Monitoring & Early-Warning Detection of Oil & Fuel for:
- Fuel Depots & Airports
- Storage Terminals
- Refineries & Midstream
- Power Plants / Industrial
- Marine Terminal Piers
- Sumps, Sewers, Separators
- Drains, Discharges, Outfalls
- Offshore & Loading Buoys
Who Uses Slick Sleuth?

**Power Generators**
- Power Plants (Coal, Fuel, Nat. Gas)
- Hydro-Electric & Nuclear Power
- Compressor Stations
- Remote Substations

**Heavy Industry**
- Steel & Aluminum
- Pulp & Paper
- Food Oils & Ethanol
- Manufacturing Factories

**Offshore Industry**
- Offshore Platforms
- Manned & Unmanned Rigs
- Marine Terminals
- Loading/Transfer Buoys

**Environmental**
- Stormwater Monitoring
- Inland Waterways
- Aquaculture & Fish Farms
- Sensitive Habitats

**Transportation**
- Ports & Harbors
- Fuel Docks & Shipyards
- Airports
- Railways

**Oil & Petrochem**
- Refineries
- Terminals
- Oil Production Sites
- Mid-Stream – Pipelines & Storage

**Water Quality**
- Desalination
- Intake Protection
- Wastewater Treatment
- Municipalities
Key Drivers

- Reduced Risk of Oil Discharge = Cost Benefits
- Minimize Clean-Up Expense & Inventory Loss
- Protect Corporate Image (stay out of the news!)
- Improve CSR & Environmental Stewardship
- Compliance w/ Pollution Regs & Best Practices
Vessels and Offshore Rigs Are NOT the Largest Source of Oil Released to the Environment

Approximately:
- 12,000 – 15,000 Oil Spills are Reported Annually in USA
- Over 50% of Reported Spills Occur at Inland Facilities
What Constitutes an Oil Spill?

“...any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water’s surface, or leaves sludge or emulsion beneath the surface. For this reason, the Discharge of Oil regulation is commonly known as the ‘sheen’ rule... Under this regulation, reporting oil discharges does not depend on the specific amount of oil discharged, but instead can be triggered by the presence of a visible sheen created by the discharged oil... and prevent oil discharges from reaching navigable waterways or adjoining shorelines” (US EPA)
Slick Sleuth Product Line

- Proven, Optical (Non-Contact) Detection
- Install Base of over 1,000 Sensors
- Highly Sensitive Detection to Sheens & Slicks
- Early Detection = Early Response & Containment

SS100 / SS100-Exd
1m range

SS300 / 320
5m - 10m range

SS300-EXd / SS320-EXd
4m - 8m range
## Slick Sleuth • Model Designations

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RANGE*</th>
<th>APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS 100</td>
<td>1 Meter</td>
<td>AST Facilities</td>
</tr>
<tr>
<td>SS 300</td>
<td>5 Meters</td>
<td>Industrial Facilities</td>
</tr>
<tr>
<td>SS 320</td>
<td>10 Meters</td>
<td>Terminal Piers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Offshore Rigs</td>
</tr>
</tbody>
</table>

* Range = Vertical Distance from Sensor to Surface
Patented Slick Sleuth Remote Oil Spill Detection & Alert System

- **24/7** Real Time Monitoring for Leaks & Spills
- Proven, Optical, **Non-Contact** Method of Detection
UV-Based Sensor • Theory of Operation

Remote Non-Contact Sheen Detection

Monitors for hydrocarbons using Ultraviolet (UV) source for excitation & detection of fluorescence

Oils typically absorb light between 300 - 400nm, then emit light in the longer 450 to 650nm range

- Extremely Sensitive
- No Probe, No Fouling
- Immune to Ambient Conditions
Strategic Early Warning & Containment

Point-Sources:

Turbines & Storm Water

Cooling & Process Water

Tank Farm Storage

Strategic Deployment of Sensors

Point-Source Monitoring

Upstream: Detection Near to Potential Source(s) for Earliest-Possible Detection & Containment

Failsafe Monitoring

Downstream Detection Near to Discharge Point for Failsafe Containment before Discharge
Tank Dike Alarms
(Model SS 100 x15)

Drainage from Tank Farm

Outfall/Failsafe Alarm
(Model SS300)

Strategic Monitoring is Key
<table>
<thead>
<tr>
<th>Medium</th>
<th>High</th>
<th>Critical</th>
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<tbody>
<tr>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>
Installation Example • Plants & Equipment Areas

- Turbine / Cooling Water – Sumps & Sewers
- Monitor Discharge for Turbine Oil, Fuel Oil, Diesel, Etc.
Installation Example • Power Plant Discharge

- Cooling Water, Storm Water – Sumps & Sewers
- Monitor Discharge for Turbine Oil, Fuel Oil, Diesel, Etc.
Installation Example • Sumps & Sewers

- Deep Sump Application with Float Switches
- Diversion Valve Actuated Upon Detection of Oil (or ability to Shut Off Pump, Activate Skimmer, etc.)
Installation Example • Sumps & Sewers

- Around the Clock Monitoring & Alarm on Industrial Sewers
- Automated Containment of Oil (Actuate Valve, Pump, Skimmer)
Installation Example • Hazardous Gas Areas

- Sensors Packaged for Class 1 Div 1 / Zone 1 Areas
Installation Example • Sub-Stations

- Remote Spill Alert plus AUTOMATED CONTAINMENT of Transformer Oil
- This Remote/Unmanned Location discharges to a National Park!
Installation Example • Interceptors

- Remote Spill Alert plus Automated Containment
- This Remote/Un-Manned Compressor Station Discharges to a Local Stream
Installation Example • Automated Containment

• Remote Spill Alert plus Automated Containment
• Interceptors Monitored Optically Through the Grating
• Local Alert and Remote Output to DCS
Installation Example • Sumps & Sewers
Installation Example • Sumps & Sewers (Airport)
Installation Example • Sumps & Sewers (Airport)

- Remote Spill Alert plus Automated Containment
- Subterranean Catchment
Installation Example • Sumps & Catchments (Airport)

- Remote Spill Alert
  & Automated Containment
  ....Prior to Discharge!
Installation Example • Sumps & Catchments

- Remote Detection of Leaks & Spills
- Sensitive to Sheens & Slicks, Leaks & Events
Installation Example • Drainages

- Remote Detection of Leaks & Spills
- Sensitive to Sheens, Slicks & Events
Installation Example • O/W Separators

- Retention Ponds & Oily Water Separators
- Install on ‘Dirty’ or Clean Water Side of O/W Separator
Installation Example • Retention Ponds

- Remote Monitoring of Containment Pond
- Cold Weather Location, with Local A/V Alarm and Wireless Signal
Installation Example • Lift Stations

- Discharge Monitoring at Lifts Stations (ACOE)
- Used to PREVENT Oil from Reaching Salmon-laden Rivers
Installation Example • Failsafe Points

- Wireless Remote Monitoring of Sump
- Plus Camera and Web-based Interface (at US Navy Base)
Installation Example • Discharges & Outfalls

- Remote Monitoring
  Upstream from a Municipal Reservoir
- Cooling Water & Stormwater
- Solar & Wireless
- Pre-positioned Boom (for use if oil is detected)
Installation Example • Discharges & Outfalls

- Fixed Boom acts as O/W Separator
- Detector can be Positioned on the ‘Dirty’ or Clean Water Side of the Boom (normally zero tolerance!)
Installation Example • Discharges & Outfalls

- Remote Monitoring
- Discharge to Local River
- Cooling Water & Stormwater
- Solar & Wireless
- Fixed (Semi-Permanent) Boom
Installation Example • Discharges & Outfalls

- Boom(s) Used to ‘Funnel’ Water to Monitoring Point(s)
- Simple Low-Cost Method of Directing Surface Effluents
- Useful Approach for Covering ‘Wide Area’ Applications
Installation Examples • Secondary Containments

- Model SS100s
- Drains near Truck (Bulk Tanker) Loading/Unloading Areas
- & Diked Areas around Storage Tanks
Installation Examples • Secondary Containments

- Model SS100s
- Tank Dikes & Drains
- Leak/Spill Alarm *Plus*
  Automated Shut-off of Valves
Typical Monitoring Points • Storage Terminals

- Inside (Interstitial) & Under Tanks
- Inside Tank Dikes & Secondary Containment
- Floating Roof Drains / Valves
- Outflows From Tank Dikes
Typical Monitoring Points • Storage Terminals

Equipment & Mixing Pads

Oil/Water Separators

Sumps, Drainages, & Outfalls
Install Example • Tanks & Terminals

Monitoring & Automated Containment System for Aboveground Floating-Roof Tanks
“EnviroEye” Automated Detection & Containment for External Floating-Roof Tanks
External-Floating Roof AST Operators’ Conundrum

Drain Lines Open or Closed?!

- **To Close, or Not to Close...?**
  A Critical Management Decision

- If Drain Lines or Couplings Leak
  ...Open Drain Allows Product to Escape

- Whereas Closed-Drains May Cause Roof to Sink if a Lot of Rain Falls

- Automated Monitoring & Control
  Eliminates Dependency on Personnel
Install Example • Tanks & Terminals

A Long-Overdue Solution
Installation Example • Pipeline / “Look Boxes”

• SS100s Used to Monitor Pipelines on Fuel Piers at Marine Terminals
Installation Example • Marine Terminals
Installation Example • Marine Terminals

Oil Sheen Monitors
Installation Example • Fuel Piers
Installation Example • Loading Piers
Installation Example • Loading Piers

- Sensors Near Loading Arms / Fuel Transfer for 24/7 Sheen Monitoring & Detection
Installation Example • Marine Terminals
Installation Example • Marine Terminals
Installation Example • Marine Terminals

• Remote Monitoring and Alarms to Vessel Traffic Center / Central Control Room
Installation Example • Marine Terminals

- Remote Monitoring and Alarms to Central Control Room of Marine Safety Office
Installation Example • Marine Terminals

- Remote Monitoring and Alarms to Central Control Room of Service Provider
- Sensor Stations are Mounted Under Terminal-Piers, with Local Audio/Visual Alert
Slick Sleuth Base Station Software - Monitoring & Control for System Arrays

- Dedicated Software for Remote Monitoring & Alerts
- Typically Used with Point to Point (PTP) Radios
- Communicate with Network of Sensors (up to 99 stations)
- Full Duplex System with Remote Alerts via Text/Email
- Used for Offshore, Coastal, and Inshore Applications
Installation Example • Remote Monitoring

Slick Sleuth
UpLinker Modem
(cellular / cloud-based)

WEB BASED ALERTS & SYSTEM CONTROL

• Secure, Password Protected Web Portal
• Dashboard & Web Based User Interface (WUI)
• Authorized Access Using Any Web-enabled Device
• Multiplex Up to Four Slick Sleuths Using One Modem
  (and Host an Unlimited Number of Stations on a single Dashboard)
• Full Duplex System with Remote Alerts via Text/Email
• Used for Offshore, Coastal, and Inshore Applications
Installation Example • Offshore Platforms
Installation Example • Offshore “Rig Guard”

SS320-EXd
4ea per platform

- Real Time Alerts
- Continuous Monitoring
- Remote Wireless Access
- Minimize Risk

...Maximize Safety!

- System Supplied as Capital Goods (CAPEX) or As-A-Service (OPEX)
Installation Example • Offshore “Rig Guard”

- SS320-Exd Rig Guard Oil Detector
- Designed Specifically for Installation on Offshore Platforms for Detection of Crude Oil, Diesel, Slops on Sea Surface
- IP68 – Weatherproof & Submergible
- Ex Certified Zone 1 / Class 1 Div 1
- Systems Available for Purchase... or Oil Spill Monitoring As a Service
Installation Example • Offshore “Rig Guard”

Standard Rig Guard System Consists of:
4x SS320-EXds, Cellular Modem(s), Web-Based Interface
Installation Support, and Annual Field Servicing

Base Station PC (included)

A/V Alarm (optional)

DCS/SCADA Interface Module (DSIM) (optional)

Central Control Room

Solar Power & Cameras (optional)
Installation Example • Buoy-based Systems

• Integrated Buoy System, inclusive Oil-On-Water Detection, Wireless Alerts, Solar Power
Installation Example • Offshore Seawater Intakes

- Integrated Spill Monitoring Buoy used for Protection of Intake at Desalination Plants
Installation Example • Marine Terminals (SPMs)

- Integrated System used to Monitor Offshore Loading Buoy
Installation Example • Marine Terminals (SPMs)
Installation Example • Spill Containment Booms

- Prototype System Testing of ‘Smart Boom’ Monitoring Buoy
- Remote Oil Detection plus Remotely Monitor Boom Position and Orientation
Installation Example • Prototype Testing - “Smart Boom”
Questions?

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