Cybersecurity in the Maritime Domain

Shipping Company Perspective to Marine Board Spring Meeting

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Origins in 1879 oil discovery at Pico Canyon, north of Los Angeles.

Second-largest integrated energy company headquartered in the US, with extensive operations in over 30 countries.

Approximately 61,000 employees and 200,000 contractors supporting daily operations.

Average net production in 2014 was 2.57 million oil-equivalent barrels per day, with about 74% outside the US.

Refineries processed 1.7 million barrels of oil per day, and we averaged 2.7 million barrels per day of refined products sales through our marketing network and retail outlets on five continents.
Chevron Shipping Company, LLC
Manage Marine Risks Across Diverse Operations

- Tankers/Barges
- LNG Carriers
- Offshore Support Vessels
- Heavy Transport
- Mobile Offshore Drilling Units
- Offshore & Fixed Marine Terminals
- FPSOs
- 4 Major offices
- Transport ~1 Billion barrels annually
- Operate 30 vessels
- Utilize more than 100 vessels daily
<table>
<thead>
<tr>
<th>Chevron Shipping Company, LLC</th>
<th>Vessel Operator and Charterer</th>
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<tr>
<td>Operate 30 vessels</td>
<td>In 2014 did not have a recordable personal injury in our operated fleet</td>
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<td>– 9 VLCC (~2 million bbl capacity)</td>
<td>Have not had a cargo or bunker spill to environment from operated fleet in &gt;11 years</td>
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<tr>
<td>– 3 Suezmax (~1 million bbl)</td>
<td>Transmit ~2 GB of information daily between our operated vessels and shore</td>
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<tr>
<td>– 5 Aframax (~600,000 bbl)</td>
<td>– Commercial, Operations and Personnel data</td>
</tr>
<tr>
<td>– 4 MR / US Flag (~350,000 bbl)</td>
<td>– Cargo / Port data</td>
</tr>
<tr>
<td>– 2 Shuttle tankers (Dynamic Position)</td>
<td>– Equipment performance data</td>
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<tr>
<td>– 7 LNG carriers</td>
<td>– Personal Communications</td>
</tr>
<tr>
<td>Utilized 825+ vessels in 2014</td>
<td>Over 2,000 voyages contacting 300+ ports in 50 countries</td>
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<td>– more than 300 owners and 200 operators</td>
<td>– Over 950 voyages did not enter US</td>
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Operational Excellence Management System

Chevron Corporate OE Expectations are organized under 13 Elements

Element 1: Security of Personnel and Assets

- Provide a physical and cyber security environment in which business operations may be successfully conducted.

  1.1 A process is in place to actively engage the workforce in security awareness and vigilance to the security environment.

  1.2 Risk-based security management plans are developed, implemented and maintained to address potential security threats to the business.

  1.3 A process is in place to integrate security management plans with related plans for emergency management, business continuity and information protection.
Increase in Targeting of Oil and Gas Companies

- Contributing factors:
  - Dropping oil prices
  - Economic instability
  - Regional conflict
  - Automation of work processes
  - Security gaps
    - Delays in patching
  - Use of external storage and hosting solutions
    - Cloud services
  - Competitors’ desire to replicate proprietary technology and processes
    - For competitive advantage
    - To decrease dependence on external partners
Threats to ICS Environments

- Threat actor types
  - Cybercriminals
  - Hacktivists
  - Nation-states

- Factors
  - Physical impacts via cyberspace
  - Widening security gap
  - Low cost

- Targets
  - HMI (Human Machine Interface)
  - ICS (Industrial Control System)
  - SCADA (Supervisory Control and Data Acquisition)
  - Operations
Targeting Cloud Services

- Threat actor types
  - Cybercriminals
  - Hacktivists
  - Nation-states

- Factors
  - Third party
  - Potential for high yield
  - No need to compromise company

- Targets
  - Intellectual property
  - Sensitive business data
  - Employee data
Global standards, architecture and infrastructure evolving for over 15 years

All equipment and software is tested for security and compatibility prior to deployment

Individual access to network, applications and sites is limited to need basis and periodically verified

Periodic training for all users on risks and mitigations

Chevron Cybersecurity Overview
Shipboard Operating Environment
Complex, multi-layered, evolving

Regulatory Requirements: Flag state, Port state, IMO, Classification Society, Company domicile, etc.

Corporate Policy/Standards: Legal, Finance, OE/HES, IT, HR, etc.

Business Unit Policy/Standards: SMS

Industry Guidelines: OCIMF, SIGTTO, BIMCO, Intertanko, API, etc.

Vessel Specific: Shipyard, Designer, Owner, OEM’s

Contractual Agreements – Charter Party, Procurement

Risk Management and Process Safety

Chevron Shipping Company LLC is committed to protecting people and the environment. We accomplish this by adhering to our Tenets of Operation, setting Operational Excellence objectives, monitoring performance, and maintaining secure facilities. We conduct our business in a socially responsible and ethical way. Our goal is to be the industry leader in safety and health performance and to be recognized worldwide for environmental excellence.
Key Message
Global Business

- Vessels move through multi-jurisdictional requirements with a multi-national workforce
- Shipping is segmented and fragmented by regions and vessel types, with large and small entities facing different operational risk profiles
- Multiple risks and threats to ship and shore facilities
- Technology provides benefits