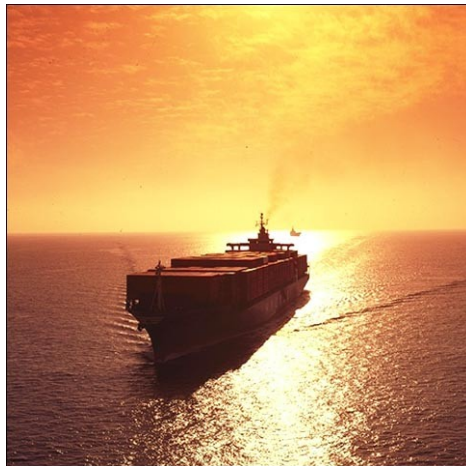


Getting On top of Environmental Compliance Issues:

“Using IT to Capture, Analyze and Report on Shipboard Environmental Performance...”

Digital Ship USA
Conference: Sept. 2008



Dale Neef PhD
Managing Director
DNA Maritime LLC

Corporate social responsibility comes to maritime shipping

Growing realisation industry needs to move with times by formulating CSR policies and implementing self-regulation

EARLIER this year, I read with interest the article 'It is time to take action to make a major and permanent improvement in shipping's standing and image' from Det Norske Veritas.

It was important because it reflects the growing realisation that corporate social responsibility and industry self-regulation is an up-and-coming issue in maritime shipping.

FirstPerson

Dale Neef



Lloyd's List

Insight & Opinion

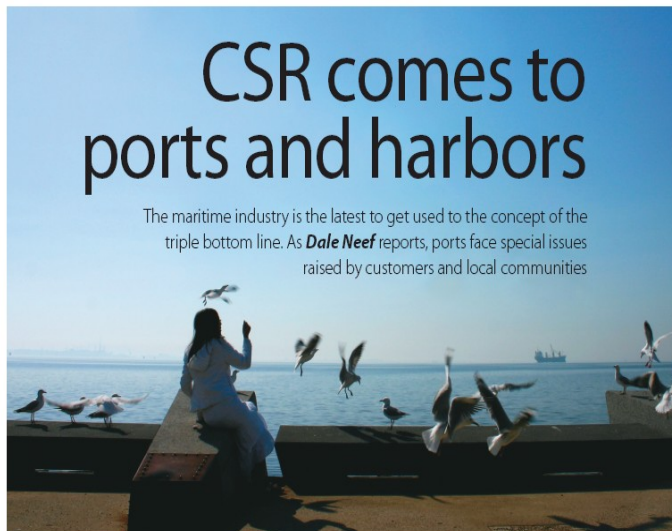


COVER STORY

Environmental Issues

Risk and responsibility

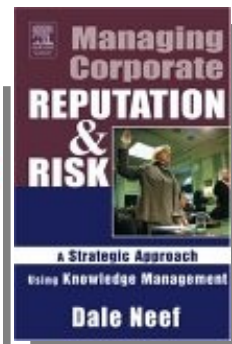
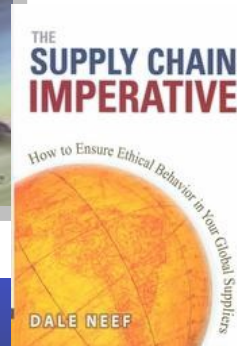
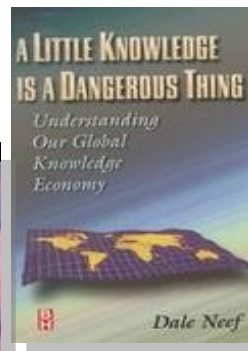
BUNKERSPOT
INDEPENDENT INTELLIGENCE FOR THE GLOBAL BUNKER INDUSTRY



CSR comes to ports and harbors

The maritime industry is the latest to get used to the concept of the triple bottom line. As **Dale Neef** reports, ports face special issues raised by customers and local communities

Dale Neef contends that ships will continue to be found guilty of discharging oil illegally until owners and ships management decide to adopt a formal Corporate Responsibility and Risk Management framework that monitors environmental, safety and security issues at a shipboard level



On the Tipping Point of an Environmental Upheaval in Shipping...

The maritime industry faces unprecedented pressures to improve their environmental performance in the next 1-3 years...

- Waste Water
- Ballast
- Emissions



Waste Water...

Bilge, Grey and Black Water

- **Stricter standards**
 - 15 ppm (Intntl) > 5 ppm > 0 ppm in sensitive areas
- **More rigorous enforcement**
 - US DOJ has levied over \$200 million in criminal fines
 - 2 – 4 new vessel pollution cases each month
 - EU's Ship-pollution directive
 - Satellite surveillance
 - Increased number of inspections
 - International collaboration
 - Conspiracy, obstruction of justice
 - Whistle-blowing



Sewage to cost ship line

Firm to pay \$2 million for dumping in Juneau.

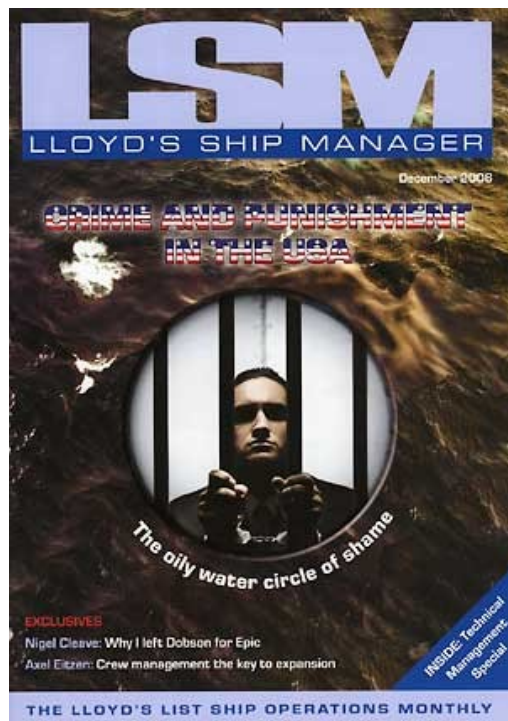
“Bilge dump spurs charges”

MARINELOG

“\$1.5 million fines and penalties in magic pipe case”

“Newfound aggressiveness of the EU in...prosecuting environmental cases against the maritime industry...”

...charged today in federal court with one count of violating the Clean Water Act ...



“Korean Freighters Charged with Dumping Oil”



“Mate Charged in Buzzards Bay Oil Spill”

"Many in the maritime industry are beginning to view the ORB as a signed confession."

Ballast

- Every hour 2 million gallons of ballast water released in U.S. waters
- 2 million gallons of foreign plankton per hour
- 3,000 alien species per day are transported in ships around the world
- Ecosystem
- Economy
- Spread of diseases



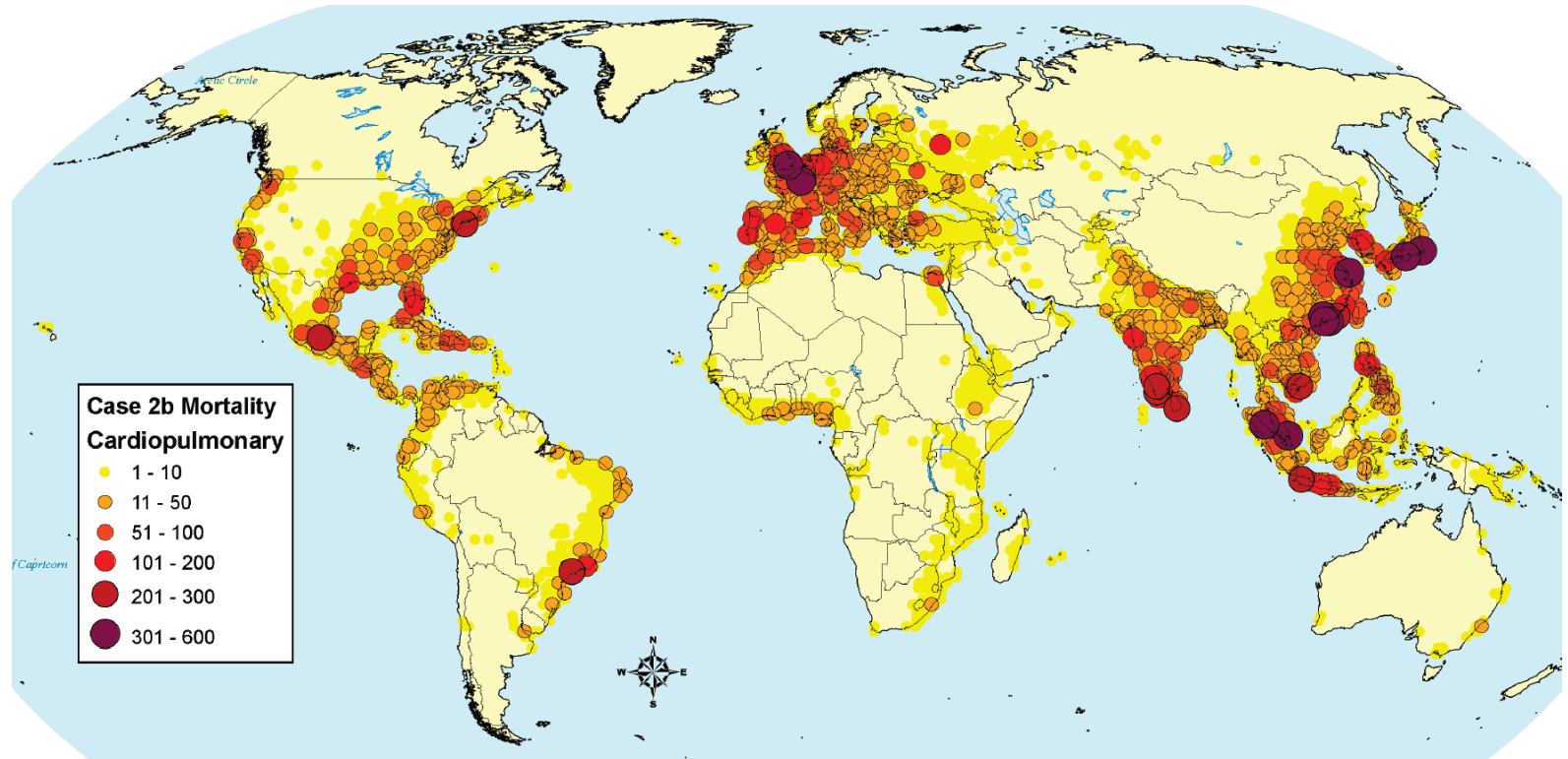
- The GEF/UNDP/IMO Global Ballast Water Management Program (GloBallast)
- New IMO Ballast Water Convention
- USCG national mandatory ballast water management program
- National Invasive Species Act for ships entering the Great Lakes from the St. Lawrence Seaway
- Alaska, Michigan, Great Lakes, West coast
- The National Ballast Information Clearinghouse (NBIC)

Emissions: Suddenly Shipping is in the Headlines...

- “Maritime CO2 emissions to grow 30% by 2020”
- “Average ship burning bunker fuel equals the same pollution as 2,000 cars”
- “One ship at berth can generate one ton of NOx and almost 100 pounds of particulate matter in a day...”
- “Pollution released from ships visiting the ports of LA and LB in a single day is roughly equivalent to 1,000,000 cars...”
- “Shipping-related PM emissions are responsible for 60,000 cardiopulmonary and lung cancer deaths annually, with most deaths occurring near coastlines in Europe, East Asia, and South Asia (annual mortalities could increase by 40% by 2012)”



Deadly Emissions...



Cardiopulmonary mortality attributable to ship PM emissions worldwide...
- Dr. James J. Corbett and Dr. Paul Fischbeck

NOx and SOx Emissions: Land vs Sea

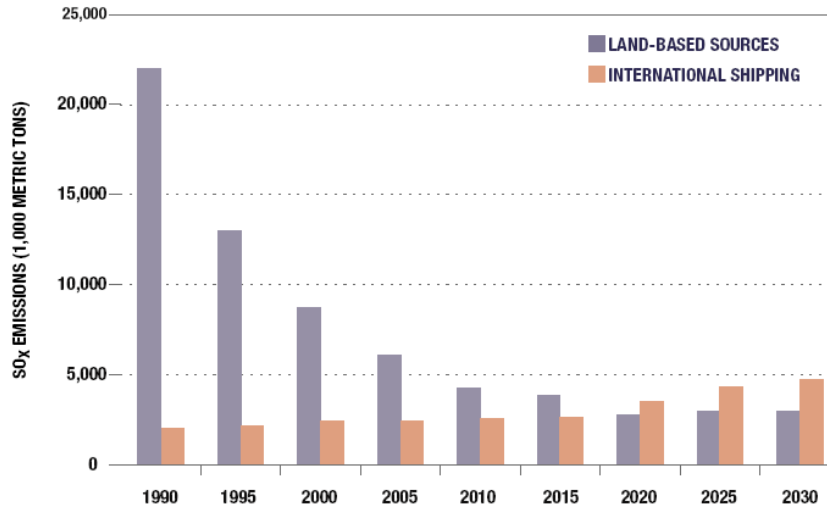


FIGURE ES-2. Inventories and Projections of SO_x Emissions in Europe from Land-based and International Shipping Sources (EC 2005)

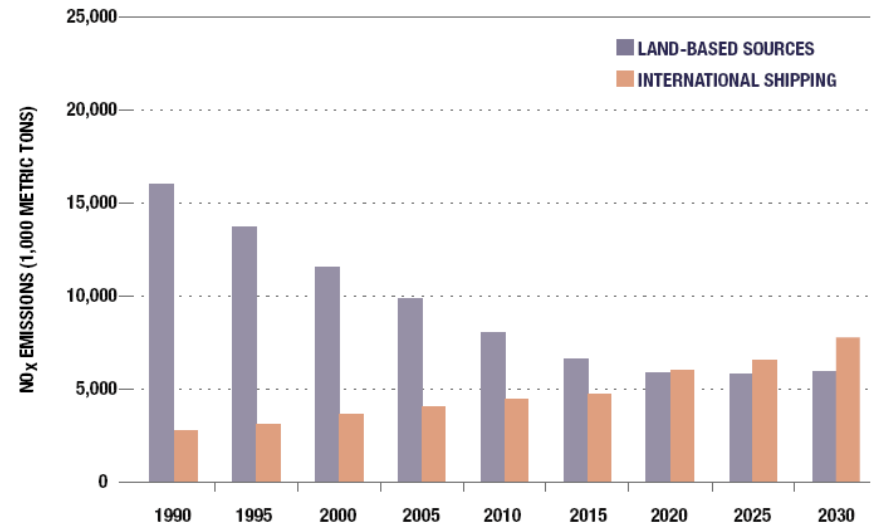


FIGURE ES-3. Inventories of NO_x Emissions in Europe from Land-based and International Shipping Sources (EC 2005)

Shipping Emissions

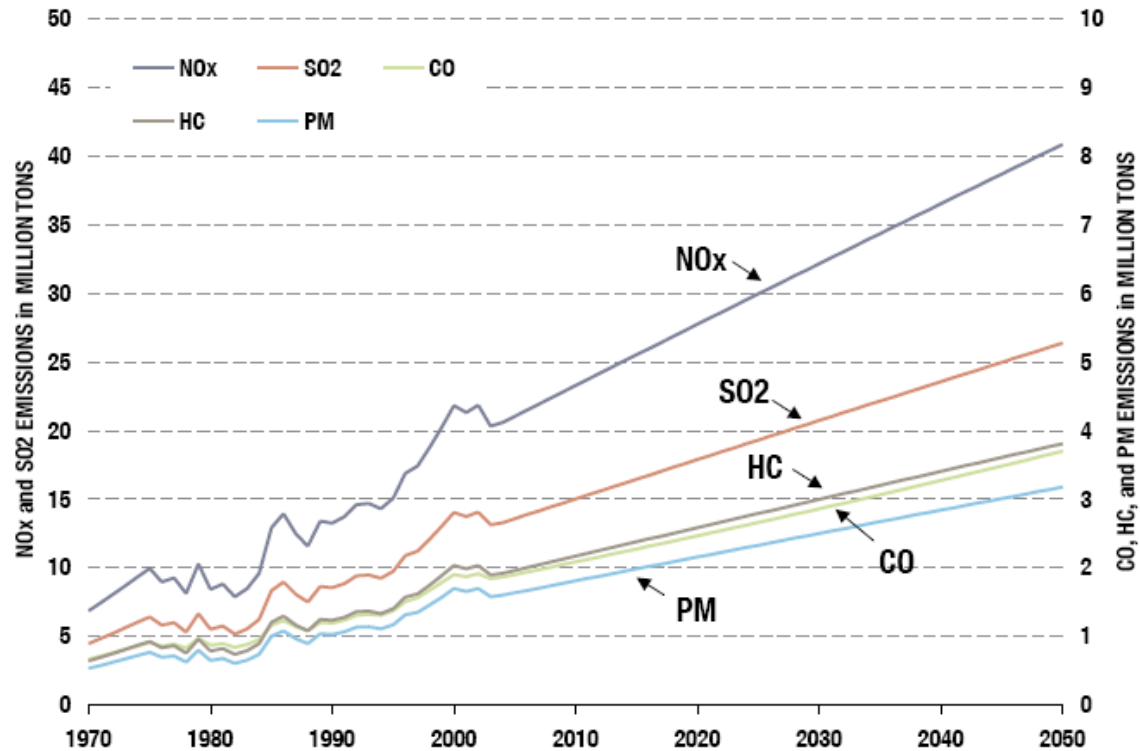


FIGURE 11. NO_x, SO₂, CO, HC, and PM Emissions from International Shipping: 1970–2050

Simply unsustainable...

Emissions Regulation...

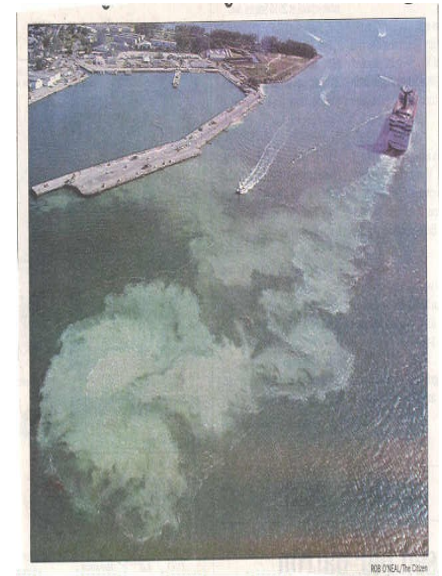
- IMO - Global cap on sulfur emissions of 0.5% by 2020, with SECA options for 0.1% / Intertanko: C3 ships should switch to marine distillate fuels of 1 percent sulfur or less by 2010; and to .5 percent by 2015
- SECAs: Baltic, North Sea, English Channel, etc. = maximum sulfur content of 1.5% m/m or exhaust gas cleaning system to reduce the emission of sulfur oxides to 6.0g SO_x/kWh or less (Proposed 1.5% by 2010)
- Industry-leading ships calling on California ports will be switching to distillates within 24 miles of shore.

Emissions Trading

- EC is including the sector in Europe's carbon dioxide cap-and-trade system.
- U.N. supports nations under Kyoto Protocol using emissions cuts in shipping and aviation to reach their targets for reducing gases linked to global warming.

Convergence: The Perfect Storm of Environmental Policy Change...

- Climate Change and greater appreciation of Global Warming
- IMO: MARPOL Annex VI
- Governmental Actions (EPA, EU, Canada)
- SECAs/ECAs
- NGO and Activist Community
- Shipping Associations (SEAaT, Intertanko, etc.)
- Shipping industry leaders voluntarily modifying policies



New World: Not Knowing is No Longer an Excuse – It is Negligence...

Even on best-equipped ships, violations still continue:

- Plausible deniability of corporate office
- Anonymity of the sea

“If you ***can know*** what is happening on your ship, you ***ought to know*** what is happening on your ship...” (legal reversal)



“Sunlight is said to be the best of disinfectants”
- Louis Brandeis, U.S. Supreme Court Justice

So Why is Shipping So Far Behind in Applying Knowledge Management Technologies?

...Not just an issue of better engines, fuels, and engineering efficiency...

...Corporate Ethics, Cultural Change, Training, Involvement, Incentives, etc., are all key...



... A failure to use modern, available technologies to help ensure proper

- **Monitoring and Assessing**
- **Recording and Reporting**

Electronic Monitoring

Electronic Onboard Data Collection...

70% of all the data required for regulatory compliance can be captured automatically and electronically from systems onboard the ship without human intervention:

- Voyage/navigation/operational/commercial
- Flow: tanks and valves
- Equipment run times
- Output (ppm) readings
- Automatic log generation



Electronic Data Capture...

Whenever possible, capture data electronically...



Engine Room System:

- Cylinder pressure
- Exhaust gas temperature
- Turbocharger revolutions
- Vibration monitoring reports
- Planned Maintenance System



Bridge/Deck System:

- Route Planning data
- Weather data
- Routing Live system and administrative systems
- Ballast Water Data
- Garbage



- Oil Record Book
- Bilge Sampling & OWS Performance Analysis
- Soundings Log
- Log of Fuel Oil/Lube Oil Purifier Settings
- Log of Oil to Sea Interfaces

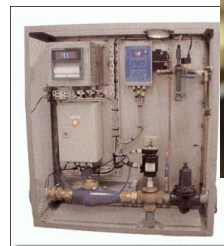
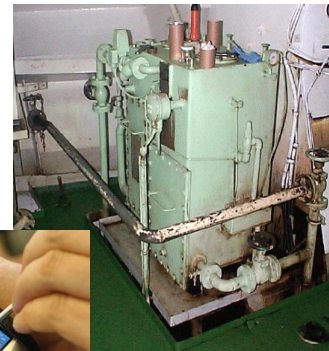
Rapidly Evolving Monitoring and Reporting Technologies...

- Sensors
 - Emissions (Martek, ET Marine, Cemtrex, Krystallon)
 - Ballast (treatment, exchange, discharge location, etc.)

- Waste water

- Handhelds

- Satellite/Broadband



Environmental Health and Safety and Business Intelligence systems ...

Environmental

- Automated measurement and calculations for:
 - Waste water
 - Emissions
- Compliance target monitoring and non-conformance
- Incident management and corrective/preventive actions
- Hazmat/Chemical
- Regulatory reporting

- Quantum
- Enviance
- ESS
- Enverity
- ESP
- Perillon

Health and Safety

- Employee training
- Condition of the ship: permits, fire safety, immersion suits, lifeboats, permits
- Incident reporting, non-conformance, permits, document control

Business Intelligence

- Management review tracking
- History/forecasting usage for bunker, emissions, ballast policy

Bilge Water Conflict Alert

Report Output

Compliance Systems, Inc.

Report > Equipment / Cargo Incidents Detail

Report Format Edit Collaborate Filter Info

Using default filter values. [Click here](#) to edit filters.

Equipment / Cargo Incidents Detail

Corrective Actions and Follow Up

Vessel Name: Mystic

Incident ID	Incident Date	Full Description
10800001	04/18/2008	Mystic Bilge Water Holding Tank's Tank Level Fell From 17.1 to 15.2 between 04/17/2008 and 04/18/2008. There is no transfer log entry.

Corrective Actions and Follow Up Details

Corrective Actions and Follow Up Details

Vessel Name: Mystic

Documentation Link: www.gcs-facts.com/gis/demo/mys041808.eml

Action Start Date	Action ID	Action Full Description
04/18/2008	A0800001	Email from Shore Supervisor to CE Mystic asking for explanation of unlogged event
04/18/2008	A0800002	The DBT OWS failed, transferred 3.7 m3 from DBT to FO Drain tank and will fix OWS.
04/18/2008	A0800003	Repaired and recalculated OWS on DBT.
04/18/2008	A0800004	Returned 3.7 m3 to from FO drain tank to DBT
04/18/2008	A0800005	Update bilge log, close "Open" bilge activity in Quantum

Done

 2 russies@gmail.com
 Now: Mostly Cloudy, 53° F
 Tue: 71° F
 Wed: 75° F

Tank Levels Screen

Voyage Reading Details

Voyage Reading Details

Vessel Name: Groton

Voyage Description: Southhampton to Newport News 4/07/2008

Sum of daily readings			Reading Date									
Equipment Description	Reading Description	Units	04/7/2008	04/8/2008	04/9/2008	04/10/2008	04/11/2008	04/12/2008	04/13/2008	04/14/2008	04/15/2008	04/16
Bilge Water Holding Tank	Tank Levels	m3	8.80	9.60	10.30	11.70	12.40	13.40	14.10	15.20	16.00	
Waste Oil Tank	Tank Levels	m3	22.60	22.60	18.30	18.50	18.90	18.90	19.50	22.60	22.60	

Vessel Name: Mystic

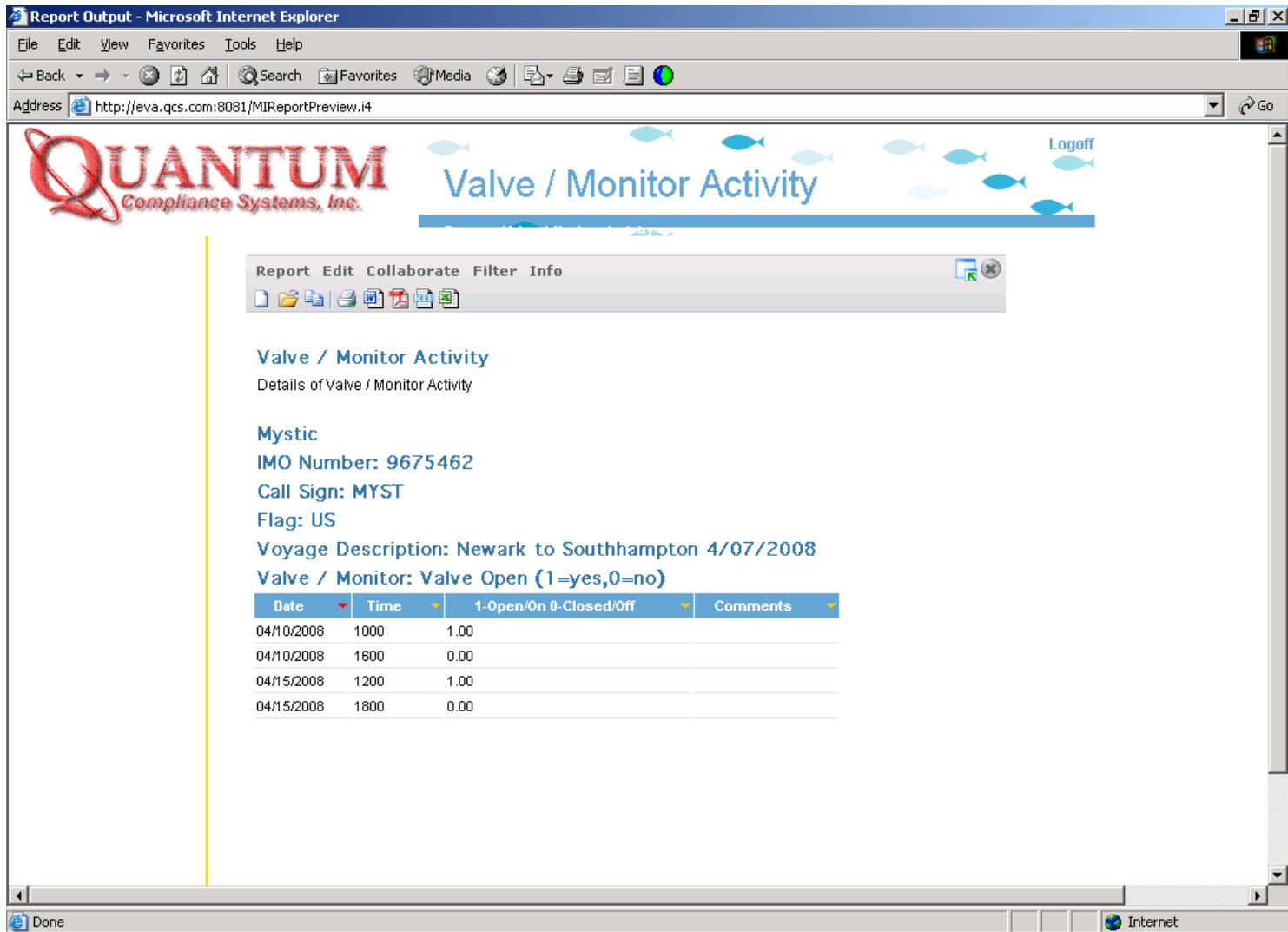
Voyage Description: Newark to Southhampton 4/07/2008

Sum of daily readings			Reading Date									
Equipment Description	Reading Description	Units	04/7/2008	04/8/2008	04/9/2008	04/10/2008	04/11/2008	04/12/2008	04/13/2008	04/14/2008	04/15/2008	04/16
Bilge Water Holding Tank	Tank Levels	m3	8.80	9.60	10.30	11.70	12.40	13.40	14.10	15.20	16.00	
F.O. Drain Tank	Tank Levels	m3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Oil Sludge Tank	Tank Levels	m3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lub Oil Sludge Tank	Tank Levels	m3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Waste Oil Tank	Tank Levels	m3	22.60	22.60	18.30	18.50	18.90	18.90	19.50	22.60	22.60	

Vessel Name: New London

Voyage Description: Rotterdam to Newport News 4/07/2008

Valve Monitoring Screen



Report Output - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://eva.qcs.com:8081/MIRReportPreview.i4

QUANTUM
Compliance Systems, Inc.

Valve / Monitor Activity [Logoff](#)

Report Edit Collaborate Filter Info

Valve / Monitor Activity
Details of Valve / Monitor Activity

Mystic
IMO Number: 9675462
Call Sign: MYST
Flag: US
Voyage Description: Newark to Southhampton 4/07/2008
Valve / Monitor: Valve Open (1=yes,0=no)

Date	Time	1-Open/On 0-Closed/Off	Comments
04/10/2008	1000	1.00	
04/10/2008	1600	0.00	
04/15/2008	1200	1.00	
04/15/2008	1800	0.00	

Done Internet


Ballast Activity



Maritime Alert System

Report » Ballast Turnover Detail

Report Format Edit Collaborate Info



Ballast Turnover Detail

Ballast Turnover Detail

Vessel Name: Groton

Trade Description: Baltimore US to Rotterdam NL

Reading Date	Reading Date	Tank Description	Capacity	Sum Flow (m3)	Longitude	Latitude	Speed (knots)	Turnover
04/22/2008	04/22/2008	Port Ballast Tank	700.00	1,400.00	8 01 W	49 50 N	15	200.00%
04/22/2008	04/22/2008	Starbord Ballast Tank	700.00	1,400.00	8 01 W	49 50 N	15	200.00%

Vessel Name: Mystic

Trade Description: Baltimore US to Rotterdam NL

Reading Date	Reading Date	Tank Description	Capacity	Sum Flow (m3)	Longitude	Latitude	Speed (knots)	Turnover
01/20/2008	01/20/2008	Port Ballast Tank	700.00	1,400.00	000 23 E	51 66 N		200.00%
01/20/2008	01/20/2008	Starbord Ballast Tank	700.00	1,400.00	000 23 E	51 66 N		200.00%

Vessel Name: Mystic

Trade Description: New York to Southampton

Reading Date	Reading Date	Tank Description	Capacity	Sum Flow (m3)	Longitude	Latitude	Speed (knots)	Turnover
04/22/2008	04/22/2008	Port Ballast Tank	700.00	1,400.00	8 01 W	49 50 N	15	200.00%
04/22/2008	04/22/2008	Starbord Ballast Tank	700.00	1,400.00	8 01 W	49 50 N	15	200.00%

Emissions



Dashboard

Reports > Dashboard



Logoff

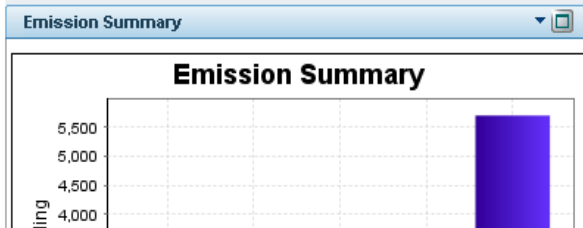
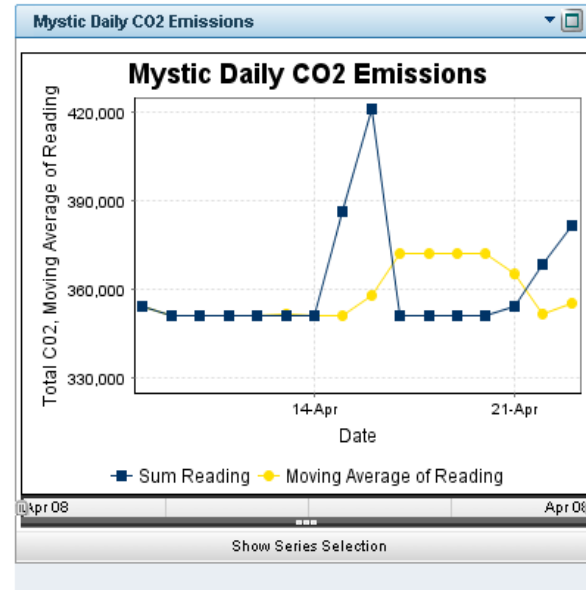
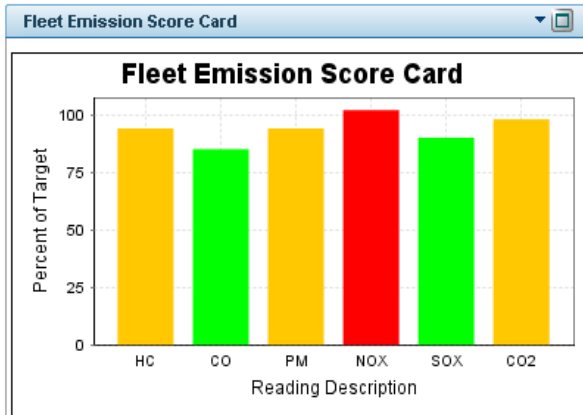
Maritime Alert System

[Dashboard](#) | [Create](#) | [Report List](#) | [Administration](#)

Search:

Alerts/ Overview | Bilge | Ballast | Garbage | Sewage | Voyage | **Emissions** | Safety | [+ Add Tab](#) | [x Delete](#) | [⚙ Edit](#)

- My Favourites
-  [Marine Alert Count](#) ▾
 -  [Nature of Injuries by Year](#) ▾
(Click Data Point to Drill)



Health and Safety



Maritime Alert System

Dashboard

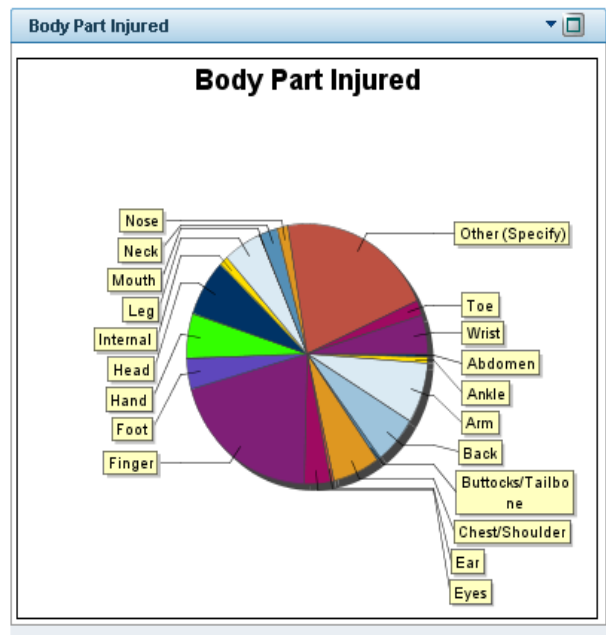
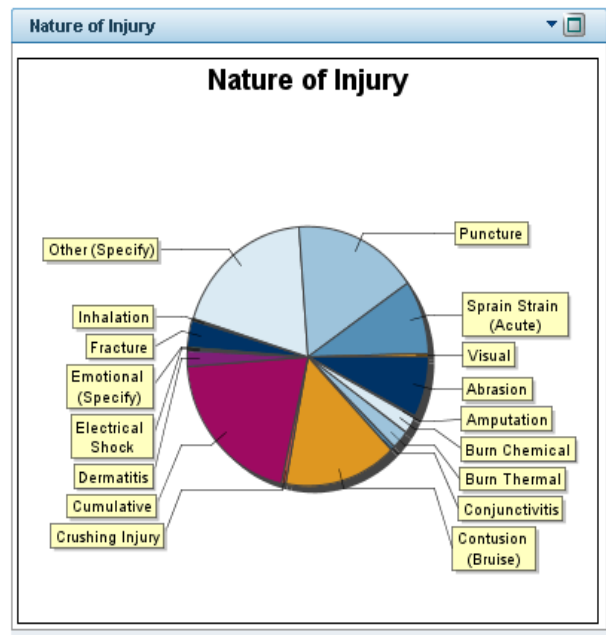
Reports > Dashboard

[Dashboard](#) | [Create](#) | [Report List](#) | [Administration](#)

Search:

Alerts/ Overview | Bilge | Ballast | Garbage | Sewage | Voyage | Emissions | **Safety** | [+ Add Tab](#) | [X Delete](#) | [Edit](#)

- My Favourites
- [Marine Alert Count](#)
 - [Nature of Injuries by Year \(Click Data Point to Drill\)](#)



Incident Count by Month

Nature of Injuries by Year (Click Data Point to Drill)

Done

Voyage Analysis





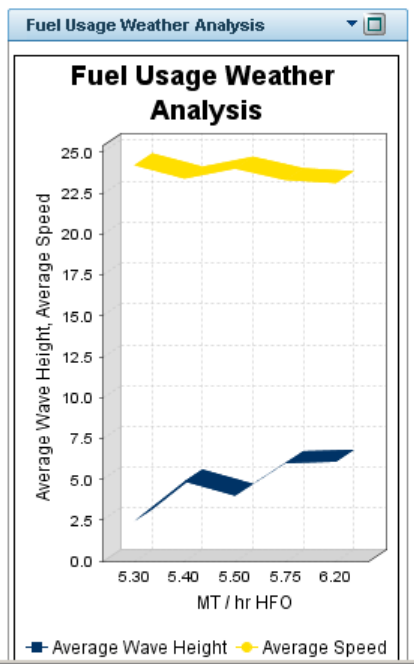
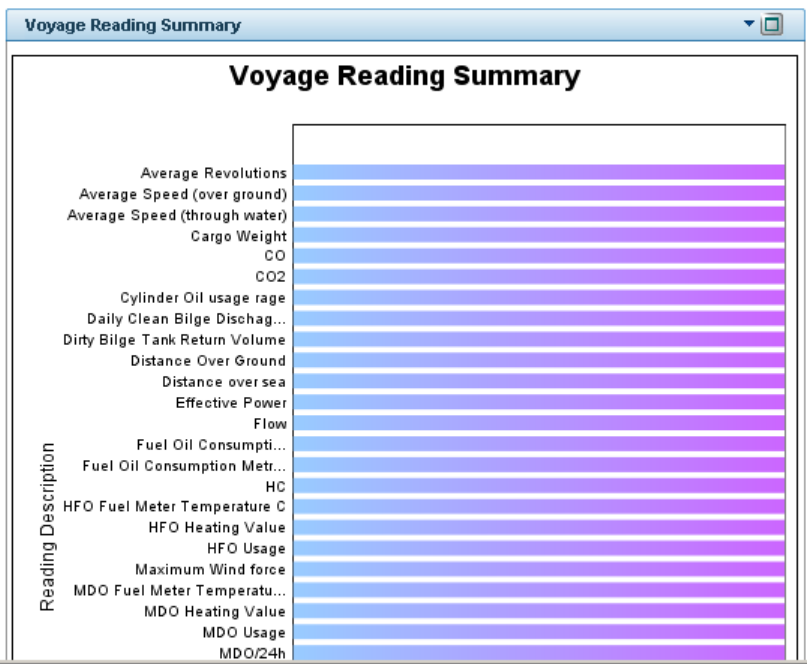
[Dashboard](#) | [Create](#) | [Report List](#) | [Administration](#)

Search: →

Alerts/ Overview | Bilge | Ballast | Garbage | Sewage | **Voyage** | Emissions | Safety + Add Tab x Delete ⚙ Edit

My Favourites

-  [Marine Alert Count](#) ▾
-  [Nature of Injuries by Year](#) ▾
(Click Data Point to Drill)



Done

Automatic Logs and Reports...

Sounding Log For Bilge & Sludge Tanks

Collection Tanks for medium that can be pumped overboard/ashore which need to be monitored & controlled

Sounding records to be logged against data period

Transfer of Tanks contents - quantity and destination to be identified and recorded.

Chief Engineer to endorse the log records as correct

Week - 03 - 2007

No.	Tank Name	Max Cap. m ³	Mon m ³	Tue m ³	Wed m ³	Thu m ³	Fri m ³	Sat m ³	Sun m ³	Transfer and Processing via OWS is to be Logged & Destination Identified
1	Aft Clean Bilge Tank	24.4	10.0	6.0	8.0	3.0	7.0	7.0	8.5	TUE: 2 cbm from Dewatered Sludge Tank through SDWU to Aft Clean Bilge Tank. VED: 5 cbm from Aft Clean Bilge Tank through
2	Forward Dirty Bilge Tank	28.2	23.0	23.0	23.0	23.0	23.0	23.0	23.0	
3	Waste Oil Tank	37.5	8.0	9.5	16.0	8.5	0.0	0.0	4.0	TUE: 6,5 cbm from Dewatered Sludge Tank through SDWU to Waste Oil Tank. WED: 16.0 cbm from Waste Oil Tank through SDWU
4	Dewatered Sludge Tank	35.6	14.0	13.0	4.5	12.0	19.0	19.0	18.0	TUE: 8,5 cbm from Dewatered Sludge Tank through SDWU to Waste Oil Tank and Aft Clean Bilge Tank. WED: 7,5 cbm from W
5	Stuff Box Tank Dirty	7.5	2.5	2.0	2.0	2.0	2.0	2.0	2.5	
6	Stuff Box Tank Clean	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7	Fuel Oil Drain Tank	7.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
8	Fuel Oil Sludge Tank	20.2	8.5	5.0	6.0	7.0	8.0	8.5	8.5	
9	Lub Oil Sludge Tank	10.7	0.0	2.5	3.0	4.0	4.5	4.5	0.0	SAT: 4,5 cbm from LO Sludge Tank through SDWU to Aft Clean Bilge Tank and Dewatered Sludge Tank.

Automatic Logs and Reports...

http://www.qcs-facts.com/qis/dna/increoport.pdf - Microsoft Internet Explorer


File Edit View Favorites Tools Help

Address http://www.qcs-facts.com/qis/dna/increoport.pdf

87%

Bookmarks

Thumbnails



Australian Government
Australian Maritime Safety Authority

INCIDENT REPORT

MO 31/15

**NOTE: This form must be forwarded within 72 hours of the incident by the ISM Code Designated Person or equivalent to: General Manager, Maritime Operations, AMSA
GPO Box 2181 Canberra ACT 2601 Australia
Fax: +61 2 6270 5958
E-mail: Reports@amsa.gov.au
For further information please call 1800 021 008**

Do not use this form to report incidents to which the MARPOL 73/78 convention is applicable. To report such incidents, the specific MARPOL 73/78 reporting form set out in the convention or Shipboard Oil Pollution Emergency Plan, must be used.

HOW TO USE THIS FORM

Enter ship details
If the incident involves:
- Breakage of gear or injury to any person during cargo work? - Complete Part 1
- Damage or defect to ship, machinery or equipment - Complete Parts 2, 5, 6 & 8
- Part of a close quarters situation - Complete Parts 2, 5, 6 & 8
- Stranding or disappearance - Complete Parts 2, 5, 6 & 8
- Death, serious injury or a dangerous occurrence - Complete Parts 2, 4, 5, 6, 7 & 8
- A birth - Complete Parts 3 & 8

REQUIREMENTS FOR REPORTING
This is a summary of the principal requirements of the relevant legislation. For more information, please consult full legislation.
Section 16 of the Transport Safety Investigation Act 2003
Requires a responsible person to submit a written report to a nominated official within 72 hours of any marine accident or serious incident. A responsible person is defined by regulation as the Master or person in charge of the ship, the owner or operator or the agent, or a pilot who has duties on board the ship. A nominated official includes a member of the staff of AMSA.
A report submitted to AMSA using this form will have fulfilled the obligation to report under section 16 of the Transport Safety Investigation Act 2003.
Application: All ships that are required to report under sections 266, 269 and 417 of the Navigation Act 1972.
Section 266 of the Navigation Act A report of accidents and of dangers to navigation must be made where, during a voyage within Australian waters or at any time on an Australian ship or during a voyage to a port in Australia:
- an accident occasioning loss of life or serious injury to a person occurs;
- damage or defect in the ship, its boilers, machinery or equipment has been discovered which has or may affect the seaworthiness or safety of the ship, efficient operation or safety of the boilers, machinery or fixed equipment of the ship;
- the ship has been in a position of peril from the action of some other ship or from danger of wreck or collision;
- the ship has been stranded or wrecked, has fouled or damaged a pipeline or submarine cable, lights, buoys, lightships, beacons, buoys or other marine marks; or where a ship having left a port in Australia has put back to that port or another port in Australia.
Application: All ships in Australian waters, Australian ships anywhere.
Section 269 of the Navigation Act Requires the owner or agent of an Australian ship to report its loss or presumed loss.
Application: Australian ships anywhere.

Ship's name	
IMO number	Flag
Call sign	Satcom number
Master	
Gross tonnage	Propulsion
Class society	
Operator's name and address	
Agents and P&I Club	
Date and time of incident	Ship's location (eg port, at sea, lat, long)

PART 1 - To be completed if reporting under Marine Orders Part 32

Person-in-charge

Employer of person-in-charge

Incident

Injury → If injury, complete parts 4 - 8
 Gear failure → If gear failure, complete parts 5 - 8
 Dangerous goods → If dangerous goods, complete parts 5 - 8

PART 2 - To be completed if reporting under section 266, 269 or 417 of the Navigation Act (other than births) and s.19 of the Transport Safety Investigation Act 2003

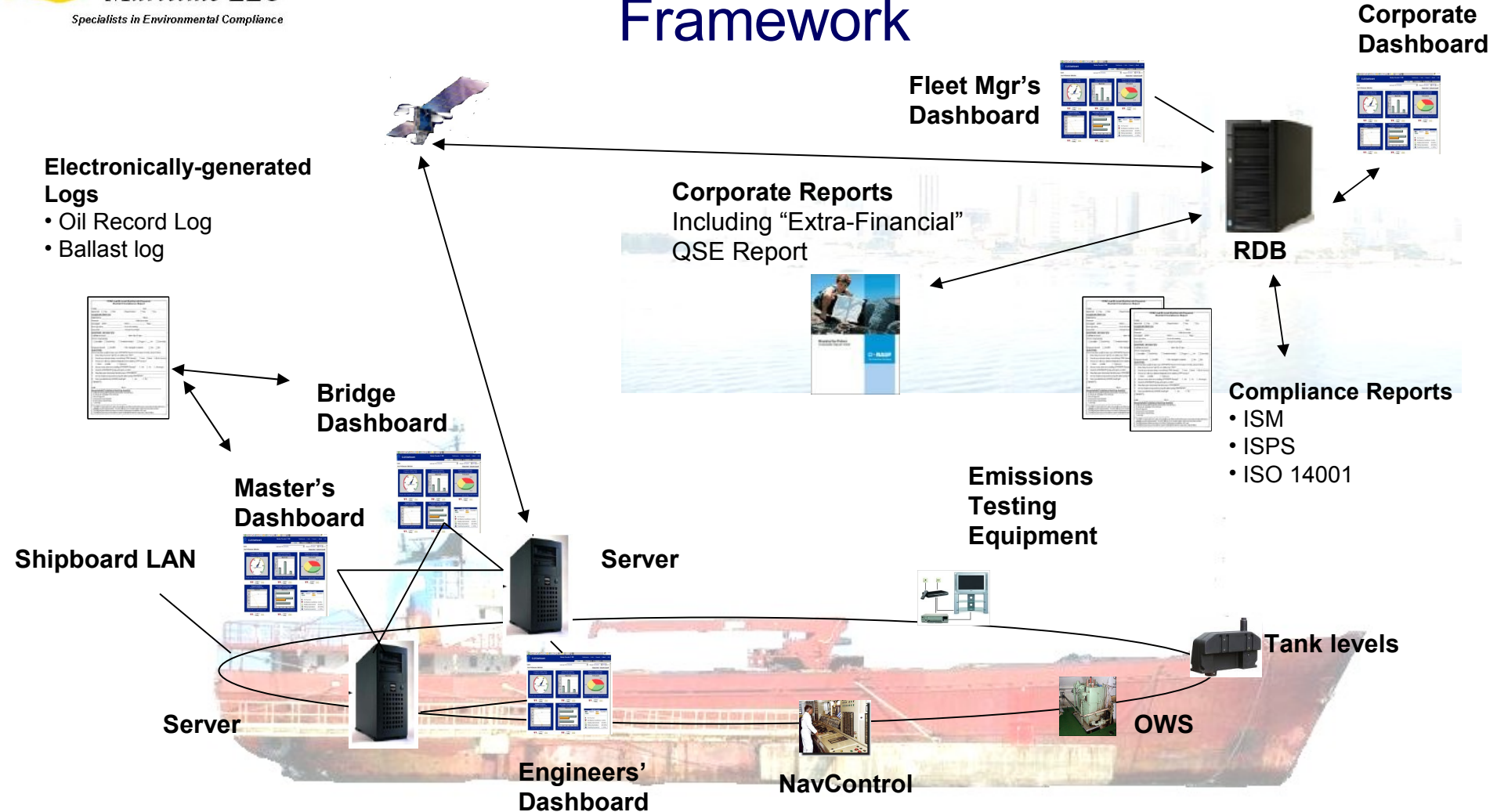
Voyage

To	From	
Incident description		
<input type="checkbox"/> Grounding	<input type="checkbox"/> Foundering	<input type="checkbox"/> Stranding
<input type="checkbox"/> Collision	<input type="checkbox"/> Capsize	<input type="checkbox"/> Flooding
<input type="checkbox"/> Fire	<input type="checkbox"/> Explosion	<input type="checkbox"/> Machinery failure
<input type="checkbox"/> Structural failure	<input type="checkbox"/> Close quarters	<input type="checkbox"/> Disappearance
<input type="checkbox"/> Loss	<input type="checkbox"/> Presumed lost	<input type="checkbox"/> Injury
<input type="checkbox"/> Death	<input type="checkbox"/> Dangerous occurrence	
<input type="checkbox"/> Illness	<input type="checkbox"/> Other (specify)	
Place of Incident		
<input type="checkbox"/> Machinery spaces	<input type="checkbox"/> Accommodation block	<input type="checkbox"/> Galley

1 of 2 8.26 x 11.69 in

http://www.qcs-facts.com/qis/dna/increoport.pdf Internet

Electronic Monitoring and Reporting Framework



Benefits of Electronic Monitoring and Reporting...

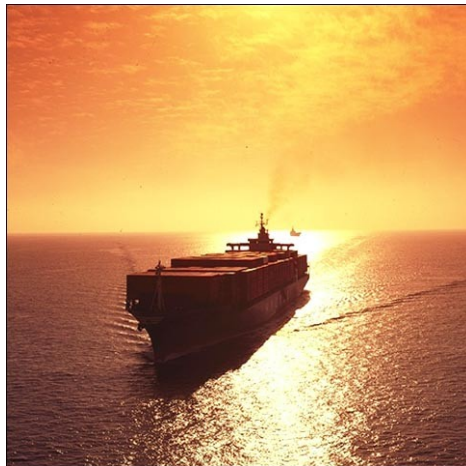
- Absolute accuracy of reporting
- Essential to good corporate risk management
- Relieves crew of paperwork and legal liability
- Provides the company with commercial/operational information
- In future will be required by authorities
- Will be necessary for emissions control and trading schemes

...Not even expensive or difficult to implement

Getting On top of Environmental Compliance Issues:

**“Using IT to Capture, Analyze and Report on
Shipboard Environmental Performance...”**

**Digital Ship USA
Conference: Sept. 2008**



**Dale Neef PhD
Managing Director
DNA Maritime LLC**