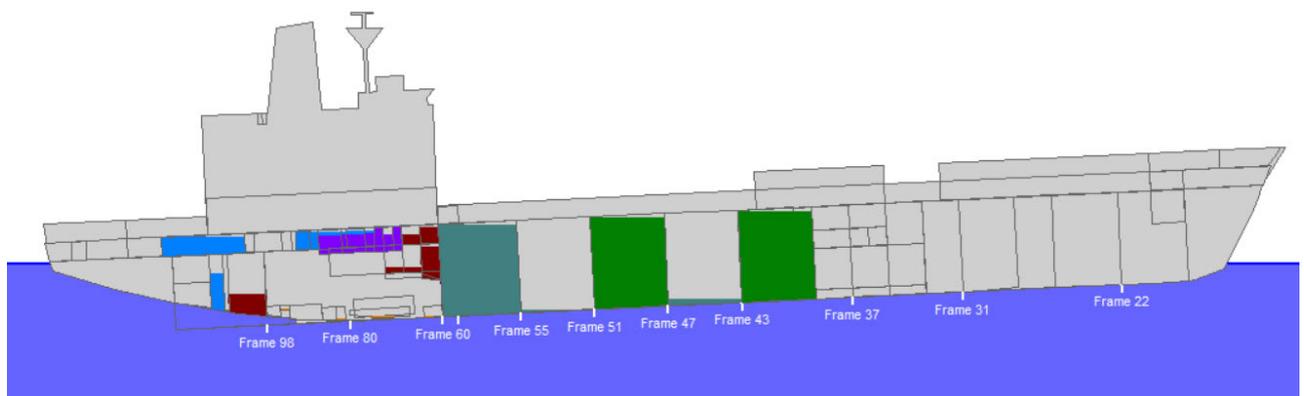
The damaged allowable Bending Moment and Shear Force are implemented in the HecSalv model which was received from SupSalv. This model with reduced strength is then used to determine an optimal loading condition where the Bending Moments are kept at a minimum aft of Frame 51 as this is considered where the majority of the structural damage is.

In this optimal loading condition, the following is assumed:

- All slops are discharged
- All intact cargo is discharged
- Deep Tank 2S is discharged to avoid risk of any potential oil spill as damage may be expected inside this tank

The ballast tanks which are situated most aft (8P, 8S, 6P, 6S) are used to reduce the Bending Moment aft of Frame 51. The bending moment could be further reduced if the most aft intact tanks (CT 10P and CT 10S) were used. It should however be noted that these tanks currently contain DFM and should be discharged to avoid any potential oil spill if anything were to happen. CT 10P and CT 10S should then be thoroughly cleaned to ensure that ballast water can be taken in without risk of contamination, allowing for its normal discharge in the future.

This loading condition could potentially be used for towing.



**Figure 17 - USNS BIG HORN with optimal loading condition for minimum Bending Moments aft of Frame 51**

Optimal loading condition USNS BIG HORN for reduced Bending Moments		
Item	Value	Unit
Displacement	26.341	LT
Heel Angle	0.09	Degrees
Trim Angle	2.72	Degrees
Trim at Perpendiculars	30.83	Ft
GMt	9.36	ft
Max. Bending Moment % Damaged Allowable At-sea	49.53	%
Max. Shear Force % Damaged Allowable At-sea	16.38	%

**Table 3 - Optimal loading condition USNS BIG HORN with minimum Bending Moments aft of Frame 51**

The HecSalv output from above-described optimal loading condition for reducing Bending Moments aft of Frame 51 can be found the Appendix A.

### **Reference files used**

- The received USNS BIG HORN loading condition from 16OCT
- Received drawings of USNS BIG HORN from SupSalv
- Received HecSalv model of USNS BIG HORN from SupSalv
- Received structural sections of USNS BIG HORN for HecSalv Section Modulus Editor

### **Closure**

This report was written with the information presently known to us. If any new and/or additional information will be available or a change of circumstances occurs, this report may become obsolete. For any question, remarks or additional information, contact the person below.

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Naval Architect  
SMIT Salvage BV

### **Appendices**

Appendix A – USNS BIG HORN – Optimal damaged Bending Moment Loading Condition



The information in this document is intended exclusively for the addressee(s). Any use by a party other than the addressee(s) is prohibited. The information is confidential in nature and falls under a duty of non-disclosure.

## 7.2. GEO Supply L.L.C - Company Profile 2024

COMPANY PROFILE



**GEO SUPPLY**

OMAN | MALAYSIA | U.A.E. | ITALY

## Solutions

1. A means of solving a problem or dealing with a difficult situation.
2. A particular instance or method of solving, an explanation or answer.
3. The process of determining the answer to a problem.

# GEO SUPPLY LLC

GEO SUPPLY (CR No: 1109100) was established on 11/05/2011 and registered on 09/05/2011.

The company team consists of a group of experienced personnel involved widely in ground improvement and foundation works in Sultanate of Oman, Malaysia and Italy.

Ground improvement, stabilization and dewatering works have been the core business for GEO SUPPLY. Apart from the shallow foundation, the company offers deep foundation which bring the company to a total solution on foundation works.

On top of the innovative construction works, GEO SUPPLY is associated with:

- 1) BERRO & SARTORI INGEGNERIA S.r.l. (Italy)  
(Design & Consultancy)
- 2) BRENELLI COSTRUZIONI S.r.l. (Italy)
- 3) SINUS GEOSOLUTIONS SDN BHD (Malaysia)  
(Geo Technical Experts)
- 4) EUROLIT ARABIA (Abdullah Musallam Trading LLC)

## COMPANY INFORMATION

### GEO SUPPLY L.L.C.

Registration No. 1109100

Address : P.O. Box: 369, Postal Code: 112  
Ruwi, Sultanate of Oman

Telephone : +968 24486445

Mobile : +968 93813381  
+968 96524882

E-mail : geosuply@gmail.com, geosupplyllc@gmail.com, geosupply.info@gmail.com

### REGISTERED COMMERCIAL ACTIVITIES

452005 : Water well drilling

749301 : Building - cleaning

602301 : Trucking of freight, bulk liquids and equipment  
(scheduled - non-scheduled)

452001 : Building and construction contract (general constructions of residential  
and non-residential buildings)

452009 : Main refurbishments and additions thereof

451001 : Drilling, landfill and leveling works

451003 : Demolition or wrecking of buildings and other structures,  
clearing building site

### REGISTERED DRILLING CONTRACTOR

Ministry of Regional Municipalities and Water Resources

### COMPANY GRADE

Excellent

### COMPANY'S PARTNERS

(b)(6) (Oman)

(b)(6) (Oman)

# COMPANY REGISTRATION



## شهادة السجل التجاري Commercial Registration Certificate

CR Number	1109100	رقم السجل التجاري	1109100
Commercial Name	GEO SUPPLY LLC	الاسم التجاري	جيو ميبلتي إل م م
Legal Type	Limited Liability Company (Subject of Foreign Investment Law)	الشكل القانوني	شركة محدودة المسؤولية (خاضعة لقانون الاستثمار الاجنبي)
Head Q	South Al Khuwair / Bousher / Muscat	المركز الرئيسي	الخوير الجنوبية / بوشر / محافظة مسقط
P.O.Box:	369	ص.ب:	369
Postal Code:	112	رمز بريدي:	112
Telephone:	968 99020401	هاتف:	968 99020401
Email:		البريد الإلكتروني:	
Establishment Date:	11/05/2011	تاريخ التأسيس:	11/05/2011
Registration Date:	09/05/2011	تاريخ التسجيل التجاري	09/05/2011
	Active	نشط	
Expiry Date:	08/05/2024	تاريخ انتهاء السجل التجاري:	08/05/2024
Fiscal Year End:	31/12	تاريخ انتهاء السنة المالية:	12/31
Cash Capital:	250,000	رأس المال النقدي:	250,000
Kind Capital:	0	رأس المال العيني:	0
Total Capital (Omani Riyal):	250,000	رأس المال الكلي (بالريال العماني):	250,000
No. of Shares:	250000	عدد الأسهم:	250000

The Commercial Registration is not considered as an approval or a warranty for a license of bri

لا يعتبر هذا السجل التجاري موافقة أو ضمانا للحصول على ترخيص باستخدام قوى

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Email: investeasyhelp@moci.gov.om, البريد الإلكتروني, www.investeasy.gov.om  
Investors Service Department Website: موقع دائرة خدمات المستثمرين:  
F: http://facebook.com/investeasy.oman, T: twitter.com/invest\_easy, call center: 2481 7210 مركز الاتصال

## COMPANY MISSION

With the rapid development of infrastructures and civil engineering projects, unsuitable and weak soil conditions are encountered all over the world.

As the company provides geotechnical solutions for strengthening this type of soil conditions, we are ready to take up the challenging work in any part of the world.

At Geo Supply, our mission is to provide innovative, sustainable, and efficient geotechnical solutions that enhance the safety, stability, and longevity of infrastructure. Specializing in ground improvement, dewatering, and slope protection and stabilization, we are committed to delivering high-quality services that meet the unique needs of each project. Through cutting-edge technology, skilled expertise, and a focus on environmental stewardship, we strive to protect both our clients' investments and the natural environment, ensuring a solid foundation for future generations.

As natural ground conditions are never homogeneous, the solutions in overcoming various types of ground falls within the exposure or geotechnical practice. We strongly believe that the company strength is capable to deliver competitive and innovative solutions.

**“Innovative Ideas Deliver Impossible Solutions”**

## COMPANY TECHNIQUES

The company provides various techniques of shallow and deep foundation solutions which covered numerous type of ground conditions. With the know-how in mechanical and hydraulic modification, the ground is being improved to sustain a new loading. As the loading increased and transfer to a lower stratum, deep foundation with structural solutions are adopted.



## ▫ **Cement Column**

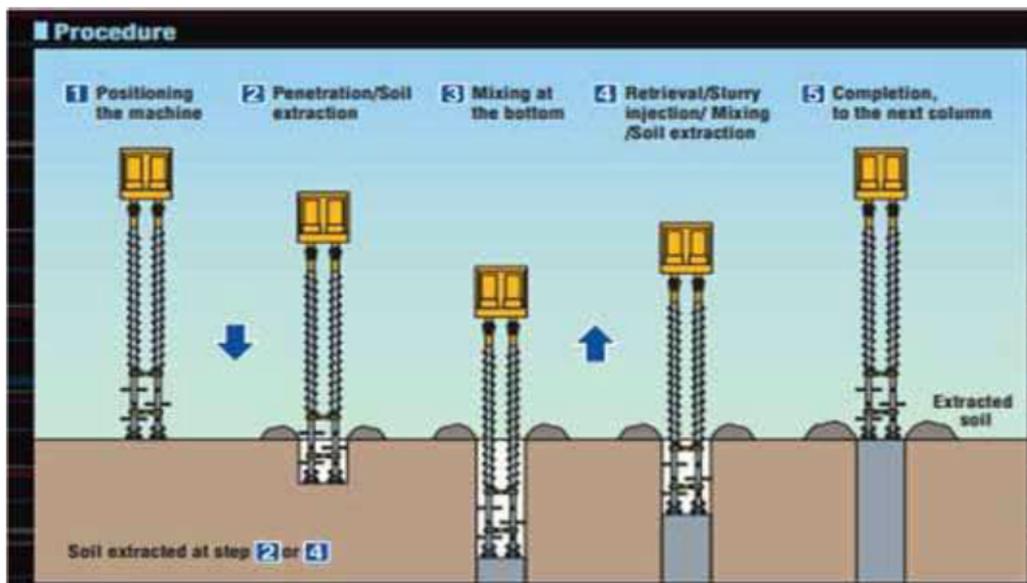


Cement columns are constructed using cement grout whereby loads are partially transfer through cement column to lower stratum by load transfer platform and remaining to be support by the surrounding soil. The load transfer platform could be constructed by granular material which consist of sand or crush stone.

The environmental friendly solutions are well adopted to urban area construction whereby the operation are clean and vibration free. Cement column is applicable to uniform loaded structure, i.e. reinforce soil wall, warehouse, shallow foundations and etc.



## Cement Soil Mixing



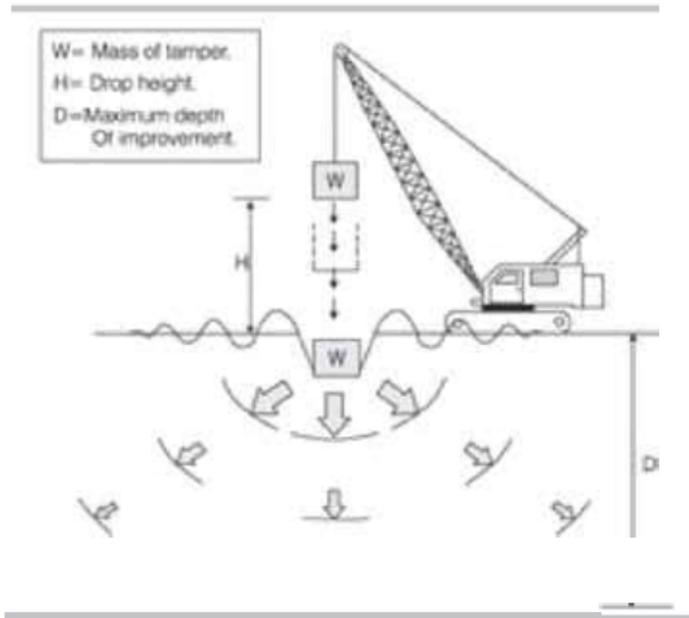
The mixing of cement and soil has been used to stabilize and control the settlement of soft or loose cohesive soil. The application can be extended to formation of composite gravity structures and slope stabilization.

Cement soil mixing is widely used in settlement control of soft cohesive soils supporting embankment, especially approaching bridges to control the differential settlement between bridge foundations and an embankment.

In-situ soil mixing is performed using either single or multiple shaft drilling equipment. The mixing tools consist of hollow-stemmed shafts that have series of discontinuous auger flights. Thick flat beater bars are attached in between auger flights. During penetration, the auger flight are rotating and it loosens and breaks up the soil while flat bars mixes the grout and soil in a pugmill fashion into a homogeneous soilcrete column.



## Dynamic Compaction



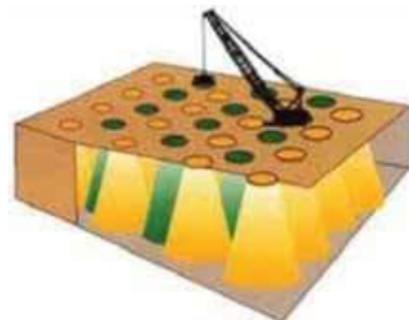
Dynamic Compaction has been proven to be an economical solution in compacting granular soil mass and non-saturated fill.

Shear and compaction wave are the intrinsic mechanism for Dynamic Compaction. These waves are generated while steel

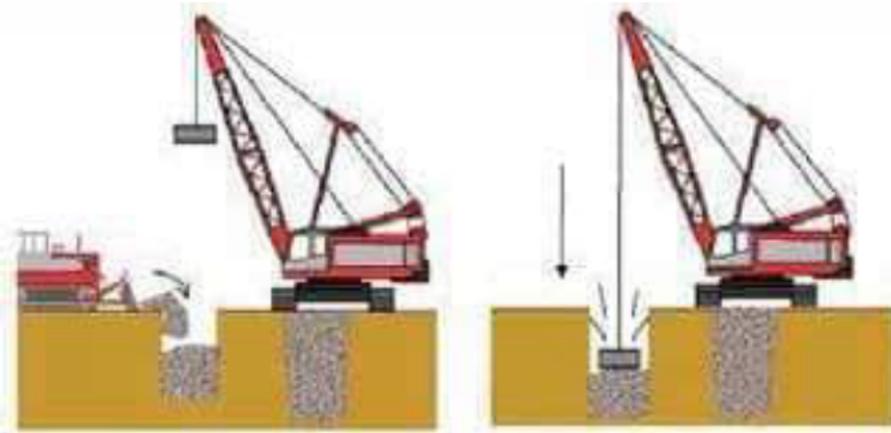
pounder are drop on the ground surface. With the repetition of drops, the ground is compacted in a denser form.

Prior to the commencement of physically works, several trial compaction are essential to determine the compaction parameters. With the compaction parameters, full production shall be performed and QA/QC to be follow up upon completion of compaction works. In order to compact a different stratum, it is a common practice that the compaction works may be carry out in several phases.

Dynamic Compaction wave generated and compaction zone.



## *Dynamic Replacement*

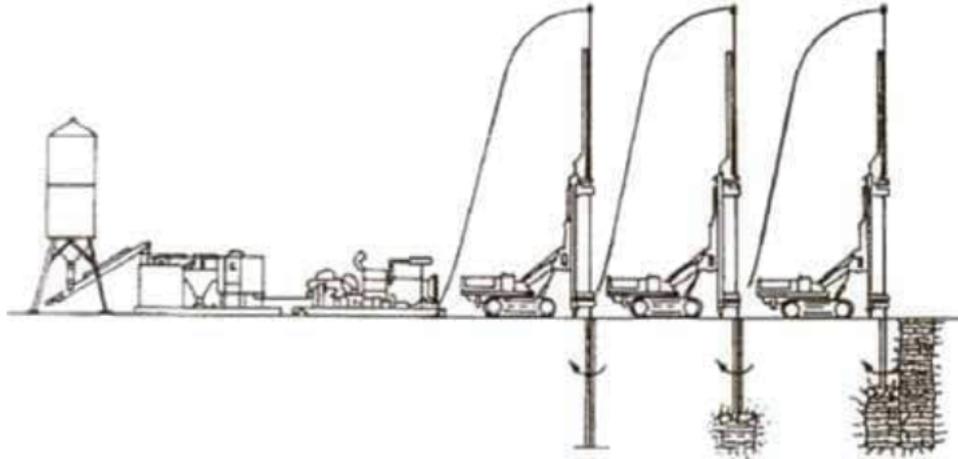


Dynamic Replacement is an extension of Dynamic Compaction technique, whereby compaction energy is used to create a granular column by means of impact. By repetition of impact, the granular material are push into deeper stratum.

Dynamic Replacement column can be constructed using granular material, which may consist of sand, gravel, boulders (max 200mm) or construction debris, i.e. concrete wall/bricks/concrete (maximum size of 200mm). These columns acting as two functions namely: 1) bearing capacity provider to increase rate of embankment construction, 2) large drain path for dissipation of excess pore water pressure.



## Jet Grouting

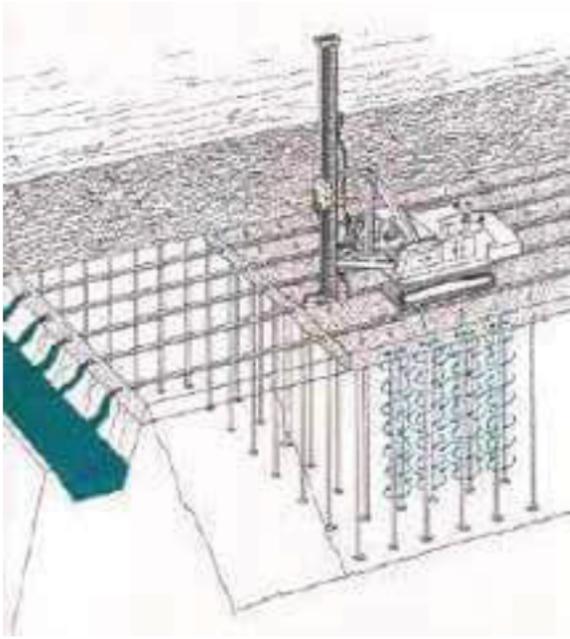


Jet grouting can be installed with three different techniques, namely 1) Mono-fluid system: cement grout is used as consolidation and breaking up agents, 2) Bi-fluid system: cement grout and air are used as consolidation and breaking up agent respectively & 3) Triple-fluid system: water and air used as breaking up agents and cement grout as consolidation agent. The drilling and withdrawing phase is coupled with the injection of fluids at high pressure.

The application of jet grouting capable to improve foundation bearing capacity, joint sealing between sheet piles, installing panel walls to cut off groundwater below road to subdivide excavations and underpinning works.



## *Prefabricated Vertical Drain*



The presence of high water content within cohesive soil mass has contributed a low shear strength, which shall subjected to settlement due to additional overburden pressure.

**Prefabricated Vertical Drain** was introduced to facilitate the drain path and hence improve the evacuation of excess pore water pressure by means of gravity flow.

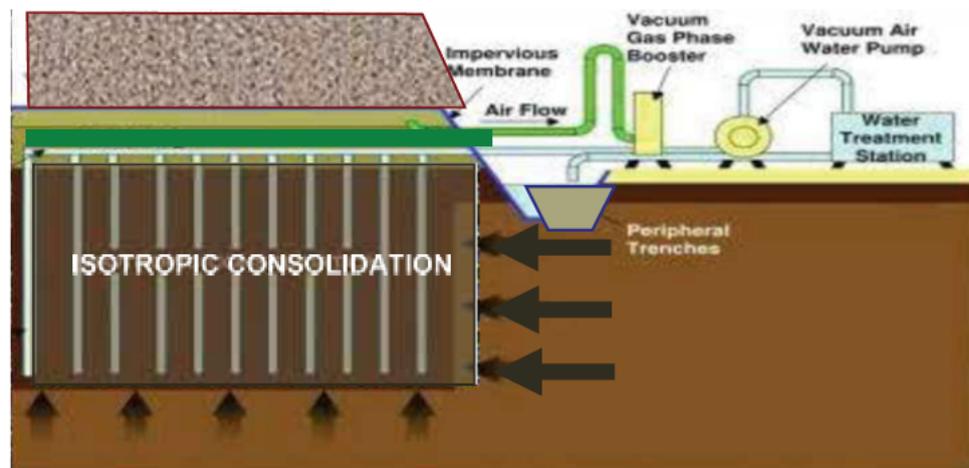
With the reduction of drain path, consolidation process will not be shorten unless additional overburden are placed on top of the soft soil in a controlled manner.

Prefabricated Vertical Drain has been proven to be an economical ground improvement technique to consolidate soft cohesive soil. However, the success of this technique is very much dependent on the three stages namely: 1) Design of ground improvement parameters, 2) Proper execution of installation works, and 3) Instrumentation and monitoring on the settlement performance against theoretical values. The company offer a total turnkey solution which bring the success of a ground improvement project.

The installation of vertical drain can be either carry out using static cable pulled or hydraulic methods. Both methods shall ensure vertical drains are installed through soft cohesive soil.



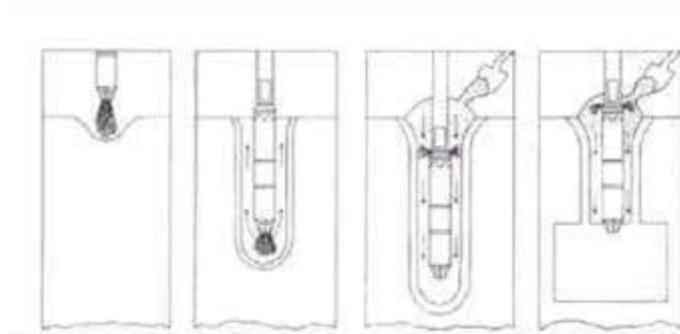
## Vacuum Consolidation



Convention consolidation process involve increase of overburden pressure and drain path in achieving an increase of effective stress within soil mass. Prior to the consolidation process, Prefabricated Vertical Drain provide no strengthening effect on the soil. Hence, in expediting the consolidation process by further increase the overburden pressure without causing the failure mechanism; a Vacuum system is introduced by borrowing the atmospheric pressure to act onto the soil mass in isotropic condition.

With the isotropic condition, vacuum consolidation allows additional surcharge fills to be placed on top of the soft soil in a shorter period of time. By increase the additional overburden pressure and the atmospheric pressure induced by the vacuum pumps, the consolidation can be achieved in shorted period of time without imposing instability within soft soil. On top of the time saving, earthmoving on surcharge fill can be minimized

## Vibro Compaction

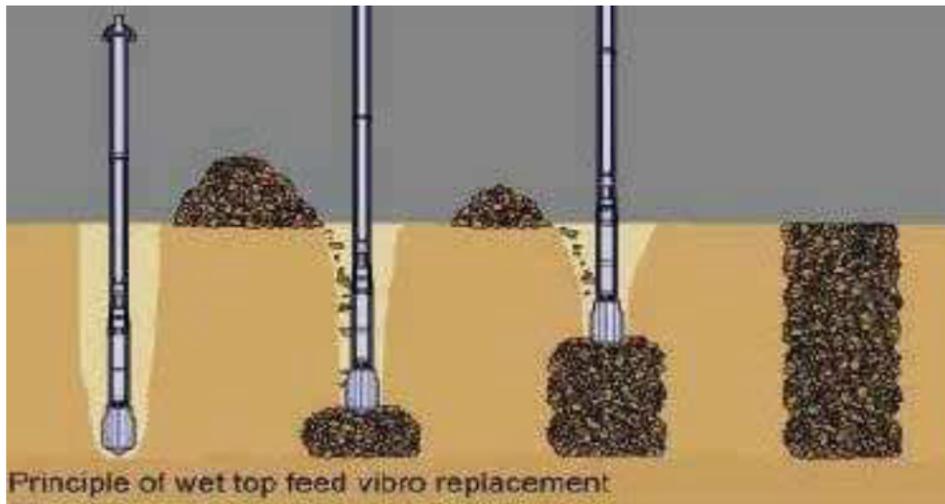


As the loose cohesiveless layer increased (greater than 8m), Dynamic Compaction may not be efficient in transferring the shear and compaction wave onto deeper stratum. Higher energy is required for Dynamic Compaction, whereby the strong surface wave may create instability to surrounding structure. Therefore, vibroflot coupled with water jetting are used in Vibro Compaction process.

Vibro Compaction is widely used for reclamation works whereby massive quantities of sand are placed over seabed. By placement of sand either hydraulic fill or open barge under water level, the granular material may not achieve the required bearing capacity. Therefore, vibroflot are used to break and compact the granular material by means of lateral vibration. Depth of compaction can be varied according to the connecting tubes. Upon completion of compaction works, in situ tests, i.e. Cone Penetration Test, Standard Penetration Test and etc. are performed to determine the performance achieved.



## *Vibro Displacement & Vibro Replacement*



Apart from the Vibro Compaction, the vibroflot is used for the construction of Stone Column. In providing sufficient bearing capacity for new imposed load onto cohesive soil, Stone Column is constructed either by displacement or replacement method. Displacement method, commonly known as DRY method are installed adopting air compressor. Whereas, replacement method are installed using water jetting, known as WET method. Both techniques possess their own advantages and disadvantages.

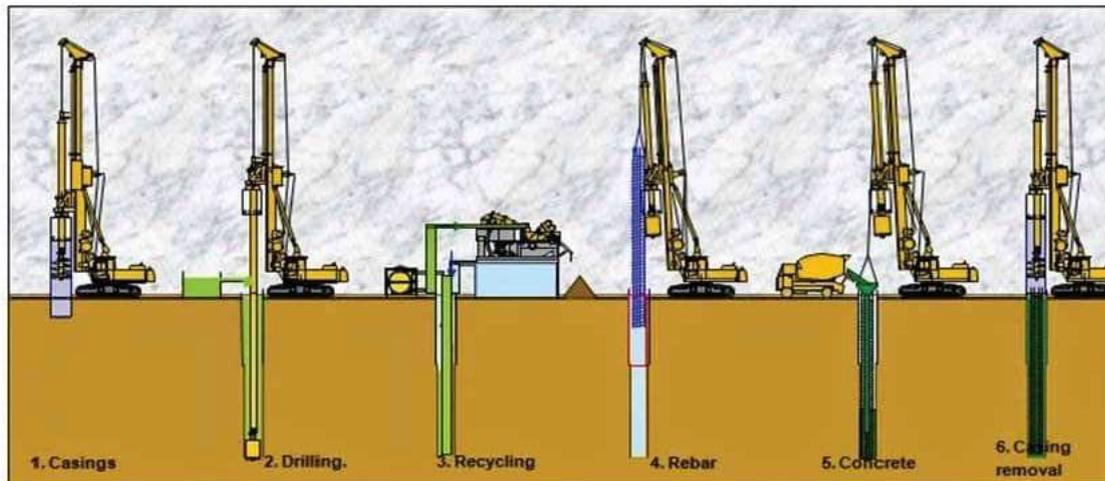
Stone Column has been commonly adopted for road embankment construction and foundation works. With the load sharing between column and surrounding soil, the composite effects provide bearing capacity and acting as a drainage column for cohesive soil.

Nevertheless, installation of Stone Column at ultra-soft cohesive layer (Undrained Shear Strength less than 10kPa) is not recommended due to lack of confining earth pressure, which will increase the replacement ratio and hence increase the cost of ground improvement method.



## DEEP FOUNDATION

### *Bored Pile*



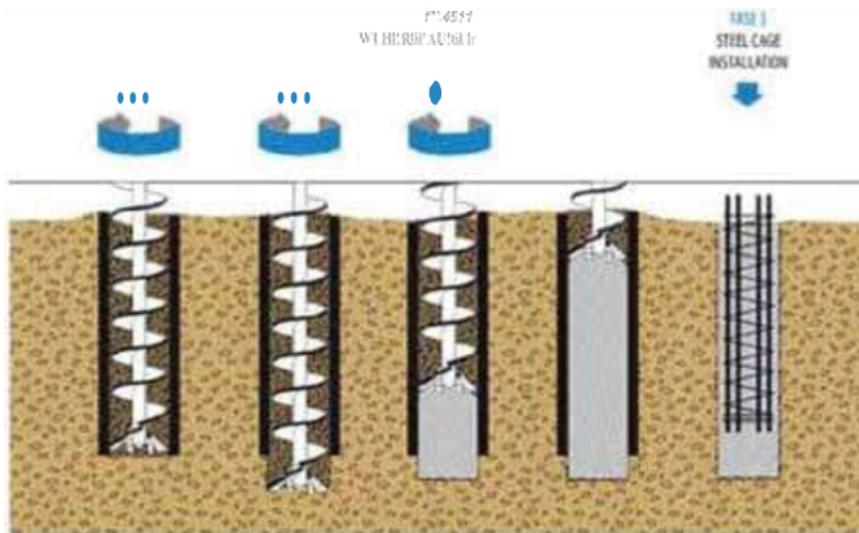
Bored Pile is one of the reinforced concrete pile which is cast in-situ in various type of diameter to support a heavier load by transferring it to a deeper stratum, i.e. bedrock. Normally bored piling are used to support building or heavy structures whereby the allowable post construction settlement are equivalent to zero.

Bored piling is cast by using either hydraulic or mechanical boring rig coupled with special designed drilling tools, bucket and grabs, which used to remove soil prior to the placement of concrete and reinforcement bar. In some occasion, whereby cohesionless material, instable soils are presence, steel casing or stabilizing muds such as bentonite suspension are used in the construction of bored pile.

The application of bored pile can be extended to retaining wall structures such as Continuous Bored Pile (CBP).



## Casing Pile

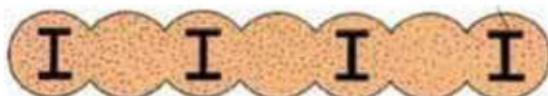


Casing Piles are installed with a continuous flight auger method. This method of pile installation is vibration and disturbance free to adjacent structures. With the casing and flight auger, the used of bentonite is not required, which eliminates the handling of mud.

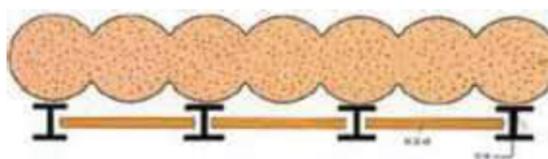
Since the removal of soil is by means of auger displacement, the pile installation length is limit to the length of continuous flight auger.

The application of casing pile can be extend to secant pile wall for the basement construction works or water tightness wall.

Earth Retention Wall for Basement Mass Excavation



Water tightness Wall



## *Driven Pile*



Apart from the case in-situ deep foundation, driven precast Reinforced Concrete Pile or Spun Pile is a conventional method for either shallow or deep foundation.

Precast piles can either be driven to bedrock or floating condition. Therefore, the decision to proceed with the length of precast pile is very much dependent on the

design requirement. The usage of pile embankment at bridge approach has been commonly practice by varying the pile length. Nevertheless, adoption of ground improvement method may be used as a combination in optimizing the overall construction cost.

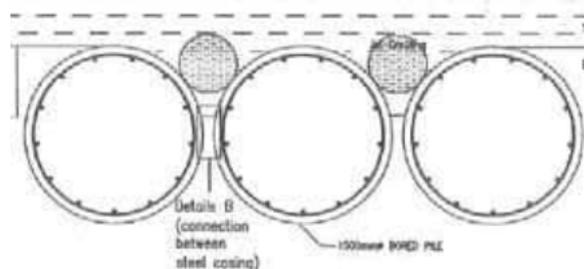


## Grout Column



Prior to the installation of Grout Column, wet hole drilling is used to drill with tri-con bit. Compressed air couple with water is used to flush media to ensure soil cutting along the drilled hole is done properly prior to placement of grout. Once the grout is placed with the piston pump, the casing will be remove from the ground and the grout column is constructed.

Grout column is commonly performed for Contiguous Bored Pile (CBP) as a method to ensure proper sealing between piles. Apart from the sealing application, grout column is used to increase the pile capacity. The diameter of grout column varied from 150mm to 250mm.



## Micro Pile



Project: Construction of Multi Story  
Car Parking for Oman Arab Bank, Al Ghoubra



Micro pile is another type of smaller pile use to support structure and transfer load to a deeper stratum. Micro pile is constructed by means of drilling and often socket inside rock. The diameter of micro pile varied from 100mm to 300mm depending on the engineer's requirement.

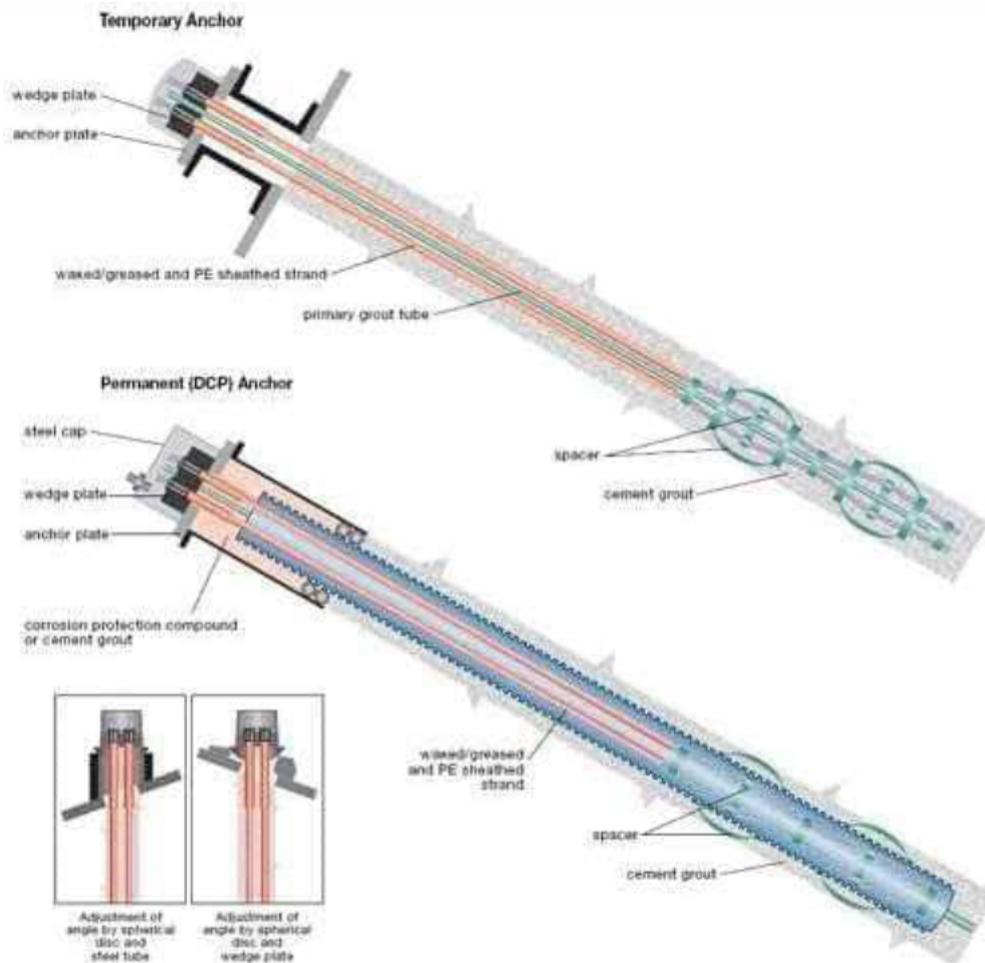
In the past, micro pile is used when the ground conditions warranted it. However, it had gained the popularity due to the low noise and vibration restraints. The application is widely use when congested environment is encountered.

Micro pile is used when the following ground conditions are encountered: -

1. Shallow Bedrock
2. Boulders and Cavities
3. Intermediate Hard Strata
4. Underpinning



## Ground Anchor

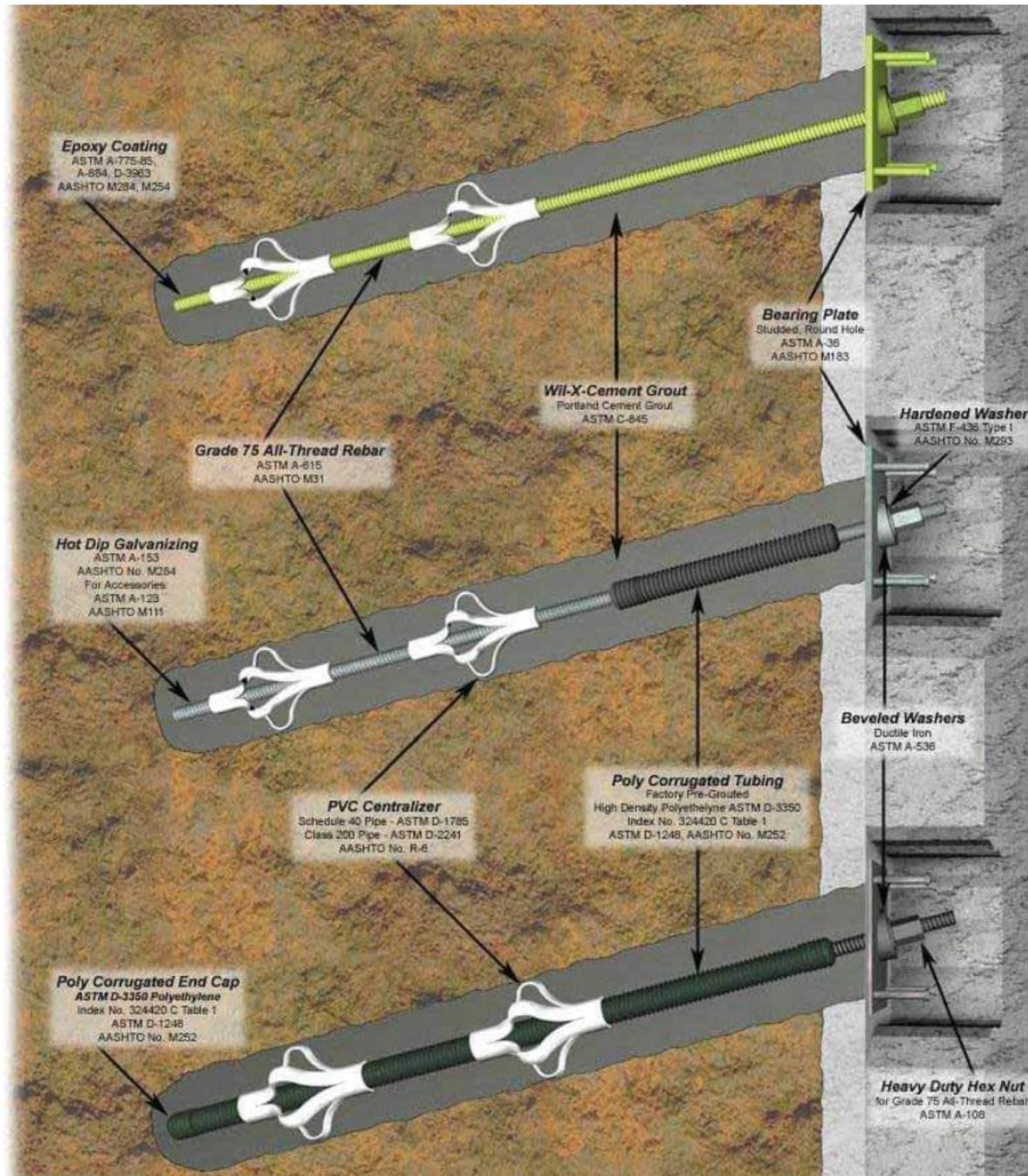


Ground anchors consisting of cables or rods connected to a bearing plate are often used for the stabilization of steep slopes or slopes consisting of softer soils, as well as the enhancement of embankment or foundation soil capacity, or to prevent excessive erosion and landslides.

The use of steel ground anchors is often constrained by overall durability in placement (due to weight), and the difficulty in maintaining tension levels in the anchor.



## Soil Nailing



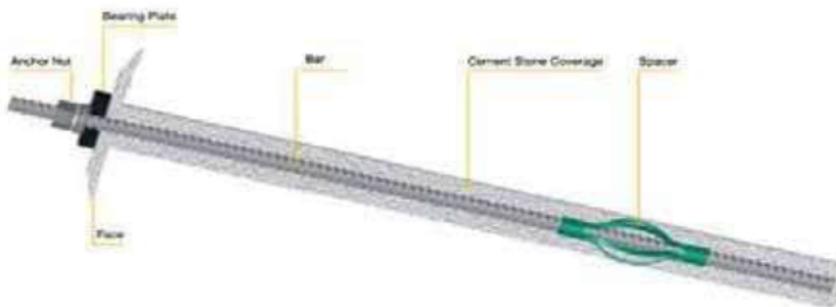
Soil nailing is an economical technique for stabilizing slopes and for constructing retaining walls from the top down. This ground reinforcement process uses steel tendons which are drilled and grouted into the soil to create a composite mass similar to a gravity wall.

A shotcrete facing is typically applied, though many architectural options such as precast panels or "green" vegetated cells are available for permanent wall facings.



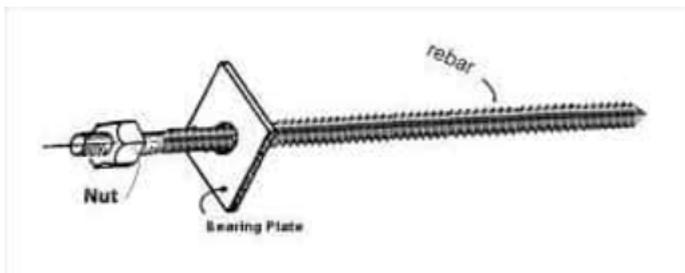
"Innovative Idea Delivered Impossible Solutions"

## Rock Anchor



Rock anchor is a high strength steel tendon, fitted with a stressing anchorage at one end and a means permitting force transfer to the grout and rock on the other end. The rock anchor tendon is inserted into a prepared hole of suitable length and diameter, fixed to the rock and pre-stressed to a specified force.

## Rock Bolt



A rock bolt is a long anchor bolt, for stabilizing rock excavations, which may be tunnels or rock cuts. It transfers load from the unstable exterior, to the confined (and much stronger) interior of the rock mass.

## Shotcrete



Project: Sogex Hill in Qurum  
Shotcreting Works



Shotcrete is concrete (or sometimes mortar) conveyed through a hose and pneumatically projected at high velocity onto a surface, as a construction technique. It is reinforced by conventional steel rods, steel mesh, and/or fibers. Fiber reinforcement (steel or synthetic) is also used for stabilization in applications such as slopes or tunnelling.

Shotcrete is usually an all-inclusive term for both the wet-mix and dry-mix versions. In pool construction, however, the term "shotcrete" refers to wet-mix and "gunite" to dry-mix. In this context, these terms are not interchangeable.

Shotcrete is placed and compacted at the same time, due to the force with the nozzle. It can be sprayed onto any type or shape of surface, including vertical or overhead areas.



## Rock fall barrier



Prevention of rockfalls is often extremely difficult owing to site access and the extent of the instability. Superficial instability of the rock face occurs as a result of thermal cracking, chemical changes in the rock, wind/rain erosion, hydrostatic pressure, plant roots and seismic actions. Our Company has a long history in providing drapery systems to contain rock fall from affecting the safety of infrastructure networks also including double twist wire mesh netting and Steelgrid. The design of a drapery system must consider the realistic amount of debris that will dislodge from the rock face over a period of time. This rock will fall contained between the mesh and rock face to the base of the rock face. The termination point could be either a trench to accommodate the volume of rock or if space is limited then the rock can be contained within the mesh. We use a software to calculate these loads on the mesh and the required anchorage resistance at the crest resulting from the debris pocket at the bottom slope. What also has to be considered is the acceptance of the presence of a "pocket" with a certain size close to the road pavement or buildings. The width of the debris must also be compatible with the distance to the road pavement also to allow periodical maintenance.

Barriers Rock barrier fences form part of the passive range of solutions where the primary objective is to intercept rock falls. This follows the same principle used for embankments which are suitable for moderate gradients however where steep gradients are encountered and space becomes a premium then rock fences are preferred. A rock fall tunnel may be considered where the rock face is near vertical slopes or where the kinetic energy developed by the falling rock exceeds 3000kJ.

The height of barrier fence, location and the impact resistance requires a good understanding of:

- Likely size of detached rock

- Topography of the downhill slope and likely energy dissipation ability

- Level of maintenance proposed to clear debris from the fences

Furthermore the location of the fence should be at least 10m from a downhill structure to accommodate the deformation that takes place during impact.

Our company offers a range of energy absorption fences from 500kJ to 5000kJ. These systems were developed after extensive research and testing which include full scale field tests in accordance with European guidelines (ETAG) to accurately replicate the energy of a specific rock size.

Rock fences consist of a number of components and accessories when combined provide the required energy absorption levels in accordance with the test certificate.



## Wirenetting



Slope stabilization of rock faces involves the containment of possible rock detachment. This intervention is classified as an "active" protection at the source and is designed to perform the following functions:

- Prevent detachment of rock (1 - 1.5m<sup>3</sup> size);
- Protect roads and buildings at the base of a man made cutting or natural slope;
- Contain smaller rock as normally performed in standard drapery solutions.

The selection of the appropriate mesh system to be used with the rock bolts is dependent on the rock size, joint structure and potential sliding planes. The overall system consists of anchorage points (rock bolts), steel cable panels, steel cables and mesh netting. In order to determine the right size of the overall system one must assess:

- Required stiffness of the system
- Shear strength at the anchorage points

Our company offers both Steelgrid and panels to satisfy the tensile strength, stiffness and long term durability requirements of the site. The Steelgrid or panels work in combination with the rock anchors to stabilise the loose rock face at low deformations. Our Rock mechanics software calculates the mesh type required and expected deformation based on the anchor spacing.



## Dewatering

### 1) Well Point Dewatering



Well point system is one of the most versatile and pre-drainage methods which can pump a few gallons per minute in fine sandy silts or many thousands of gallons per minute in coarse sands and gravels.

A well point system consists of a number of well points spaced along a trench or around an excavation site, all connected to common header pipe, which is attached to one or better point dewatering pumps.

Well point system is more suitable in shallow aquifers where water level needs to be lowered no more than 15-20 feet. Due to the vacuum limitation of the pump, excavations that are deeper

When designing a well point system, it is necessary to give first consideration to physical conditions of the site to be dewatered and the final Architectural finishes internally of the buildings.

### 2) Deep Well Dewatering (Bore Well System)



The deep well system is also a versatile pre-drainage dewatering system which can pump high and low volumes of ground water. This method is best suited to homogenous deep excavation that extends well below the bottom of the excavation. Deep well system consists of one or more individual wells, each of which has its own submersible pump at the bottom of

the well. Deep well systems are suitable for water table or confined excavation and will lower the water table 100 feet or more in single lift without staging.



Project: Construction of ROP Residential Complex at Al Ansab  
Dewatering Works



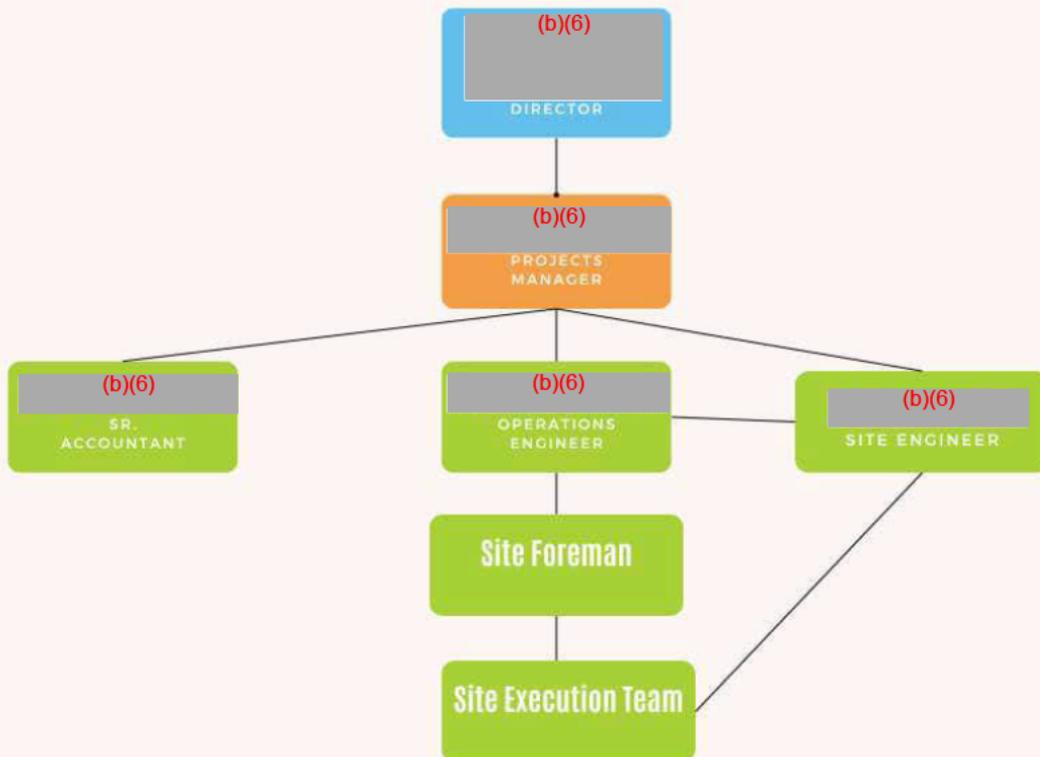
Project: Jaifer Bin Junaid Private School, Al Mawaleh North  
Dewatering Works



# COMPANY STRUCTURE

## Geo Supply L.L.C. Organizational Chart

### GEO SUPPLY LLC ORGANIZATIONAL CHART



## List of Projects Managed by Geo Supply L.L.C. in Sultanate of Oman

S.No.	Description of the Work	Main Contractor	Starting Date	Completion Date	Value of Completed Work (R.O.)
1	Carryout Supply and Application of Shotcreting works for Slope Protection - Dualisation of Amarat-Bousher Road	Galfar Engineering & Contracting SAOG	February-11	March-11	37,604.375
2	Repair of Damage on Wadi Tayeen Road -Shotcreting Works	Galfar Engineering & Contracting SAOG	September-11	January-12	115,791.050
3	Construction of Wadi Bani Kharus Asphalt Road - Shotcreting Works	Galfar Engineering & Contracting SAOG	December-11	February-12	130,837.900
4	Carryout Supply and Application of Shotcreting works for Slope Protection - Dualisation of Amarat-Bousher Road	Galfar Engineering & Contracting SAOG	March-12	June-12	63,585.500
5	Dualization of Bidbid to Sur Road, Section 1, Package 1-A - Shotcreting Works	Astaldi-Ozkar JV	February-13	April-13	9,682.200
6	Dualization of Bidbid to Sur Road, Section 1, Package 1-A - Rock Bolts Works	Astaldi-Ozkar JV	December-12	January-13	8,800.000
7	Construction of Asphalt Road from Wadi Hatt to Ar Rustaq (Phase-IV), Part A - Shotcreting Works	Galfar Engineering & Contracting SAOG	May-13	August-13	128,829.596
8	Carryout Shotcreting Works for Dual Carriageway of Duqm Town	Oman Gulf Company L.L.C.	November-12	March-14	445,500.000
9	Construction of Residential Complex at ROP Complex Qurum - Shoring Works	Teejan Trading & Contracting Company L.L.C.	Jul-13	Apr-14	70,160.000
10	Carryout Shotcreting Works - Construction of Extension of the Water Distribution Networks in Niswa in Dakhliyah Region - Proj. 1 2	Galfar Engineering & Contracting SAOG	July-13	June-15	170,000.000
11	Saraya Bandar Jissah Project, Advanced Earthworks - Ground Anchorages Works	Nagarjuna Construction Company International L.L.C.	May-15	July-15	20,000.000
12	Dualization of Bidbid to Sur Road, Section 1, Package 1-A - Rock Bolts Works	Astaldi-Ozkar JV	July-14	September-14	40,602.500



## List of Projects Executed by Geo Supply L.L.C. in Sultanate of Oman

S.No.	Project Name and Work Description	Main Contractor	Starting Date	Completion Date	Value of Completed Work (R.O.)
1	Al Muzn Centre, Mawaleh-Seeb - Dewatering Works	Al Subhiah Trading & Contracting L.L.C.	November-14	July-15	189,803.040
2	Al Muzn Development Muscat - Dewatering Works	Al Subhiah Trading & Contracting L.L.C.	March-16	June-16	79,580.000
3	Commercial & Residential Building on Plot No. 376 & 377 at MBD, Ruwi - Shotcreting Works	Hussain Fadhil & Partners L.L.C.	October-16	October-16	16,000.000
4	Stabilization of Hill in Duqm - Shotcreting & Painting Works	Modern Delta International Projects L.L.C.	November-15	March-16	270,429.500
5	Construction of Commercial Building in Sohar Industrial Estate - Shotcreting & Soil Nailing Works	Al Rawdha World Center Trading & Contracting L.L.C.	March-17	April-17	33,000.000
6	Construction of Commercial and Residential Building on Plot No. 290 at Ruwi - Dewatering & Shotcreting Works	Al Subhiah Trading & Contracting L.L.C.	January-17	August-17	161,250.000
7	Construction of Multi Storey Car Parking for Oman Arab Bank, Ghoubra Micropiles for Raft Foundation	Al Subhiah Trading & Contracting L.L.C.	April-18	July-18	130,000.000
8	Construction of Idealmed Hospital, Al Ghoubra - Shoring Works	Al Subhiah Trading & Contracting L.L.C.	July-18	August-18	82,000.000
9	Construction of Idealmed Hospital, Al Ghoubra - Dewatering	Al Subhiah Trading & Contracting L.L.C.	August-18	April-19	118,500.000
10	Hypermarket Lulu at Ruwi Souq - Dewatering	Lulu Group International	May-19	September-19	77,000.000
11	MOD Project - Rental of Machines and Supply of site materials	Ministry of Defence	August-19	October-19	39,772.000
12	Soqex Hill in Qurum Slope Protection Works	Bahwan Engineering Company LLC	July-19	December-19	154,590.400
13	Jaifer Bin Junaid Private School Al Mawaleh North - Dewatering	Leading Construction Technology L.L.C.	June-20	September-20	12,900.000
14	Construction of ROP Residential Complex at Al Ansab - Dewatering	Al Hajiry Trading LLC	March-20	October-20	73,000.000
15	HSBC New Building Al Khuwair - Dewatering	Al Hajiry Trading LLC	August-20	October-20	8,300.000



## List of Projects Executed by Geo Supply L.L.C. in Sultanate of Oman

S.No.	Project Name and Work Description	Main Contractor	Starting Date	Completion Date	Value of Completed Work (R.O.)
16	Duqum Integrated Power and Water Plant - Shotcreting Works	Bahwan Engineering Company L.L.C.	September-20	January-21	85,683.832
17	Seven Seas Headquarters, Seeb Dewatering Works	Al Hajiry Trading L.L.C.	February-21	May-21	20,000.000
18	Seven Seas Headquarters, Seeb Earth Pit Drilling Works	Al Hajiry Trading L.L.C.	April-21	April-21	1,371.000
19	Duqum Integrated Power and Water Plant 2 - Shotcreting Works	Bahwan Engineering Company L.L.C.	September-21	October-21	4,660.000
20	Construction for Slope Stabilization at Qurum, (North - West Periphery Road)-Stage -2	International Piling Infrastructure LLC	December-21	March-22	40,000.000
21	Construction of Golf Club, Sindalah Island, NEOM, KSA - Consolidation Grouting in cavity and fractured subsoil.	Eurolit Arabia	February-23	June-23	120,000.000
22	Ministry of Defense Shooting Complex at Al Ansab - Ground Improvement by Permeation and Cavity Grouting	Saif Salim Essa Al Harasi & Co. L.L.C.	August-23	January-24	228,483.570
23	Construction of National Olympic Shooting Complex for Ministry of Defense at Al Ansab – Shotcreting Works	Saif Salim Essa Al Harasi & Co. L.L.C.	January -24	March-24	86,184.000

24	Construction of 132/33 KV Power Station at Al Jawabi GS – Shotcreting Works	Zawawi Powertech Engineering L.L.C	May-24	June-24	6,825.000
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**List of On-Going Projects by Geo Supply L.L.C. in Sultanate of Oman**

<b>S.No.</b>	<b>Project Name</b>	<b>Description</b>	<b>Main Contractor</b>	<b>Project Value (R.O.)</b>	<b>Remarks</b>
1	Construction of Commercial and Residential Building at Boushar – Shotcreting Works	Shotcreting	Al Hinai Construction LLC	20,190.000	On-going

## List of Projects Executed by Sinus Geosolutions Sdn Bhd in Malaysia

S.No.	Project Name	Work Description	Owner	Consultant	Main Contractor	Year
1	Centre Spine Road, Package 1B	Dry Stone Column	Jabatan Kerja Raya	Nik Jai Associates S/B	Urict (M) Team S/B	2014
2	Proposed Refinery and Petrochemicals Integrated Development (RAPID) - Package 18D	Prefabricated Vertical Drain	Petronas	G&P Geotechnics S/B	Menta Construction S/B	2015
3	Proposed Construction of Interchange at LDP, Puchong Utama	Grout Column	MPSJ	E-Geo Consultant S/B	Syarikat Ismail Ibrahim S/B	2015
4	Upgrading of Kota Bharu - Kuala Terengganu	Wet Stone Column	Jabatan Kerja Raya	GR Associates S/B	Eight Ace S/B	2015
5	West Coast Expressway, Section 5	Prefabricated Vertical Drain	WCE	HSS Engineering S/B	IJM Bhd	2015
6	Duta-Ulu Kelang Expressway (DUKE) Phase 2	Dry Stone Column	Kesturi S/B	MMSB Consult S/B	Pembinaan Hamid Abd Rahman S/B	2016
7	West Coast Expressway, Section 4	Prefabricated Vertical Drain	WCE	GCU Consultants S/B	IJM Bhd	2016
8	Housing Development at Metropolitan Park	Prefabricated Vertical Drain	Sinerjuta S/B	Advanced Consulting Engineers S/B	Appromax Construction S/B	2016
9	East Klang Valley Expressway	Wet Stone Column	EKVE S/B	GeoPave Consultant S/B	Ahmad Zaki Resources Bhd	2016
10	Reclamation of New Deep Water Terminal at Kuantan Port	Prefabricated Vertical Drain	Kuantan Port Consortium S/B	EDP Consulting Group S/B	See Song & Sons S/B	2016
11	Kuantan Port Expansion External Infrastructure Works, Package 3 - Trumpet Interchange and Associated Works	Dry Stone Column	East Coast Economic Region Development Council	HSS Integrated S/B	Norwest Holdings S/B	2016
12	Proposed Road Construction from Jalan Pendas Laut, Mukim Jelutong, Johor Bahru, Johor	Wet Stone Column	Santuary Development S/B	SNA Consult S/B	Eco Geotechnics S/B	2016
13	Development & Upgrading of PAN Borneo Highway in Sarawak (Pantu - Batang Skrang)	Prefabricated Vertical Drain	Lebuhraya Borneo Utara	Perunding Muhandis S/B	Gamuda Naim Engineering & Construction (GNEC) S/B	2017
14	Rancangan Tebatan Banjir, Pembinaan Pintasan Belomang Di Sungai Muar, Johor	Cement Soil Mixing	JPS Negeri Johor	Pakatan Runding Yusoff S/B	Maya Masrii S/B	2017
15	Proposed High End Waterfront Mixed Development on A2 Island, Mukim Johor Bahru, Johor	Wet Stone Column	Iskandar Waterfront S/B	Dr. CT Toh Consultant S/B	Knusford Construction S/B	2017
16	West Coast Expressway, Section 2	Dry Stone Column	WCE	HSS Engineering S/B	Pembinaan Mitrajaya S/B	2017
17	Proposed Ground Treatment for Eco Sanctuary	Controlled Vertical Consolidation	Eco World	DR YG Tan Jurutera Perunding S/B	Sinus Geosolutions S/B	2017
18	Cadangan Membina Sebuah Kilang Setingkat, Banting	Prefabricated Vertical Drain	Gamuda	Gamuda Engineering S/B	Gamuda Industrial S/B	2017



## PROFILE OF OUR ASSOCIATED COMPANIES



Thanks to the professionalism and experience acquired over the years, the study Berro Sartori & Engineering Srl It is able to offer today a wide range of technical services to stakeholders , public and private, that wish to obtain finished products of the highest quality on .schedule.



Berro & Sartori Ingegneria S.r.l. It's a design company general whose skills range from Town to architectural, engineering and related services. The study brings together the reality consolidated over the years the Studio Berro S.r.l. e di C & S Engineering Eng Sartori in order to enhance the professional structure with multidisciplinary character.

The Company relies on the professionalism of qualified technicians with different skills in order to address the many issues related to the design industry. The firm, in fact, has professional architects who deal with urban and architectural design, the design engineers for the facilities, infrastructure and water projects, as well as other professionals who deal with the supervision of works and safety coordination during planning and execution to address any type of work in a multidisciplinary way from the initial planning stage until the execution and delivery of turnkey for commissioning.

The technical services offered mainly design starting from the analysis and design, the preparation of projects at various levels: preliminary, final and executive, the economic evaluation of intervention, control and management of realization through construction management, coordination security during design and implementation to final delivery of the work completed. Additional written numerous appraisals for real estate of all types and sizes located throughout the national territory

The firm works with both private clients and public works for the construction of medium and large , within the timeframes scheduled according to specific needs and problems of the subject to be treated .

Thanks to the professionalism and experience acquired over the years , the study Berro Sartori & Engineering Srl It is able to offer today a wide range of technical services to stakeholders , public and private , that wish to obtain finished products of the highest quality on .schedule.



**GEO SUPPLY**

Registration No. 1109100  
P.O. Box: 369, Postal Code: 112  
Ruwi, Sultanate of Oman

Telephone : +968 24486445  
Mobile : +968 93813381  
+968 96524882

E-mail: [geosuply@gmail.com](mailto:geosuply@gmail.com)  
[geosupplyllc@gmail.com](mailto:geosupplyllc@gmail.com)  
[geosupply.info@gmail.com](mailto:geosupply.info@gmail.com)



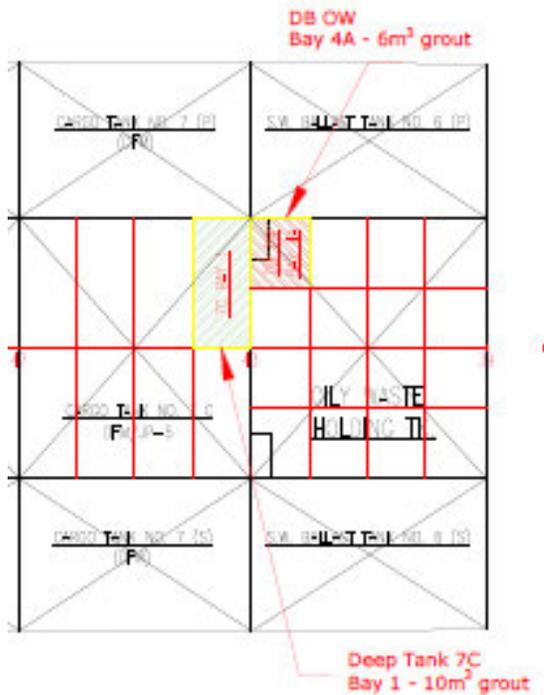
**DEPARTMENT OF THE NAVY**  
NAVAL SEA SYSTEMS COMMAND  
1333 ISAAC HULL AVE, SE  
WASHINGTON NAVY YARD, DC 20376-0001

TECHNICAL MEMO

From: (b)(6) NAVSEA 00C24  
To: N72, MILITARY SEALIFT COMMAND  
Date: 29 October 2024  
Subj: USNS BIG HORN (T-AO 198) GROUTING PLAN ISO SEP 2024  
CASUALTY RESPONSE  
Ref: a) USNS BIG HORN (T-AO 198) PATCHING PLAN ISO SEP 2024  
CASUALTY RESPONSE, Technical Memo, NAVSEA 00C24, dtd  
21 OCT 2024.  
Encl: 1) USNS BIG HORN - Grout Stress Calculation, SMIT  
Salvage, Rev 4, dtd 28 OCT 2024.

1. USNS BIG HORN (T-AO 198) was involved in a casualty on 23 September 2024 resulting in flooding and structural damage. Flooding has been stopped via externally applied patching and all damaged spaces have been emptied, ventilated, and inspected internally. Ref (a) concluded the BIG HORN is structurally sound for an open ocean tow in a loading condition designed to limit underway stresses. It is intended to internally seal damaged areas with a waterproof grout mixture to provide additional watertight integrity and reinforce the externally applied patches. Enclosure (1) is the SMIT Salvage plan for application of cement grout and suitability of the grout for tow and is a revision to the grout locations identified in Ref (a). This memo summarizes the plan and SUPSALV's independent assessment.
2. Hull penetrations leading to water ingress were limited to the Engine Room Void, Main Contaminated Fuel Tank, Deep Tank 2P, Cargo Tank 10C, and the Pump Room Double Bottom Oily Waste Tank. Progressive flooding through damaged bulkheads resulted in additional ingress into Cargo Oil





Midship Grout Locations

3. The grout proposed and locally available is a mixture of OPC Cement, GGBS, Microsilica, and Water with additives for waterproofing, non-shrink, and improved liquidity. Manufacturer testing confirmed a minimum compressive strength of 50 MPa and tensile strength of 15 MPa. Testing for Young's Modulus (elasticity) is not commonly performed but is being pursued for this specific mixture. A review of literature from previous testing has determined that elasticity is directly proportional to the size of the aggregate. Testing performed on a sample with an aggregate of gravel and quartz sand produced a Young's Modulus of 1550 MPa. This property was used for the analysis as the proposed grout has a smaller aggregate and is anticipated to have a lower Young's Modulus, the assessment will be updated if testing of the specific grout is attainable.
  
4. As the BIG HORN is structurally sound for tow the grout is not required to increase structural capacity but only to provide an internal patch to stop water ingress at crack locations and across compromised bulkheads. Once applied to a sufficient height to withstand the external

hydrostatic force of the identified holes and hardened the primary required capacities will be sufficient tensile strength and flexibility to absorb ship deflections when underway. Increasing the tensile strength of the grout with rebar or similar without connecting to ship structure to similarly deflect with the ship would negatively impact the grout seal by increasing stiffness and reducing flexibility.

5. Encl (1) is the SMIT Salvage engineering assessment of the maximum at sea deflection that would occur in the patched areas of BIG HORN and the capacity of the grout to withstand this deflection. Deflection across an unsupported span of grout is determined as the difference between the calculated still water deflection in the intended loading condition and the deflection after applying the design wave induced bending moment and the relevant locations. These moments and resulting deflections were applied to the reduced structural properties of the damaged sections. From that deflection the strain, moment, and force the grout is required to withstand in tension is calculated and compared to the allowable loads on the grout. The resulting stresses are within allowable limits of the grout.
6. SUPSALV concurs with the SMIT analysis and assessment of seaway loads and capacity of the grout to absorb them. Additionally, the maximum wave induced moment was dynamically compared using the US Navy Ship Motions Program. To achieve a single instance of the design wave induced bending moment in the intended loading condition requires a 10 day exposure time in a 5m significant wave height sea. This equates to a Sea State 6 and will be one of the operational restrictions placed on the tow. Additionally, this is considered a conservative evaluation for the following reasons:
  - a. Residual section modulus was calculated by rendering damaged members (longitudinals and shell plate) fully ineffective. It can be visually seen that they are all partially intact and will provide additional strength reducing deflection.
  - b. The overall grout height will be above the damaged stiffeners which will reduce the tensile force by applying a compressive force partway up the column.
  - c. The tensile strength and Young's Modulus were both selected at the conservative end of the test result

range.

7. If there are any questions or concern (b)(6) or (b)(6) act me at

Enclosure 1:

USNS BIG HORN - Grouting Plan, SMIT Salvage, Rev 4

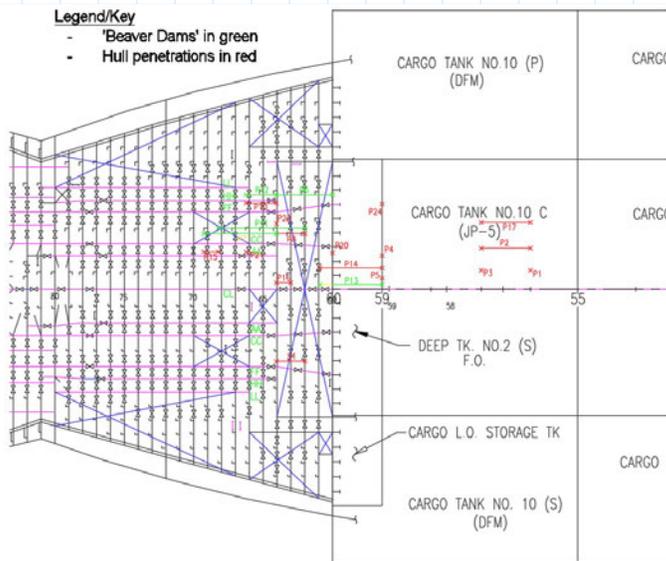
## 1. INTRODUCTION

This calculation note aims to analyse the occurring stresses within the grout.

A combination of US Navy divers and Seaward divers performed patching activities at water ingress locations. The observed damage and patches were mapped by the divers. Where cracks were observed, patching included so called 'Beaver Dams' which are wooden wedges hammered into the cracks and subsequently fully sealing the crack by applying a type of epoxy over the wooden wedges. Furthermore, the same type of epoxy is applied at smaller hull penetrations.

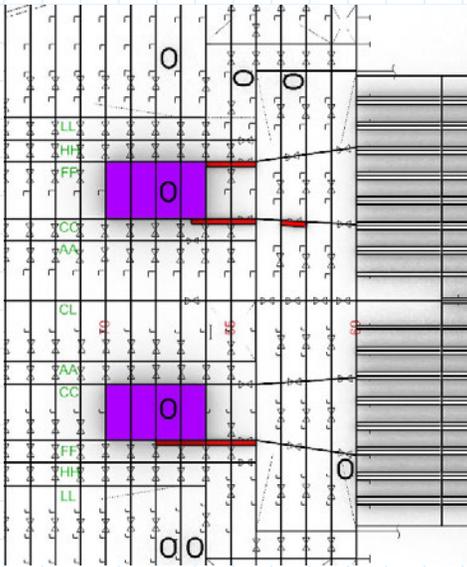
## 2. GROUT PLAN

The approximated diver indicated location of the 'Beaver Dams' and hull penetrations is plotted:



Safe tank access of all breached tanks was established through discharging, stripping and ventilating the breached tanks. This requires daily tank monitoring, involving gas measurements to ensure safe access, followed by the appropriate use of Personal Protective Equipment (PPE). With safe breached tank access the damage could be examined from the inside. It should be noted that only the 'Beaver Dams' could be identified from the inside of the ship through visual inspection of the wooden wedges as there is no way of identifying smaller hull penetrations where only the type of epoxy was applied from the outside.

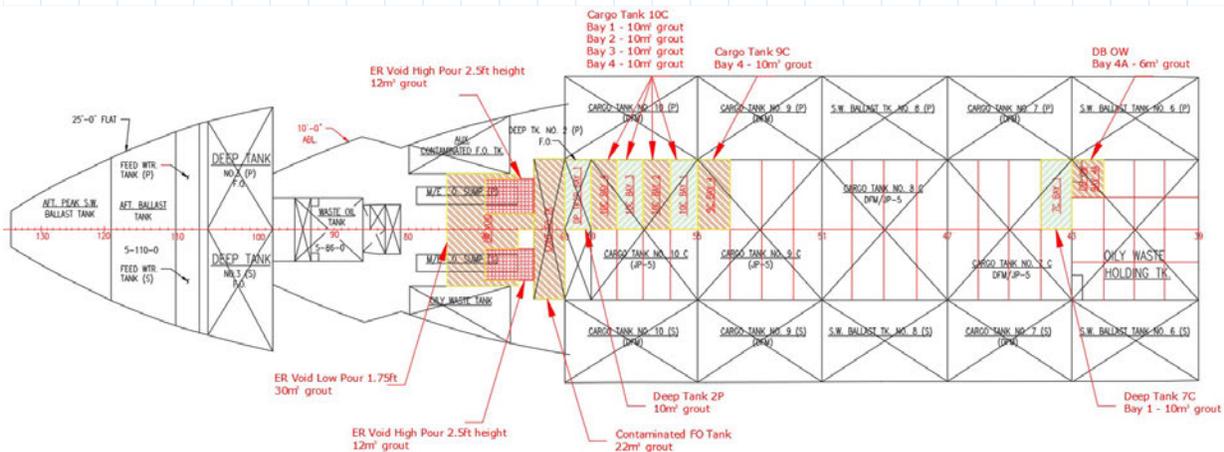
All diver stated 'Beaver Dams' have been identified except for one. Divers' measurements locate this 'Beaver Dam' inside Deep Tank 2P. A reason for not able to locate this 'Beaver Dam' could be that the steel deformation of hull plating and longitudinal stiffeners inside Deep Tank 2P to such extent that the 'Beaver Dam' is underneath the deformed steel and cannot be identified from the inside. The identified 'Beaver Dams' from the inside are plotted in red in the figure below.



Based on observed deformations and hull penetrations, a grout plan was developed to internally seal the hull penetrations. This plan incorporates compartmentalization to facilitate grout application and ensure adequate pour height in each section.

The areas or bays designated for grouting are divided into compartments. In Cargo Tanks 10C, 9C, 7C, and the DB OWT, compartmentalization is achieved using web frames and longitudinal girders. Penetrations, such as scallop holes and longitudinal stiffener pass-throughs, are blocked off to create distinct bays. Each of these compartmentalized bays will then be grouted individually. Deep Tank 2P and the FO Contaminated Tank will each be grouted in a single lift. For the Engine Room Void, a similar approach to the Cargo Tanks will be used, with the structure compartmentalized into boxes using the ship's existing structural members.

The following figure illustrates the grouting plan:





# USNS BIG HORN - Grout Stresses

Project: SSG242134

Prepared by: (b)(6)

Checked by: (b)(6)

Date: 27/10/24

## 3. GROUT SPECIFICATION

Specifications were received from grout supplier for the grout that will be used:

Minimum Tensile strength  $R_m$  as per grout supplier

$$R_m := 15 \text{ MPa}$$

$$R_m = 2.176 \text{ ksi}$$

$$\sigma_{b\_allowable} := 0.6 \cdot R_m = 9 \text{ MPa}$$

$$\sigma_{b\_allowable} = 1.305 \text{ ksi}$$

$$\tau_{allowable} := 0.4 \cdot R_m = 6 \text{ MPa}$$

$$\tau_{allowable} = 0.87 \text{ ksi}$$

$$\sigma_{c\_allowable} := 0.7 \cdot R_m = 10.5 \text{ MPa}$$

$$\sigma_{c\_allowable} = 1.523 \text{ ksi}$$

Below indicated Young's Modulus was provided via previous published testing of similar material with the most compatible grout and aggregate mixture selected. Testing of the proposed grout mixture is being conducted and this report will be revised once received.

$$E_{grout} := 1550 \text{ MPa}$$

$$E_{grout} = 224.808 \text{ ksi}$$

## 4. GROUT STRESSES

The grout stresses are calculated by analyzing the relative difference in deflection between two outputs from HecSalv. The first output represents the assumed towing loading condition, while the second output models increased bending moments in the towing condition, reaching 100% of the at-sea allowable limits by adding weight to the forward peak tank (FPT). This calculation uses the damaged at-sea allowable bending moments, which factor in the design wave-induced bending moments. To simulate damage, the section modulus is conservatively reduced by excluding certain structural members at frames 43, 55, and 59, resulting in decreased allowable bending moments both at-sea and in-port.

The worst-case scenario is identified at the location with the largest relative deflection difference, as this is tied to the tangent angle of the deflection curve, leading to greater deflection further from the point of maximum deflection. Analysis of both HecSalv deflection curves identifies the largest relative deflection delta at Cargo Tank 10C, which has a web frame spacing of 8.5 ft and is therefore considered the worst case.

Bending and shear stresses are calculated for the outer fiber, assumed to be in tension in the worst case. Stiffeners are excluded since the deflection applied is assumed to be uniform for both the ship's steel structure and the grout.

$$\delta_{towing\_LC\_fr59} := 2.426 \text{ in}$$

$$\delta_{towing\_LC\_fr55} := 2.586 \text{ in}$$

$$\Delta\delta_{towing\_LC\_59\_55} := \delta_{towing\_LC\_fr55} - \delta_{towing\_LC\_fr59} = 0.16 \text{ in}$$

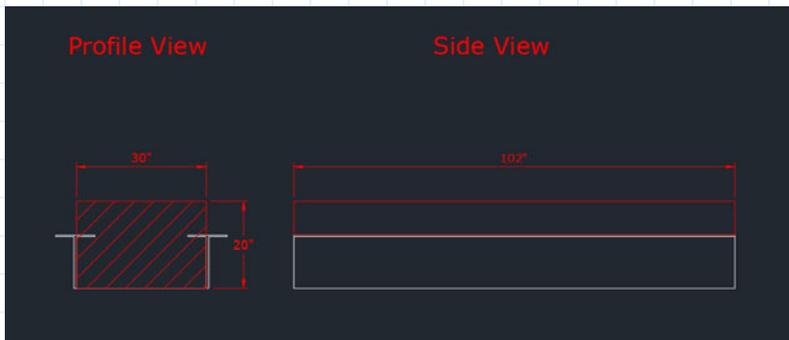
$$\delta_{maxBM\_LC\_fr59} := 5.616 \text{ in}$$

$$\delta_{maxBM\_LC\_fr55} := 6.114 \text{ in}$$

$$\Delta\delta_{maxBM\_LC\_59\_55} := \delta_{maxBM\_LC\_fr55} - \delta_{maxBM\_LC\_fr59} = 0.498 \text{ in}$$

The maximum change in relative deflection for a bay in between frame 55 and frame 59 can be calculated as there are four bays:

$$w_3 := \frac{\Delta\delta_{maxBM\_LC\_59\_55} - \Delta\delta_{towing\_LC\_59\_55}}{4} = 0.085 \text{ in}$$

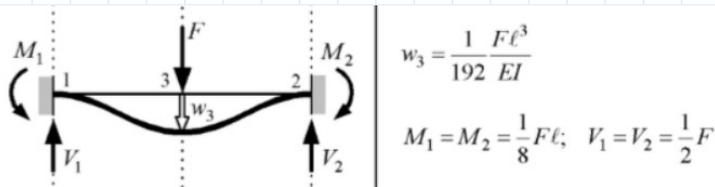


$$B_{grout} := 30 \text{ in}$$

$$H_{grout} := 20 \text{ in}$$

$$L_{grout} := 8.5 \text{ ft}$$

The problem is approximated by assuming this grout beam has two fixed supports with a force applied on the grout beam.



## 4.1 BENDING STRESS

$$I_{xx} := \frac{1}{12} \cdot B_{grout} \cdot H_{grout}^3 = (8.325 \cdot 10^9) \text{ mm}^4$$

$$F := \frac{w_3 \cdot 192 \cdot E_{grout} \cdot I_{xx}}{L_{grout}^3} = 305.764 \text{ kN}$$



# USNS BIG HORN - Grout Stresses

Project: SSG242134

Prepared by: (b)(6)

Checked by: (b)(6)

Date: 27/10/24

$$M := \frac{1}{8} \cdot F \cdot L_{grout} = 99.022 \text{ kN}\cdot\text{m}$$

Distance to outer fibre c

$$c := 0.5 \cdot H_{grout} = 254 \text{ mm}$$

$$\sigma_b := \frac{M \cdot c}{I_{xx}} = 3.021 \text{ MPa}$$

$$\sigma_b = 0.438 \text{ ksi}$$

Unity check for bending stress

$$UC_{\sigma_b} := \frac{\sigma_b}{\sigma_{b\_allowable}} \quad UC_{\sigma_b} = 0.34$$

## 4.2 SHEAR STRESS

$$A_{grout} := B_{grout} \cdot H_{grout} = (3.871 \cdot 10^5) \text{ mm}^2$$

$$\tau := \frac{F}{A_{grout}} = 0.79 \text{ MPa}$$

$$\tau = 0.115 \text{ ksi}$$

Unity check for bending stress:

$$UC_{\tau} := \frac{\tau}{\tau_{allowable}} \quad UC_{\tau} = 0.13$$

## 4.3 COMBINED STRESS (VON MISES)

$$\sigma_c := \sqrt{(\sigma_b)^2 + 3 \cdot (\tau^2)}$$

$$\sigma_c = 3.317 \text{ MPa}$$

$$\sigma_c = 0.481 \text{ ksi}$$

Unity check combination stress:

$$UC_c := \frac{\sigma_c}{\sigma_{c\_allowable}} \quad UC_c = 0.32$$



# USNS BIG HORN - Grout Stresses

Project: SSG242134

Prepared by: (b)(6)

Checked by : (b)(6)

Date: 27/10/24

## **5. CONCLUSION**

Since all unity checks are below 1, this suggests that, with the currently assumed grout properties, the grout has sufficient flexibility to accommodate the expected deflections during towing. However, these calculations may need adjustment once we receive detailed specifications from the third-party supplier regarding the exact grout to be used.



UNCLASSIFIED

# USNS BIGHORN POI Survey



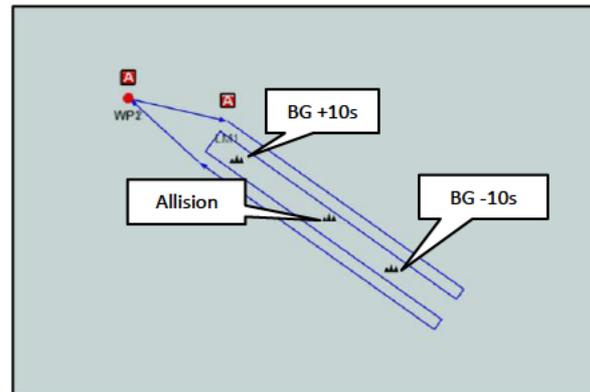
**BLUF:** (U) 56.1.4 integrated with RNO partner forces to obtain sonar imagery of the BIGHORN 's point of allision, based on the ship's logs and track verification. No man-made objects were detected. BIGHORN likely ran into a large rocky outcropping.

### Results

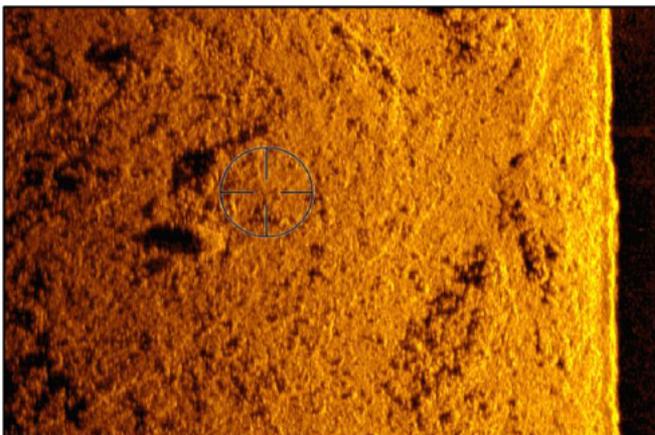
(U) The team ran a Mk 18 Mod 1 UUV on the track displayed in Figure 1 (right). This track encompasses a roughly 100m by 300m area where the BIGHORN allision occurred. The southeastern mountain marker represents the ship position 10 seconds before allision, the middle marker is the likely allision point, and the northwestern marker is the ship position 10 seconds after allision. All positions were acquired from the track logs of the BIGHORN. Figures 2-4 (below) show sonar imaging at each location. Note the rocky bottom throughout the area. The UUV measured depths ranging from 9.4 to 12 meters through the area with an average depth between 10 and 11 meters. The BIGHORN most likely impacted the large triangular shaped rock at a depth of 10m displayed in figure 3 (below).

### Further Considerations

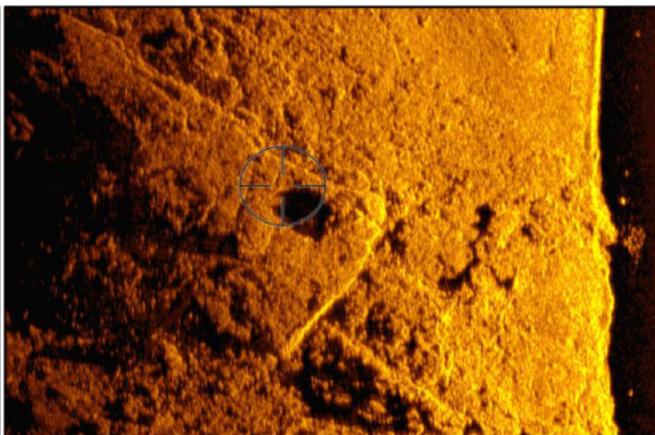
(U) The primary issue facing the team was inaccuracy of charts used for the UUV operation. The charts, sourced from MineNet tactical, display a depth of 22-24 meters; however, the actual depth was 9.4-12 meters. The Omani charts utilized on the VOO reflected more accurate depths for the area, and the POI was located in a shallow zone they normally avoid. Additionally, the team was unable to conduct a recon via ROV due to the crane breaking on the Omani vessel preventing the launch of the RHIB. However, the benefit of this recon would be minimal due to low visibility in the water column.



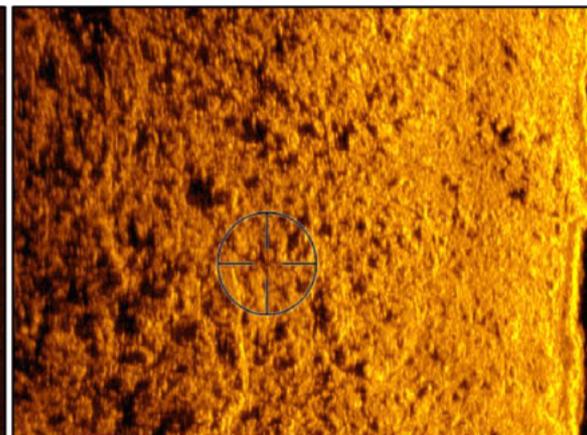
(U) Fig 1: Mk 18 Mod 1 Mission



(U) Fig 2: Sonar Imagery of BG track 10 seconds before allision.



(U) Fig 3: Sonar Imagery of suspected allision point. Triangular rock depth was measured at 10 meters.



(U) Fig 4: Sonar Imagery of BG track 10 seconds after allision.

	<b>Military Sealift Command, Government Operations Safety Management System</b>	
Endorsed by: ISM Steering Committee	Approved by: _____ Date: 6 June 2007 <div style="background-color: gray; color: red; padding: 2px; display: inline-block;">(b)(6)</div> J.R. Taylor, Director	7.2-005-AO187 Revision 0.8 Page 1 of 4

## Under Keel Clearance (UKC) - T-AO187

### 1 PURPOSE

To provide standards and procedures for determining Under Keel Clearance (UKC).

2. **APPLICABILITY:** This procedure applies to all T-AO 187 Government Operated ships.

### 3 BACKGROUND & PROCEDURES

**Note:**

**The Master has authority to delay transit or take any action necessary to ensure the vessel's safe navigation.**

**Determination of the impact of pier depths (provided by a facility or by official chart datum) on ship safety is always at the discretion of the Master.**

- 3.1 This procedure provides written under keel clearance guidance as required by 33 CFR 157.455 for vessels carrying oil in bulk.
- 3.2 The following minimum clearances shall be maintained:
- Underway in confined waters (harbors) – 3 feet of charted depth plus tides
  - Underway in inland waters – 2 feet of charted depth plus squat plus tides
  - Underway in open water – 2 feet of charted depth plus squat plus tides
  - During dead stick maneuvering (pilot aboard and assisted by tugs) – 2 feet of charted depth plus squat plus tides

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- For drydocking/sill – 12 inches over the high block, sill, or highest projection including the effects of list, trim, and hog/sag, and tides
- Pierside (including availabilities) – 3 feet of charted depth plus squat plus tides
- Pierside at DESC fueling piers – 2 feet of charted depth plus squat plus tides

3.2.1.1 T-AO arrival drafts for ROH is 27' aft; other availabilities will be dependent on load.

3.2.1.2 Attachment 1 contains info on determining Squat effect.

- 3.3 Checklist 7.2-003-ALL, Navigational Brief Checklist records the determination of the minimum under keel clearance.
- 3.4 While in port the Mate on Watch shall be observant for any indication the ship has grounded such as unexplained list/trim changes or ship's draft changing with tide.
- 3.5 Whenever UKC requirements cannot be complied with for vessels pierside, vessel Masters should consider breasting barges as a viable alternative if the separation provided by the barge allows compliance with this procedure to be met. Alternatively, vessel Masters may also consider taking on fuel or cargo oil by barge while at anchor if the UKC requirements for being pierside at a fueling facility cannot be met.
- 3.6 To calculate UKC, the depth information used must be from navigation charts that meet SMS Procedure 7.2-004-ALL (Charts and Publications). Alternative hydrographic data provided by the facility may only be considered by vessel Masters if it is from a reliable source, has an approval signature, and is less than one year old.

#### 4 RECORDS & REPORTS

- 4.1 SMS Checklist 7.2-003-01-ALL, Navigational Brief Checklist.

#### 5 REFERENCES

- 5.1 33 CFR 157.455 Minimum Under Keel Clearance.
- 5.2 SMS Checklist 7.2-003-01-ALL, Navigational Brief Checklist

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## 6 DEFINITIONS

- 6.1 Squat: The hydrodynamic phenomenon by which a vessel moving quickly through shallow water creates an area of lower pressure under its keel that causes it to sink ("squat") lower in the water. The squat effect results in vessels having deeper drafts than would normally be expected/experience.

## 7 REVISION HISTORY

- Original 06 Jun 2007  
Rev 0.1 07 Dec 2007- Section 2, Applicability-Changed to reflect current release date.  
Rev 0.2 31 Aug 2009 - Updated definition of Squat, paragraph 6.1.  
Rev 0.3 09 Feb 2016 – Updated paragraph 3.2 to add plus tides  
Rev 0.4 29 Jul 2016 - Revised paragraphs 3.5 and 3.6 to clarify UKC requirements when cannot be complied when vessel is pierside and provided more information to calculate UKC.  
Rev 0.5 11 Jul 2018 – Procedure title modified to make consistent throughout fleet.  
Rev 0.6 18 Nov 2021 – Corrected formatting throughout.  
Rev 0.7 08 Jun 2022 – Renumbered to specify applicability.  
Rev 0.8 01 Jan 2024 - Updated Section 2 “Applicability” by removing the current release date information and adding specific ship applicability.

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## Attachment 1

T-AO 187 / T-AO 205 Class Squat Data			
Loaded (Static Draft 36 Ft Even Keel)		Estimated Squat Effect	
Under Keel Clearance (ft)	Ship's Speed (kt)	Max Squat Bow (ft)	Max Squat Stern (ft)
5	10	1.9	0.5
	12	3.7	1.6
	14	4.5	1.1
	16	G	---
7.5	10	1.8	0.4
	12	3.3	1.1
	14	4.2	1.2
	16	6.0	2.0
10	10	1.7	0.4
	12	3.0	1.0
	14	3.9	1.1
	16	5.4	1.6
12.5	10	1.6	0.4
	12	2.7	0.8
	14	3.6	1.0
	16	4.9	1.4
15	10	1.5	0.4
	12	2.6	0.6
	14	3.4	0.9
	16	4.6	1.3

T-AO 187 / T-AO 205 Class Squat Data			
Light (Static Draft 26 Ft Even Keel)		Estimated Squat Effect	
Under Keel Clearance (ft)	Ship's Speed (kt)	Max Squat Bow (ft)	Max Squat Stern (ft)
5	10	1.8	1.0
	12	2.8	1.5
	14	4.6	1.7
	16	G	---
7.5	10	1.6	0.9
	12	2.5	1.4
	14	4.1	1.5
	16	6.5	2.4
10	10	1.5	0.8
	12	2.2	1.2
	14	3.6	1.4
	16	5.6	2.1
12.5	10	1.3	0.7
	12	2.0	1.1
	14	2.9	1.2
	16	5.0	1.9
15	10	1.2	0.7
	12	1.9	1.0
	14	2.7	1.3
	16	3.9	1.7

Notes: The above values were determined by the Carderock Division using the Ship Wave Analysis (SWAN, Sclavounous, 1994) and Beck, Newman, and Tuck (BNT – 1975) computer programs. None of these values have been verified with shallow water model tests. For sinkage greater than the initial under keel clearance condition the table shows a "G" to indicate a grounding condition. All values shown in the tables are in feet and should be added to the initial static draft to obtain the dynamic draft at the bow, LCB, and stern at the speed condition.

Note: When operating in confined waters consider limitations on speed.

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(b)(6)

**CAPT USN COMSC LANT NORFOLK (USA)**

**From:** (b)(6) CIV USN COMSC NORFOLK VA (USA)  
**Sent:** Thursday, October 31, 2024 12:14 PM  
**To:** (b)(6) CIV USN COMSC NORFOLK VA (USA); (b)(6) CAPT USN COMSC LANT NORFOLK (USA)  
**Cc:** (b)(6) CIV USN COMSC NORFOLK VA (USA)  
**Subject:** RE: Ship Squat - BIG HORN multiple methodologies  
**Signed By:** (b)(6)@us.navy.mil

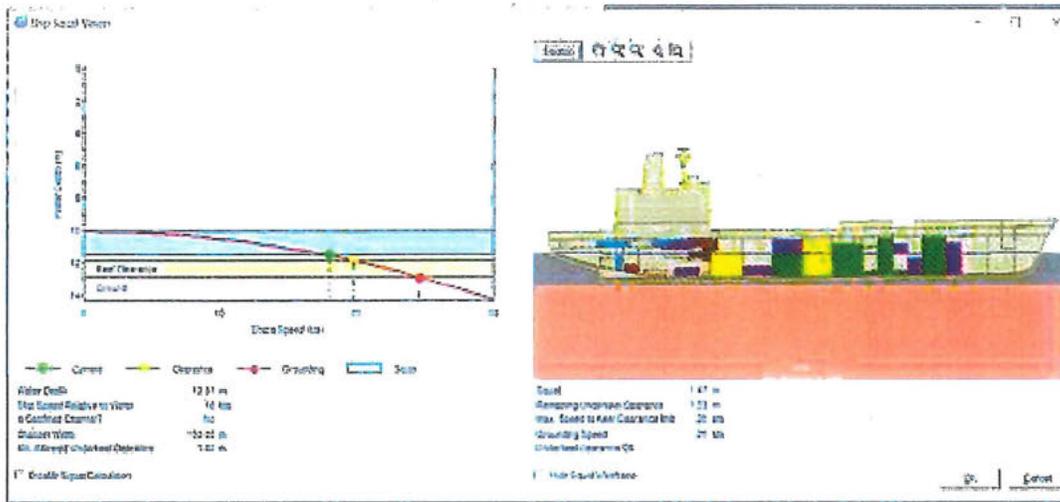
CDRE (b)(6)

When calculating squat there are various formulas and methodologies. All of which make assumptions about water conditions, water flow restrictions (open ocean or restricted channels), vessel characteristics, vessel draft and trim (even keel). The trim condition can be one of the most influential factors in actual squat results as the static trim will decide where the maximum squat will be located when underway. Trim is not taken into account in the provided SMS Checklist. In both displacement conditions over various speeds, trim is considered zero and the bow is shown to have the greatest squat results.

With this said I did run four approaches to approximate squat. Assuming water under the keel of 4.5m, Speed 18knts

1. Eryuzulu and Hausser Formula, noted to be suited for shallow unrestricted water while incorporated vessel characteristics; however at even keel
  - a.  $Squat(m) = 0.5 * \frac{V^2}{g * h} * \frac{B}{T}$  Where V is speed (m/s), g is gravitational acceleration, h is the depth of water (m), B is the beam, and T is the draft.
  - b. Source: Eryuzlu, N., and Hausser, R., *Ship Squat and Shallow Water Effects*, Ocean Engineering, 1978.
  - c. **Calculated Squat = 1.2m**
2. Barrass Formula, Effective for general open water conditions where vessel squat is less impacted by lateral water flow restrictions, simplified and no consideration for trim
  - a.  $Squat (m) = \frac{Cb * V^2}{100}$ , where V is speed (knots) Cb is vessel block coefficient
  - b. Source: Barrass, C.B., and Derrett, D.R., *Ship Stability for Masters and Mates*, 6th Edition, Butterworth-Heinemann, 2006.
  - c. **Calculated Squat = 2.23m**
3. 2<sup>nd</sup> Empirical equation for predicting squat by Barrass (1979,1981) built into CargoMax
  - a. Maximum Squat =  $\frac{C_B * S^{0.81} * V^{2.08}}{30}$ , where C<sub>B</sub> is a block coefficient, S is the blockage factor, and V is the vessel speed relative to the water, in knots.
  - b. Blockage Factor =  $\frac{\text{Submerged cross section area of ship}}{\text{Submerged cross section area of channel}} = \frac{b * d}{B * D}$ , where b and d are the breadth and draft of the ship, respectively, and B and D are width and depth of the channel, respectively.
  - c. CargoMax referenced methodology. Noted to be wide ranging in assumptions and is simplified.
  - d. **Calculated Squat = 1.47m**, See screen shot below.

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e.

4. Romish (1989), effective in unrestricted shallow waters. Assumes even keel. Is the only methodology noted to provide unique stern and bow squat.
  - a.  $S_b = C_V * C_F * K_T * T$
  - b.  $S_S = C_V * K_T * T$ , where  $C_V$  is a correction factor for ship speed,  $C_F$  is a correction factor for ship shape, and  $K_T$  is a correction factor for squat at ship critical speed. The value for  $C_F$  is equal to 1.0 for the stern squat.
  - c. **Calculated squat:**
    - i. **Bow: 2.38m**
    - ii. **Stern: 2.23m**

Averaging these methodologies assuming 4.5m of UKC and speed of 18knts. **The average potential experienced squat was 1.8m (~5.9ft).** Once again it is important to note that the vessel static trim to stern would result in a higher squat on the stern than the bow. More advanced methodologies requiring CFD analysis would be needed to provide a value with less uncertainty

Additional notes:

The fathometer is located approx. 3ft fwd of FR22 (69ft aft of FP), considering the vessel trim, the draft on the hull at this location would be approx. 8.37m. Applying 4.5m of under keel water depth. The total assumed water depth was 12.87m. Once again considering trim, Aft Perp was 1.707 meters deeper than the fathometer location. AP Draft = 10.05m.

Regards,

(b)(6)

(b)(6)

Lead Naval Architect (Acting)  
Trim & Stability and CargoMax COR

U.S. Navy's Military Sealift Command  
N721 Engineering Technical Division - Naval Architecture Branch  
471 East C Street, Bldg. N-19  
Norfolk, VA 23511-2914

(b)(6) (cellular work)

(b)(6) @us.navy.mil

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# Navigational Brief Checklist

To be used in conjunction with SMS Arrival or Departure Checklists. The below items are information and discussion elements associated with special sea evolutions and to be incorporated into the Navigation Brief. The checklist and any supporting information will be retained onboard by the 2/O. The navigation brief will be conducted in a timely manner as determined by the Master within 24 hours of the evolution. A navigation brief is appropriate for arrivals, departures, transits within restricted waters, or situations as deemed necessary by the Master. A deck log entry is to be made on completion of the brief.

**Vessel Name** \_\_\_\_\_

**Port:** \_\_\_\_\_ **Voyage:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Description of Evolution:**

\_\_\_\_\_

The following individuals (where assigned duties associated with this event) have participated in applicable elements of this Navigation Brief. Mark "N/A" where not applicable.

Title	Printed Name	Signature
Master		
Chief Mate		
Chief Engineer*		
Cargo Mate		
Navigator		
Helm Safety Officer		
Watch (After Steering)		
Bow Person in Charge		
Stern Person in Charge		
Operations Officer		
Deck Cadets		

\*As advised by the Master the Chief Engineer may report via email the status of the engineering plant and any equipment limitations in lieu of attending the brief.

1.  Arrival / Departure Times
2.  Pilot ETA \_\_\_\_\_
3.  Pilot Pick-up Location
4.  Updated Pilot Card
5.  Drafts reviewed:  
     FWD \_\_\_\_\_ MID \_\_\_\_\_ AFT \_\_\_\_\_ \*AFT APPENDAGE \_\_\_\_\_
6.  Squat \_\_\_\_\_

Note: Obtain Squat value from CargoMax. When entering values for channel width, depth, and ship's speed, use most conservative estimates obtained from ship's projected trackline.

7.  Minimum Under Keel Clearance \_\_\_\_\_ ft.
8.  Calculate Air Draft (if applicable): \_\_\_\_\_ ft.
9.  Overhead clearance (if applicable) during transit \_\_\_\_\_
10.  Keel clearance in channel \_\_\_\_\_ at pier or anchorage \_\_\_\_\_
11.  Anticipated speed of transit \_\_\_\_\_
12.  ETA at berth \_\_\_\_\_

Enclosure (50)

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