



Automated 24/7 Oil Spill Monitoring & Leak Detection



The logo for Slick Sleuth, featuring the words "Slick" and "Sleuth" in a white, sans-serif font, stacked vertically and enclosed within a black, irregular, rounded shape that resembles a splash or a drop. The background of the entire slide is an aerial photograph of an industrial waterfront area with various buildings, piers, and ships.

**Slick
Sleuth™**

*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**



Strategic Early Warning & Containment

***Vessels and Offshore Rigs Are NOT
the Largest Source of Oil Released to the Environment***

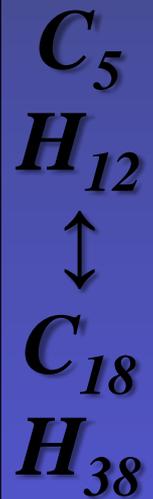
Approximately:

- 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

MODEL

RANGE*

APPLICATION



SS 100

1 Meter

AST Facilities



SS 300

5 Meters

Industrial Facilities



SS 320

10 Meters

**Terminal Piers
Offshore Rigs**

** Range = Vertical Distance from Sensor to Surface*

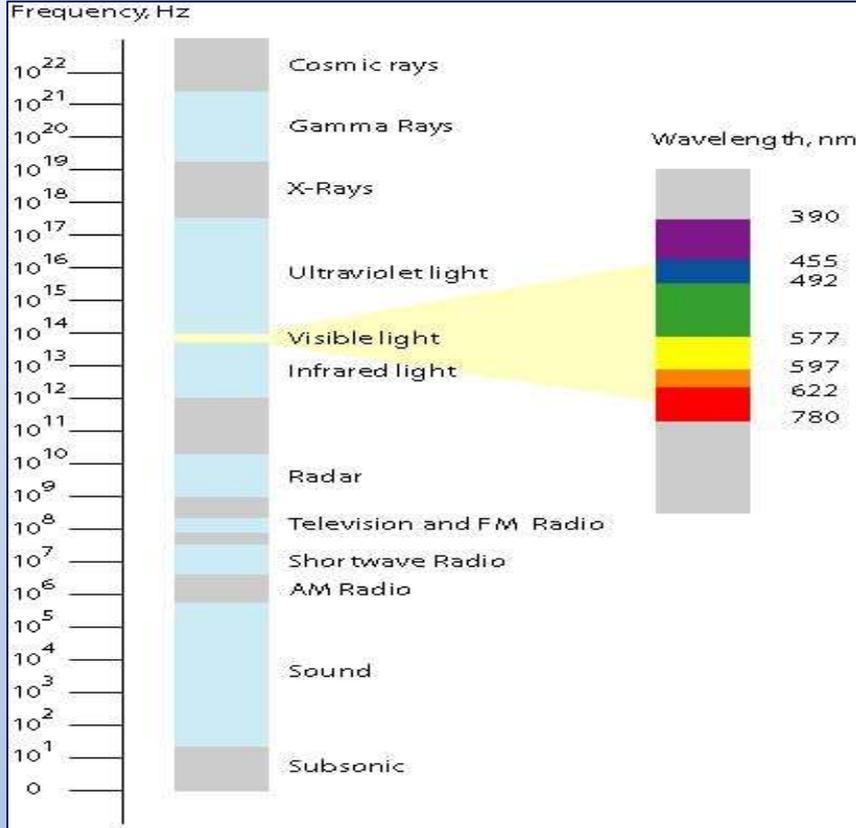
UV-Based Sensor • Theory of Operation



Patented Slick Sleuth Remote Oil Spill Detection & Alert System

- **24/7** Real Time Monitoring for Leaks & Spills
- Proven, Optical, **Non-Contact** Method of Detection

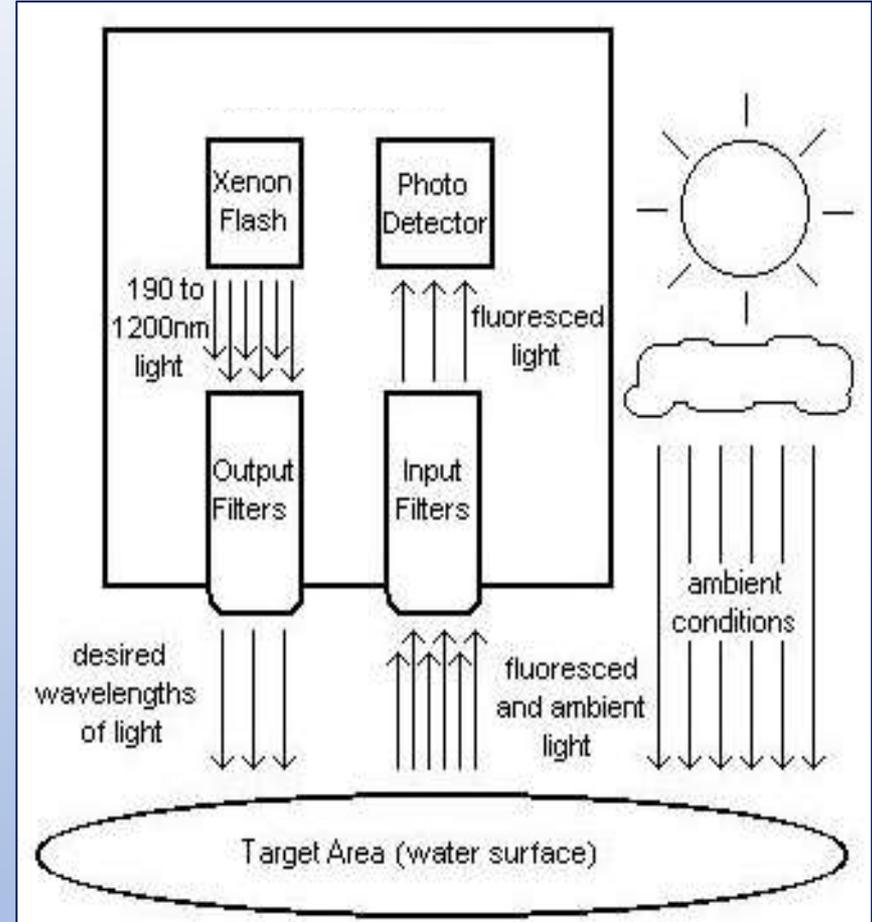
UV-Based Sensor • Theory of Operation



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



Tank Farm Storage



Cooling & Process Water



Turbines & Storm Water

Point-Sources:



Failsafe:



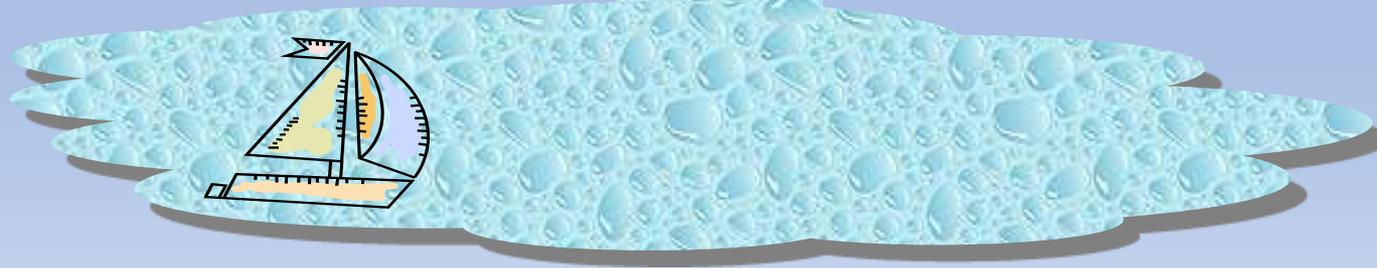
Strategic Deployment of Sensors

Point-Source Monitoring

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

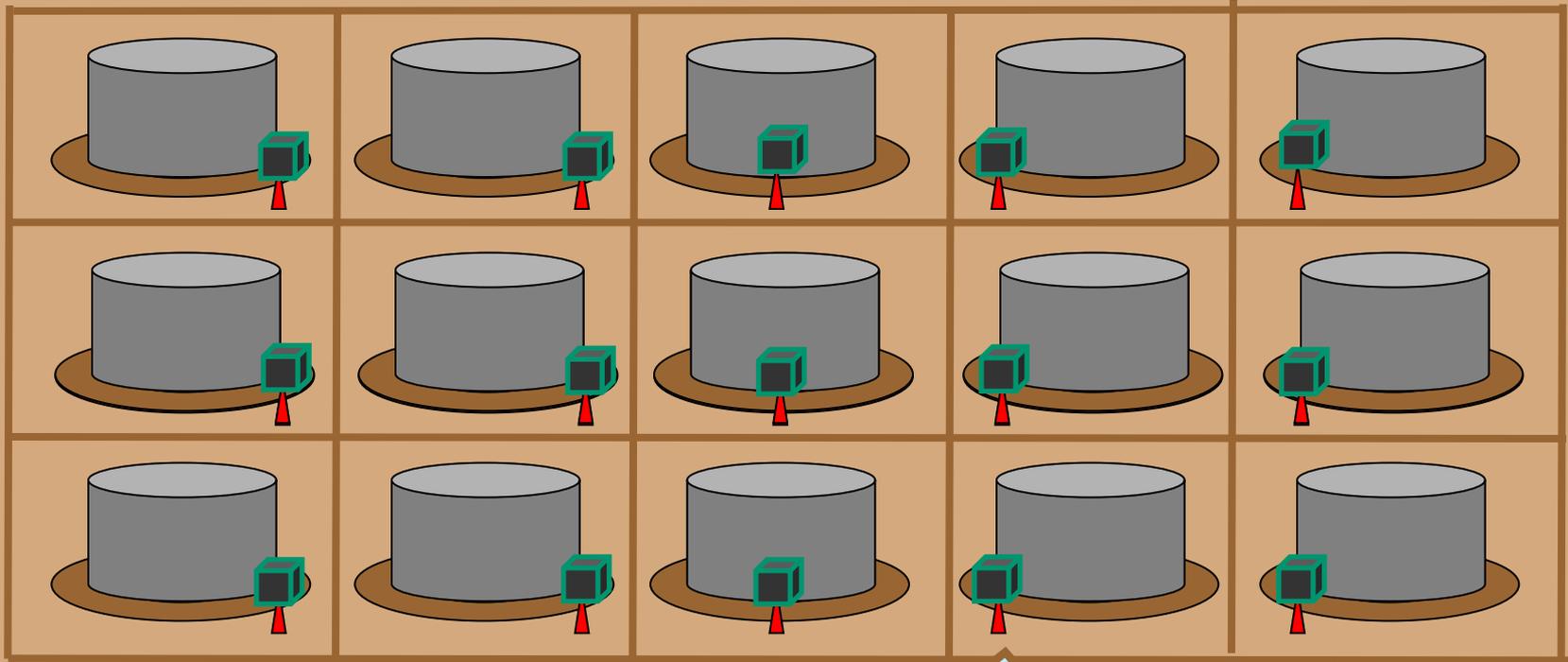
Failsafe Monitoring

*Downstream Detection Near to Discharge Point
for Failsafe Containment before Discharge*





Strategic Monitoring is Key



Tank Dike Alarms
( Model SS 100 x15)



Outfall/Failsafe Alarm
(Model SS300)



Drainage from Tank Farm



Risk Management • Heat Mapping Strategy

Medium

High

Critical

Low

Medium

High

Low

Low

Medium

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)



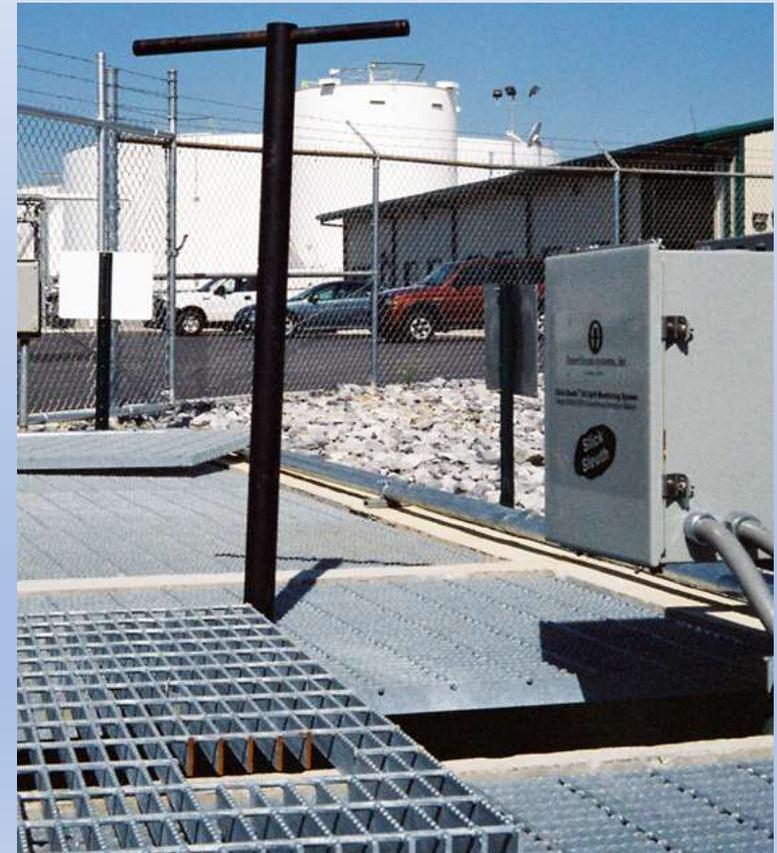
- Remote Spill Alert
plus Automated Containment
- Subterranean Catchment



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



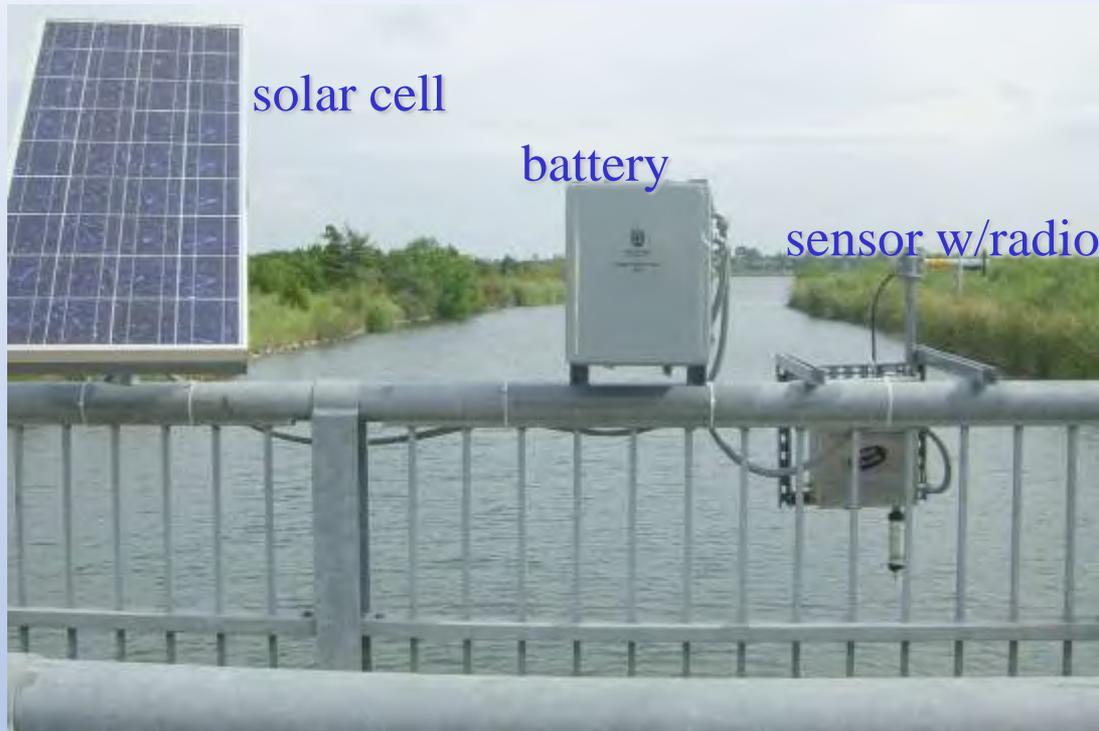
- Discharge Monitoring at Lifts Stations (ACOE)
- Used to PREVENT Oil from Reaching Salmon-laden Rivers

Installation Example • Failsafe Points



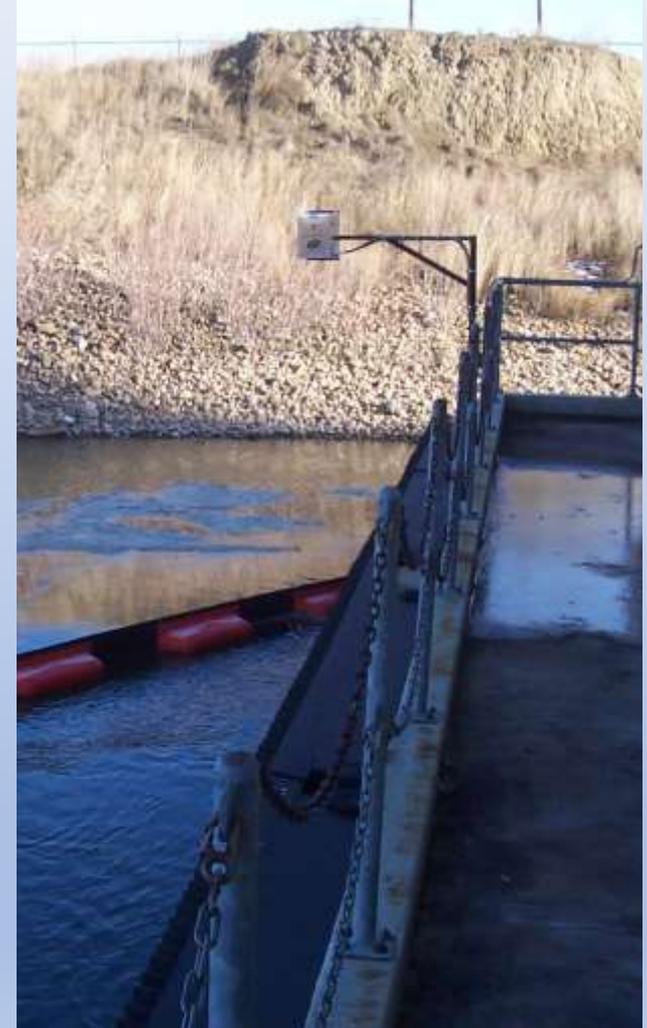
- Wireless Remote Monitoring of Sump
- Plus Camera and Web-based Interface (at US Navy Base)

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



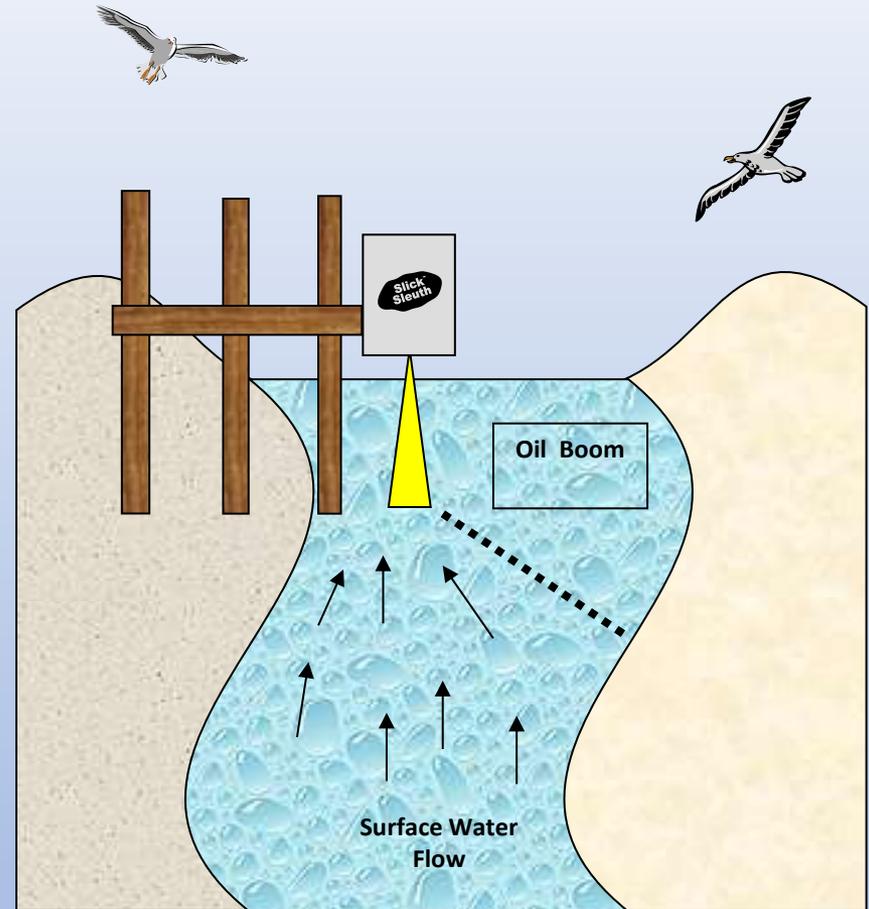
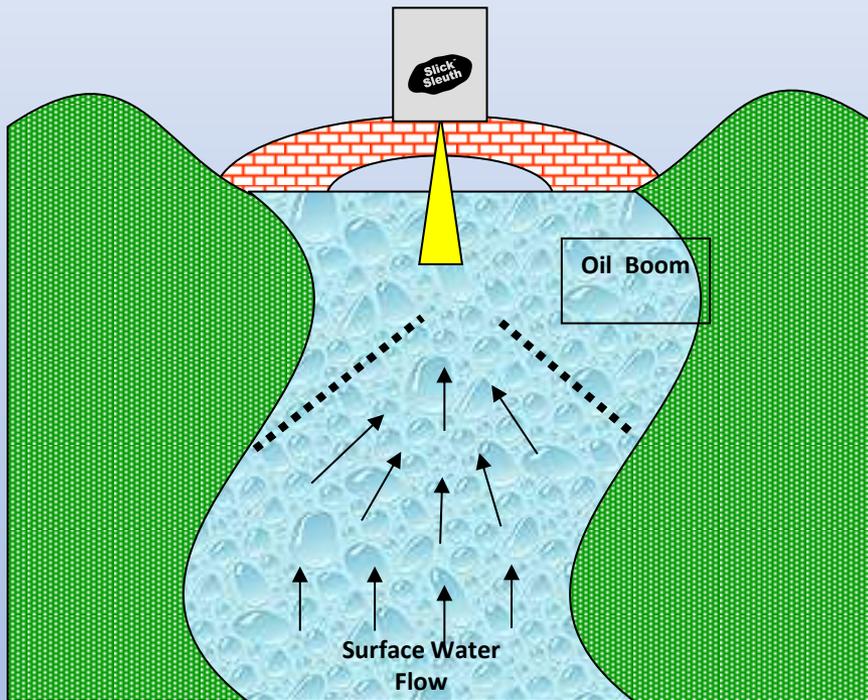
- Fixed Boom acts as O/W Separator
- Detector can be Positioned on the 'Dirty' or Clean Water Side of the Boom (normally zero tolerance!)

Installation Example • Discharges & Outfalls



- Remote Monitoring
- Discharge to Local River
- Cooling Water & Stormwater
- Solar & Wireless
- Fixed (Semi-Permanent) Boom

Installation Example • Discharges & Outfalls



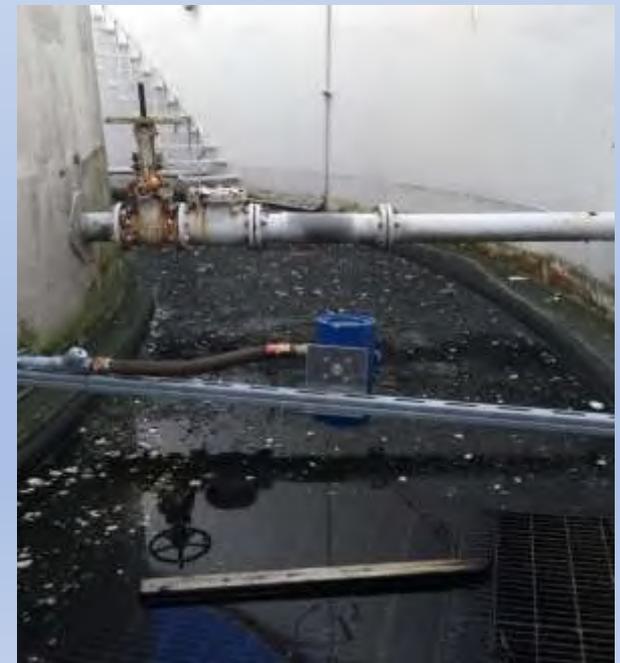
- Boom(s) Used to 'Funnel' Water to Monitoring Point(s)
- Simple Low-Cost Method of Directing Surface Effluents
- Useful Approach for Covering 'Wide Area' Applications

Installation Examples • Secondary Containments



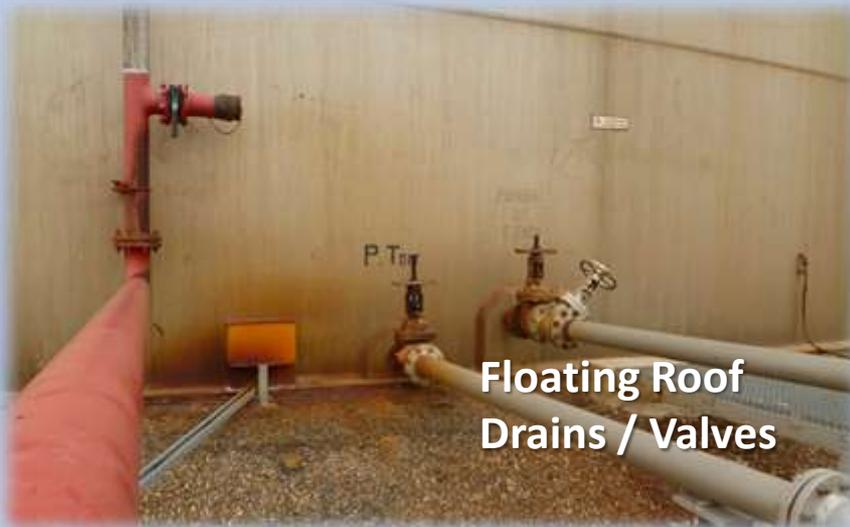
- Model SS100s
- Drains near Truck (Bulk Tanker) Loading/Unloading Areas
- & Diked Areas around Storage Tanks

Installation Examples • Secondary Containments



- Model SS100s
- Tank Dikes & Drains
- Leak/Spill Alarm *Plus*
Automated Shut-off of Valves

Typical Monitoring Points • Storage Terminals



Typical Monitoring Points • Storage Terminals

Equipment & Mixing Pads



Sumps, Drainages, & Outfalls



Install Example • Tanks & Terminals



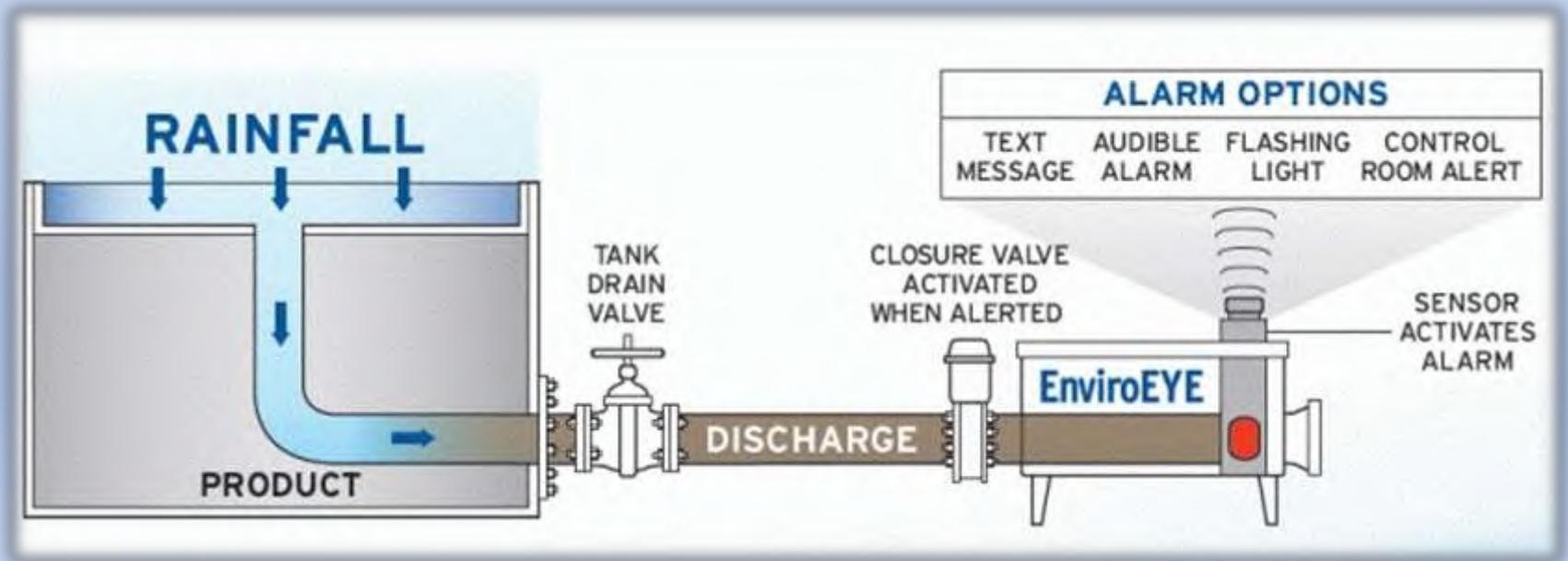
Imagery ©2017 Google, Map data ©2017 Google 200 ft

Monitoring & Automated Containment System for Aboveground Floating-Roof Tanks

Install Example • Tanks & Terminals



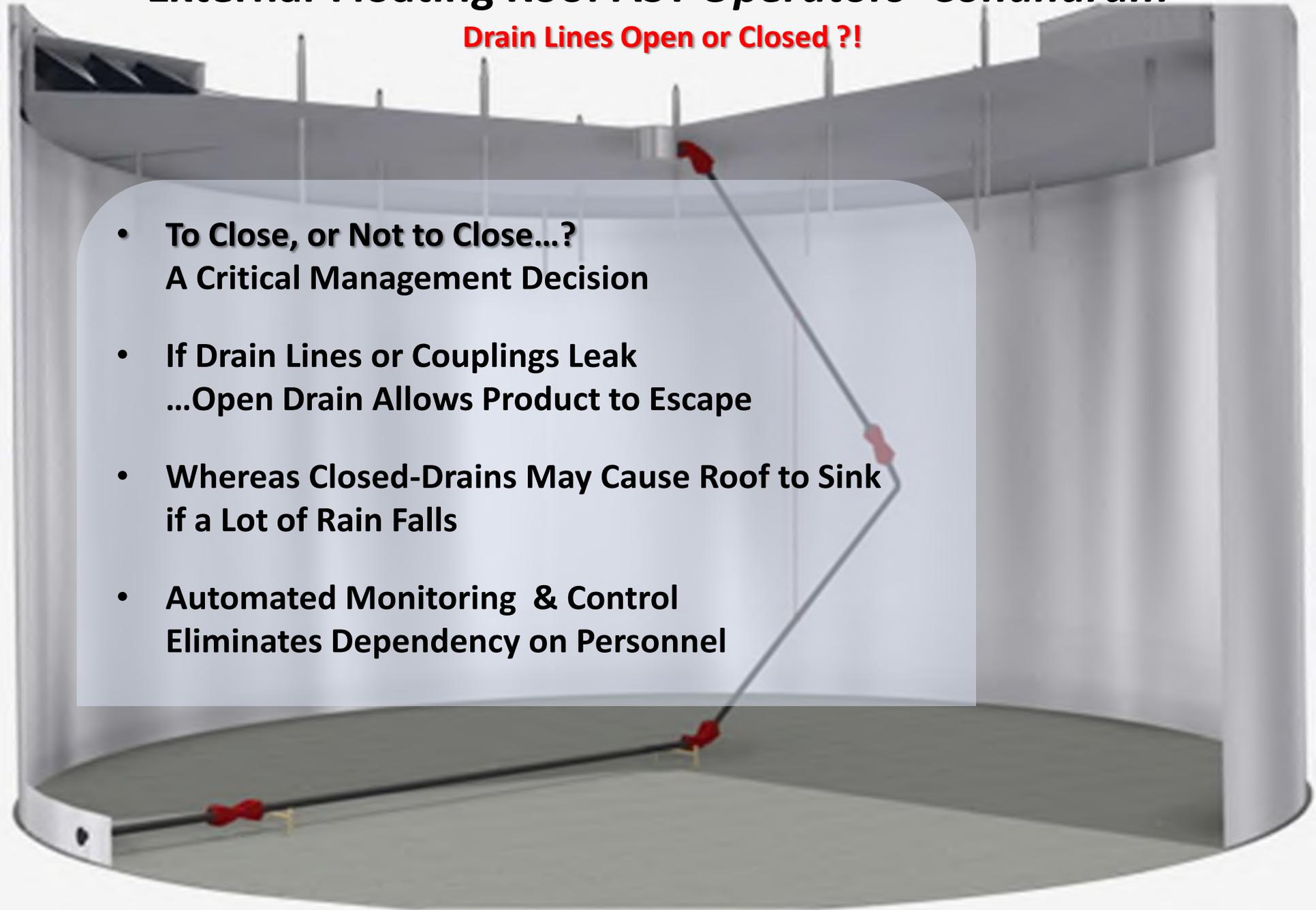
“EnviroEye” Automated Detection & Containment for External Floating-Roof Tanks



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

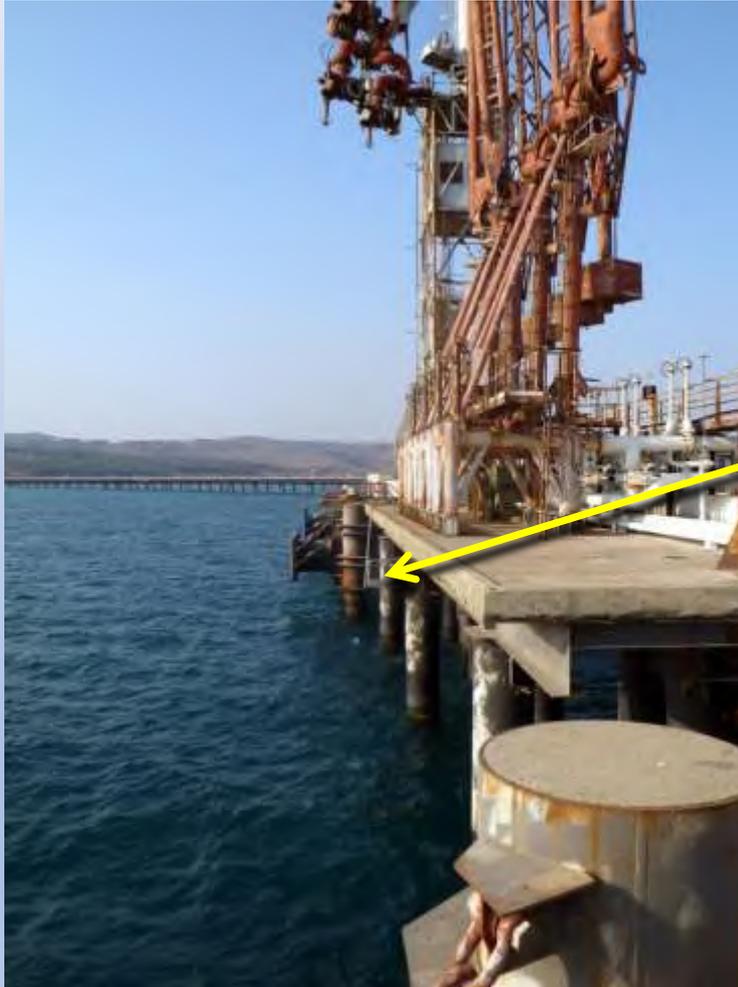


● *Oil Sheen Monitors*

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

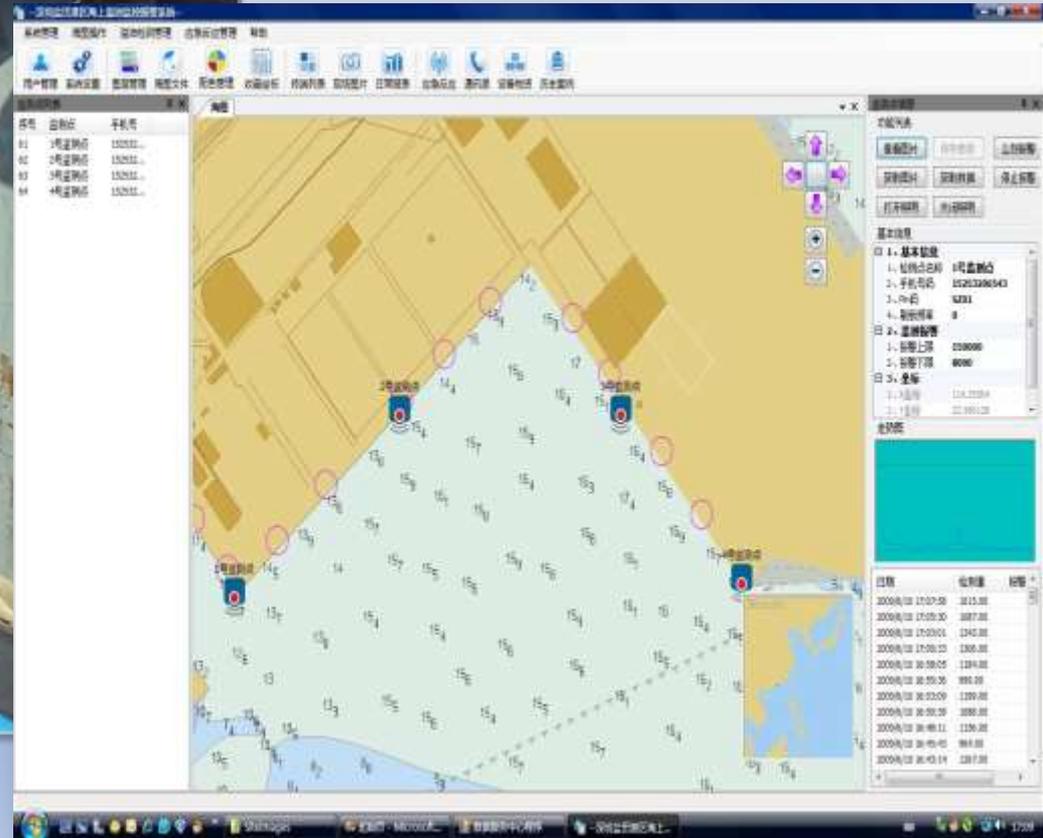


Installation Example • Marine Terminals



- 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

Installation Example • Remote Monitoring



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

The screenshot shows a web browser window with the URL `https://slicksleuth.` and a search bar. The dashboard is titled "Dashboard" and features a satellite map of an offshore platform. Below the map, there are five status cards for different stations, each with a title, three status indicators (Spill, Station, Connection), and a timestamp.

Dashboard

Map Satellite

Google

Map data ©2017 Imagery ©2017 Terms of Use

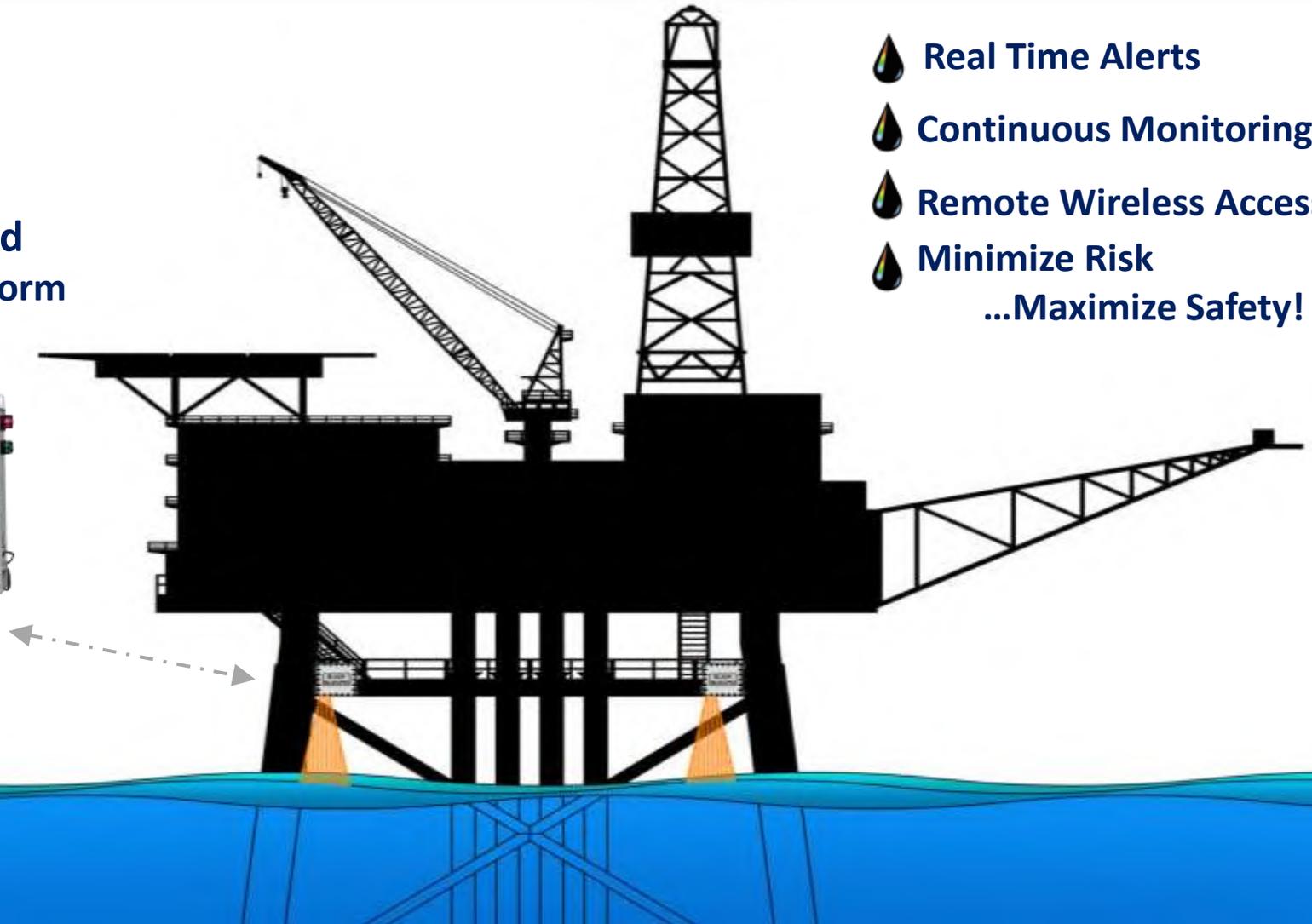
Stations

Station Name	Spill	Station	Connection	Timestamp
OTC Remote (09)	✓	✓	✓	05/01/17, 5:07:57 am
Platform 01 North (02)	✓	✓	✓	05/01/17, 5:07:59 am
Platform 01 West (03)	✓	✓	✓	05/01/17, 5:07:08 am
Platform 01 South (04)	✓	✓	✓	05/01/17, 5:08:04 am
Platform 01 East (01)	✓	✓	✓	05/01/17, 5:07:45 am

Dashboard Display WUI

Installation Example • Offshore “Rig Guard”

SS320-EXd
4ea per platform



- Real Time Alerts
 - Continuous Monitoring
 - Remote Wireless Access
 - Minimize Risk
- ...Maximize Safety!

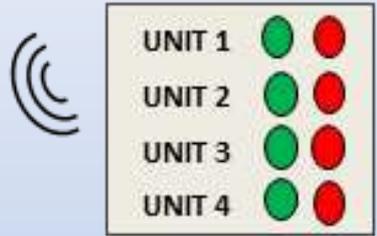
- System Supplied as Capital Goods (CAPEX) or *As-A-Service* (OPEX)

Installation Example • Offshore “Rig Guard”

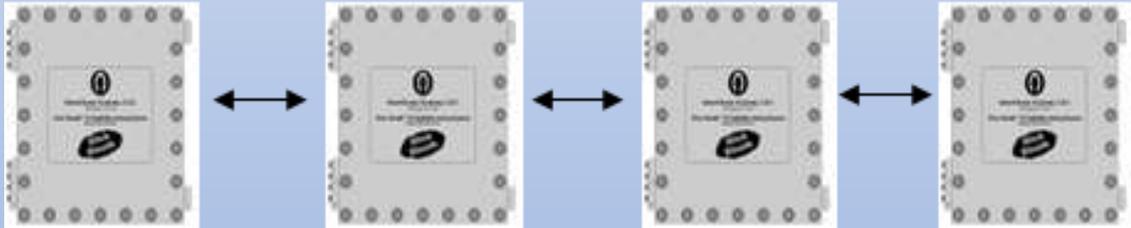
- SS320-Exd Rig Guard Oil Detector
- Designed Specifically for Installation on Offshore Platforms for Detection of Crude Oil, Diesel, Slops on Sea Surface
- IP68 – Weatherproof & Submergible
-  Certified Zone 1 / Class 1 Div 1
- Systems Available for Purchase...
or Oil Spill Monitoring *As a Service*



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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**Slick[™]
Sleuth**

