Marine Safety Investigation Report

VERY SERIOUS MARINE CASUALTY | **October 2024**

Seapeak Napa
Fire on deck on 27 October 2023

The Bahamas Maritime Authority

The Bahamas conducts marine safety or other investigations on ships flying the flag of the Commonwealth of the Bahamas in accordance with the obligations set forth in International Conventions to which The Bahamas is a Party. In accordance with the IMO Casualty Investigation Code, mandated by the International Convention for the Safety of Life at Sea (SOLAS) Regulation XI-1/6, investigations have the objective of preventing marine casualties and marine incidents in the future and do not seek to apportion blame or determine liability.

Reports website
www.bahamasmaritime.com/published-investigation-reports/

For all enquiries
casualty@bahamasmaritime.com

What happened

In the early morning of 27 October 2023, Seapeak Napa had completed loading a cargo ethylene in Daesan, South Korea, when the vessel's gas engineer identified that liquid cargo was leaking from the cargo manifold. Having identified that the blank was probably missing a gasket, the gas engineer and duty able seafarer were unbolting the blank when the cargo vapour ignited, creating a fire ball that engulfed the manifold platform and extended in excess of 10 meters in diameter.

The automatic water-spray system did not operate as required but the crew extinguished the fire after 17 minutes. The able seafarer was seriously injured. The gas engineer died due to complications from burns five days after the fire.

Why it happened

The ethylene was introduced to the manifold due to the incorrect line up of valves during cargo sampling. It was exposed to atmosphere from the leaking blank and when the manifold drain valve was opened.

The ignition source could not be determined with certainty but the spanners being used at the manifold were not suitable for use with highly flammable cargoes due to the risk of sparking. Additionally, the gas engineer was wearing a cold weather jacket that was of a type that could produce a static electricity charge.

Despite concerns about the gas engineer's conduct and competency, the gas engineer was working without support or supervision on a complex system.

Firefighting efforts were complicated by a blocked head on the automatic water spray system. Readiness (both onboard and ashore) was reduced on completion of cargo operations when the risk of fire was thought to be reduced.

What we can learn

The use of non-suitable spanners on deck had become normalised as the necessary non-sparking tools to get the job done were not readily available.

The Company's stop work authority was not robust enough to counter individual culture – none of the crew that were aware of the cargo at the manifold felt empowered to stop the work of a superior.

A retributive approach to mistakes and errors undermines a just culture: if people are worried about the consequences, it is more difficult for them to speak up.

Manufacturer's recommended planned maintenance methodology and frequency for water-spray systems may not ensure operability when the water-spray is actually needed.

Narrative

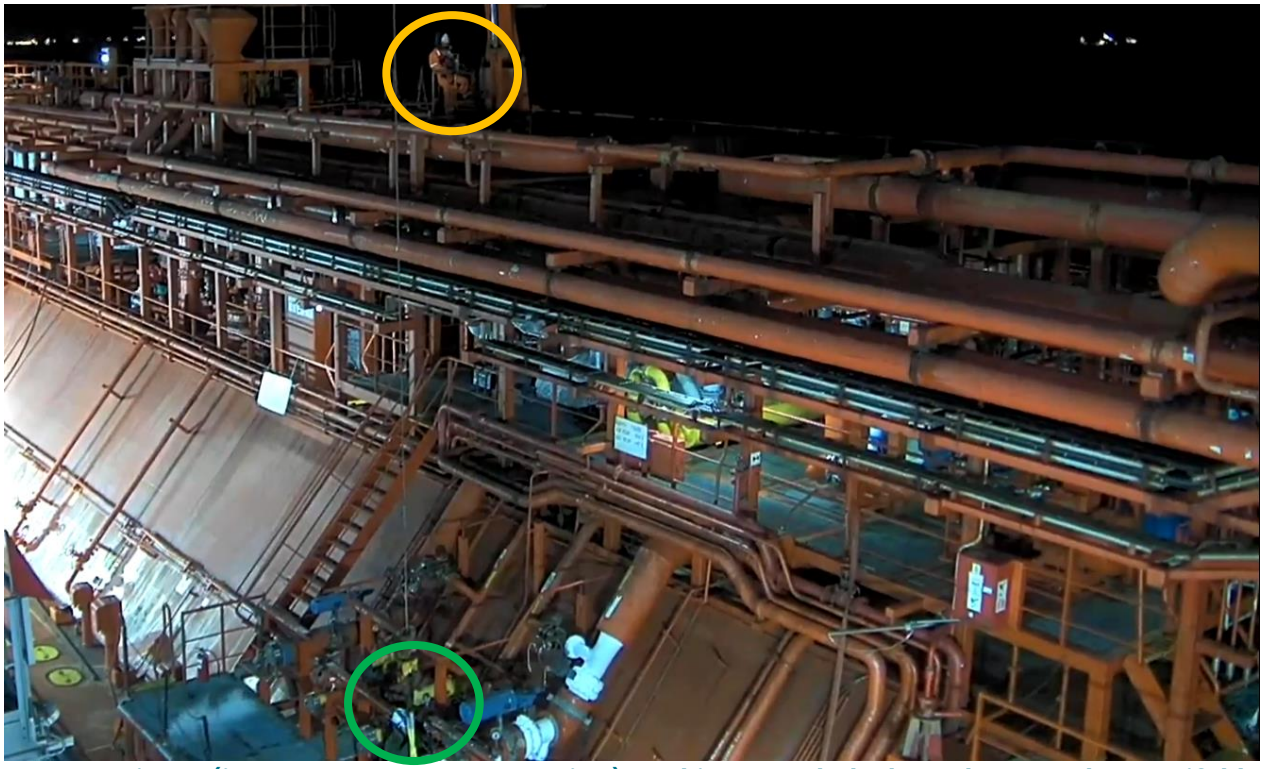
All times in this report are local time (UTC+9)

At 08:40 on 26 October 2023, The Bahamas flagged liquified petroleum gas tanker, Seapeak Napa, secured at HD Hyundai oil bank terminal, Daesan, South Korea. After completing the ship/shore safety checklist and the shipboard operation checklists, at 10:15 it started loading a cargo of ethylene via manifold 2, on the port side.

Loading continued until 02:25 the following morning with 5267.7 tonnes loaded in total. At about 02:30 the vessel started to clear the cargo lines (hot gas blowing) and when this was completed, at 02:55, crew and terminal staff started to disconnect the hydraulic loading arm.

03:00 Completion of hot gas blowing – loading arm connected to manifold 2 (icing on exposed pipework and valves due to cargo temperature)

At 03:10, once disconnected, the officer of the watch returned to the cargo control room (located on the bridge) and the vessel's gas engineer started to unbolt the terminal's manifold reducer. The duty able seafarer (AB1) was operating the crane. The manifold reducer was lifted ashore at 03:24, followed by the last of the terminal's equipment that has been brought onboard.



03:15 Gas engineer (in green overcoat, green ring) working to unbolt the reducer at the manifold, AB1 operating crane (orange ring)

Whilst the last of the lifts was being completed, the gas engineer started to secure a blank on the open manifold, stopping when asked by the chief officer (from the cargo control room) to accompany the cargo surveyor and complete cargo sampling. At about the same time AB1 started to put away portable firefighting equipment (fire hoses and portable dry chemical powder extinguishers) that had been positioned at the cargo manifold as part of the pre-cargo operations checklist.

At 04:00, around the same time as the AB1 handed over to AB3, the gas engineer returned to the manifold and noticed it was leaking cargo. This was also smelled, then seen, by AB1.

The gas engineer then opened the manifold drain valve, closing it again when it was clear that there was cargo under pressure behind the valve. He then summoned AB3 to assist with tightening the bolts on the manifold blank. With cargo still leaking, AB3 asked whether the gasket was in place, unsure (and unable to tell by sight), the gas engineer returned to the compressor room to fetch gaskets. Whilst he was away, AB3 continued the task of securing the firefighting equipment.

At 04:21 the chief officer came on deck to ask AB3 about the location of a gas meter. They did not notice the leaking cargo and it was not brought to their attention.

At 04:23 AB3 returned to the manifold, followed by the gas engineer. Together they started to unbolt the blank to enable fitting the gasket - gas engineer inboard and AB3 outboard. As they started, the gas engineer re-opened the drain valve, releasing a significant amount of cargo to the drip tray.

04:26 Gas engineer opens drain valve, cargo vapour rising from drip tray, AB3 retreating

With the gas engineer behind the manifold, at 04:27 AB3 backed away from the growing vapour cloud to get fresh air when the cargo vapour ignited, creating a fire ball that engulfed the manifold platform, including AB3 and the gas engineer, and extending in excess of 10 meters in diameter.

04:27 Cargo vapour ignites

AB3 was injured but not immobilised and jumped over the ship's rail to get away from the fire, landing on a fender between the vessel and terminal.

The vessel's automatic water-spray system was activated when its fusible plug melted but the system failed to provide any spray at the manifold. Shipboard firefighting efforts started at 04:30 and the terminal began to assist at 04:43. The fire was extinguished at 04:44.

04:44 Shipboard and terminal firefighting efforts

AB3 suffered extensive burns and other serious injuries as a result of the fall to the fender. The gas engineer died due to complications from burns five days after the fire.

Vessel and Crew

Seapeak Napa was a type 2G[1] liquified gas tanker with a deadweight of 10,000 tonnes. It had two cargo tanks and one deck tank. Cargo manifolds were located amidships on each side of the vessel with the cargo sampling station located next to the pump room. Cargo operations were controlled from the bridge.
The vessel was last subject to a port state control inspection on 04 January 2023 and a flag state annual inspection on 28 June 2023. Neither identified any deficiencies. The vessel was last subject to a SIRE[2] inspection on 15 August 2023 when three observations were recorded - none related to the casualty.

The vessel was built in 2003 and completed a special survey in dry-dock in Zhoushan, China on 07 October 2023.

At the time of the casualty, there were 17 crew onboard, including one cadet. The vessel's third engineer had returned home (on compassionate grounds) at the previous port and had not yet been replaced.

The master was a 54-year-old Russian and had been onboard for approximately one month. They had been with the Company for over four years and had over five years' experience at this rank, much of it on this vessel.

The chief officer was a 34-year-old Russian and had been onboard for approximately two months. They had been with the Company for over four years and had less than one year's experience at this rank. The chief officer conducted the gas engineer's cargo system familiarisation.

The gas engineer was a 47-year-old Filipino and had been onboard for one month. This was his first contract with the Company and he was on probation. The loading operation in Daesan was his second onboard this vessel. The gas engineer reported to the chief officer during cargo operations and to the chief engineer for day-to-day maintenance.

AB3 was a 45 year old Filipino and had been onboard for six months. They had been with the Company for over seven years and had nearly 10 years' experience with this vessel type.

---

[1] Tanker intended to transport products, indicated in Chapter 19 of the IGC code, which require significant preventive measures to prelude the escape of cargo.
[2] SIRE is the Ship Inspection Report Programme facilitated by Oil Companies' International Marine Forum. Inspectors are asked to report on all vessel or operational deficiencies and to detail both positive and negative comments on the vessel's operations.

Cargo and handling system

Ethylene is extremely flammable and ethylene gas/air mixtures are explosive - it must be handled in a closed system (the cargo should not come into contact with the atmosphere). It is also an asphyxiant. Ethylene has a boiling point of -103°C at atmospheric pressure. The cargo onboard Seapeak Napa was loaded at a temperature of -100°C: the ethylene liquid posed a cryogenic risk.

Material safety data information highlighted the need to protect from static electricity discharges.

The vessel's cargo handling system included locally operated hydraulic and manual valves. Control of the hydraulic valves was released from the cargo control room which allowed crew to operate valves locally.

There was no means for remote monitoring of valve position. The only mimic board was in the cargo control room. Valve line up for each stage of the cargo operation was advised by the chief officer and completed by gas engineer with assistance from the crew.

Safety management systems

Seapeak Napa's operator, OSM Tanker Management Pte Ltd, had an extensive safety management system which included general guidance on gas tanker safety as well as specific standard operating procedures and checklists covering the ship/shore interface, loading operations, disconnection of the loading arm and cargo sampling. The Company had a stop work authority policy.

The chief officer completed shipboard risk assessments for *Cargo Transfer Operation* and *Connection/ Disconnection Loading Arm/Cargo Hose at Manifold* with the deck department prior to starting cargo operations.

Legislation and guidance

The International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) provides an international standard for the safe carriage by sea in bulk of liquefied gases by prescribing design and construction standards and equipment gas tankers should carry so as to minimize the risk to the ship, its crew and the environment.

Trade specific, harmonised guidance is provided in OCIMF's *International Safety Guide for Oil Tankers and Terminals*, International Chamber of Shipping's *Tanker Safety Guide (Liquefied Gas), and SIGTTO's Liquefied Gas Handling Principles on Ships and in Terminals.*

Analysis

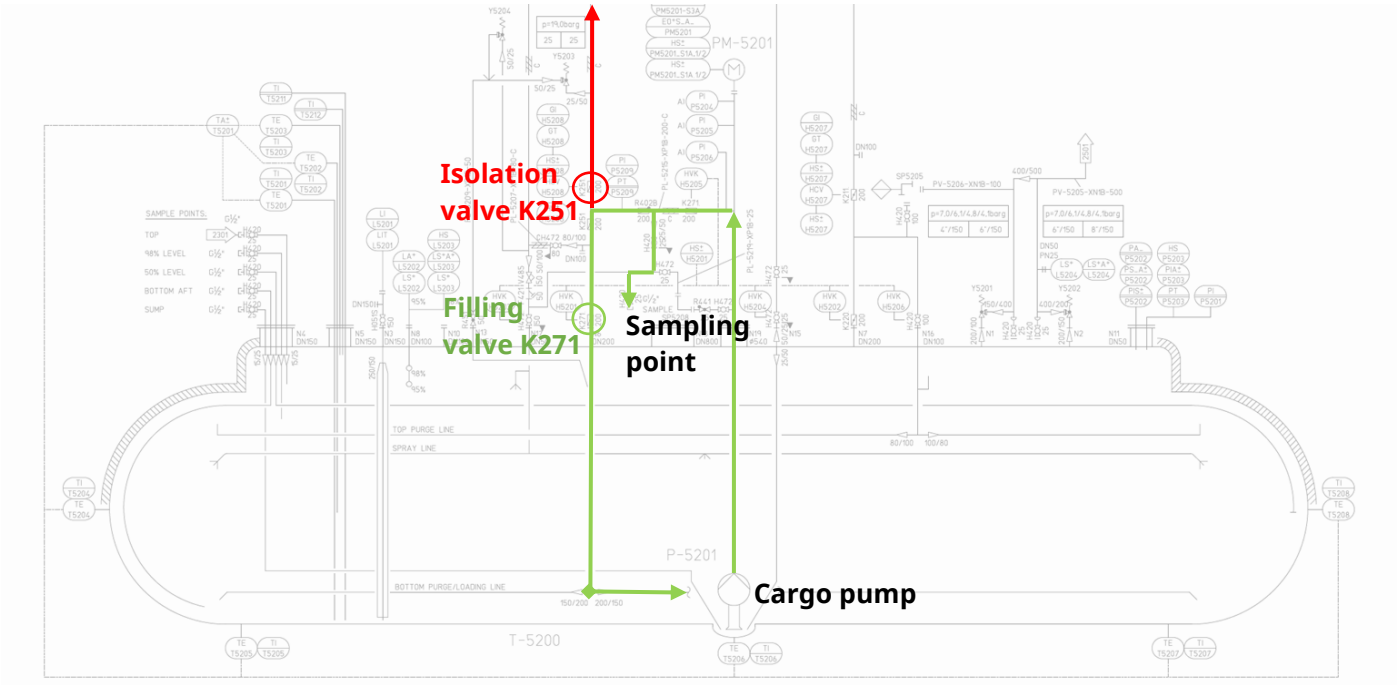
The purpose of the analysis is to determine the contributory causes and circumstances of the casualty as a basis for making recommendations to prevent similar casualties occurring in the future.

Fuel

The cargo manifold was confirmed clear of cargo after hot gas blowing / prior to disconnection of the cargo loading arm. The ethylene was introduced to the manifold during or after cargo sampling.

On Seapeak Napa, cargo sampling was conducted by lining up valves to enable drawing cargo from a point in the cargo system whilst the cargo is pumped in a loop from and back to a cargo tank. After sampling, valves are lined up to allow draining of the lines back to the cargo tank.

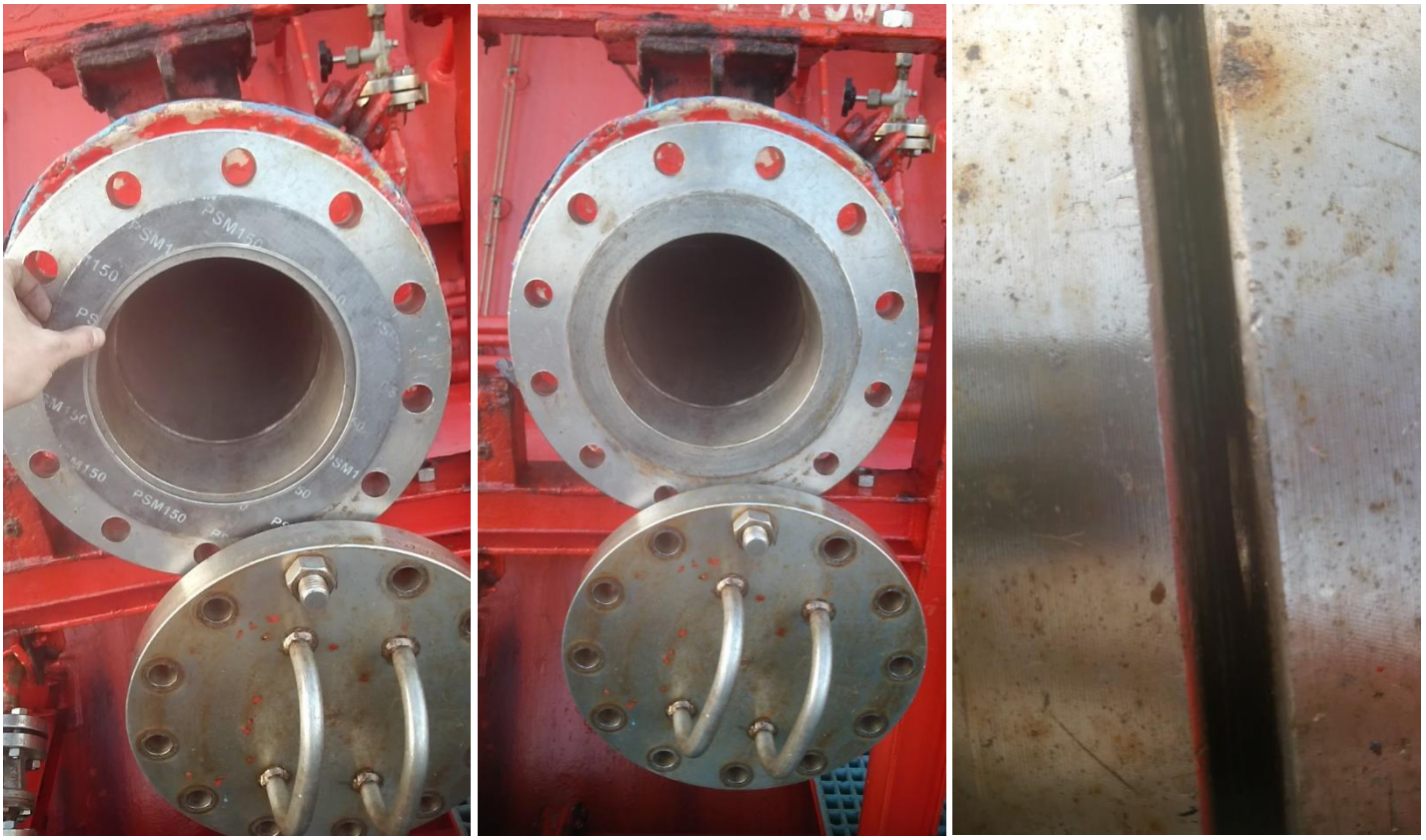
Inspection of the valves after the fire identified that the isolation valve (K251) was not closed, allowing unintentional cargo migration.



Cargo tank 2: Planned cargo pumping loop and sampling point in green. Open isolating valve and resultant cargo migration in red.

Beyond the open isolation valve, cargo passed through manual valve K451 and hydraulic valve K451F (which were not closed after line clearing) to reach the manifold. The presence of the cargo at the manifold may have gone undetected if the manifold blank did not leak. Inspection after the fire confirmed that the manifold blank had been fitted without a gasket.

The manifold gaskets onboard Seapeak Napa were of a reusable type but, due to their design (no tab), once the blank was fitted, it was not possible to visually identify whether a gasket was present. In any event, the blank was not fully secured when cargo sampling started.



Undamaged manifold with and without gasket. View between with blank mounted

Ignition

SIGTTO's *Liquefied Gas Handling Principles on Ships and in Terminals* provides the following guidance on the energy required for the ignition of flammable vapours:

> Accidental sources of ignition of a flammable vapour can be flames, thermal sparks (due to metal-to-metal impact) and electric arcs or sparks. The minimum ignition energy necessary to set fire to hydrocarbon vapours is very low, particularly when the vapour concentration is in the middle of the flammable range. Minimum ignition energies for flammable vapours in air are typically less than one milliJoule. This is an energy level substantially exceeded by any visible flame, by most electric circuit sparks or by electrostatic discharges down to the lowest level detectable by human contact. The presence of oxygen in excess of its normal proportion in air further lowers the minimum ignition energy.

The ignition source could not be determined with certainty; radios and torches in use at the time of the casualty were of the intrinsically safe type and electrical continuity bonding tests, carried out on cargo lines before and after the casualty found no issues.

Potential ignition source: static electricity

Ethylene is a static accumulator. Even with proper grounding and bonding, the material can accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable mixtures can occur.

A static electricity charge may have been generated by the gas engineer's cold weather jacket which was made of synthetic fabric. The jacket was one of a batch purchased directly by the ship's agent during the last drydock when the Company issued cold weather jackets were argued to be too heavy. After dry dock, the jackets remained in use onboard.

Potential ignition source: metal to metal sparks

There were three spanners found at the manifold post-casualty – two standard (steel) 36mm spanners and a 36mm (steel) spanner with an extended handle. Due to the risk of creating a spark, steel tools were not to be used on deck or in proximity to highly flammable cargoes. There was a selection of non-sparking tools stored in the compressor room (including 36mm spanners) but the tools available did not include spanners that the deck crew considered to be suitable for the task – they were of insufficient length to generate enough torque to tighten the bolts fully and the use of steel tools was not considered to be dangerous by the crew that noticed their use prior to the fire – the use of steel tools to get the job done was normal.

Manifold with steel spanner attached post-fire

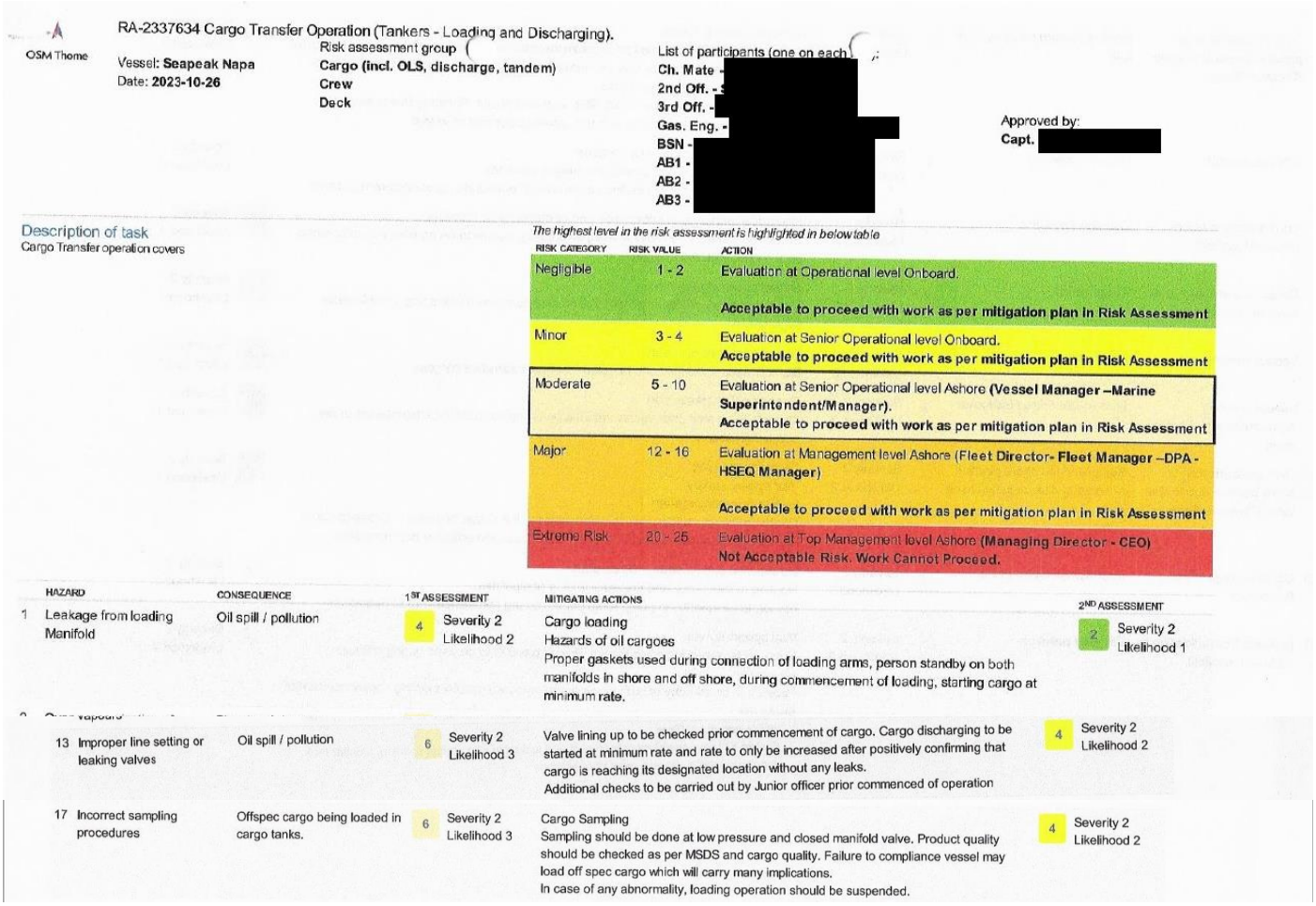
Non-sparking tools stored in the compressor room

Risk controls

Ethylene is highly flammable, draining the cargo at the manifold to the drip tray was a significant violation of the protocol for handling of such cargoes and (evidently) carried a significant risk.

Identified risks

Risk assessments for cargo operations and connection/disconnection were created by the chief officer and reviewed with the crew on 26 October 2023. They were not cargo specific but identified the need for gaskets and correct line setting. Identified risk associated with sampling and the need to use non-sparking tools were specified. With the existing controls, all risks were deemed tolerable.



RA-2337634 Cargo Transfer Operation (Tankers - Loading and Discharging).

OSM Thome

Vessel: **Seapeak Napa**
Date: **2023-10-26**

Risk assessment group
Cargo (incl. OLS, discharge, tandem)
Crew
Deck

List of participants (one on each)
Ch. Mate - [redacted]
2nd Off. - [redacted]
3rd Off. - [redacted]
Gas. Eng. - [redacted]
BSN - [redacted]
AB1 - [redacted]
AB2 - [redacted]
AB3 - [redacted]

Approved by:
Capt. [redacted]

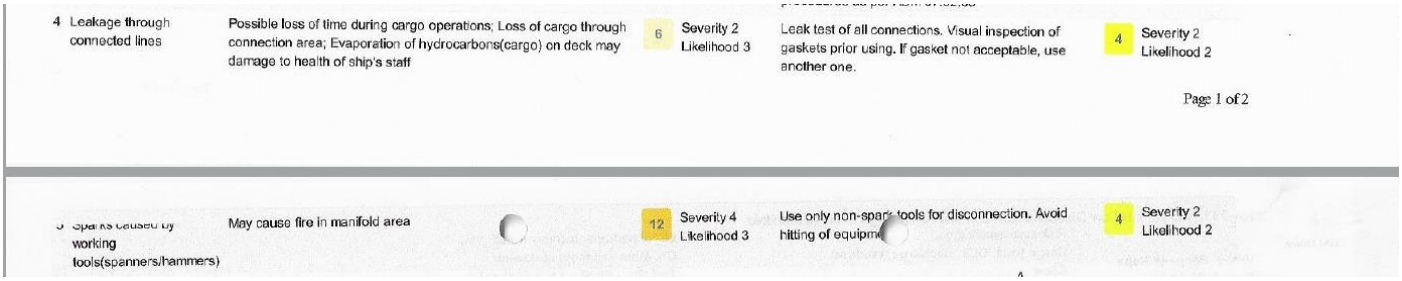
Description of task
Cargo Transfer operation covers

The highest level in the risk assessment is highlighted in below table

RISK CATEGORY	RISK VALUE	ACTION
Negligible	1 - 2	Evaluation at Operational level Onboard. **Acceptable to proceed with work as per mitigation plan in Risk Assessment**
Minor	3 - 4	Evaluation at Senior Operational level Onboard. **Acceptable to proceed with work as per mitigation plan in Risk Assessment**
Moderate	5 - 10	Evaluation at Senior Operational level Ashore **(Vessel Manager –Marine Superintendent/Manager).** **Acceptable to proceed with work as per mitigation plan in Risk Assessment**
Major	12 - 16	Evaluation at Management level Ashore (Fleet Director- **Fleet Manager –DPA - HSEQ Manager)** **Acceptable to proceed with work as per mitigation plan in Risk Assessment**
Extreme Risk	20 - 25	Evaluation at Top Management level Ashore **(Managing Director - CEO)** **Not Acceptable Risk. Work Cannot Proceed.**

	HAZARD	CONSEQUENCE	1ST ASSESSMENT	MITIGATING ACTIONS	2ND ASSESSMENT
1	Leakage from loading Manifold	Oil spill / pollution	4 Severity 2 Likelihood 2	Cargo loading Hazards of oil cargoes Proper gaskets used during connection of loading arms, person standby on both manifolds in shore and off shore, during commencement of loading, starting cargo at minimum rate.	2 Severity 2 Likelihood 1
13	Improper line setting or leaking valves	Oil spill / pollution	6 Severity 2 Likelihood 3	Valve lining up to be checked prior commencement of cargo. Cargo discharging to be started at minimum rate and rate to only be increased after positively confirming that cargo is reaching its designated location without any leaks. Additional checks to be carried out by Junior officer prior commenced of operation	4 Severity 2 Likelihood 2
17	Incorrect sampling procedures	Offspec cargo being loaded in cargo tanks.	6 Severity 2 Likelihood 3	Cargo Sampling Sampling should be done at low pressure and closed manifold valve. Product quality should be checked as per MSDS and cargo quality. Failure to compliance vessel may load off spec cargo which will carry many implications. In case of any abnormality, loading operation should be suspended.	4 Severity 2 Likelihood 2

Cargo transfer risk assessment – identifying need for gaskets and correct line setting, risk associated with sampling focused on quality



4	Leakage through connected lines	Possible loss of time during cargo operations; Loss of cargo through connection area; Evaporation of hydrocarbons(cargo) on deck may damage to health of ship's staff	6 Severity 2 Likelihood 3	Leak test of all connections. Visual inspection of gaskets prior using. If gasket not acceptable, use another one.	4 Severity 2 Likelihood 2

Page 1 of 2

	Sparks caused by working tools(spanners/hammers)	May cause fire in manifold area	12 Severity 4 Likelihood 3	Use only non-spark tools for disconnection. Avoid hitting of equipme	4 Severity 2 Likelihood 2

Connect/Disconnection risk assessment – identifying need to check gaskets. Specifying use of non-sparking tools.

The need to immediately report cargo leakage to the chief officer was explicitly stated in standard operating procedures and reiterated in the chief officer's standing orders. The protocol in case of a cargo spill was to raise the alarm, inform the terminal, stop ventilation and activate the emergency shut down. None of these things happened and controls to prevent leakage and avoid ignition sources were not in place.

Policy v culture

Stop work authority is a policy that should enable crew to stop any work when they see a hazard that could cause harm to themselves, their shipmates or the environment. The Company had a stop work authority policy and AB1 and AB3 were both aware of it. They could (theoretically, at least) apply the policy to situations when other crew were doing something that was considered unsafe. They did not, however, feel that they could stop the work of a superior. The gas engineer was deemed to be in control of the operation and, working in the absence of the officer of the watch or chief officer, the gas engineer's position of authority was self-evident.

Power distance is a concept used to understand the relationship between individuals with varying power. It can be applied in a variety of settings and can be a useful way to understand national cultures and workplace dynamics. The Philippines is considered to be a high power distance country. Amongst other things, high power distance countries can be characterised by having hierarchical organisations with a formal structure where the culture does not tolerate low-ranking individuals challenging their superiors.

In the lead up to this casualty, the stop work policy was not strong enough to counter the individuals' culture.

Performance and supervision

This was the Gas Engineer's first trip with the Company and first time onboard Seapeak Napa, he had joined during dry dock and had completed one cargo loading operation onboard. In the month that he has been onboard he had received two written warnings. The first on 17 October concerned an ethylene leak in the compressor room (that went unfixed and unreported) and his "Final" written warning was five days later.

Description of Breach
On this the **Tuesday** of **17-Oct-2023** at **11:30** hours (UTC) the seafarer...
During the cooling cargo tanks which were presented Ethylene cargo, cargo compressors were running, an alarm occurred from Fix gas detector about concentration of gases in the Compressor room. The gasket on the second stage of the compressor between the pressure indicator and cover has damage. When Ch. Mate came inside compressor room, Ch. Mate detected a high noise and gases strong odor inside compressor room. Nevertheless, there was an Gas Engineer nearby and when Ch. Mate asked him why he didn't immediately report what happened, he simply smiled. For information: it's take a time to fill up cargo compressor room with a gas to observe the strong smell, because of cargo compressor room is open type. This means that there has been a gas leak for a long time. It was impossible not to pay attention to the strong noise. No any action have been done by Gas Engineer for repair and report. Ch. Mate asked support from Engine Department.

Description of Breach
On this the **Sunday** of **22-Oct-2023** at **08:30** hours (UTC) the seafarer...
Upon arrival to Dongjiakou during approaching to terminal, he received order to stop both compressors, but he also stopped the sea water pump. It's just happiness that Master heard this and ordered the pump to start immediately. Otherwise both Condensers would have been frozen by the cargo, debris and destroyed. Which can cause gas leak, expensive and time consuming repairs with lost Charter.

Excerpts from written warnings

The master had requested the gas engineer be repatriated. In response, the Company requested "the initiation of management or supervisory interventions to investigate the cause and provide assistance in improvement of performance".

Despite the previous concerns raised about the gas engineer's performance and familiarity with the ship's cargo systems, the gas engineer was left to conduct the cargo sampling unsupervised, contrary to

requirements[3]. There was no way to remotely check valve line up for sampling or draining the lines and no physical checks were made by the duty or chief officer during or after valve line up.

When the gas engineer identified that there was cargo present at the manifold his decision to vent the cargo to atmosphere rather than inform the chief officer may have been informed by his earlier written warnings and that: "This is your Final Written Warning. A repeat of the offence or failure to meet the required standards will result in further action being taken."

The Company endeavoured to promote a "Just culture"[4] but a retributive approach to the gas engineer's mistakes may have undermined their learning culture. if people are worried about the consequences, it is more difficult for them to speak up when they've done something wrong.

Firefighting

A suitably dimensioned water-spray system is required by the IGC Code[5] to provide cooling, fire prevention and crew protection on gas carriers. Seapeak Napa's water-spray system covered the bridge/cargo control room, deck house, cargo manifold, tank domes and the deck tank. The system was kept in automatic mode, designed that in the event of a fire a fusible plug would melt and a low pressure switch would activate the water-spray pump, fire alarm and trigger the emergency shut down.

During the casualty, the fire melted the fusible plug at the manifold and the pump and alarm were activated but the system did not provide any spray at the manifold. Post-casualty inspection identified that the spray head was clogged by debris. Work by the US Coastguard[6] has identified scale accumulation at spray heads as an ongoing issue with water-spray systems on gas carriers due to the fundamental design and operating environment: scale that has formed anywhere in the pipework is ultimately carried to the point of discharge, blocking the spray head when activated.

Shipboard records indicate that the system was maintained in line with manufacturer's requirements and tested prior to arrival at Daesan[7]. The system was also inspected and tested by the attending surveyor during dry dock in September. Existing planned maintenance methodology and frequency may not be effective to ensure operability when the water-spray is actually needed.

Part of the preparation for cargo operations was to deploy firefighting equipment ready for immediate use at the manifold, in order to reduce response time when risk of fire was deemed to be highest. With loading completed, the crew started to secure this equipment in line cargo completion checklist: readiness both onboard and ashore was reduced when the risk of fire was thought to be gone but, evidently, still remained.

Conclusions

An able seafarer was seriously injured and a gas engineer died after a fire at the gas manifold when vapour from the ethylene cargo was ignited. The ethylene was introduced to the manifold due to the incorrect line up of valves during cargo sampling – the line had previously been cleared to enable disconnection of the loading arm.

[3] The Company's operating procedures for cargo sampling also required that "all cargo sampling be witnessed by the chief officer or the duty officer."
[4] A "Just Culture" refers to a system of shared accountability in which organizations are accountable for the systems they have designed and for responding to the behaviours of their employees in a fair and just manner.
[5] Regulation 11.3
[6] See www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/LGCNCOE/docs/LGC-Newsletter-2018-03-SecHouston-Deck-Water-Spray-Systems.pdf?ver=2020-03-04-183439-650
[7] On 25 October 2023

The ignition source could not be determined with certainty but the spanners being used at the manifold were not suitable for use with liquid petroleum gas cargoes due to the risk of sparking. Additionally, the gas engineer was wearing a cold weather jacket that was of a type that could produce a static electricity charge.

There was a crate of non-sparking tools onboard but the tools available did not include spanners that the deck crew considered to be suitable for the task.

The gas engineer's cold weather jacket was one of a batch purchased directly by the ship's agent during the last drydock and did not meet the Company's personal protective equipment requirements.

The gas engineer drained the cargo to the drip tray/atmosphere, contrary to guidance. His actions to rectify the situation without engaging help from the chief officer may have been informed by two written warnings. He was in his initial probation period with the Company.

Despite concerns about the gas engineer's conduct and competency, the gas engineer was working without support or supervision on a complex system that could not be monitored remotely.

The Company's stop work authority was not effective – none of the crew that were aware of the cargo at the manifold felt empowered to stop the work of a superior. The use of non-suitable spanners on deck was normalised as the necessary non-sparking tools were not available to get the job done.

Firefighting efforts were complicated by a blocked head on the automatic water spray system. Readiness both onboard and ashore was reduced on completion of cargo operations when the risk of fire was thought to be reduced.

Action taken and Recommendations

As a result of this casualty OSM Thome has:

- Undertaken a full review of its safety management system.
- Introduced "life-saving rules" across the fleet.
- Updated requirements for personal protective equipment onboard its tankers.
- Overhauled the control of tools (including the supply and location of non-sparking tools) in hazardous areas.
- Adapted its generic risk assessment to include human factors.
- Adapted its cargo plans to include critical stages of operations from arrival until departure.
- Provided mimic plans in compressor rooms and cargo control rooms.
- Increased test frequency for of fixed water spray system and enhanced schedule for replacement of pipework.
- Shared lessons learned from the casualty across its fleet.
- Conducted (onboard) workshops on stop work authority, leadership, risk assessment and toolbox meetings.

Ongoing work includes introduction of a cargo auditing process, changes to its recruitment and onboarding process and the introduction of a quality safety program.

In view of actions taken and ongoing, there are no recommendations.

Vessel particulars	
Vessel name	Seapeak Napa
Vessel type	LPG tanker
Flag / IMO number	Bahamas / 9254953
Registered owner	Seapeak Napa LLC
Manager	OSM Tanker Management Pte Ltd
Classification Society	Det Norsk Veritas
Built	China, 2003
Length / breadth / moulded depth	129.77m / 19.8m / 11.5m
Gross / net tonnage	9,691 / 2,908
Minimum safe manning	11

Voyage Particulars	
Load port	Daesan, South Korea
Discharge port	Kaohsiung, Taiwan
Cargo information	5267.7 tonnes of ethylene (in vacuum)
Crew	17 (including one cadet)

Marine Casualty Information	
Severity of casualty	Very serious marine casualty
Date / time	27 October 2024 / 04:27LT (UTC+9)
Geographical location	Daesan, South Korea
Place onboard	On deck - cargo manifold
Injuries / fatalities	1 serious injury, 1 fatality
Damage / environmental impact	Minimal fire damage
Ship operation	Preparing for sea
Stage of passage	Alongside
External environment	Wind: NNW BF4, clear skies, good visibility. Air temperature: 18°C