Annex A

Essence De Papeterie Material Safety Data Sheet reviewed on 22 November 2004

Material Safety Data Sheet
According to 91/155/EEC

Printing date 22.11.2004 Reviewed on 22.11.2004

1 Identification of the substance/preparation and of the company/undertaking

· **Product details**

· **Trade name: ESSENCE DE PAPETERIE**
· **Application of the substance / the preparation:** Intermediate.

· **Manufacturer/Supplier:**
D.R.T.
30 rue Gambetta
BP 206
F-40105 DAX CEDEX
FRANCE
Tel: 33-(0)558566200
Fax: 33-(0)558566222
Email: drtsales@drt.fr

2 Composition/information on ingredients

· **Chemical characterization**
· **Description:** Crude sulphate turpentine.

· **Dangerous components:**		
CAS: 8006-64-2 EINECS: 232-350-7	turpentine (mix.) Xn, N; R 10-20/21/22-36/38-43-51/53-65	97.5-99.5%
	suphur compounds (dimethyl sulphide, dimethyl disulphide, mercaptans)	0.5-2.5%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

3 Hazards identification

· **Hazard description:**
Harmful
Highly flammable
Dangerous for the environment
· **Information concerning to particular hazards to man and environment:**
Highly flammable.
Harmful by inhalation, in contact with skin and if swallowed.
Irritating to eyes and skin.
May cause sensitisation by skin contact.
Harmful: may cause lung damage if swallowed.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

4 First-aid measures

· **After inhalation:**
Supply fresh air; consult doctor in case of complaints.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:**
Immediately rinse with plenty of water.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Immediately rinse with water. Remove contact lenses.
Rinse opened eye for at least 15 minutes under running water. Then consult an ophthalmologist.

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According to 91/155/EEC

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Trade name: ESSENCE DE PAPETERIE

(Contd. of page 1)

· **After swallowing:**
Do not induce vomiting.
If person is conscious, rinse out mouth with water.
Call for a doctor immediately.

5 Fire-fighting measures

· **Suitable extinguishing agents:**
Foam
Fire-extinguishing powder
Carbon dioxide (CO2)
· **For safety reasons unsuitable extinguishing agents:** Water with jet
· **Special hazards caused by the substance, its products of combustion or resulting gases:**
In case of fire, may form hazardous combustion gases and vapours. May form sulphur oxides.
· **Protective equipment:**
Wear self-contained respiratory protective device.
Do not inhale explosion gases or combustion gases.
· **Additional information:** Cool endangered receptacles with water spray.

6 Accidental release measures

· **Person-related safety precautions:**
Wear personal protection equipment.
Keep unprotected persons away.
Ensure adequate ventilation
· **Measures for environmental protection:** Do not allow product to reach sewage system or any water course.
· **Measures for cleaning/collecting:**
Absorb liquid components with liquid-binding material.
Send for recovery or disposal in suitable receptacles.
Dispose of the material collected according to regulations.
· **Additional information:**
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling:**
· **Information for safe handling:** Ensure good ventilation/exhaustion at the workplace.
· **Information about fire - and explosion protection:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.

· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Keep receptacle tightly sealed.
All equipments including ventilation systems must be equipotential and earthed.
Anti-deflagrant electric devices.
· **Information about storage in one common storage facility:** Store away from oxidizing agents.
· **Further information about storage conditions:**
Store in a well ventilated area.

(Contd. on page 3)

Material Safety Data Sheet
According to 91/155/EEC

Printing date 22.11.2004 Reviewed on 22.11.2004

Trade name: ESSENCE DE PAPETERIE

(Contd. of page 2)

Keep away from sources of ignition.

8 Exposure controls/personal protection

· **Ingredients with limit values that require monitoring at the workplace:**

8006-64-2 turpentine (mix.)

OES	Short-term value: 850 mg/m³, 150 ppm Long-term value: 566 mg/m³, 100 ppm

· **Additional information:** The lists valid during the making were used as basis.

· **Personal protective equipment:**
· **General protective and hygienic measures:**
The usual precautionary measures are to be adhered to when handling chemicals.
Immediately remove all soiled and contaminated clothing
Avoid contact with the eyes and skin.
Do not inhale vapours.
· **Respiratory protection:** Suitable respiratory protective device recommended.
· **Protection of hands:** Solvent resistant gloves
· **Eye protection:** Tightly sealed goggles
· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **General Information**	
Form:	Liquid
Colour:	From yellow to brown
Odour:	Unpleasant
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	140-180°C
· **Flash point:**	5-20°C
· **Auto-ignition temperature:**	220-253°C
· **Explosion limits:**	
Lower:	0.8 Vol %
Upper:	6 Vol %
· **Density at 20°C:**	0.860-0.870
· **Solubility in / Miscibility with water:**	Insoluble.

10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

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Trade name: ESSENCE DE PAPETERIE

(Contd. of page 3)

· **Materials to be avoided:**
May react violently with :
- oxidizing products, strong mineral acids and halogens (especially chlorine)
- Ca(OCl)2, CrO3, Cr(OCl)2, SnCl4
- hexachloromelamine and trichloromelamine.

· **Dangerous reactions:**
The product can self-oxidize on contact with air and generate heat which may cause spontaneous ignition in enclosed areas.
Materials such as rags, vessels, insulation when soaked with the product, can self-ignite in enclosed areas.

· **Dangerous decomposition products:** No dangerous decomposition products known.

· **Additional information:** Keep away from sources of ignition.

11 Toxicological information

· **Acute toxicity:**
According to the annex I of directive 67/548/EEC on dangerous substances, the product is considered as harmful by inhalation, in contact with skin and if swallowed.

· **Primary irritant effect:**

· **on the skin:** Irritant to skin.

· **on the eye:** Irritant to eyes.

· **Sensitization:** Sensitization possible through skin contact.

12 Ecological information

· **Ecotoxical effects:**
The product is considered : toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

· **General notes:** Do not allow product to reach ground water, water course or sewage system.

13 Disposal considerations

· **Product:**

· **Recommendation:**
After prior treatment product has to be disposed of in an incinerator for special waste adhering to the regulations pertaining to the disposal of special waste.

· **Uncleaned packaging:**

· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **Land transport ADR/RID (cross-border)**

· **ADR/RID class:**	3 Flammable liquids.
· **Item:**	F1
· **Danger code:**	33
· **UN-Number:**	1993
· **Packaging group:**	II
· **Hazard label:**	3
· **Description of goods:**	1993 FLAMMABLE LIQUID, N.O.S.

(Contd. on page 5)

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Trade name: ESSENCE DE PAPETERIE

(Contd. of page 4)

· **Maritime transport IMDG:**
· **IMDG Class:** 3
· **UN Number:** 1993
· **Label:** 3
· **Packaging group:** II
· **EMS Number:** F-E,S-E
· **Proper shipping name:** FLAMMABLE LIQUID, N.O.S.

· **Air transport ICAO-TI and IATA-DGR:**
· **ICAO/IATA Class:** 3
· **UN/ID Number:** 1993
· **Label:** 3
· **Packaging group:** II
· **Proper shipping name:** FLAMMABLE LIQUID, N.O.S.

15 Regulatory information

· **Labelling according to EU guidelines:**
The product has been classified and marked in accordance with EU Directives / Ordinance on Hazardous Materials.

· **Code letter and hazard designation of product:**

Xn Harmful
F Highly flammable
N Dangerous for the environment

· **Hazard-determining components of labelling:**
turpentine (mix.)

· **Risk phrases:**
11 Highly flammable.
20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
36/38 Irritating to eyes and skin.
43 May cause sensitisation by skin contact.
51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
65 Harmful: may cause lung damage if swallowed.

· **Safety phrases:**
16 Keep away from sources of ignition - No smoking.
24 Avoid contact with skin.
33 Take precautionary measures against static discharges.
36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
61 Avoid release to the environment. Refer to special instructions/safety data sheets.
62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

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Trade name: ESSENCE DE PAPETERIE

(Contd. of page 5)

· **Relevant R-phrases:**

10	Flammable.
20/21/22	Harmful by inhalation, in contact with skin and if swallowed.
36/38	Irritating to eyes and skin.
43	May cause sensitisation by skin contact.
51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
65	Harmful: may cause lung damage if swallowed.

Version of 22/11/2004.

Annex B

Cargo Handling Procedures (QCH) Section 2.16 - cargo plan / pre-arrival conference

2.16 CARGO PLAN / PRE-ARRIVAL CONFERENCE

The Chief Officer is responsible to conduct a Pre-Arrival conference prior to arrival in a load or discharge port. All Deck Officers and crew members involved in the cargo operation must attend.
If any bunkering and/or loading or handling of stores involving other departments is planned in the cargo area simultaneously with the cargo operation, then representative(s) from those departments should also attend the conference.

All known defects to the cargo equipment must be noted and proper procedures to be made to ensure that unsafe operations can not occur due to the defect. If needed, the Risk Assessment shall be updated.

The Chief Officer is responsible for:

- Advising Officers and crew about terminal requirements and berth restrictions.
- Preparing a written plan for the cargo operation on a berth to berth basis when more than one berth is called at during a port stay.
- Identifying all hazards associated with each cargo to be handled, and Personal Protective Equipment (PPE) required for these cargoes.
- Making sure that all relevant information is reviewed, recorded and distributed.

The plan must include the following:

* Cargo stowage plan & Ballast plan
* Cargo Loading / Discharge orders
* Effectively controlling multiple operations
* Manifold arrangements plans
* Max transfer rate / pressure
* Topping rate
* Stop ullage
* Tank inspections
* Inert operations
* Tank venting and vapour return requirements
* Particular hazards of each cargo and distributions of MSDS
* Specific PPE to be worn for each cargo
* Safety precautions related to equipment and hoses to be used
* Specific operations during which PPE shall be worn
* Any planned tank cleaning and / or gas freeing operations
* Heating requirements
* Inhibitor requirements
* Other relevant cargo issues
* Other activities when alongside

The Duty Officers are responsible for:

- Signing and understanding the cargo plan.
- Safe implementation of the cargo plan.

- Ensuring that all involved officers and crew are using proper PPE and other safety precautions required during their watches.
- Using required PPE.
- Report all failures to follow procedures or to wear proper PPE.

All Shipboard Personnel are responsible for:

- Ensuring own safety by being knowledgeable about cargoes being handled and associated hazards.
- Using required PPE.
- Report all failures to follow procedures or to wear proper PPE.

RECORDING

The Chief Officer shall make an entry in the Deck Logbook when this conference is held. All cargo plans, orders and other related documents retained as part of the vessel's cargo files.

CHANGES IN THE CARGO PLANS AND / OR ORDERS

It is the Chief Officers responsibility to maintain the cargo plans as up to date as possible and to distribute changes to the Duty Officers involved. The Duty Officer is responsibility to verify changes made prior to assuming their watches.

2.16.1 CHIEF OFFICER STANDING ORDERS

The Chief Officer should make his/her own standing orders for the cargo operation. The topics of the standing orders are each individual Chief Officers choice as long it will not conflict with company or international procedures/regulations. Both Chief Officer and Duty Officers shall sign the standing orders.

Annex C

Georgia-Pacific GP-S08 crude sulphate turpentine Material Safety Data Sheet - dated 13 February 2003

Georgia-Pacific

MATERIAL SAFETY DATA SHEET

Effective Date: 2/13/2003
Supercedes Date:10/18/2002

* * * Section 1 – Chemical Product and Company Identification * * *

Product Name: Turpentine

Synonyms: Crude Sulfate, CST, Oil of Turpentine, Spirit of Turpentine, Turpentine

Product Use: Industrial Process By-Product

Manufacturer Information

Georgia-Pacific Corporation
133 Peachtree Street, N. E.
Atlanta, GA 30303

Phone: (404) 652-5119
Emergency # 1-800-424-9300 (Chemtrec)

* * * Section 2 – Composition / Information on Ingredients * * *

CAS #	Component	Percent	OSHA PEL	ACGIH TLV
8006-64-2	Turpentine	99	100 ppm	100 ppm
Reduced Sulfur Compounds:				
624-92-0	Dimethyl Disulfide	<1	Not Established	Not Established
75-18-3	Dimethyl Sulfide	<1	Not Established	Not Established
7783-06-4	Hydrogen Sulfide	<1	10 ppm 15 ppm STEL 20 ppm* Ceiling 50 ppm Peak	10 ppm 15 ppm STEL
74-93-1	Methyl Mercaptan	<1	0.5 ppm 10 ppm Ceiling	.5 ppm

* 20 ppm Ceiling for 10 minutes

* * * Section 3 - Hazards Identification * * *

Emergency Overview

DANGER! FLAMMABLE! Contact with oxidation catalysts or with strong oxidizing agents (chlorine) may cause fires or explosions. Product is a light yellow to amber liquid with offensive sulfurous odor. May be harmful or fatal if inhaled, swallowed or absorbed through the skin. May cause irritation to the eye, mucous membrane, respiratory tract and skin.

Target Organs:

Central Nervous System, Eye, Respiratory Tract, Kidney, Skin

Potential Health Effects: Inhalation

Inhalation of vapors or mist may be harmful or fatal. May cause respiratory tract irritation, sensitization and central nervous system depression. Turpentine may also release reduced sulfur compounds (dimethyl disulfide, dimethyl sulfide, hydrogen sulfide and methyl mercaptan) causing irritation. Symptoms may include: salivation, coughing, chest pain and shortness of breath; confusion, headache, dizziness, nausea, anxiety, painful or bloody urination.

Potential Health Effects: Eyes

May cause severe eye irritation or burns. Direct liquid contact may cause severe irritation with swelling, corneal burns and conjunctivitis. Symptoms may include: burning, redness, swelling and tissue damage.

Potential Health Effects: Skin

May causes skin irritation. Symptoms may include: redness, burning and swelling. Skin absorption causes central nervous system depression with systemic effects similar to those seen following inhalation. Repeated exposure may cause sensitization (e.g. dermatitis).

Potential Health Effects: Ingestion

Ingestion of liquid can produce severe gastrointestinal irritation and central nervous system depression. Symptoms may include: burning pain in the mouth and throat, nausea, vomiting, diarrhea, abdominal pain, excitement, ataxia, confusion, stupor, seizures, fever and may cause death due to respiratory failure.

Medical Conditions Aggravated

Exposure may aggravate pre-existing eye, kidney, skin, respiratory and cardiovascular disorders.

* * * Section 4 – First Aid Measures * * *

First Aid: Eyes

Immediately rinse with water. Remove contact lenses. Hold eyelids apart and flush eyes with water for at least 15 minutes. Get immediate medical attention.

First Aid: Skin

Wash skin thoroughly with soap and water. Immediately remove contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse or dispose of properly.

First Aid: Ingestion

If swallowed, DO NOT induce vomiting. If the subject is conscious, then give 1 or 2 glasses of water to dilute the chemical. Get immediate medical attention.

First Aid: Inhalation

Remove to fresh air immediately. If breathing is difficult, trained personnel should administer oxygen. If breathing has ceased apply artificial resuscitation using oxygen and a suitable mechanical device such as a bag and a mask. Get immediate medical attention.

First Aid: Notes to Physician

Exposure may aggravate pre-existing eye, kidney, skin, respiratory and cardiovascular disorders.

*** Section 5 – Fire Fighting Measures ***

Flash Point:	53° - 80°F	**Flash Point (Industry Average):**	71° F
Method Used:	Closed Cup		
Upper Flammable Limit (UFL):	Not Available	**Lower Flammable Limit (LFL):**	0.8
Auto Ignition:	253°C (488° F)	**Flammable Classification:**	Flammable

General Fire Hazards

Turpentine is a flammable liquid and may be ignited by heat, sparks or flames. May form explosive mixtures with air. Vapors may travel to an ignition source and flash back. Empty containers may retain residue including flammable or explosive vapors. Do not cut, drill or weld near full, partially or empty product containers

Hazardous Combustion Products

Emits acrid fumes on heating.
Decomposition produces carbon dioxide, carbon monoxide and low molecular weight hydrocarbons.

Extinguishing Media

Dry Chemical, Foam or Carbon Dioxide.

Fire Fighting Equipment/Instructions

Keep unnecessary people away; isolate hazard area and deny entry. Remove containers exposed to fire if possible; otherwise cool them from the side with water spray. Emergency equipment including self-contained breathing apparatus (SCBA) and full fire fighting turnout gear should be worn by fire fighters.

NFPA Ratings:
Health: 2 **Fire:** 3 **Reactivity:** 1
(Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe)

*** Section 6 – Accidental Release Measures ***

Containment Procedures

In the event of a spill or leak, evacuate area; consult the environmental & safety supervisor immediately. Remove all ignition sources. Ventilate area of spill or leak to disperse gas. Stop flow of gas, if you can do so without risk.

Clean Up Procedures

Consult the environmental & safety supervisor before beginning clean up. Wear appropriate protective equipment and clothing during clean up. Use inert materials for clean up. Do not get water inside containers and prevent entry into waterways, sewers, basements or confined areas. Decontaminate the spill area. In addition, comply with all applicable regulations on spill and release reporting.

Evacuation Procedures

Close off area. Isolate spill or leak area immediately. Keep unnecessary personnel away. Stay upwind.

Special Procedures

The use of monitoring equipment is recommended when entering confined spaces that may contain turpentine vapors or liquid. Additional monitoring may also be needed for sulfur compounds, such as: dimethyl disulfide, dimethyl sulfide, hydrogen sulfide and methyl mercaptan.

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Exercise caution when entering confined spaces that contain or have contained turpentine. Do not inhale vapors. Avoid contact with eyes, skin and clothing. Always test air prior to entry to ensure atmosphere is below the permissible exposure limit.

Storage Procedures

Avoid contact with incompatible materials (Section 10). Do not store near strong oxidizing agents, oxidation catalysts and sources of ignition and heat.

* * * Section 8 – Exposure Controls / Personal Protection * * *

Exposure Guidelines

Exposure limits for Turpentine can be found in Section 2: Composition/Information on Ingredients.

Engineering Controls

Provide local and general exhaust ventilation to keep airborne concentrations below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

(PPE RECOMMENDATIONS BELOW: IT MAY BE NECESSARY TO FOLLOW PPE REQUIREMENTS AS DETERMINED BY YOUR WORKPLACE)

Personal Protective Equipment: Eyes/Face

Wear chemical splash goggles to prevent eye contact or face shield (ANSI Z87.1). Ensure compliance with OSHA's PPE standards 29 CFR 1910.132 (General) and .133 (Eye and face protection). Safety shower/ eye-wash fountain must be readily available in the work-place area 29 CFR 1910.151(c).

Personal Protective Equipment: Skin

Impervious protective gloves, such as polyvinyl alcohol & Teflon, are recommended for personnel handling/collecting samples. Ensure compliance with OSHA's PPE standards 29 CFR 1910.132 (general) and .138 (hand protection). Safety shower/eye-wash fountain must be readily available in the work-place area 29 CFR 1910.151(c).

Personal Protective Equipment: Respiratory

Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2).

* * * Section 9 – Physical & Chemical Properties * * *

Appearance:	Light yellow to amber	**Odor:**	Offensive Sulfurous Odor
Physical State:	Liquid	**PH:**	Not Determined
Vapor Pressure:	4 mmHg	**Vapor Density:**	4.8 (at 60°F)(Air = 1)
Boiling Point:	150 - 180°C	**Melting Point:**	-50 to –60 °C
Solubility (H_2O):	Insoluble	**Specific Gravity:**	0.86 – 0.90 (at 25°C)(Water = 1)

*** Section 10 – Chemical Stability & Reactivity Information ***

Chemical Stability:
Product is stable under normal conditions of use.

Conditions to Avoid:
Heat, exposure to air in a confined space and sources of ignition.

Incompatibility:
Strong oxidizers (especially chlorine), strong acids, chromic anhydride, chromyl chloride, hexachloromelamine and stannic chloride. Will attack ordinary rubber.

Hazardous Decomposition
Carbon Dioxide, Carbon Monoxide, low molecular weight hydrocarbons

Hazardous Polymerization
Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

*** Section 11 – Toxicological Information ***

Acute and Chronic Toxicity

A: General Product Information
Turpentine is a skin, eye, mucous membrane, and upper respiratory tract irritant and a central nervous system (CNS) depressant. There have been a number of fatalities reported from the ingestion of turpentine. The mean oral lethal dose from humans is 15 to 90 mL (ACGIH, 1992). Symptoms of turpentine exposure include: burning of the mouth and throat, abdominal pain, nausea, vomiting, and diarrhea. Central Nervous System effects include: excitement, ataxia, confusion and stupor. Convulsions may occur after several hours after ingestion. Turpentine liquid may cause conjunctivitis and corneal burns. The liquid can be absorbed through the skin and mucous membranes and intoxication by this route has been reported.

B: Component Analysis - LD50/LC50
Toxicological values have been published for Turpentine (8006-64-2).

Carcinogenicity

A: General Product Information

Data available in one or more of the following categories:
Epidemiology, Neurotoxicity, Mutagenicity and Teratogenicity.

B: Component Carcinogenicity

This product is not listed as a carcinogen by ACGIH, IARC, NIOSH or NTP.

* * * Section 12 – Ecological Information * * *

Turpentine is a plant-derived hydrocarbon, the resins in turpentine can be harmful to water birds, plankton, algae and fishes through its coating action.

* * * Section 13 – Disposal Considerations * * *

US EPA Waste Number & Descriptions

A: General Product Information

This product, if discarded, as supplied, would meet the characteristics of RCRA ignitable waste (D001). If the material is altered by processing, use, or contamination the waste must be tested using methods described in 40 CFR 261 to determine if it meets applicable definitions of hazardous wastes.

B: Component Waste Numbers

D001

Disposal Instructions

Do not flush into public or off-site accessed sewers or surface waters. Dispose of waste material according to Local, State, Federal and Provincial Environmental Regulations.

* * * Section 14 – Transportation Information * * *

US DOT Information

Shipping Name:	Flammable liquids, n.o.s. (Crude sulfate turpentine)
Hazard Class:	3
UN/NA #:	UN1993
Packaging Group:	II
Required Label(s):	Flammable Liquid

*** Section 15 – Regulatory Information ***

US Federal Regulations

A: General Product Information

No information available

B: Component Analysis

This material does not contain one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4):

Acute Health: Yes **Chronic Health:** Yes **Fire:** Yes **Pressure:** No **Reactive:** No

State Regulations

A: General Product Information

No information available

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA	RI
Turpentine	8006-64-2	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Other Regulations

A: Component Analysis - Inventory

Component	CAS #	TSCA	DSL
Turpentine	8006-64-2	Yes	Yes

B: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Turpentine	8006-64-2	1% Item 1665;French Item 15

* * * Section 16 – Other Information * * *

MSDS REVISION SUMMARY:

Effective Date:	2/13/2003	Supersedes Date:	10/18/2002
Section 11:	Additional language		
Section 14:	Shipping Name change		

Other Information

IMPORTANT: The information and data herein are believed to be accurate and have been compiled from sources believed to be reliable. It is offered for your consideration, investigation and verification. Buyer assumes all risk of use, storage and handling of the product in compliance with applicable federal, state and local laws and regulations. Georgia-Pacific and its subsidiaries make no warranty of any kind, express or implied, concerning the accuracy or completeness of the information and data herein. The implied warranties of merchantability and fitness for a particular purpose are specifically excluded. Georgia-Pacific and its subsidiaries will not be liable for claims relating to any party's use of or reliance on information and data contained herein regardless of whether it is claimed that the information and data are inaccurate, incomplete or otherwise misleading.

Key/Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
C	Ceiling Limit
CAS	Chemical Abstract Services Number
CFR	Code of Federal Regulations
DOT	Department of Transportation
DSL	Domestic Substance List
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air
HMIS	Hazardous Material Identification System
IARC	International Agency for Research on Cancer
NA	Not Available or Not Applicable
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NJTSR	New Jersey Trade Secret Registry
NSL	Non-Domestic Substance List
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
STEL	Short term exposure limit
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average
WHIMS	Workplace Hazardous Materials Information System

This is the end of MSDS GP-S08 (Turpentine)

Annex D

Turpentine Chemdata sheet - 000372F1-0001B939

TURPENTINE

E.A.C. 3Y
UN No. 1299
APP CODE ***
UN HAZARD 3

PRODUCT NAME

* TURPENTINE

IDENTIFICATION

DOC No. 015287 EC No. 232-350-7

CAS number(s) 0008006-64-2

FORM

Liquid, Colourless, Immiscible with water, lighter than water

PROTECTION

* Breathing apparatus.
* Protective gloves, boots.

HAZARDS

* Flammable (flash point >32C, <45C).
* Toxic in large doses or on prolonged exposure.
* Irritant.
* May cause sensitisation (allergic reaction) by skin contact.
* Can give rise to aspiration risks if swallowed, resulting in lung damage.
* Dangerous to the aquatic environment.

REACTIVITY

* No information available.

PRECAUTIONS

General Precautions

* No ignition sources.
* Avoid contact with skin and eyes.
* Prevent substance entering watercourses and sewers.
* Keep container(s) cool if involved in a fire.

Small Spills

* Absorb spillage in earth or sand or other non-combustible material.

Large Spills

* Contain spillage by any means available.

ENVIRONMENTAL PROTECTION PRIORITY

* **MODERATE PRIORITY** - effects may be significant in short term but are not likely to be persistent. e.g. minimise surface water run-off.

FIRE

* Use foam.
* Wherever possible run-off water should be contained.

TURPENTINE

DECONTAMINATION OF EQUIPMENT

* To decontaminate, wash with copious amounts of water and detergent.

FIRST AID

* **EYE CONTACT:** Flush contaminated eye(s) with gently flowing water for at least 15 minutes and until the chemical is removed. Take care not to rinse contaminated water into the unaffected eye. Obtain medical attention immediately.
* **SKIN CONTACT:** Flush with gently flowing water for at least 15 minutes and until the chemical is removed. Remove contaminated clothing, shoes and leather goods (e.g. watch straps, belts). If breathing has stopped then trained personnel should begin artificial respiration. Obtain medical attention immediately. Completely decontaminate clothes, shoes and leather goods before reuse or discard.
* **INGESTION (swallowing):** Rinse mouth thoroughly with water then give casualty 200-300 ml water to drink. DO NOT induce vomiting. NEVER give anything by mouth to an unconscious casualty. If breathing has stopped then trained personnel should begin artificial respiration. Obtain medical attention immediately.
* **INHALATION:** Remove to fresh air. Keep warm and at rest. If breathing has stopped then trained personnel should begin artificial respiration. Obtain medical attention immediately.

PUBLIC NOTE

* No information available.

PHYSICAL PROPERTIES

Molecular mass	136 (approx)
Solubility in water	none
Auto-ignition temperature	220 to 255 C
Flash point	30 to 46 C c.c.
Explosive limits	0.8 vol% in air / 6 vol% in air
Boiling point	149 to 180 C
Melting point	-50 to -60 C
Relative density (water = 1)	0.9
Relative vapour density (air = 1)	4.6 to 4.8
Relative density of the vapour/air-mixture (air = 1)	1.01 at 20 C
Vapour pressure, kPa at 20 C	0.25 to 0.67

Data reproduced by kind permission of the International Programme on Chemical Safety.

CLASSIFICATION

E.A.C.	3Y	UN No.	1299
UN HAZARD	3	ADR CLASS	3
PACKING GROUP	III	ADR CLASSIFICATION	F1
EMS	F-E|S-E	ADR HIN	30
NFPA	1-3-0	ADR TUNNEL CODE	D/E

PROPER SHIPPING NAME

TURPENTINE

INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

* Data only available for substances classified as toxic by inhalation.

ENVIRONMENTAL DATA

ENVIRONMENTAL PROTECTION PRIORITY

* **MODERATE PRIORITY** - effects may be significant in short term but are not likely to be persistent. e.g. minimise surface water run-off.

TERRESTRIAL ENVIRONMENT

* BIOACCUMULATION AND TAINTING: Insufficient data
* ACUTE TOXICITY: MODERATELY TOXIC - oral/dermal LD50 5-50 mg/kg

MARINE ENVIRONMENT

* MARINE BIOACCUMULATION AND TAINTING: taken up by marine organisms causing TAINTING of seafood.
* ACUTE MARINE TOXICITY: SLIGHTLY TOXIC; 96 hr LC50 10-100 mg/l

TURPENTINE

* MARINE AMENITY DAMAGE: MODERATELY OBJECTIONABLE due to persistence, smell or poisonous or irritant characteristics; short-term restrictions on beaches. Animal carcinogen or potential for serious long-term adverse health effects.
Marine information taken from Evaluation of hazards by the joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP).

EMERGENCY SCHEDULE (Fire) F-E

NON-WATER-REACTIVE FLAMMABLE LIQUIDS

GENERAL COMMENTS

* Cargoes in tanks exposed to heat may explode suddenly in or after a fire situation by a *Boiling Liquid - Expanding Vapour Explosion* (BLEVE).
* Keep tanks cool with copious quantities of water.
* Fight fire from a protected position from as far away as possible.
* Stop leakage or close open valve if practicable.
* Flames may be invisible.

CARGO ON FIRE ON DECK

PACKAGES
* Create water spray from as many hoses as possible.
CARGO TRANSPORT UNITS
* Cool burning transport units and nearby cargo exposed to the fire with copious quantities of water.

CARGO ON FIRE UNDER DECK

* Stop ventilation and close hatches.
* Use cargo space fixed fire-extinguishing system. If this is not available create water spray using copious quantities of water.

CARGO EXPOSED TO FIRE:

* If practicable, remove or jettison packages which are likely to be involved in fire.
* Otherwise, cool for several hours using water.

SPECIAL CASES

* None.

EMERGENCY SCHEDULE (Spillage) S-E

FLAMMABLE LIQUIDS, FLOATING ON WATER

GENERAL COMMENTS

* Avoid all sources of ignition (e.g., naked lights, unprotected light bulbs, electric handtools)
* Liquid is flammable and spillage may evolve flammable vapours.
* Wear suitable protective clothing and self-contained breathing apparatus.
* Stop leak if practicable.
* In general, substances covered under this schedule will have fuel-oil-like properties. They are immiscible with water and are liable to float on the surface of water. The use of inert absorbent material, as used in machinery spaces, is appropriate in all cases. For sticky liquids, shovels may be used, preferably shovels made of non-sparking or non-ferrous material.
* You may use light or soap-like products (surfactants) to clean small areas. Clean the area thoroughly because of the flammability hazard.
* Any pumping of spilled liquid overboard will create an oil spill on the sea surface. In this case, contact coastal authorities.
* Report discharge overboard according to MARPOL reporting requirements.

SPILLAGE ON DECK:

PACKAGES (SMALL SPILLAGE)
* Collect spillage in oil drums, metal boxes or salvage packagings.
* You may use inert absorbent material.
CARGO TRANSPORT UNITS (LARGE SPILLAGE)
* Restrict flow of leakage to an enclosed area (e.g., by diking with inert material or cement).
* Collect spillage in oil drums, metal boxes or salvage packagings. You may use inert absorbent material.
* Otherwise, wash overboard with copious quantities of water.

SPILLAGE UNDER DECK:

TURPENTINE

PACKAGES (SMALL SPILLAGE)
* Shut off all possible sources of ignition in the space.
* Provide adequate ventilation.
* Do not enter space without self-contained breathing apparatus.
* Check atmosphere before entering (toxicity and explosion hazard).
* If atmosphere cannot be checked, do not enter.
* Let vapours evaporate.
* Collect spillage in oil drums, metal boxes or salvage packagings. You may use inert absorbent material. Keep collected spillages in well ventilated areas or on deck only.

CARGO TRANSPORT UNITS (LARGE SPILLAGE)
* Shut off possible sources of ignition in the space.
* Provide adequate ventilation.
* Do not enter deck without self-contained breathing apparatus.
* Check atmosphere before entering (toxicity and explosion hazard).
* If atmosphere cannot be checked, do not enter.
* Let vapours evaporate.
* Where the ventilation system is used, particular attention should be taken in order to prevent toxic vapours or fumes entering occupied areas of the ship, e.g., living quarters, machinery spaces, working areas.
* Provide good ventilation of the space. Use water spray on effluent in the space to avoid ignition of flammable vapours. Wash down to the bottom of the hold. Use copious quantities of water.
* Treat effluent according to Shipboard Oil Pollution Emergency Plan. Otherwise, radio for expert ADVICE.

SPECIAL CASES

* None.

SUPPLEMENTARY CODES

E.A.C.

3Y

3 FOAM - Use foam for fire situations.

Y Can be violently or even explosively reactive, including combustion. Wear self-contained open circuit positive pressure compressed air breathing apparatus conforming to BS:EN 137 in combination with fire kit. Prevent, by any means available, spillage from entering drains or water courses.

ADR HIN

30 Flammable liquid (flash-point between 23C and 60C, inclusive) or flammable liquid or solid in the molten state with a flash-point above 60C, heated to a temperature equal to or above its flash-point, or self-heating liquid.

NFPA

HEALTH	1: Materials which on exposure would cause irritation but only minor residual injury even if no treatment is given.
FIRE	3: Liquids and solids that can be ignited under almost all ambient transport conditions.
REACTIVITY	0: Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.

Annex E

PD Teesport Harbourmaster’s approval for Ship to Ship transfer dated 30 April 2009

PD TEESPORT

Harbour Master's Office
Tees Dock
Grangetown
Middlesbrough
TS6 6UD

FACSIMILE TRANSMISSION
766-101-4/TC4 (Rev 4)

Port Operations Centre (24 hours) Tel: +44 (0) 1642 277 205
Port Operations Centre (24 hours) Tel: +44 (0) 1642 277 206
Port Operations Centre Fax: +44 (0) 1642 277 207

Date: 30 April 2009

To: [redacted]

Fax No: 243936

From: Harbour Master

No. of Pages: 2 (including this page)

"JO EIK"

Proposed transhipment of cargo of Turpentine from Jo Eik berthed at Vopak No 2 Jetty to Puccini.

Permission is granted for the proposed transfer, provided that:

1. Adequate fendering is in place between the two vessels.
2. Flexible hoses should have been tested, as per ISGOTT.
3. Vessels should berth same way round - in this case, both vessels will be head to sea.
4. Efficient communication system between the two vessels is established.
5. Mutually agreed person to be in overall charge of the operation - name and position of this person to be advised to Harbour Master before transhipment commences.
6. All normal fire and other safety precautions to be observed by both vessels, as per ISGOTT.
7. Requirements of Regulation 21 (4) & (5) of the Dangerous Substances in Harbour Areas Regulations 1987 have been fully complied with.
8. "Tees Ports Control" is advised by vessel at commencement and completion of operation.
9. Double banking of the two vessels does not take place until both ships are ready to achieve the cargo transfer and that once the transfer is completed, the alongside ship leaves for a suitable berth.
10. A copy of this letter is held by the person referred to in paragraph 5 of this letter, for inspection by any authorised person.

Please notify the Port Operations Centre on +44 (0) 1642 277 205/206 if any page(s) are not received or if any page(s) require re-transmitting.

11. It is understood that this permission may be withdrawn at any time during the operation, or final clearance to commence may be refused, if weather conditions, especially wind speed and direction, so dictate.

[redacted]

for Harbour Master

Annex F

Sylfat and turpentine cargo discharge programme dated 5 May 2009

JO TANKERS

Vessel: M/T Jo Eik
DATE : 5-May-09
Port: TEESPORT
Berth: VOPAK NO 2

CARGO DISCHARGING PROGRAM:

Cargo no. 01 - TALL OIL FATTY ACID
Tanks: 6P, 6S

Cargo no. 04 - TURPENTINE
Tanks : 6CS,7CS, 10P

DISCHARGING SEQUENCE:	BALLASTING SEQUENCE:
See separate sheet	
NOTE: DOUBLE CHECK THE MANIFOLD LAY OUT	

NOTE: MAXIMUM MANIFOLD DISCHARGE PRESSURE= 7 BARS

> During initial discharging all tanks mentioned above are to be discharge below 92%.
> After Discharging above mentioned tanks below 92%, then start discharging in PARALLEL
> Follow the discharging and ballasting sequences mentioned above
> During discharging of cargo, must start at slow rates to ensure cargoes flowing in the manifold. If you are sure that delivering cargo to shore, you can slowly increase the pump pressure which has been agreed with the shore installations
> Closed discharging through out the operations make sure all tank lids and butterwash holes are closed.
> Check tank ullages at regular interval to monitor tank's volume discharged and quantity discharge.
> Maximum discharging rate with the manifold pressure not exceeding 7 bars or ship and shore agreement.
> Stripping tanks at the end and blowing the lines empty with air or N2
> Check ships stability, bending moment, longitudinal strength or ships hull stresses in the computer hourly.
> During discharging operations UTI should not be used in taking ullages inside uninerted. cargo tanks due to presence of flammable and toxic gasses that may caused static electricity. if UTI to be used for emergency or any reason, stop the discharging in a certain tank and wait for 30 minutes for cargo relaxation before using UTI inside the tanks.
> Scupper plug are properly plug in and other firefighting equipments are rigged at the manifold and standby.
> Watch man must be at the manifold at all times, never leave the manifold unless he is properly relieved.
> The duty officer will personally ensure himself all drain plugs and drain cocks in the cargo lines not to be used are closed.
>Make sure after using the windlass disengaged from the drum /mooring ropes shall not be exceed 1 turns on the tension drums.
> Prior to any cargo operations, all checklist must be properly carried out as per company cargo handling procedures.
> Ships / shore checklist to be carried out before commencing any cargo operations.
> Checked all mooring lines are properly tended and gangway regularly.
> Rig all necessary safety equipments, fire hoses and fire extinguisher
> Rig fire wires forward and aft at least 1 meter above the water. Check/adjust against the tide and draft
> In case of cargo and oil spillage on deck, immediately stop cargo operations and inform Chief officer.
> Mobilized all crew to contain the spillages and avoid flowing of cargoes overside.
> Lastly read the material safety data sheets for cargo classifications and fire fighting agents to be used during fire and heatlh hazard and medical first aid guide.
> Report and log any defects and irregularities of equipment on decks throughout the operation.

NOTE: Max. B.M. and S.F. must not exceed 90 % and every four hrs.print out the stability condition
>>>Please call me anytime when in doubt.<<<

[redacted]

Chief Officer

[redacted]

Master

JO TANKERS

Vessel: M/T Jo Eik
DATE : 5-May-09
Port: TEESPORT
Berth: VOPAK NO 2

CARGO DISCHARGING PROGRAM:

Cargo no. 01 - TALL OIL FATTY ACID
Tanks: 6P, 6S

Cargo no. 04 - TURPENTINE
Tanks : 6CS,7CS, 10P

DISCHARGING SEQUENCE:	BALLASTING SEQUENCE:

CARGO 01 - TALL OIL FATTY ACID

1) Start discharging in 6P & 6S at minimum rate 2-3 bars , when everything confirms okey increased discharge rate to maximum 7.0 bars. Strip to empty then blow line with N2.
See attache manifold connection

2) CARGO NO. 04- TURPENTINE
Discharging into Coaster " PUCCINI "
Start discharging slowly in 6CS, then de-bottom next tank 7CS & 10P below 95%, Then increased flow rate gradually to maximum 7.0 bars, Strip/ empty tanks and blow lines with N2. / Pre-wash follows
See attached manifold connection
SHP SHORE COMMUNICATION SHORE RADIO CALL JETTY 2 / BACK UP DIAL 3620 SHORE PHN CALL SHIFT SUPERVISOR
SHIP TO SHIP VHF CH

Compare Line pressure and inert pressure
Enter cargo and ballast in the computer and make a print after end of watch.
Check pumproom from time to time when ballasting and de-ballasting
Fill-up ballast Log, Ship/shore checklist
Don't leave manifold CCR unattended,
Check Moorings, gangway all the time.
Give shore one hour notice before completion
Call agent 1 hour before completion last grade

Ballast:
1) NO BALLASTING
2) UTILIZED DB 6S TO KEEP HER UPRIGHT
3)AFTER COMPLETION OF DISCHARGE /BEFORE DPARTURE FILL IN BALLAST 7C AT 98%

[redacted]

Chief Officer

[redacted]

Master

[redacted]

[redacted]

[redacted]

Annex G

Completed cargo checklists 1,6,7 and 8 dated 5 May 2009

CARGO CHECK LIST - 1 SAFETY FOR ALL OPERATIONAL PROCEDURES			Page 1/1
	YES	NO	N/A
1 Are product information leaflets available and displayed	☑	☐	
2 Is the stowageplan readily available?	☑	☐	
3 Are the dangers of the products discussed during a pre-load/discharge meeting with all involved in the operation ?	☑	☐	
4 Are the jumperhoses to be used checked for resistance to the products ?	☑	☐	
5 Is the following equipment checked and ready for immediate use ? * Personal protective equipment. * Safety and firefighting equipment. * Gasdetection and oxygen meters * The first aid kit, incl. antidote if required	☑ ☑ ☑ ☑	☐ ☐ ☐ ☐	
6 Is N2 required for blowing or stripping ?	☑	☐	
8 Have scuppers and driptray plugs been closed ?	☑	☐	☐
9 Are all external doors leading to the tank deck closed ?	☑	☐	
10 Is airconditioning on recirculation ?	☑	☐	☐
11 Is gangway propperly rigged with safety net, safetyplan and lifebuoy with self igniting light in place?	☑	☐	☐
12 Are smoking and naked light requirements in force ?	☑	☐	
13 Have internal communication means been tested ?	☑	☐	
14 Is a constant VHF listening watch required ?	☑	☐	☐
15 Have emergency procedures been agreed upon ?	☑	☐	
16 Has everybody involved in the operation been properly instucted ?	☑	☐	
17 Have working schedules been issued ?	☑	☐	
18 Is sufficient material available on deck to deal with any kind of spill ?	☑	☐	

It is strictly prohibited to start any operational procedure before this checklist is carried out !

PARS PORT / 05 MAR 07 / 1610 H
Place, Date & Time

CARGO CHECK LIST - 6 BEFORE DISCHARGE			Page 1/1
	YES	NO	N/A
1 Are emergency stops of powerpacks and valves tested ?	☑	☐	
2 Are cargolines, incl. dead-ends, checked they are not clogged ?	☑	☐	
3 Have pump cofferdams been purged by N2 or air ?	☑	☐	
4 Has the cargo the required discharge temperature ?	☑	☐	☐
5 Are the tanks to be discharged properly lined up ?	☑	☐	
6 Are all unused manifold connections and cargohoses properly blanked ?	☑	☐	
7 Has a secondary check been made on the complete line up ?	☑	☐	
8 Are overfill alarms (95%-98%) tested and in good working order ?	☑	☐	
9 Are the P/V valves set in correct operating condition ?	☑	☐	
10 Are tank pressure alarms set correctly to type of discharge operation ?	☑	☐	
11 Is a proper manifold lay-out available in the CCR ?	☑	☐	
12 Is discharging meeting held with loadingmaster, discussing : * Max. discharge rate / max.backpressure * Emergency stop procedure / Communications * Who will blow the lines after completion / stop of solidifying product * A Ship/Shore Checklist been completed	☑ ☑ ☑ ☑	☐ ☐ ☐ ☐	
13 Has Notice of Readiness been tendered ? Are cargo calculations completed and agreed by surveyor ?	☑ ☑	☐ ☐	
14 Have watchorders been issued by the Chief Mate, containing : * Information from meeting with loadingmaster, special requirements * Personal protective equipment to be used. * Stoplulages calculated ,to be checked by Duty officer at part discharge. * Ballasting schedule * Signed and understood by all Deck officers	☑ ☑ ☑ ☑ ☑	☐ ☐ ☐ ☐ ☐	☐
15 Are all shoreconnections correctly lined up with the proper ships lines ?	☑	☐	
16 Have cargo samples been taken by vessel, labelled and stored ?	☑	☐	
17 Are butterworth hatches closed after taking samples ?	☑	☐	
18 Are means available to deal with solidifying/freezing products ?	☐	☐	☐

It is strictly prohibited to start any discharge operation before this checklist is carried out.
Any faults found must be reported immediately, and repaired onboard or the appropriate service order made to ensure follow up.

FLES PORT / 06 MAR '07 / 16:15
Place, Date &Time

Rev. 6

CARGO CHECK LIST - 7 DURING DISCHARGE	YES	NO	
1 Are all lines, pumps and valves checked for loakages ?	☑	☐	
2 Are homogeneous cargo discharge procedures followed ? Is cargo tank level monitored for decrease, to assure no backflow of cargo ?	☑ ☑	☐ ☐	☐
3 Is the cargocomputer operating correctly ?	☑	☐	
4 Is the back pressure / discharge rate according ship/shore agreement ?	☑	☐	
5 Is cargo being received ashore ?	☑	☐	
6 Is tankheating shut off in time ?	☐	☐	☐
7 Does the stress of the vessel (BM and SHF) ever exceed the maximum limits throughout the loading operation ?	☑	☐	
8 Is the cargotank pressure continuously monitored and within safe limits ?	☑	☐	
9 Is trim and/or heel for stripping the cargo tanks according P&A manual ? Has surveyor been warned in advance of time of completion ? Is Duty officer well aware if N2 must be used to drain the tank ?	☑ ☑ ☑	☐ ☐ ☐	☐ ☐
10 In case of sweeping cargo is fan running in time and material ready to use ?	☐	☐	☑
11 Are mooring lines and firewires regularly adjusted as required ?	☑	☐	
12 Is the gangway at all times in a safe boarding position	☑	☐	☐
13 Is there a manifold watch throughout the cargo operation ?	☑	☐	
14 Is there always sufficient manpower on board in case of emergency ?	☑	☐	
15 Is a pumping-log and an accurate time-log kept of all events during the discharging ?	☑	☐	

Nothing in this checklist overrules the existing harbour and authorities regulations!

[illegible] / 05 MAY '09 / 1627
Place, Date & Time

No : CC
Page : 8
Date : 06 MA
Prep.by :

CARGO CHECK LIST - 8
AFTER DISCHARGE

Page 1/

	YES	NO	N/A
1 Has the empty tank been inspected and accepted by the surveyor ? Has the Empty tank certificate been signed/issued by the surveyor ?	☐ ☐	☐ ☐	☐ ☐
2 Has final ullage been taken by surveyor at part discharge ? Has cargocalculation been completed after part discharge ?	☐ ☐	☐ ☐	☐ ☐
3 Have lines been blown properly, especially with solidifying cargo ?	☐	☐	
4 Has action been taken to avoid 'rest' cargo to freeze in pumpstack and well ?	☐	☐	☐
5 Have P/V-valves been set in service position ?	☐	☐	
6 Are all tankopenings properly closed ?	☐	☐	
7 Do Annex II pre-wash arrangements have to be taken ? If yes, has the Annex II surveyor been notified in time ? has the Annex II surveyor signed the Cargo record book	☐ ☐ ☐	☐ ☐ ☐	☐
8 Is before disconnecting checked if manifold valve is properly closed and hose is depressurized ?	☐	☐	
9 Has there been any delay or other irregularity ? If yes, has a Letter of Protest been issued ?	☐ ☐	☐ ☐	
10 Have pump cofferdams been purged by N2 or air ?	☐	☐	☐

Check, recheck and double check tank openings if they are seatight !

Terneuzen 05 May '01
Place, Date & Time

Signature

Rev. 8

Annex H

Intertek OCA's "Ship Tanks After Discharge Report" - Report Number 6269 dated 6 May 2009

Report Number : 6269

VESSEL TANKS AFTER DISCHARGE REPORT

Vessel : Jo Eik	Date : 06-May-09
Location : Vopak, Tees	

We hereby report that we, Intertek Caleb Brett, attended on board the Vessel for the purpose of visually inspecting the listed tanks.

Inspection carried out from **deck level.**

Date and Time of Inspection : 06-May-09 @ 11:20

Cargo Discharged :	Turpentine
Port tanks :	10
Centre tanks :	6S, 7S
Starboard tanks :	

Each of the listed tanks were inspected by us and found to be well drained.

We have been assured by the vessel that the Vessel lines have been adequately cleared to the shore facility.

Other tanks inspected as a precautionary measure :

REMARKS

Sea Valve Seal Numbers : Port- _____ Starboard- _____ Overboard- _____

SIGNED FOR RECEIPT BY (Name/Rank) : Signature :

Intertek Inspector [redacted]

[redacted]

For Intertek Caleb Brett .....

Page 98 of the Chapter 17 table of the IBC Code relating to turpentine

a	c	d	e	f	g	h	i'	i''	i'''	j	k	l	n	o
Trimethylacetic acid	Y	S/P	3	2G	Cont	No			Yes	R	No	A	No	15.11.2, 15.11.3, 15.11.4, 15.11.5, 15.11.6, 15.11.7, 15.11.8, 15.19.6, 16.2.6, 16.2.9
Trimethylamine solution (30% or less)	Z	S/P	2	2G	Cont	No			No	C	F-T	A, C	Yes	15.12, 15.14, 15.19, 16.2.9
Trimethylbenzene (all isomers)	X	P	2	2G	Cont	No			No	R	F	A	No	15.19.6
Trimethylolpropane propoxylated (n)	Z	S/P	3	2G	Open	No	-	-	Yes	O	No	A, B, C	No	
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	Z	P	3	2G	Open	No			Yes	O	No	A, B	No	
2,2,4-Trimethyl-1,3-pentanediol-1-isobutyrate	Y	P	2	2G	Open	No			Yes	O	No	A	No	15.19.6
1,3,5-Trioxane	Y	S/P	3	2G	Cont	No			No	R	F	A, D	No	15.19.6, 16.2.9
Tripropylene glycol	Z	P	3	2G	Open	No			Yes	O	No	A	No	
Trixylyl phosphate	X	P	2	2G	Open	No			Yes	O	No	A	No	15.19.6, 16.2.6
Tung oil (n)	Y	S/P	2 (k)	2G	Open	No	-	-	Yes	O	No	A, B, C	No	15.19.6, 16.2.6, 16.2.9
Tung oil (containing less than 2.5% free fatty acids)	Y	P	2 (k)	2G	Open	No	-	-	Yes	O	No	A, B, C, D	No	15.19.6, 16.2.6, 16.2.9
Turpentine	X	P	2	2G	Cont	No			No	R	F	A	No	15.19.6
Undecanoic acid	Y	P	2	2G	Open	No			Yes	O	No	A	No	16.2.6, 16.2.9
1-Undecene	X	P	2	2G	Open	No			Yes	O	No	A	No	15.19.6
Undecyl alcohol	X	P	2	2G	Open	No			Yes	O	No	A	No	15.19.6, 16.2.9
Urea/Ammonium nitrate solution	Z	P	3	2G	Open	No			Yes	O	No	A	No	
Urea/Ammonium nitrate solution (containing aqua ammonia)	Z	S/P	3	2G	Cont	No			NF	R	T	A	No	16.2.9
Urea/Ammonium nitrate solution (containing less than 1% free ammonia) (n)	Z	S/P	3	2G	Cont	No			NF	R	T	A	No	16.2.9
Urea/Ammonium phosphate solution	Y	P	2	2G	Open	No			Yes	O	No	A	No	15.19.6
Urea solution	Z	P	3	2G	Open	No			Yes	O	No	A	No	
Valeraldehyde (all isomers)	Y	S/P	3	2G	Cont	Inert	T3	IIB	No	R	F-T	A	No	15.4.6, 15.19.6
Vegetable acid oils (m) (n)	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	A, B, C	No	15.19.6, 16.2.6, 16.2.9
Vegetable fatty acid distillates (m) (n)	Y	S/P	2	2G	Open	No	-	-	Yes	O	No	A, B, C	No	15.19.6, 16.2.6, 16.2.9
Vegetable protein solution (hydrolysed) (o)	Z	P	3	2G	Open	No			Yes	O	No	A	No	
Vinyl acetate	Y	S/P	3	2G	Cont	No	T2	IIA	No	R	F	A	No	15.13, 15.19.6, 16.6.1, 16.6.2
Vinyl ethyl ether	Z	S/P	2	1G	Cont	Inert	T3	IIB	No	C	F-T	A	Yes	15.4, 15.13, 15.14, 15.19, 16.6.1, 16.6.2

MARPOL 73/78 Annex II, Regulation 6 - Categorization and Listing of Noxious Liquid Substances

Regulation 6 - Categorization and Listing of Noxious Liquid Substances and other Substances

1 For the purpose of the regulations of this Annex, noxious liquid substances shall be divided into four categories as follows:

.1 Category X: Noxious liquid substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a major hazard to either marine resources or human health and, therefore, justify the prohibition of the discharge into the marine environment;

.2 Category Y: Noxious liquid substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment;

.3 Category Z: Noxious liquid substances which, if discharged into the sea from tank cleaning or deballasting operations, are deemed to present a minor hazard to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment;

.4 Other substances: Substances indicated as OS (Other substances) in the pollution category column of chapter 18 of the International Bulk Chemical Code which have been evaluated and found to fall outside category X, Y or Z as defined in regulation **6.1** of this Annex because they are, at present, considered to present no harm to marine resources, human health, amenities or other legitimate uses of the sea when discharged into the sea from tank cleaning or deballasting operations. The discharge of bilge or ballast water or other residues or mixtures containing only substances referred to as ‘‘Other Substances’’ shall not be subject to any requirements of the Annex.

Annex K

Tank washing risk assessment form - undated

Ship: JO EIK	Participants: CHIEF OFFICER , BSN, PUMPMAN , GPAB/OS							Date:				
Job Description / Change reason: Tank Cleaning							☑ DECK ☐ ENGINE ☐ OTHER					
Activity(JOB STEPS)	Hazards	Existing Controls	Risk	C	F	R	New Controls	Risk	C	F	R	
Planing	Fatigue, voyage rotation, Stability, trim/list, weateher condition	Check lists, Rest/work hours control, equipment manuals,passage planning	Personnel	2	2	4		Personnel			0	
			Cost	2	2	4		Cost			0	
			Environm.	2	2	4		Environm.			0	
Preparing	Tank preparation, lining up, miscommunication, inexperienced / not motivated people, language, fatigue	checklists, rest/work hours control, breifing with crew, training (VOD)	Personnel	2	2	4		Personnel			0	
			Cost	2	2	4		Cost			0	
			Environm.	2	2	4		Environm.			0	
Hose & Overboard connection	Miscommunication, wrong ppe, fatigue, crane driver not trained, worn out tools, Use of incorrect material, short bolts / old gaskets	planning, work/rest hours control, checklist, proper and correct size tools, wearing of proper PPE,	Personnel	2	3	6	only trained ship staff to operate the crane, using proper tools, Sufficient manpower	Personnel	2	2	4	
			Cost	3	2	6		Cost	2	2	4	
			Environm.	2	2	4		Environm.			0	
Lowering & Retreiving of Tank cleaning Hoses	Miscommunication, wrong ppe, fatigue, equipment failure, over pressure, hose burst/rapture , solidifying cargoes	checklists, VOD training, rest/work hours control, meeting & breifing with crew, testing of equipment,Amos maintenance	Personnel	2	2	4		Personnel			0	
			Cost	2	2	4		Cost			0	
			Environm.	2	2	4		Environm.			0	
Manual hand hosing of sediment/ Residues inside cargo tanks	Miscommunication, wrong ppe, fatigue, equipment failure, solidifying cargoes, over pressure , corrosive , lack of oxygen , incorrect equipment reading ,	Checklists, work permit, Millbros, VOD training, rest/work hours control, meeting with crew and officers, training,wearing of proper PPE, QMS reviews and procedures	Personnel	4	2	8	Double checking of 02 and gas meter reading, control and supervision of crew working inside the tank	Personnel	2	2	4	
			Cost	2	3	6		Cost	2	2	4	
			Environm.	2	1	2		Environm.			0	

Jo Tankers Risk Assessment Form

Activity(JOB STEPS)	Hazards	Existing Controls	Risk	C	F	R	New Controls	Risk	C	F	R
Eject water,Mopping and drying of Cargo tanks	Miscommunication, wrong ppe, fatigue, equipment failure, lack of oxygen, corrosive, equipments/ rags left inside cargo tanks,	checklists,work permits, rest/work hours control, meeting / breifing with crew, training, QMS reviews and procedures	Personnel	2	4	8	Double checking of 02 and gas meter reading, control and supervision of crew working inside the tank	Personnel	2	2	4
			Cost	2	3	6		Cost	2	2	4
			Environm.	2	2	4		Environm.			0
			Personnel			0		Personnel			0
			Cost			0		Cost			0
			Environm.			0		Environm.			0
			Personnel			0		Personnel			0
			Cost			0		Cost			0
			Environm.			0		Environm.			0

Is the risk of the job/change acceptable? ☑ YES ☐ NO

Approved by: (one of SMT members)

Does this risk assessment reveal a need of improvements related to:

☐ PROCEDURES ☐ LIST OF CRITICAL EQUIPMENT
☐ SPARE PART INVENTORY ☐ TECNICAL MODIFICATION ☐ SPECIFY (Enclosure)

Time limit for the improvements? ☑ NO ☐ YES **If yes fill in date:**

What is communicated to relevant personnel? ☑ RISK ASSESSMENT RESULTS ☐ NEW CONTROLS

Are the existing / new controls in place? ☑ YES ☐ NO

Did the work result in any unforeseen incidents not identified in the Risk Assessment? ☐ YES ☑ NO

OTHER COMMENTS:

Annex L

Jo Elk's cargo checklists

CARGO CHECK LIST - 1
SAFETY FOR ALL OPERATIONAL PROCEDURES

Page 1/1

	YES	NO	N/A
1 Are product information leaflets available and displayed	☐	☐	
2 Is the stowageplan readily available?	☐	☐	
3 Are the dangers of the products discussed during a pre-load/discharge meeting with all involved in the operation ?	☐	☐	
4 Are the jumperhoses to be used checked for resistance to the products ?	☐	☐	
5 Is the following equipment checked and ready for immediate use ?			
* Personal protective equipment.	☐	☐	
* Safety and firefighting equipment	☐	☐	
* Gasdetection and oxygen meters	☐	☐	
* The first aid kit, incl. antidote if required'	☐	☐	
6 Is N2 required for blowing or stripping ?	☐	☐	
8 Have scuppers and driptray plugs been closed ?	☐	☐	☐
9 Are all external doors leading to the tank deck closed ?	☐	☐	
10 Is airconditioning on recirculation ?	☐	☐	☐
11 Is gangway propperly rigged with safety net, safetyplan and lifebuoy acc to company procedures ?	☐	☐	☐
12 Are smoking and naked light requirements in force ?	☐	☐	
13 Have internal communication means been tested ?	☐	☐	
14 Is a constant VHF listening watch required ?	☐	☐	☐
15 Have emergency procedures been agreed upon ?	☐	☐	
16 Has everybody involved in the operation been properly instucted ?	☐	☐	
17 Have working schedules been issued ?	☐	☐	
18 Is sufficient material available on deck to deal with any kind of spill ?	☐	☐	

It is strictly prohibited to start any operational procedure before this checklist is carried out !

Place, Date & Time

Signature

CARGO CHECK LIST - 2 PREPARING STOWAGE PLAN			Page 1/1
	YES	NO	N/A
1 Is the vessel allowed to carry the products according to the Certificate of Fitness, incl. addendums ?	☐	☐	
If no, has a request for a Tripartite agreement been submitted to the appropriate Authority by Operations Dept.?	☐	☐	
2 Are IBC-code Special Requirements and MARPOL category checked	☐	☐	
3 Is it allowed to carry the product in wingtanks and/or decktanks ?	☐	☐	
4 Checked products' compatibility with tankcoating ?	☐	☐	
5 Checked melting points and viscosities of category Y and Z cargoes ?	☐	☐	☐
6 Checked if product can be loaded in centre/wing/decktank with a view to the maximum allowable specific gravity in those tanks ?	☐	☐	
7 Checked USCG compatibility list for adjacent stowage ?	☐	☐	☐
8 Checked if stowage allowed adjacent heat ?	☐	☐	☐
9 Stowage of heated cargoes, if possible and allowed, in a block.	☐	☐	☐
10 Stowage of drying oils adjacent to heat, if possible,to be avoided.	☐	☐	☐
11 Checked N2 requirements and stock on board ?	☐	☐	
12 Checked if required Draeger tubes are on board or on order ?	☐	☐	
13 Checked cargo nominations against loadline & draught restrictions and bunker requirements ?	☐	☐	
14 **Checked the stability and stress of the vessel in all possible situations with regard to loading and discharge sequence proposal ?**	☐	☐	

Place, Date & Time

Signature

CARGO CHECK LIST - 3 BEFORE LOADING			Page 1/1
	YES	NO	N/A
1 Have pump cofferdams been purged by N2 or air ?	☐	☐	
2 Are all heating coils of tanks containing non-heated cargoes been blown and blanked ?	☐	☐	
3 Has the cargo valves remote control been tested ?	☐	☐	☐
4 Are the tanks to be loaded properly lined up ?	☐	☐	
5 Are all drains in the cargo- & vapourlines properly closed and plugged ?	☐	☐	
6 Are all unused manifold connections and cargohoses properly blanked ?	☐	☐	
7 Has a secondary check been made on the complete line up ?	☐	☐	
8 Are overfill alarms (95%-98%) tested and in good working order ?	☐	☐	
9 Are the P/V valves set in correct operating condition ?	☐	☐	
10 Are tank pressure alarms set correctly for type of loading operation ?	☐	☐	
11 Is a proper manifold lay-out available in the CCR ?	☐	☐	
12 Has a pre-loading conference been held with loadingmaster, discussing : * Max. loading rate / max. backpressure * Emergency stop procedure / Communications * Who will blow the lines after completion / stop of solidifying product * Ship / shore stop agreement and notice to be given for each product * A Ship/Shore Safety Checklist been completed	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	
13 Has Notice of Readiness been tendered ? Has Certificate of Cleanliness been issued ?	☐ ☐	☐ ☐	
14 Have watch orders been issued by the Chief Mate, containing : * Information from meeting with loadingmaster; special requirements * Personal protective equipment to be used. * Deballasting schedule * Signed and understood by all Deck officers	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	 ☐
15 Are all shore connections correctly lined up with the proper shipslines ? And properly connected (acidcovers if applicable) ?	☐ ☐	☐ ☐	
16 Is cargocomputer correctly set up (zeroset if appl.) and all data entered ?	☐	☐	
17 Have final ullages been calculated and re-checked by Duty officer ?	☐	☐	
18 Are INHIBITOR Requirements and Documentation arranged?	☐	☐	☐

It is strictly prohibited to start any loading operation before this checklist is carried out. Any faults found must be reported immediately, and repaired onboard or the appropriate service order made to ensure follow up.

Place, Date & Time

Signature

CARGO CHECK LIST - 4 DURING LOADING			Page 1/1
	YES	NO	N/A
1 Have cargo samples been taken by vessel ? Are samples correctly labelled, stored and recorded in the sample-log.	☐	☐	
2 Are all lines, pumps and valves checked for leakages ?	☐	☐	
3 Is cargo entering the correct tanks ?	☐	☐	
4 Is the cargocomputer operating correctly ?	☐	☐	
5 Is the back pressure / loadingrate according ship/shore agreement ?	☐	☐	
6 Is inhibitor added ?	☐	☐	☐
7 Is cargotemperature according shore information ?	☐	☐	
8 Does the stress of the vessel (BM and SHF) ever exceed the maximum limits throughout the loading operation ?	☐	☐	
9 Is the cargotank pressure continuously monitored and within safe limits ?	☐	☐	
10 Is heating applied for cargoes requiring heating, and temperature monitored?	☐	☐	☐
11 Are mooring lines and firewires regularly adjusted as required ?	☐	☐	
12 Is the gangway at all times in a safe boarding position	☐	☐	☐
13 Is there a continuous manifold watch throughout the loading operation ?	☐	☐	
14 Is there sufficient manpower on board in case of emergency ?	☐	☐	
15 Is an accurate time-log kept of all events during the loading ?	☐	☐	

Nothing in this checklist overrules the existing harbour and authorities regulations!

Place, Date & Time

Signature

CARGO CHECK LIST - 5 AFTER LOADING			Page 1/1
	YES	NO	N/A
1 Have lines been properly blown, especially with solidifying cargo ?	☐	☐	
2 Have cargolines been checked for clogging ?	☐	☐	☐
3 Have P/V-valves been set in service position ?	☐	☐	☐
4 Are final ullages taken and calculations completed and agreed by surveyor ?	☐	☐	
5 Are all tankopenings properly closed and secured ?	☐	☐	
6 Is N2 blanket applied ?	☐	☐	☐
7 Is an instruction to maintain N2 pressure received ?	☐	☐	☐
8 Are all flanges blanked after disconnecting ?	☐	☐	
9 Are receivers & ship cargo samples received ?	☐	☐	
10 Are inhibitor certificates received ?	☐	☐	☐
11 Have heating instructions been received ?	☐	☐	☐
12 Is the difference between ship's figures and B/L-figures 0.2 % or more ? If yes, has a Letter of Discrepancy been issued ?	☐ ☐	☐ ☐	
13 Does the loading quantity according B/L-figures comply with ship's loading instructions ? If no, has a Deadfreight claim been made ?	☐ ☐	☐ ☐	
14 Has there been any delay or other irregularity ? If yes, has a Letter of Protest been issued ?	☐ ☐	☐ ☐	
15 Have pumpcofferdams been purged by N2 or air ?	☐	☐	

Check, recheck and double check <u>all</u> tank openings if they are seatight !

Place, Date & Time

Signature

CARGO CHECK LIST - 6 BEFORE DISCHARGE			Page 1/1
	YES	NO	N/A
1 Are emergency stops of powerpacks and valves tested ?	☐	☐	
2 Are cargolines, incl. dead-ends, checked they are not clogged ?	☐	☐	
3 Have pump cofferdams been purged by N2 or air ?	☐	☐	
4 Has the cargo the required discharge temperature ?	☐	☐	☐
5 Are the tanks to be discharged properly lined up ?	☐	☐	
6 Are all unused manifold connections and cargohoses properly blanked ?	☐	☐	
7 Has a secondary check been made on the complete line up ?	☐	☐	
8 Are overfill alarms (95%-98%) tested and in good working order ?	☐	☐	
9 Are the P/V valves set in correct operating condition ?	☐	☐	
10 Are tank pressure alarms set correctly to type of discharge operation ?	☐	☐	
11 Is a proper manifold lay-out available in the CCR ?	☐	☐	
12 Is discharging meeting held with loadingmaster, discussing :			
* Max. discharge rate / max. backpressure	☐	☐	
* Emergency stop procedure / Communications	☐	☐	
* Who will blow the lines after completion / stop of solidifying product	☐	☐	
* A Ship/Shore Checklist been completed	☐	☐	
13 Has Notice of Readiness been tendered ?	☐	☐	
Are cargo calculations completed and agreed by surveyor ?	☐	☐	
14 Have watchorders been issued by the Chief Mate, containing :			
* Information from meeting with loadingmaster; special requirements	☐	☐	
* Personal protective equipment to be used.	☐	☐	
* Stopullages calculated ,to be checked by Duty officer at part discharges	☐	☐	☐
* Ballasting schedule	☐	☐	☐
* Signed and understood by all Deck officers	☐	☐	
15 Are all shoreconnections correctly lined up with the proper ships lines ?	☐	☐	
16 Have cargo samples been taken by vessel, labelled and stored ?	☐	☐	
17 Are butterworth hatches closed after taking samples ?	☐	☐	
18 Are means available to deal with solidifying/freezing products ?	☐	☐	☐

It is strictly prohibited to start any discharge operation before this checklist is carried out. Any faults found must be reported immediately, and repaired onboard or the appropriate service order made to ensure follow up.

Place, Date & Time

Signature

CARGO CHECK LIST - 7 DURING DISCHARGE			Page 1/1
	YES	NO	N/A
1 Are all lines, pumps and valves checked for leakages ?	☐	☐	
2 Are homogeneous cargo discharge procedures followed ? Is cargo tank level monitored for decrease, to assure no backflow of cargo ?	☐ ☐	☐ ☐	☐
3 Is the cargocomputer operating correctly ?	☐	☐	
4 Is the back pressure / discharge rate according ship/shore agreement ?	☐	☐	
5 Is cargo being received ashore ?	☐	☐	
6 Is tankheating shut off in time ?	☐	☐	☐
7 Does the stress of the vessel (BM and SHF) ever exceed the maximum limits throughout the loading operation ?	☐	☐	
8 Is the cargotank pressure continuously monitored and within safe limits ?	☐	☐	
9 Is trim and/or heel for stripping the cargo tanks according P&A manual ? Has surveyor been warned in advance of time of completion ? Is Duty officer well aware if N2 must be used to drain the tank ?	☐ ☐ ☐	☐ ☐ ☐	☐ ☐
10 In case of sweeping cargo is fan running in time and material ready to use ?	☐	☐	☐
11 Are mooring lines and firewires regularly adjusted as required ?	☐	☐	
12 Is the gangway at all times in a safe boarding position	☐	☐	☐
13 Is there a manifold watch throughout the cargo operation ?	☐	☐	
14 Is there always sufficient manpower on board in case of emergency ?	☐	☐	
15 Is a pumping-log and an accurate time-log kept of all events during the discharging ?	☐	☐	

Nothing in this checklist overrules the existing harbour and authorities regulations!

Place, Date & Time

Signature

CARGO CHECK LIST - 8 AFTER DISCHARGE			Page 1/1
	YES	NO	N/A
1 Has the empty tank been inspected and accepted by the surveyor ? Has the Empty tank certificate been signed/issued by the surveyor ?	☐ ☐	☐ ☐	☐ ☐
2 Has final ullage been taken by surveyor at part discharge ? Has cargocalculation been completed after part discharge ?	☐ ☐	☐ ☐	☐ ☐
3 Have lines been blown properly, especially with solidifying cargo ?	☐	☐	
4 Has action been taken to avoid 'rest' cargo to freeze in pumpstack and well ?	☐	☐	☐
5 Have P/V-valves been set in service position ?	☐	☐	☐
6 Are all tankopenings properly closed ?	☐	☐	
7 Do Annex II pre-wash arrangements have to be taken ? If yes, has the Annex II surveyor been notified in time ? has the Annex II surveyor signed the Cargo record book	☐ ☐ ☐	☐ ☐ ☐	☐
8 Is before disconnecting checked if manifold valve is properly closed and hose is depressurized ?	☐	☐	
9 Has there been any delay or other irregularity ? If yes, has a Letter of Protest been issued ?	☐ ☐	☐ ☐	
10 Have pump cofferdams been purged by N2 or air ?	☐	☐	☐

Check, recheck and double check tank openings if they are seatight !

Place, Date & Time

Signature

CARGO CHECK LIST - 9 BEFORE CLEANING			Page 1/1
	YES	NO	N/A
1 Is a detailed cleaning schedule prepared, taking into account: * MARPOL requirements * In case of hot butterworthing, the quality of products in adjacent tanks. * In case of cleaning chemicals, the coating compatibility	☐	☐	☐
2 Are sloptanks required? If yes, Annex I slops in dedicated sloptank ? If yes, Annex II slops compatible with each other and tank coating ?	☐	☐	☐
3 Has washing program been discussed with personnel involved ? Is the duty officer on the bridge supplied with cleaning schedule as guidance ?	☐	☐	☐
4 Is all personnel involved instructed to use personal protective equipment ?	☐	☐	☐
5 Has tankcleaning equipment been prepared to start tankcleaning operations as soon as possible if regulations do allow for it ?	☐	☐	☐
6 Are washing machines in good working order ?	☐	☐	☐
7 Are sufficient cleaning chemicals with relevant datasheets onboard ?	☐	☐	☐
8 Do local harbour regulation allow washing tanks in port ? If yes, permission asked in time and received ?	☐	☐	☐
9 Has bleeder been installed ?	☐	☐	
10 Has ER been informed that operations are about to start ? Is airconditioning put on recirculation ? Is steam requested for hot butterworthing ? Sea-suctions closed as far as practicable ?	☐	☐	☐
11 No unauthorised craft alongside ?	☐	☐	☐
12 All tanklids closed, except the ones of the tanks to be cleaned first ?	☐	☐	
13 All cargolines not in use isolated/blanked and all valves closed.	☐	☐	
14 All hose connections properly made.	☐	☐	

It is strictly prohibited to start any cleaning operation before this checklist is carried out.

Place, Date & Time

Signature

CARGO CHECK LIST - 10 DURING CLEANING			Page 1/1
	YES	NO	N/A
1 Are washing machines lowered to first level ? Are washing machines lowered to second level ? Are washing machines lowered to third level ?	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
2 Are machines checked regularly for proper operation ?	☐	☐	☐
3 Are temperature and pressure of washing medium regularly checked ?	☐	☐	☐
4 Is liquid level in tank regularly checked and bottom kept empty ?	☐	☐	
5 Is dropline flushed ? Is strippingline flushed ? Is P/V line flushed ? Has manifold been flushed over <u>both</u> sides ?	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
6 Are all drainplugs in the cargosystem to be cleaned removed ? Are all drainvalves of manifold cross-over, cargo & stripping lines flushed ?	☐ ☐	☐ ☐	 ☐
7 Are tanklids and butterworth hatches checked on cleanliness ?	☐	☐	
8 Has pumpcofferdam been purged? In case of leakage, has pumpcofferdam been flushed ?	☐ ☐	☐ ☐	 ☐
9 Is manifold-cross over line clean at visual inspection ?	☐	☐	
10 Is the tank flushed with sufficient freshwater ? Are dropline and strippingline flushed with freshwater ? Is P/V line flushed with freshwater ? Has manifold been flushed over <u>both</u> sides with freshwater ? Are all drainvalves of manifold cross-over, cargo & stripping lines flushed with fresh water ? Has pumpcofferdam been flushed with freshwater ?	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	 ☐

Flush stainless steel as soon as possible with fresh water !

Place, Date & Time

Signature

CARGO CHECK LIST - 11 AFTER CLEANING			Page1/1
	YES	NO	N/A
1 Has tank been sufficiently ventilated ?	☐	☐	
2 Are tank-entry permit items carried out and all precautions observed ?	☐	☐	
3 After first inspection does tank need additional cleaning ?	☐	☐	
4 Is vapourreturn (cross over) line visually checked, clean and dry ?	☐	☐	
5 Are all tankinternals (e.g. stairs, behind stiffeners, pumpstack, dropline) visually checked, clean and in good condition ?	☐	☐	
6 Has wallwash inspection been carried out ? (if required for next cargo)			
* Inorganic chlorides .....ppm	☐	☐	☐
* Inorganic chlorides by conductivity .... UMho	☐	☐	☐
* Hydrocarbons	☐	☐	☐
* Permanganate Time Test ....mins	☐	☐	☐
* PH value	☐	☐	☐
* Odour	☐	☐	☐
7 Are all valves and drains of the cargotank-system in open position ?	☐	☐	
8 Pumpwell emptied with eductor ?	☐	☐	
9 Tank and all lines blown until completely dry ?	☐	☐	
10 Have heating coils been pressure tested ? If yes, pressure ....bar.	☐	☐	
11 Have tanks been checked for cracks, pittings, coating/st.steel condition ?	☐	☐	
12 Are tankhatch and butterworth hatch gaskets checked and in good condition ?	☐	☐	
13 Is pumpcofferdam purged and dry ?	☐	☐	
14 Completed Oil/Cargo Record book ?	☐	☐	☐
15 Lists of last 3 cargoes and cleaning methods(hoses, tanks, vapour)updated ?	☐	☐	

Place, Date & Time

Signature

Annex M

Vopak Terminal Teesside Ltd’s Emergency Procedures contained in the Cargo Information Book

EMERGENCY PROCEDURES

THE ALARM	**A rise and fall siren**
THE "ALL CLEAR"	**The alarm will sound continuously for one minute. This will be confirmed verbally.**
THE ALARMS ARE TESTED	**1000 hours every Wednesday**

IN THE EVENT OF AN EMERGENCY ON THE TERMINAL: ACTION TO BE TAKEN BY SHIP PERSONNEL

1. You will be informed of the NATURE OF THE EMERGENCY by terminal supervisor via the ship/shore radio or jetty operator.
2. STOP all operations.
3. Maintain a LISTENING WATCH on both the ship/shore radio and vhf channel 14.
4. On receipt of this information you are requested to follow your own SHIP PROCEDURE for such an incident. All personnel on board, whether they are CREW OR OTHERWISE, must follow the ship's procedures.
5. Should members of your ship be ashore at this time, they must follow NORMAL SHORE PROCEDURES as advised by terminal personnel.
6. In the event of a TOXIC RELEASE you are advised to go inside the accomodation and close all non essential inlets.
7. POLICE, FIRE AND AMBULANCE can be obtained by dialling 9-999 on jetty phone.

IN THE EVENT OF AN EMERGENCY ON BOARD THE VESSEL: ACTION TO BE TAKEN BY SHIP PERSONNEL

1. Sound ONE OR MORE BLASTS of the ships whistle. Each blast of NOT LESS THAN TEN SECONDS duration supplemented by a continuous sounding of the general alarm system.
2. If possible, SOUND THE FIRE ALARM on the jetty by activating the break glass unit.
3. INFORM THE TERMINAL of the nature of the emergency via the ship/shore radio.
4. STOP all operations
5. INFORM THE HARBOUR OFFICE using vhf channel 14 and maintain a listening watch on this channel for further advice.
6. Prepare to vacate the jetty.
7. Attempt to contain any spillages.

Acknowledged by _____ MV _____

Annex N

Records of Vopak's hourly safety check record sheets for *Jo Eik* and *Puccini*

A signature on this sheet indicates that all repetitive checks have been completed, including those in the main body of the ship/shore checklist & the supplementary checks below.

ANY NEGATIVE RESPONSE - IMMEDIATELY STOP PRODUCT TRANSFER

ITEM	✓ Tick each column to indicate a positive																
Ship/Shore communications tested and clear.	✓	✓	✓	✓	✓	✓	✓	✓									
Position of the flex/s is such that they will not be trapped by tidal movements. They are not damaged. They are not stretched.	✓	✓	✓	✓	✓	✓	✓	✓									
No leaking flanges or other leaks evident on the jetty or ship. Cannot smell anything? Cannot see anything? Cannot hear anything?	✓	✓	✓	✓	✓	✓	✓	✓									

ANY NEGATIVE RESPONSE - CONSIDER CONSEQUENCES - INFORM SUPERVISOR & SHIP

ITEM	✓ Tick each column to indicate a positive																
Jetty gates closed, locked and jetty is secure.	✓	✓	✓	✓	✓	✓	✓	✓									
Access to, and egress from the ship appears to be safe and secure.	✓	✓	✓	✓	✓	✓	✓	✓									
Do the ship's mooring lines keep the vessel in contact with the fenders? They should not be too taught or slack.	✓	✓	✓	✓	✓	✓	✓	✓									
Any work by contractors taking place in the jetty area has been approved and work permit is valid.	–	–	–	–	✓	N/A	N/A	N/A									
Time	0550	0650	0750	0845	0950	1115	1230	1430									
Signature	[redacted]																

ADD ADDITIONAL SHEETS AS REQUIRED (VTT-OPS-CHEC-0035)

Checks for *Puccini*

A signature on this sheet indicates that all repetitive checks have been completed, including those in the main body of the ship/shore checklist & the supplementary checks below.

ANY NEGATIVE RESPONSE - IMMEDIATELY STOP PRODUCT TRANSFER

ITEM	✓ Tick each column to indicate a positive																	
Ship/Shore communications tested and clear.	✓	✓	✓	✓	✓	✓	✓											
Position of the flex/s is such that they will not be trapped by tidal movements. They are not damaged. They are not stretched.	✓	✓	✓	✓	✓	✓	✓											
No leaking flanges or other leaks evident on the jetty or ship. Cannot smell anything? Cannot see anything? Cannot hear anything?	✓	✓	✓	✓	✓	✓	✓											

ANY NEGATIVE RESPONSE - CONSIDER CONSEQUENCES - INFORM SUPERVISOR & SHIP

ITEM	✓ Tick each column to indicate a positive																	
Jetty gates closed, locked and jetty is secure.	✓	✓	✓	✓	✓	✓	✓											
Access to, and egress from the ship appears to be safe and secure.	✓	✓	✓	✓	✓	✓	✓											
Do the ship's mooring lines keep the vessel in contact with the fenders? They should not be too taught or slack.	✓	✓	✓	✓	✓	✓	✓											
Any work by contractors taking place in the jetty area has been approved and work permit is valid.	—	—	N/A	N/A	✓	N/A	N/A											
Time	0530	0630	0750	0845	0900	1115	1230											
Signature	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]											

ADD ADDITIONAL SHEETS AS REQUIRED (VTT-OPS-CHEC-0035)

Annex O

Vopak Terminal Teesside Ltd’s Ship to Ship transfer instructions

SCOPE

This procedure should be followed, when a ship is berthed on a Vopak jetty, and a second ship is required to berth alongside the first ship, to transfer cargo.

RESPONSIBILITY

It is the ships agents' responsibility to get the relevant permission, from the Port Authority, to allow a ship to ship transfer. This will include product and quantity to be transferred.
It is the ships` agents` responsibility to get the relevant permission, from Vopak, to allow a ship to ship transfer. This will include the product, quantity, and ships dimensions.
It is the ships agents' responsibility to inform all services, i.e. Boatmen, Pilots etc. of intended berthing arrangements.
It is the responsibility of the Captain, of the vessel alongside Vopaks` jetty, to ensure the vessel is securely moored, sufficient to allow the berthing of the second vessel alongside.
It is the Captain and pilots` responsibility, on the second vessel, to ensure as much care as possible is taken when mooring alongside the first vessel.
It is the responsibility of both Captains, to ensure adequate fendering, between both vessels, is in place at all times.
It is the Chief Officers`, of vessels`, responsibility to confirm the product and quantity to be transferred and the maximum pressures and rates allowed during the transfer, this is usually carried out using onboard paperwork.
It is the responsibility of both Chief Officers to monitor the safe transfer of the cargo.
It is the responsibility of both Chief Officers to monitor the mooring of both vessels during the transfer.
On completion it is the responsibility of both Chief Officers to ensure the transfer hose is removed without any spillage occurring.
It is the Supervisor's responsibility to nominate an operator to berth the first vessel alongside Vopak.
It is the operator's responsibility to complete a ship to shore checklist, with the first vessel.
The operator will witness both Chief Officers agreeing and signing the transfer paperwork.
The operator will complete the Vopak ship to ship checklist.
It is the operators responsibility to witness the sailing of the first vessel, after the successful completion of the ship to ship transfer.

HEALTH, SAFETY & ENVIRONMENT

All personnel involved, in berthing both vessels, i.e. Boatmen, Pilots, must wear the correct PPE.
Ship to shore radios must be issued to both ships.
Vopak ship to shore, and Vopak ship to ship checklist, to be completed.

REFERENCES

VTT-OPS-SHIP-0001.
VTT-OPS-SHIP-0002.
VTT-OPS-SHIP-0003.

PROCEDURE

1. Vopak Supervisor to issue ship shore checklist to be completed by Vopak and vessel moored alongside Vopak jetty. He will also issue the Vopak ship to ship checklist which will be completed by a competent person on both vessels.

2. Vopak operator will take the berthing radio to the nominated jetty, and ensure the vessel is berthed alongside Vopak`s jetty safely.

3. Vopak operator to complete ship to shore checklist, on first vessel.

4. Second vessel to moor alongside first vessel, ensuring adequate fendering is in place.

5. A safe and secure means of access, between the vessels, will be provided.

6. The nominated competent person, will complete the Vopak ship to ship checklist, witnessed by the Vopak operator.

7. The nominated competent person will complete any ship to ship paperwork, confirming product, quantity, pressures, rates and all safety aspects related to the transfer of cargo. This will also be witnessed by the Vopak operator.

8. A transfer hose will be connected between both vessels, using a ships crane.

9. The nominated competent person, from both vessels, will confirm both vessels are ready to transfer cargo.

10. Cargo operations will commence, and both vessels will check systems for leaks.

11. Communications will be tested on a regular basis, i.e. every hour, throughout the cargo transfer.

12. On completion of cargo, all lines, from the discharging vessel, will be blown to the receiving vessel. Blowing will commence with the agreement of both vessels.

13. On completion of blowing, any pressure should be released to the discharging vessel.

14. The transfer hose should be disconnected, ensuring any product residues are collected on board, for disposal.

15. The transfer hose should be removed by a ships crane.

16. All final paperwork should be completed by both vessels.

17. Vopak to retrieve both radios.

Vopak will monitor the sailing of both vessels.

Owner : (Assistant Operations Manager)

Vopak Terminal Teesside Ltd’s On-site Emergency Plan (v2009/01) - Toxic Release

TOXIC RELEASE

In the event of a toxic release from a location within our terminal, from a ship berthed alongside or from an adjoining premises, the general site alarm will be sounded with a specific verbal instruction by radio confirming that a toxic release has taken place.

1. Vopak personnel should follow the initial alarm response and in addition whist making way to the nearest safe refuge should take with them saver sets from the nearest location. Take any drivers or visitors with you. Await instructions from the site main controller.

2. Alert adjoining premises, particularly those downwind of the release, of the product, nature and quantity involved.

3. Alert the Harbour office if the release is likely to affect the river and shipping traffic etc.

4. Isolate the source or cause of the release where possible, if this can be done without endangering oneself.

5. During the toxic release, keep persons not operationally involved indoors with windows and doors shut.

    a) Do not let VTT staff use breathing apparatus unless you have no other option.
    b) Do not send people out in breathing apparatus until you know how you will account for their return.
    c) Do not use escape breathing apparatus except for emergency evacuation.

5. In or downwind from affected area restrict any sources of ignition.

    a) Do not start engines.
    b) Do not use vehicles.
    c) Do not operate electrical switches.

6. Following any spillage to other than into an impermeable bund where all the spilt product was contained and there have been no detrimental affects to the environment (air, land and water), the environment agency must be informed after consultation with Vopak senior management.

Annex Q

Drill matrix for 2008

Drill Schedules (2008)

Jo Eik

			Last Drill (dd-mm-07)	January	February	March	April	May	June	July	August	September	October	November	December
Fire:	monthly	Accomodation/Mustering	24-12	16	3,28	15		21	14	5	15		11	14	
		Engineroom	24-12			3		17		11	22	26		1	19
		man./foc'le/prm/deck/galley	10-11	27		15,27	27	11	6		9	19	24	21	26
		tank explosion	15-07	27		27	17			5		13	18	28	5
Abandon ship	monthly	Toxic/Flammable vapours	14-10	27		15,27	27	11	6		9	19	18	1,28	5
		After Collision/Mustering	10-11		3,28			17	14	11	15	13	11	21	26
		Fire Out of Control/Mustering	24-12	27		3,27	27	21		5	22	26	24	14	19
Pollution and mitigation drills:	one scenario every month	rupture cargo hose	28-01							18			24		
		cargo tank overflow	07-06					16					11		
		bunker tank overflow	04-03								9			20	
		cargoline leak	23-08						6						19
		bunkerline/fuel line leak	14-10									19			
		hydraulic leakage	10-11			1								14	
		toxic poisonous cargo spill	15-08		3			16		18					
		corrosive/acid cargo spill	12-09												19
		grounding / stranding / touching bottom	23-10												26
		hull leakage	x												26
		excessive list	x												26
		notification procedures (US & Panama)	06-03	31				16			9	19	11,25	20	
Others:	each scenario every 3 months	manoverboard / williamson turn	24-12		25			16			22			1	
		enclosed space rescue	18-06					17	13	11			18		
		flammable vapour ER	17-06			3							11		
		flammable vapour in accom.	13-08									13			5
		emergency steering	15-07		3	15	15	16		18		17		20	
		helicopter / ship rescue	11-09								9			14	
Security Drill	one scenario every 3 months	bomb search/foreign object	22-02		3			9		18		19		14	
		level change/breach	15-07					9				19			
		discover suspicious device	12-08												5
		controlled evacuation	x												
		piracy/stowaway search	x		3					18					
	3m	Silent Security Alert System	21-09				30			8			23		
	1 yr	Security Exercise	10-11		3	30								14	
	monthly	Safety Instructions	24-12	11,27	3	3	27	11,17	6	18	15,22	13,26	11	1,19,21	5,19
		Safety Video	12-11	27		3		9	13	5,12	11,13,15	10,12,15,17	10,18,26	14,15,16,17,18	18,27,28,29,30,31
		Security De-Briefings	24-11		3		27			18		18,19		14	5
	6m	Lifeboat launch to sea/davit*	13-12				13				3		10		6
	m	Rescue boat launch to sea	13-12		25		27	25	24			5,28	10	12	6

Vessel @ Drydock

Note:

Titles of Safety Videos to be viewed are to be determined by the Officer in charge..

Shaded blocks are the plan schedule for the next month.

Annex R

Drill matrix for 2009

Drill Schedules (2009)

Jo Eik

			Last Drill (dd-mm-07)	January	February	March	April	May	June	July	August	September	October	November	December
Fire:	monthly	Accomodation			8										
		Engineroom													
		man./foc'le/pumprm/deck													
		tank explosion													
Abandon ship	monthly	Toxic/Flammable vapours													
		after collision			8										
		Uncontrollable Fire													
Pollution and mitigation drills:	one scenario every month	rupture cargo hose													
		cargo tank overflow			8										
		bunker tank overflow													
		cargoline leak													
		bunkerline/fuel line leak													
		hydraulic leakage													
		toxic poisonous cargo spill													
		corrosive/acid cargo spill													
		grounding / stranding / touching bottom													
		hull leakage	x												
		excessive list	x												
		notification procedures (US & Panama)			8										
Others:	each scenario every 3 months	manoverboard / williamson turn													
		enclosed space rescue													
		flammable vapour ER													
		flammable vapour in accom.	x												
		emergency steering			9										
		helicopter / ship rescue													
Security Drill	one scenario every 3 months	bomb search/foreign object			2										
		level change/breach													
		discover suspicious device													
		controlled evacuation	x												
		stowaway search	x												
	3m	Silent Security Alert System													
	1 yr	Security Exercise													
	monthly	Safety Instructions													
		Safety Video			2										
		Security De-Briefings													
	6m	Lifeboat launch to sea/davit*													
	m	Rescue boat launch to sea			3										

Note
Titles of Safety Videos to be viewed are to be determined by the Safety Officer.

Annex S

CERAM Research Ltd's Organic Analysis Report - 093667/Supplement dated 29 July 2009

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Marine Accident Investigation Branch
Carlton House
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SO15 2DZ

ORGANIC ANALYSIS REPORT

CERAM Reference:	(093667) /Supplement		
Order Number:	MAIB 01/10/321/WH Paid		
Date Logged	23-Jun-2009	**Test Start Date:**	19-Jun-2009
Date Reported	29-Jul-2009	**Test Finish Date:**	07-Jul-2009

Please find attached the results for the samples recently submitted for analysis.

This report supersedes the report issued on 8 July 2009 for CERAM SDG (093667) for Organic Analysis.

Authorised Signatory

Material Type: Turpentine Crude Sulfate
Your Reference: As Reported
CERAM Reference: (093667)-16830 to 16832 /Supplement

Organic Analysis Results

Introduction

Three ink samples were received for analysis.

CERAM Reference No	Customer Reference
16830	From chemical tanker Jo Eik Cargo Tank - 6CS
16831	From chemical tanker Jo Eik Cargo Tank - 7CS
16832	From chemical tanker Jo Eik Cargo Tank - 10P

Method

The samples were analysed by two techniques to determine both the hydrogen sulphide and organo-sulphur.

For the hydrogen sulphide analysis 50µl turpentine was added to 1 litre of clean air in clean tedlar bag. The liquid was volatilised over a drying oven (approximately 60°C) then allowed to cool. 5ul of the gas inside the bag was analysed, in duplicate, on a 5950 GC-FPD instrument at 60°C and quantified against a 3 point calibration of standards of known concentration. A measured volume of the resulting gas was collected on a silcosteel treated dual bed (tenax and Unicarb) automated thermal desorption tube. The samples were analysed for the other gaseous organosulphurs using a Markes International Unity/Ultra thermal desorption system connected to an Agilent 6890/5973i gas chromatograph-mass spectrometer. The mass spectrometer was operated in scan mode between 35 and 400amu. The tubes in the ATD were desorbed for 5 minutes at 300°C to fully desorb the volatile contents of the sample tube. The ATD was then heated at 300°C to transfer the contents into the GC column. The GC oven program ran from 35°C to 180°C at a rate of 25°C/min before heating at 40°C/min to 250°C (then held for 7 minutes). The organosulphurs were quantified against a 5 point calibration.

A 1:100 dilution, in methanol, was performed on each of the turpentine samples. A 5ul portion was spiked onto a silcosteel treated dual bed (tenax and Unicarb) automated thermal desorption tube. The samples were analysed using a Markes International Unity/Ultra thermal desorption system connected to an Agilent 6890/5973i gas chromatograph-mass spectrometer. The mass spectrometer was operated in scan mode between 35 and 400amu. The tubes in the ATD were desorbed for 5 minutes at 300°C to fully desorb the volatile contents of the sample tube. The ATD was then heated at 300°C to transfer the contents into the GC column. The GC oven program ran from 35°C to 180°C at a rate of 25°C/min before heating at 40°C/min to 250°C (then held for 7 minutes). The samples were quantified against a 4 pint calibration of organosulphur compounds.

Results

Copies of the chromatograms are included.

CERAM TEST RESULTS

Material Type: Turpentine Crude Sulfate
Your Reference: As Reported
CERAM Reference: (093667)-16830 to 16832 /Supplement

CERAM Reference	16830		16831		16832	
Compound	**Conc. Gas Phase (% w/v)**	**Conc. Liquid Phase (% w/v)**	**Conc. Gas Phase (% w/v)**	**Conc. Liquid Phase (% w/v)**	**Conc. Gas Phase (% w/v)**	**Conc. Liquid Phase (% w/v)**
Hydrogen Sulphide	**<0.03** (<300ppm)	**NA**	**<0.03** (<300ppm)	**NA**	**<0.03** (<300ppm)	**NA**
Dimethyl sulphide	**0.349** (3490ppm)	**0.774** (7740ppm)	**0.433** (4330ppm)	**0.642** (6420ppm)	**0.607** (6070ppm)	**0.794** (7940ppm)
Carbon Disulphide	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)
Dimethyl Disulphide	**0.205** (2050ppm)	**0.290** 2900ppm	**0.244** 2440ppm	**0.406** 4060ppm	**0.207** 2070ppm	**0.374** 3740ppm
Ethyl methyl suphide	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)
Diethyl sulphide	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)
Diethyl Disulphide	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)
Methanethiol	**0.246** 2460ppm	**0.244** 2440ppm	**0.162** 1620ppm	**0.838** 8380ppm	**0.171** 1710ppm	**1.374** 13740ppm
Ethanethiol	**<0.004** (<40ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)	**<0.002** (<20ppm)	**<0.02** (<200ppm)

The concentrations reported are related to amounts of the organosulphur compounds in the turpentine.

The disparity in the results may be related to naturally occurring degradation of the organosulphur compounds in the tedlar bag which are not seen when the material is diluted and analysed instead. The hydrogen sulphide analysis, from the tedlar bag, was carried out immediately after preparation of the tedlar bag so degradation would have been minimal.

All except one result for methanethiol from cargo tank 10P all the concentrations were below the concentrations specified on the MSDS for the Turpentine sulphate.

Conclusion

The results indicate that while there are high levels of other organosulphur compounds present in the samples hydrogen sulphide was not detected, at a concentration above the stated reporting limit, in the gas phase sample. It is possible that hydrogen sulphide was present at a concentration below 300ppm but it has not been possible to detect it because to the limitations of the instrument and the dilution carried out on the sample. It is possible that what was detected was one or all of the sulphur compounds listed above causing positive interference on the handheld monitor. Chemically, the degradation of the organosulphur compounds present to form hydrogen sulphide would require the presence of a catalyst and heat to occur. Anaerobic digestion of inorganic and organic compounds can produce hydrogen sulphide. Overall it is unlikely that the cargo would deteriorate to release hydrogen sulphide. Because all of the compounds found are odorous and fairly volatile (methanethiol and hydrogen sulphide are naturally gases) agitation of the turpentine by the movement of the boat or aggressive cleaning may release enough vapour to create a hazardous environment in an enclosed area. Of the other chemical compounds found none would be unusual if found in turpentine and were a mixture of alkyl and aromatic hydrocarbons. There was no evidence of an inhibitor compound found in these analyses.

The compounds found at the highest concentrations were Dimethyl Sulphide and Methanethiol. The MSDS details for methanethiol indicate that this compound would cause similar effects on the central nervous system and respiratory system as hydrogen sulphide, including unconsiousness and difficulty breathing, if encountered at a significant concentration.

CERAM TEST RESULTS

Material Type: Turpentine Crude Sulfate
Your Reference: As Reported
CERAM Reference: (093667)-16830 to 16832 /Supplement

Possible Health effects of the Sulphur chemicals found

(N.B. the information contained in this section has been derived from an internet search and reference to material safety data sheets related to the compounds determined in the samples. The reader must accept therefore that this information and opinion has no legal status and cannot be relied upon in any legal proceedings. CERAM disclaims any responsibility or liability whatsoever for errors and omissions in this sheet.)

Methanethiol

Colourless gas with a garlic-like or rotten cabbage-like smell that is harmful is inhaled; chronic exposure may cause lung damage. Skin, eye and respiratory irritant and a CNS depressant; thought to have similar effects to common anaesthetics (***Pharmacology and Experimental Therapeutics: Volume 228, Issue 1, pp. 103-108, 01/01/1984***). Vapour can be toxic by inhalation causing irritation to the respiratory system, eyes, and mucous membrane. Skin contact may cause irritation. Symptoms include nausea, dizziness, vomiting, sore throat, coughing, shortness of breath, fatigue, and mucous membrane irritation of the lips, mouth and nose. High concentrations may affect the central nervous system causing muscle weakness, tremors, narcosis, convulsions, unconsciousness, paralysis of the respiratory tract, cyanosis, coma and death. Typical Personal Exposure Limit 0.5 - 1.0 ppm

Dimethyl Sulphide

Under the EU Dangerous Substances Directive 67/548/EEC as amended and adapted to technical progress (as implemented in Great Britain by the Chemicals (Hazard Information and Packaging for Supply) Regulations (CHIP) this compound is classified as a Category 2 mutagen. It is important to wear suitable protective equipment when coming into contact with this chemical. It is irritating to respiratory system and to skin. The maximum exposure limit (MEL) is at present 0.05 ppm (0.26 mg/m3 for DMS related to an 8 hour time weighted average (TWA) reference period.

Dimethyl Disulphide

Safety glasses, good ventilation, gloves, should be worn when handling this material. Dimethyl disulphide can enter the body either by inhalation of air containing dimethyl disulphide, ingestion of contaminated water, or by dermal contact with dimethyl sulphide. Inhalation of dimethyl sulphide can irritate the respiratory tract. Aspiration of dimethyl sulphide in to the lungs may lead to inflammation and accumulation of fluid in the lungs. Ingestion of dimethyl disulphide can cause skin irritation. Eye contact can also cause irritation. The International Agency for Research on Cancer has not designated dimethyl disulphide in terms of its carcinogenicity. However, exposure to dimethyl disulphide at normal background levels is unlikely to have any adverse effect on human health.

End of Test Report

MAIB Safety Bulletin 2/2008 dated July 2008

MAIB SAFETY BULLETIN 2/2008

Fatalities in enclosed spaces

MAIB SAFETY BULLETIN 2/2008

This document, containing urgent safety recommendations, has been produced for marine safety purposes only, on the basis of information available to date.

The Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 provide for the Chief Inspector of Marine Accidents to make recommendations at any time during the course of an investigation if, in his opinion, it is necessary or desirable to do so.

This Safety Bulletin is issued to raise awareness of the unnecessary and avoidable loss of life of seafarers working in enclosed spaces and, through industry bodies and organisations, seeks to establish control measures that can be utilised to prevent such accidents in the future.

Stephen Meyer
Chief Inspector of Marine Accidents

This bulletin is also available on our website: http://www.maib.gov.uk

Press Enquiries: 020 7944 6433/3387; out of hours: 020 7944 4292
Public Enquiries: 020 7944 3000

BACKGROUND

Since September 2007 the MAIB has started three investigations into accidents in which a total of six seafarers have died in enclosed/confined spaces:

- On 23 September 2007, three experienced seamen died inside the chain locker on board the emergency response and rescue vessel *Viking Islay*. The first two were overcome while tying off an anchor chain to prevent it from rattling in the spurling pipe. The third to die was the first rescuer who entered the chain locker wearing an Emergency Escape Breathing Device (EEBD). He was soon constrained by the device and removed its hood. All three men died as a result of the lack of oxygen inside the chain locker caused by the on-going corrosion of its steel structure and anchor chain.

- On 18 January 2008, two seamen collapsed in a store on board the general cargo ship *Sava Lake*. The chief officer entered the store to try and rescue the men but was soon forced to leave when he became short of breath and his vision narrowed. The two seamen had been asphyxiated. The store was adjacent to the vessel's forward cargo hold containing 'steel turnings'. To allow for the drainage of sea water and the removal of cargo residue, the bellows pieces on the cargo vent trunk either side of the cargo ventilation fan motor, located in the store, had been cut. This allowed a path for the air from the self-heating cargo, to enter the store. When tested, the air in the cargo hold contained only 6% oxygen.

- On 11 June 2008, an experienced seaman died on board the passenger cruise ship *Saga Rose* after he entered an almost empty ballast tank. The tank's manhole cover, which was inside a small cofferdam accessed from within the engine room, had been removed and the seaman had been instructed to confirm the tank's contents. As it was not intended for the seaman to enter the tank, no permit to work was issued. When the seaman was found to be missing, an experienced motorman was sent into the cofferdam to check on his wellbeing. He found the seaman lying at the bottom of the empty tank and raised the alarm. The motorman then entered the tank but collapsed when trying to recover the seaman. After the ship's emergency response team provided air to the stricken crew via in-line breathing apparatus, the motorman recovered and was able to leave the tank. However, the seaman never regained consciousness. He had been asphyxiated in the oxygen depleted atmosphere of the tank, which had not been inspected for several years and was heavily corroded. It is not certain why the seaman entered the tank but it is likely it was to determine whether a small amount of water in the tank bottom was salt or fresh water.

The MAIB report of its investigation of the fatalities on board *Viking Islay* was published on 9 July 2008. The MAIB will publish reports on the fatalities on board *Saga Rose* and *Sava Lake* on completion of its investigations.

Co-incident with the MAIB investigations, the Marine Accident Investigators International Forum (MAIIF) identified the large number of fatalities in the shipping industry worldwide which were related to work in confined or enclosed spaces and considered that the occurrence of such accidents was increasing. Accordingly, in October 2007, MAIIF tasked its representative from Vanuatu to research the incidence of this type of accident with a view to the submission of a paper to the International Maritime Organization (IMO). To date, responses from 18 administrations identify 120 fatalities and 123 injuries resulting from entry into confined spaces since 1991. These statistics do not include the fatalities from *Sava Lake* or *Saga Rose*.

SAFETY LESSONS

There can be few aspects of personal safety on board ships that have received more attention than the importance of following the correct procedures before entering a dangerous enclosed/confined space. Tragically, it is clear that the measures which have been put into place have failed to prevent the death of many seafarers. Indeed, the data collected on behalf of MAIIF indicates that accidents in enclosed/confined spaces continues to be one of the most common causes of work-related fatalities on board ships today. This is due to:

- Complacency leading to lapses in procedure;
- Lack of knowledge;
- Potentially dangerous spaces not being identified; and,
- Would-be rescuers acting on instinct and emotion rather than knowledge and training.

It is essential that the IMO recognises the unacceptably large fatality rate in this area and takes the lead in identifying initiatives to improve this very poor safety record. It is also vital that all shipping industry bodies raise the awareness of the continuing and increasing number of deaths in enclosed spaces to show that no-one is immune to the physical effects of the lack of oxygen or harmful gases. While the holding of breath might seem a logical step to a person entering a tank 'for a few seconds' or to a would-be rescuer, it is all too frequently the last life sustaining breath he or she ever takes.

RECOMMENDATIONS

Ship owners and managers, and industry bodies and organisations are recommended to:

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- Identify and implement measures aimed at improving the identification of all dangerous and potentially dangerous spaces and increasing compliance with the safe working practices required when working in such compartments.
- Individually and collectively raise the awareness of the continuing high incidence of fatalities of seafarers working in enclosed spaces.

The Maritime and Coastguard Agency is recommended to:

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Co-sponsor with the Maritime Administration of Vanuatu and other concerned administrations a submission to the IMO aimed at raising the awareness of the number of fatalities on ships which have occurred in enclosed spaces, and highlighting the need for measures to be identified which will reduce this unnecessary loss of life, such as the identification and marking of all potentially dangerous spaces.

Issued July 2008

MAIB Safety Flyer resulting from the *Jo Eik* investigation

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

FLYER TO THE SHIPPING, TANK STORAGE AND CARGO INSPECTION INDUSTRIES

Jo Eik

Release of cargo vapours resulting in two casualties

On 6 May 2009 the Norwegian registered chemical tanker *Jo Eik* completed a ship to ship transfer (StS) of a cargo of Crude Sulphate Turpentine (CST) at the Vopak Terminal Teesside. During the final stripping following the mandatory MARPOL pre-wash, a deck rating became unconscious following exposure to CST vapours. The chief officer, who attempted a rescue, was also overcome and another deck rating suffered the effects of vapour inhalation but managed to escape unaided. Both casualties were rescued and made a full recovery.

Before loading the unfamiliar CST cargo at Savannah, USA, the chief officer conducted a pre-arrival conference, but he did not have the cargo Material Safety Data Sheet (MSDS) at the time and so the safety briefing did not properly cover the cargo hazards, which unbeknown to him contained hydrogen sulphide (H_2S), organo-sulphides and mercaptans. A cargo specific MSDS was later handed to him by the shipper. In the meantime the ship manager obtained an MSDS which was ***not*** cargo specific and which did not mention H_2S. This MSDS was passed to the agent, the receiving StS ship and the terminal staff. It was not passed to the cargo surveyor who obtained a generic MSDS from the internet. As a result he equipped himself with the incorrect respirator filter to protect against H_2S vapours.

A Teesside pre-arrival conference was not held and the crew were not advised to take any particular precautions. It is of note that the Safety Management System was explicit in its direction to use breathing apparatus (BA) where there was a risk of cargo vapour inhalation.

The ship's cargo Procedures and Arrangements Manual specified that the fixed washing systems should be the normal method of tank cleaning. However, only 7 out of 65 were functional, so it had become normal practice to use the portable washers which were passed through open Butterworth hatches. As the tank atmosphere was agitated, dense cargo vapours were driven through the open hatch and accumulated in the enclosed area around it.

Although part of the weather deck, the area around the hatch fell into the International Maritime Organization's definition of an enclosed space. However, this was not identified by the crew, so there were no warning signs. Despite the strong pungent smell of the released vapours, the hazards were not recognised. The casualties exhibited the classic signs of H_2S / mercaptan inhalation.

Open inboard hatch

Safety Lessons

This is the fourth MAIB investigation since September 2007 which has related to oxygen depleted or contaminated atmospheres. The previous three accidents resulted in the deaths of six seafarers. In all cases the following issues have been identified:

- **Complacency leading to lapses in procedure** – on *Jo Eik* there were inadequate safety briefings, non use of breathing apparatus, acceptance of chemical smells and fixed washing system defects. These points were adequately covered in the SMS: for their own safety, officers and crew must take ownership of, and properly implement the SMS instructions.

- **Potentially dangerous spaces not being identified** – on *Jo Eik* the area around the Butterworth hatch was effectively in an enclosed space. The surrounding construction impeded air flows from dissipating cargo vapours. There are many such areas on ships. They should be identified and risk assessments conducted to determine the appropriate risk control measures.

- **Would-be rescuers acting on instinct and emotion rather than knowledge and training** – on *Jo Eik* the initial rescue was attempted without BA and without testing the atmosphere. Realistic drills should be regularly carried out and critically assessed so that equipment and manpower resources are used to best effect. In this case the chief officer was nominated to lead the rescue; he would have been more effective in an "on-scene commander's" role.

Additionally in this case:

- **Use of different MSDSs** – there were two different MSDSs in use. The one obtained by the vessel's managers did not specify all the cargo's components and so decisions made about safety measures that might be required were based on inaccurate information. Ship managers should take action to ensure that the cargo specific MSDS is promulgated to receivers (whether they be terminals or transshipment vessels/barges) either directly or via the ship operator or agent.

This flyer and the MAIB's investigation report are posted on its website:

www.maib.gov.uk

Alternatively, a copy of the flyer and / or report will be sent on request, free of charge.

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November 2009

Annex V

Vopak Terminal Teesside Ltd's instruction for investigating CEAS alerts - reference M/C dated 28 July 2009

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our reference	tel. direct	fax direct	date
M/C	01642543691	01642 543600/601	28.07.2009

During the ship to ship transfer of crude turpentine between the Puccini and the Jo Eik and the subsequent marpol washing of the Jo Eik's tanks on Vopak jetty 2 ,a number of reports were received on the terminal of a strong odour. The initial response to these reports was to assume that the source of this odour was off site and the CEAS system was used by the control room on several occasions to ask Vopak neighbours if they had any information with regard to possible discharge of product or vapours on their or any other site that could account for this.

Further investigation and subsequent events showed that the source was as a result of the activities on Vopak jetty 2.

Can all staff please note that in the event of receiving reports of odour being detected on the terminal that the first course of action is to confirm what activities are taking place on Vopak's site. Once this has been determined and it is confirmed that terminal activities are not the cause of any problems relating to any such report, then action should be taken to try and identify where the source is located including the use of CEAS.

This action should take in to consideration any off site alarms/CEAS messages that may give indication of events such as toxic release that may help identify that the source of odour as being off site.

Regards.
[redacted] safety supervisor

Annex W

Jo Tanker’s new instruction - QCH - 1.6 New Cargoes for the Company, Vessel, Master or Chief Officer

QCH - 1.6 New Cargoes for the Company, Vessel, Master or Chief Officer

All cargoes that a vessel is certified to carry are listed in the Certificate of Fitness. When a vessel is nominated to carry a product which the Company, Vessel, Master or Chief Officer has not previously transported, then it is the responsibility of the Operator, Master and Chief Officer to ensure they are updated with the relevant information on the product. Such information is normally available on the MSDS, but there are also other sources of information.
All hazards and safety information must be fully understood by the relevant crew onboard prior to loading the product, according to our procedures this must be discussed during the pre-arrival conference

Annex X

Jo Tanker's Lessons to Learn Number: 7/2009 -
Unconscious Crew Members due to Inhalation of Cargo Vapours

Lessons to Learn

NUMBER: 7/2009 Unconscious Crew Members due to Inhalation of Cargo Vapours.

DESCRIPTION OF EVENT

One of our vessels had completed discharging Turpentine. During the final stripping after the pre-wash a deck rating became unconscious due to being exposed to Turpentine vapours.

A rescue operation was immediately initiated onboard. During the rescue operation a Deck Officer also became unconscious due to the vapours. Both victims were transported to a safe area. The Deck Officer quickly regained consciousness and sent to hospital by ambulance while the situation of the deck rating was considered more serious and he was therefore transported by Helicopter.

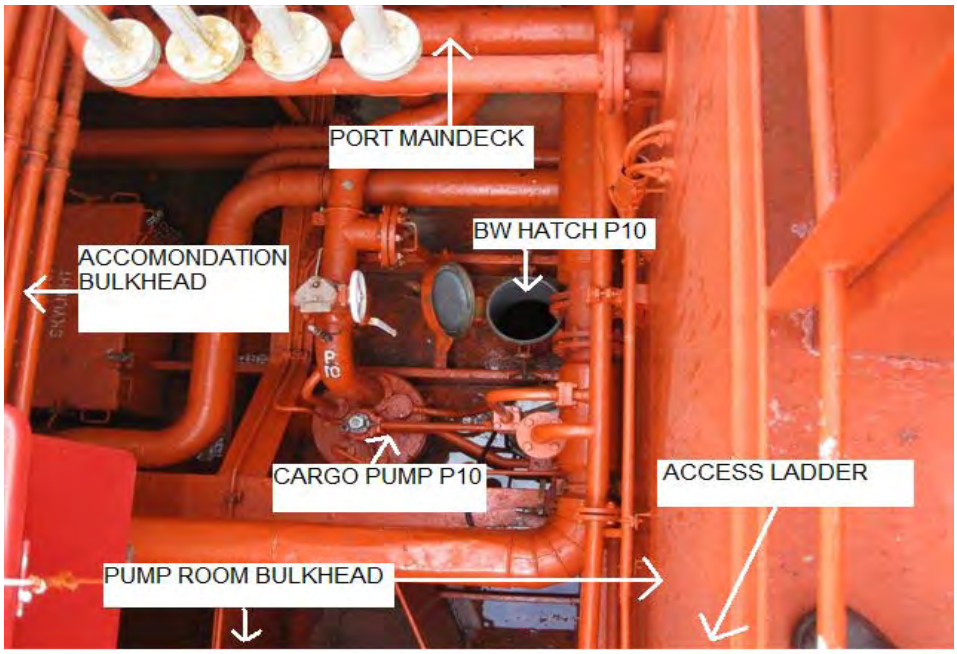
The Deck Officer was released from hospital the same evening and returned to the vessel.
The deck ratings condition was more serious due to longer exposure and he remained under observation in hospital longer. He was released from hospital some days later.

Investigation

The MSDS received from the loading port stated that inhalation of vapors or mist may be harmful or fatal, and may cause respiratory tract irritation, sensitization and central nervous system depression. The cargo may also release sulfur compounds (dimethyl disulfide, dimethyl sulfide, hydrogen sulfide and mercaptan). According to the MSDS the cargo is categorized as Cat 2 product – slight hazard (NFPA ratings).

There was no direct instruction to the deck crew to use additional PPE for the handling of Turpentine. Therefore, “Basic Personal Protection” – Safety Shoes, Safety Helmets, Safety Goggles, Gloves and Coverall where used.

P10 deck layout;
The accommodation bulkhead is located aft of the tank. The pump room bulkheads are on the starboard side and in front of the cargo pump; this may prevent a free air flow. The only access point from main deck is from port side, but due to the piping layout it can restrict access and possibly the ventilation. The main access is by a vertical ladder from the upper deck directly down to the inner BW hatch and cargo pump. The wind condition was light air from port side aft.



Since many of the fixed cleaning machines were considered unreliable it was decided to use portable tank cleaning machines. Due to this the BW hatches had to be open during tank washing.

During stripping of the pre-wash water the watchman was controlling the stripping from the pump head by use of pressurized air. The stripping was stopped when the tank was visually checked to be empty.

A Deck Officer and Rating did notice a strong cargo smell but did not considered suspending operations or to use additional PPE such as breathing apparatus. The vessel is also equipped with a BA Trolley which can give breathing air anywhere on the main deck, this is simpler and more comfortably to use than a normal BA set.

After one of the watchmen had secured the outer cleaning machine he observed the 2nd watchman to be unconscious sitting next to the open BW hatch.

At 12:16 hrs the Master raised the alarm.

The Deck Officer stopped the pump and proceeded down to the main deck to try to move the watchman away from the open tank hatch without wearing breathing apparatus. The Deck Officer was not able to close the hatch due to the cleaning machine hose was still inside the tank. The pressurized air used for stripping was left open by the watchman. This resulted in that air was continuously blowing into the tank which was causing a higher amount of gases to escape from the open tank hatch. The Deck Officer closed the air valve.

At 12: 18 hrs the Deck Officer was also reported unconscious.

Breathing apparatus were put on the Watchman and the Deck Officer by the rescue team.

At 12:21 hrs the Deck Officer was lifted from the main deck to the upper deck by use of a line from the safety hardness located above the pump room. At 12:22 the Watchman was lifted from main deck to upper deck. Both were reported unconscious with pulse and breathing.

ROOT CAUSES & INDIRECT CAUSES

Root cause

- Several fixed tank cleaning machines were not fully operational.
- Onboard there are 11 Portable tank cleaning machines; these were used for the cleaning operation.
- The toxic nature of this particular turpentine was not fully appreciated. Although a pre-arrival and pre-tank cleaning meeting was held, not all crew members were present and the specific cargo properties according to the MSDS was not fully discussed during these meetings. However the MSDS was clearly posted.
- After the watchman was observed to be unconscious the Deck Officer did not immediately consider the use of breathing apparatus because the watchman was on the main deck, this resulted in him also becoming a victim.

Indirect cause

- The inner BW hatch of P10 is representing an area where extra safety measures must be taken when there is a danger of cargo vapors. Due to the open tank hatch and because of the deck layout with limited wind flow at P10, breathing apparatus should have been used during pre-washing and stripping. At the time of the incident the weather was very calm with no noticeable wind.

- Safety Awareness; when the cargo smell was noticed prior to the incident action should have been taken to stop the cargo operation or wear additional PPE.

LESSON TO LEARN

- Through Risk Assessment, define and clearly mark areas on deck where extra safety measures must be taken due to possible gas build up. New procedure

- Deck crew involved in cargo operation must wear Personal Gas Detectors when handling products which contain H2S. New procedure

- Deck crew must wear Personal Gas Detectors when involved in cargo/cleaning/gas freeing operation when they are likely to come in contact with any cargo vapours from open tank hatches or open cargo lines. New procedure

- Defect cleaning machines must be repaired asap, and should preferable be used when cleaning.

- *QSA 5.4 (e) Breathing apparatus is to be worn by all personnel who are likely to come into contact with toxic vapors.*

  QSA 5.4 (f): The Emergency Party is to wear Breathing Apparatus when dealing with emergency involving a toxic product. (QEM)

  QSA 5.4 (c): Careful attention is to be given to wind condition and direction. Cargo operation must be suspended if still air or adverse wind condition make the presence of vapors on deck possible.

  QCH 2.27: Cleaning or gas freeing of cargo tanks are frequent operations carried out on chemical tankers. During such operations there may be release and build up of hazardous vapors. Access to the deck area should be restricted when such operations are carried out and the personnel involved in such operations should wear the proper personal protective equipment as required.

Annex Y

Jo Tanker’s new instruction QSA 7.3.2 - Procedure for Handling Cargo Containing H_2S

7.3.2 P ROCEDURE FOR HANDLING OF CARGO CONTAINING H2S

It is the responsibility of the Master and Chief Officer to determine if a cargo contains H2S and to inform the relevant persons on board prior to cargo operations. (Consult MSDS for cargo carried). All safety precautions must be taken to safely handle any cargo that contains H2S.

The acceptable level of H2S has to be less than 5 ppm to ensure safety of personnel working in such spaces.

The Chief Officer should make sure that the H2S detectors are duly calibrated, maintained, and that there are adequate tubes or sensors onboard. The deck must be monitored for the presence of H2S when it can be expected. Special attention should be given during loading, tank cleaning or gas freeing.

All Officers and crew must understand the use and importance of H2S detectors whenever working in areas where exposure to H2S gas is likely.

The Chief Engineer should ensure that the ventilation / air conditioning systems are checked prior to loading operation or cleaning/gas freeing cargo tanks containing H2S and consider putting air conditioning on re-circulation to maintain a positive pressure inside the accommodation, and monitoring the area.

A Risk Assessment shall be performed prior to occasions when staff may be exposed to H2S.

“Breathing apparatus” for cargo operation and “emergency escape sets” (e.g. in CCR) shall be located where they can be easily accessed for emergency escape or for rescue operations.

During loading, tank cleaning and gas freeing when there is little or no wind, gasses coming from tank openings or vents can tend to form a cloud over the deck. It may be necessary to control the number of openings in order to ensure that the escaping vented gas has sufficient velocity to clear the decks. If necessary, to avoid accumulation of gases including H2S at deck level, suspend the operation.

When in doubt, evacuate the area.

Personal Protective Equipment

The only effective respiratory protection in an H2S environment above permissible levels as stated is a positive pressure, full face, breathing apparatus.

Persons with potential exposure to hydrogen sulphide should not wear contact lenses. The lenses may absorb the irritants and cause eye damage.

In addition to breathing apparatus, when there is a potential of exposure to a H2S cargo the following should be used: coveralls with sleeves, gloves, rubber boots, and head protection.

Annex Z

Jo Tanker’s new instruction QSA 5.41 - Lack of Natural Ventilation On Deck

5.41 LACK OF NATURAL VENTILATION ON DECK

Extra safety precautions must be taken where there is a possibility of gas building up, due to deck constructions which may prevent or reduce natural ventilation. Special attention must be given to the wind direction and speed. Breathing apparatus is to be worn by all personnel who are entering an area on deck where there may be a lack of oxygen or where toxic or corrosive gases, vapours, mists or smoke in large concentrations could be present.

Precautions must also be taken during N2 purging. N2 can build up in between deck constructions and frames. This can especially happen if there is a lack of natural ventilation when any cargo tank hatch is open.

A Risk Assessment should be preformed onboard to determine all areas on deck where extra precautions must be taken due to possible gas build up. All these areas must be clearly marked.

Reference is made to:

QCH - 2.27 *TANK CLEANING/GAS-FREEING*
QCH - 2.25 *WEATHER PRECAUTIONS*

Jo Tanker’s new instruction QSA 7.3.1 - Personal Oxygen and Gas Detection Meter and it's Use

7.3.1 PERSONAL OXYGEN AND GAS DETECTION METER AND IT'S USE

Before entering an enclosed space the O_2 level and explosion level must be measured. It is imperative that each time an instrument is used for measurement of O_2 level and/or flammable or toxic vapours, the batteries (if fitted) should be checked and the unit should be properly controlled, including zero setting and calibration and alarm.

Note: The use of personnel gas detection meters is to be used when entering double bottom tanks and other confined areas including cargo tanks to enable continuous monitoring of the oxygen content, and the presence of hydrocarbon and toxic vapours.

When working in a group where use of personal gas detector is required, at least one of the crew members shall wear the personal gas detectors. The crew involved must then be working in a close vicinity of each other.

Entry permits must always be used.

Personal oxygen and gas detection meter is to be used by all ship personnel involved in cargo/cleaning/gas freeing operation when they are likely to come in contact with any cargo vapours from open tank hatches or open cargo lines. These could be but not limited to manifold connection, sampling, tank inspection when stripping and after discharging.

During loading, tank cleaning and gas freeing when there is little or no wind, gasses coming from tank openings or vents can tend to form a cloud over the deck. Personal gas detectors must also be used in these conditions. It may be necessary to control the number of openings in order to ensure that the escaping vented gas has sufficient velocity to clear the decks. If necessary, to avoid accumulation of gases at deck level, suspend the operation.

7.3.1.1 NITROGEN HAZARDS

Personal Oxygen meter should be used in areas which may have a lack of natural ventilation during Nitrogen operation. N2 can build up in between deck constructions and frames. N2 present a particular hazards since it has no smell and in an atmosphere inerted or padded with nitrogen there is no feeling of distress or warning symptoms of asphyxiation. Inhalation of nitrogen is fatal when it lowers the available oxygen in air to below life-sustaining levels

Maintenance and calibration

Reference is m ade to the instruction m anual and the m aintenance procedures as laid down in AMOS.