InterOcean

InterOcean Systems, Inc.
4241 Ponderosa Avenue
San Diego, CA. 92123

May 4, 2009

Ms. Eileen Maher
San Diego Unified Port District (SDUPD)
Environmental Services Department
3165 Pacific Highway San Diego, CA 92101

Re: Proposal for Implementation & Evaluation of a Real-Time Oil Spill Monitoring System in San Diego

Dear Ms. Maher,

It is our pleasure to submit our proposal to the SDUPD Environmental Services Department and Environmental Advisory Committee in response to your RFP for Environmental Projects Benefiting the San Diego Bay. Enclosed please find three hard copies and a CD-ROM with electronic Word 2002 and PDF copies of a proposal to supply, implement, and evaluate a real-time oil spill monitoring system in the San Diego Bay. Our proposal has been prepared in full accordance with your RFP dated March 10, 2009 and includes a cost proposal, the required disclosure statements, as well as the InterOcean Systems' Equal Opportunity Program.

This proposal details a project to install and operate a real-time oil spill monitoring, detection, and alarm system in the San Diego Bay just north of the environmentally sensitive areas known as San Diego National Wildlife Reserve [NWR], which includes the Sweetwater Marsh and the 4,000 acres of South Bay. This area includes Paradise Marsh, Chula Vista Nature Preserve, Emory Cove, South Bay Salt Works -Marsh and the Otay River Estuary. The proposed oil spill monitoring system will provide a real-time early warning system in the event of an oil spill so that first responders can deploy booms and other mitigation devices to protect these environmentally sensitive areas.

This project is applicable to multiple "category specific criteria" named in the RFP and has relevance with respect to SDUPD environmental policies such as the NMRS and Green Port, as well in accordance with the SDUPD's mission as it pertains to environmental stewardship of the Tidelands Trust resources.

The system of four oil spill detection sensors will be mounted on strategically situated fixed points (i.e. channel markers and pier pilings) and will be networked into the SDUPD's IT system for remote real time data and spill alert. The final location of these sensors will be decided based on input from our Advisory Panel, whose voluntary members include: Mr. Judd Muskat of OSPR [CA Dept of Fish and Game]; Dr. Hany Elwany of Scripps Institution of Oceanography and Coastal Environmental; and CAPT Debra Marks of the San Diego Harbor Safety Committee. Additionally, we will invite a member of the SDUPD's Environmental Division and/or a member of the SDUPD's Marine Operations Department to participate on this panel in defining the optimum locations for the oil spill detection sensors and base station.

The primary objective of this project is to protect sensitive habitat in the South Bay and also to ensure that the water quality of these environmentally sensitive areas remains free of hydrocarbons. The bay supports numerous endangered and threatened species of plants and animals and is a vital link to other wildlife areas. The presence of rare eel grass beds, resident and over-wintering waterfowl, seabirds, and shorebirds makes this very large, contiguous mud-flat a refuge and a haven for avifauna, and an important stop on the Pacific flyway. Seabirds and shore birds are particularly vulnerable to oil spills, however, other species of plants and animals are also severely impacted by oil spills, particularly if/when a significant spill encroaches upon environmentally sensitive habitats such as those indexed throughout the southern portion of SD Bay. Furthermore, this Project will aid OSPR, the San Diego Area

Contingency Plan (ACP) Committee and others tasked with developing and implementing first-responder plans for improved spill response procedures in the San Diego Bay.

The Project Manager will be Christopher Chase of InterOcean Systems [IOS]. IOS is located at 4241 Ponderosa Avenue, San Diego, CA. 92123. He can be reached by phone at (858) 565-8400 and by email at ChrisC@InterOceanSystems.com.

This grant funding request is for $119,006 and the total actual cost of the project is $162,531. Matching funds for this project will be provided by InterOcean Systems; for engineering, supply, installation and operational support of the four oil spill detection sensors as well as the solar power, wireless network and base station computer that will remotely and securely interface into the SDUPD's IT network. Additionally, the aforementioned Advisory Panel will provide their services at no cost to this project.

At contract award, IOS will immediately convene the Advisory Panel to establish the optimum locations for the four oil spill detection sensors and network base station computer. Once these locations are determined and agreed upon, IOS will consult with the appropriate SDUPD personnel in order to plan the physical installation of the four oil detection sensors and the base station. Design for installation of each sensor station will be provided to the SDUPD for approval within two weeks of this time. Because the system will be based on wireless cellular communications and operate on solar power, we envision NO need for any notable construction, electrical conduit, permitting issues, etc. Accordingly, no allowance has been made in our price proposal for such items.

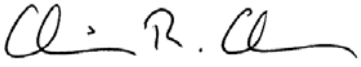
Approximately 6 weeks after contract award, the four sensors and the system network controller (base station) will be ready for installation. The complete system will be operational within 8-10 weeks of the contract award.

In addition to quarterly reports, at the end of this project a formal year-end report will be submitted. It will summarize all hydrocarbon events detected by the oil detection system (frequency, duration, source – if determined, etc) as well as documentation and analysis of the system's functional operation, and an evaluation of the system's value and utility as it relates to protection of San Diego Bay and tidelands. Mr. Judd Muskat of OSPR will act as Co-Investigator for this project and will write the final report together with Christopher Chase of InterOcean Systems. The Advisory Panel will also contribute input to this report and provide peer review.

During the 12-month period of this grant, IOS will take responsibility for all operations, quality assurances and site inspections of this system. Following this twelve-month period, the system will remain installed and operational, available to the SDUPD and San Bay for ongoing and lasting benefits well beyond the initial one year period of this project. During succeeding years, this oil spill detection system is capable of future growth, i.e., adding more sensors at various points throughout San Diego Bay. This project and grant contract award could be used as the initial vehicle for this effort.

The San Diego Bay will benefit immediately from the operational use of a real-time oil spill detection system. The system will provide a baseline dataset for spill incidence in the South Bay, and more importantly will enable first-responders to arrive at the scene of a hydrocarbon spill event within a very short time period, thereby minimizing the impact of spills on the environment. It will help to greatly decrease the likelihood that a devastating spill could happen in San Diego Bay, particularly as it relates to the environmentally sensitive habitats in South Bay. These benefits will extend to all port stakeholders, the greater harbor community and local ecosystems.

Respectfully yours,



Mr. Christopher Chase,
Manager, Oil Products Division
InterOcean Systems

Implementation and Evaluation of a Real-Time Oil Spill Monitoring System in San Diego Bay

Submitted in response to:

Request for Proposals
Environmental Projects Benefiting San Diego Bay - 2009

San Diego Unified Port District
Environmental Services Department
Port of San Diego
3165 Pacific Highway - San Diego, CA 92101

Submitted by:

InterOcean Systems, Inc.
4241 Ponderosa Avenue
San Diego, CA. 92123

On:

May 4, 2009

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List of Acronyms

ACP ..... Area Contingency Plan
EPA ..... U.S. Environmental Protection Agency
ESI ..... Environmental Sensitivity Index
IOS ..... InterOcean Systems
JHOC ..... Joint Harbor Operations Center
MOU ..... Memorandum of Understanding
NASSCO ..... National Steel Shipbuilding Company
NCMT ..... National City Marine Terminal
NEMA ..... National Electrical Manufacturers Association
NOAA ..... U.S. National Oceanographic and Atmospheric Administration
NPDES ..... National Pollutant Discharge Elimination System
NRMP ..... Natural Resources Monitoring Plan
NWR ..... National Wildlife Reserve
OSPR ..... CA Dept of Fish & Game - Office of Oil Spill Prevention & Response
PCH ..... Pacific Coast Highway
SDMIS ..... San Diego Marine Information System
SDUPD ..... San Diego Unified Port District
SDUPDIT ..... San Diego Unified Port District Information Technology
SIO ..... Scripps Institute of Oceanography
SPCC ..... Spill Prevention, Control, & Countermeasure
TAMT ..... Tenth Avenue Marine Terminal
USCG ..... United States Coast Guard
UV ..... Ultraviolet Light

I. Introduction

This section describes our project proposal to engineer, implement, and evaluate a real-time oil spill monitoring system in the San Diego Bay. Some background about the sensor technology and the application of these sensors by many users throughout the world will be provided and shown to be applicable to our bay. A detailed project description including a scope of work will be provided, as well as the benefits that will be accrued by the installation of this proposed real-time oil spill monitoring system.

a. Background

The majority of oil pollution in harbors and bays results from urban sources such as storm water run-off, fueling activities within the harbor, and industrial activities such as shipyards and power plants. Newly developed technology by IOS (remote, field-installable, non-contact, UV, filter-fluorometer type oil monitor) is now being used by IOS customers worldwide to reduce the frequency and magnitude of oil spills. These oil detection sensors are being installed in ports at fueling piers and terminal piers, as well as at storm water discharge and drainage points, and other areas where early detection can be used to minimize the amount of oil spilled into the environment. These oil detection sensors are basically 24/7 operational "smoke alarms for oil spills". They are activated whenever an oil spill event occurs in an area being monitored.

There are numerous examples where an *ill-timed* (i.e. night time) spill has gone undetected within a working harbor setting. These spills have caused significant environmental damages, commercial stoppages, exorbitant response and mitigation costs, and public relations nightmares. Likewise, there are many examples of smaller but *ill-placed* (i.e. located in or near sensitive areas) oil spills causing disproportionately higher amounts of these associated damages and hardships. This is due to the fact that environmentally sensitive habitats are particularly vulnerable, both short-term and long-term, to the consequences oil spill events. San Diego's NWR and South Bay have numerous areas classified as sensitive habitats, which are cataloged in the San Diego Area Contingency Plan (ACP) utilizing Environmental Sensitivity Index [ESI] methodology.

From their website, NOAA defines ESI as follows:

> "ESI maps provide a concise summary of coastal resources that are at risk if an oil spill occurs nearby. Examples of at-risk resources include biological resources (such as birds and shellfish beds), sensitive shorelines (such as marshes and tidal flats), and human-use resources (such as public beaches and parks).
>
> When an oil spill occurs, ESI maps can help responders meet one of the main response objectives: reducing the environmental consequences of the spill and the cleanup efforts. Additionally, ESI maps can be used by planners--before a spill happens--to identify vulnerable locations, establish protection priorities, and identify cleanup strategies".

The system proposed herein is intended to provide real-time early warning before oil reaches ESI habitats in South Bay so that responders can implement spill response plans expediently - particularly in the scenario of a night time spill that goes un-discovered until morning, which is too late in terms of early response prevention/minimization of the spill's impacts.

b. Project Overview

For this project we plan to install a small network of four spill detection sensors that will be strategically placed near (or at the periphery of) the environmentally sensitive areas of South Bay. And, in the event that one or more of these detectors are activated when an oil spill event begins to drift toward the South Bay with prevailing winds and/or on an incoming tide, an alarm will activate notifications to the SDUPD and designated first responders for implementation of the appropriate spill response procedures prescribed in San Diego's ACP. See Figure 1 indicating these environmentally sensitive areas of the NWR in the South Bay and surrounding areas.

Figure 1 – Environmentally Sensitive Areas in the South Bay NWR

A voluntary Advisory Panel will be consulted to select the optimum positions for the oil detection sensors, which will be strategically located within San Diego Bay. Each of these sensor systems will be outfitted with a data telemetry system to allow for real time communications (data and spill alarms) to a base station computer, which in turn can be interfaced to the SDUPD's IT system. It should be noted that IOS is already working with the SDUPD's Marine Operations Department and IT Department to provide similar real-time data as part of the SDMIS, a system that was developed and installed by IOS.

Each of the sensor stations will be solar powered, minimizing the system's energy impact, in keeping with SDUPD's Green Port goal of long-term environmental benefits through resource conservation. Furthermore, the application of this system in the South Bay will enhance water quality and help to protect sensitive natural habitats, consistent with aspects of the SDUPD's Environmental Dept., NMRS and Green Port policies' intent to protect and conserve natural resources in these ecological sensitive areas.

The system will be configured to allow additional sensors to be easily added to the network at a later date. These additional sensors could be installed throughout the Port of San Diego to further enhance water quality, to protect other valuable areas of the Port, and to exhibit a proactive leadership position by SDUPD as the principal environmental steward of San Diego Bay. Potential additional sensor locations might include the Jankovich fuel terminal and fuel barge, TAMT/NCMT terminals, Broadway/B-St. Pier and cruise ship terminals, commercial and recreational fuel piers, US Navy fuel pier, NASSCO [National

Steel Ship Company], the south bay power plant, Sweetwater Channel, urban stormwater points, etc. Other users such as the US Navy or South Bay power plant could also add their own 'point source' sensors to the network, with the SDUPD-owned oil monitoring base station acting as the central monitoring and 24/7 spill-alert center for all point and non-point sensors.

c. Beyond Compliance and Mitigation

This project satisfies the "beyond compliance and mitigation" requirement, per the SDUPD's RFP. This real-time spill monitoring capability is not mandated by the San Diego ACP or any other governing management plan of the SDUPD or local/state/federal environmental groups. Nor has this project been proposed or funded by any other funding entity within the San Diego harbor, nor within San Diego County. The primary purpose of this project -- to preserve and protect South Bay water quality and habitats -- is consistent with the SDUPD's stated mission of environmental stewardship of the Tidelands Trust resources. This project focuses directly on the protection of the NWR and the more than 4,000 acres of the South Bay and important sensitive habitat and species therein.

While the US EPA [Environmental Protection Agency] does mandate SPCC [Spill Prevention, Control, and Countermeasure] Planning and NPDES [National Pollutant Discharge Elimination System] Permits for numerous Port tenants, oil spill detection monitors are not yet mandatory to satisfy any known authorities' mitigation or regulatory compliance requirements at this time.

d. Goals and Implementation

Under the purview of the SDUPD, our goal for this grant is to supply, implement, operate and support a turnkey real-time oil spill detection monitoring system which operates 24/7 and provides information that will help to preserve and protect the ecologically sensitive areas and vulnerable animal and plant life of the NWR and greater South Bay. This real-time alert capability will enable designated first responders to deploy oil containment booms should an oil spill event begin propagating towards the South Bay with the tidal movement -- consistent with the "Cross Bay Boom" strategy detailed in the ACP.

Our goals will be met successfully in a professional, timely and environmentally conscientious manner, consistent with our company philosophy and track record. The timeline we are committed to is realistic and achievable and is detailed herein.

IOS will develop, install and operate this system in a manner similar to the process we used successfully for the SDMIS, which was/is a considerably more complex system involving numerous installation sites around and within San Diego Bay under an MOU between the SDUPD, USCG, USN and OSPR.

IOS will work very closely on this project with the SDUPD Environmental personnel overseeing this project, as well as other SDUPD personnel (General Services It Dept., etc) related to installation of the sensors and interface into the SDUPDIT communication network.

II. Project Narrative

a. Description and Implementation – Project Scope

Project Start-Up

Upon notification of grant award, InterOcean will immediately begin to fabricate system components. The Advisory Panel will be convened to assist in assessing the optimal locations of the four remote sensors, the location of the physical base station, as well as to determine who will receive the spill alarm notifications when they occur. The spill alerts can be sent to up to five recipients by email and text message. Potential recipients of real-time spill notification include: SDUPD Environmental and/or Security Departments, USCG –JHOC [Joint Harbor Operations Center], personnel named in the ACP for particular ESIs (i.e. local response personnel), the Marine Exchange of Southern California, etc. Project stages and the projected timeline are detailed in the following sections.

System Description

These oil spill detection sensors are called Slick Sleuth™ sensors and they are non-contact UV filtered-fluorometer hydrocarbon spill monitors that activate an alarm in the event of a spill in the area of the sensor. They operate much like a camera, and are focused on a particular spectral bandwidth to identify the presence of oil on water. They may be mounted up to 5 meters above the target surface (in this case above the high tide water line within San Diego Bay), and have sensitivity that detects micron-level sheens. A wide range of hydrocarbons are detected, including marine diesel, lube oil, hydraulic oil, bunker fuel, motor oil, gasoline, and many others. A system demonstration can easily be arranged for SDUPD Environmental Dept., upon request, at SDUPD or at IOS factory and offices in Kearny Mesa.

The Slick Sleuth™ sensors are housed in NEMA 4X IP66 –rated stainless steel enclosures. The system is designed and manufactured for installation in rugged marine settings. The sensors are completely automated, and because they are non-contact they are not subject to marine fouling – thus, they require little if any maintenance during a 2-3 year time period, unlike other in-water types of probes used for water quality monitoring.

Slick Sleuth™ proprietary optical sensor technology was developed by IOS and has been proven reliable and successful by a worldwide user base. Nearly 200 systems have been installed to date. Additional information regarding Slick Sleuth sensors can be found at: www.slicksleuth.com. Technical details and operation manuals for the sensor and the base station components of the system can be obtained from IOS upon request. Several images showing port, harbor and marine installations of Slick Sleuth are shown in Figures 3 and 5 in Appendix A.

The sensors will be installed at optimal points selected within the port, which will be agreed upon by SDUPD and IOS, with recommended inputs from the aforementioned Advisory Panel. Probable points include a minimum of two sensors -- mounted to mid-channel navigation markers [“day marks”] near the NCMT turning basin. In our thinking there are many other target possibilities, but the final decision will be left until project kick-off, with the final determination being based upon where greatest benefit would be derived for early warning protection and preservation of South Bay. A conceptual system diagram and a sample screen capture of Slick Sleuth Base Station user interface displaying a few potential installation points are shown in Figures 2 and 4 in Appendix A.

The sensor stations will operate using solar panels and rechargeable batteries, which are commonly used to power the Slick Sleuth™ system for remote applications. The power and communications will be housed in stainless steel enclosures similar to those used to house the sensors.

The system will send real-time data and event alerts via wireless communication [cellular signal] to a base station computer residing at the SDUPD building on PCH [although it should be noted that the base station could in fact be installed anywhere]. The service contract for the wireless data service will be paid for by IOS as a part of this proposal. Spill alarm notification will be text-messaged automatically to any email address or cellular phone entered into the computer of the base station [“in case of alarm”] call list. In addition to real-time alerts, the system will record and archive all data and alarm history. The base station also contains site-specific information, to be input by the user, for ready access in case a spill occurs (i.e. information identifying whom to call for an oil spill detected at a given point [environmentally sensitive areas, pre-positioned containment booms, available spill response assets, etc.].

IOS will conduct the physical installation of the sensor system and base station utilizing IOS personnel and IOS’ workboat (or a chartered vessel). Installation is expected to take less than a week. Prior to installation, IOS will provide the SDUPD with drawings for each of the selected install sites for final approval. Because the field-deployed sensor stations are designed to be wireless [no AC Power or hardwired communications] there should be no issues as far as permitting, engineering stamps, and/or related installation planning requirements. As such, no allowances have been made for these cost items.

If the SDUPD prefers, they may elect to provide their own workboat to transport IOS personnel to the on-water installation sites and provide hands-on installation support/assistance. If this is the case, the cost for the workboat, for the installation and the-end-of-program site inspection, could be eliminated from the scope of supply and cost proposal [see Appendix C].

IOS will visit each of the sensor locations and the base station at the end of project period of one year. This physical inspection of the sensors and peripheral equipment will provide a final field assurance test of the system assuming that the SDUPD will desire to continue to use this system. Additionally, IOS will make a field visit to each remote site at a three-month interval for physical inspection, photo documentation, operational testing, quality assurance, and as required servicing. These mid-project site visits will be contributed as another IOS in-kind contribution toward successful system operation.

Quarterly Reporting, Final Report, and Project Publicity

A quarterly report will be provided by Christopher Chase of IOS to the SDUPD, per the stated requirement in the RFP, and will describe IOS activities for the specified time period, as well as a summary of system activity and operational performance.

A final report will be generated by Mr. Judd Muskat, environmental and GIS expert for OSPR, and Christopher Chase, Project Manager for IOS. The technical report will detail project successes, strengths and weaknesses, qualitative and quantitative analysis of all data and spill history collected, summary of incidents (where information is available), lessons learned, and assessment of the operation and practical use of this system as it pertains to the stated project objectives. Recommendations for additional Slick Sleuth™ sensor locations will also be made. Input for this report will also be provided by the Advisory Panel, who will also provide peer review of the final report, prior to final project presentation to SDUPD.

The final report may be published on SDUPD's website, as deemed appropriate. Additional publicity will include a project presentation for installation in the lobby of SDUPD offices on PCH, and press releases will be provided to "The Log" and other suitable publications. In addition to quarterly and year-end presentations to the SDUPD, IOS is willing to present project information to the San Diego Harbor Safety Committee, San Diego ACP Committee and other stakeholders and interested parties as deemed appropriate by the SDUPD. A technical 'white paper' presentation may also be generated for presentation at suitable port-related and/or environmental-oriented conference(s).

b. Project Time Line

The time line for this project is provided below. Each item is referenced from date of a signed contract.

Weeks After Award	***Item***
0	Contract Award from SDUPD
1	IOS develops press release to send to local publications
1	Meeting with Advisory Panel to determine optimum Slick Sleuth™ locations
6	IOS completes Slick Sleuth™ system and is ready for installation
10	IOS completes Slick Sleuth™ system installation
13	Submit 1st quarterly report and submit Invoice for period of performance
23	Field visit for inspection and Q/A all system assets
26	Submit 2nd quarterly report and submit Invoice for period of performance
27	IOS develops and installs a project display in SDUPD lobby
36	Field visit for inspection and Q/A all system assets
39	Submit 3rd quarterly report and submit Invoice for period of performance
51	Complete a site inspection of all sensors and base station of Slick Sleuth™ system prior to hand off to SDUPD
52	Submit 4th and final quarterly report and submit Invoice for period of performance
56	Submit Draft of Final Report of Slick Sleuth™ performance and evaluation sent to the SDUPD Environmental committee for comments
58	IOS Submits Final Report
59	IOS provides presentation on Slick Sleuth™ project

c. Project Importance and Benefits to San Diego Bay

This proposed project will not only provide habitat protection in ecological areas of the South Bay, but will also help to ensure that the water quality of the South Bay and greater San Diego Bay is not degraded due to significant or catastrophic oil spill(s). This project offers benefits consistent with several of these "Category Specific Criteria" as well as the "Generalized Criteria" per the RFP.

i. Water Quality Issues

- One of the principal goals of this project is to protect water quality in the South Bay from the incursion of hydrocarbons by providing around the clock real-time monitoring of water entering the area. These initial individual detection sensors will be located in strategic positions so that there will be adequate time for the deployment of the oil containment booms north of the NWR, in keeping with the objectives of the ACP. By expediting response time and minimizing the impact of a potentially catastrophic spill, water quality will be preserved and remediation prevented or minimized.

- The project is intended to prevent the Non Point Source (NPS) and Point Source hydrocarbons from incursion into NWR and ESI areas. Potential Non Point Sources can be characterized as "mystery spills", "orphan sheens", and/or spills that come from unknown 'upstream' or watershed sources. Potential Point Sources include ships, industrial activities such as the power plant or shipyards, tank farms such as those at Jankovich, NASSCO, or the US Navy's facility in Point Loma (known to be leaking), fuel barges, fuel docks, etc.

- The proper and timely response to an oil spill event will help protect water quality in the South Bay, helping also protect the physical and chemical factors supporting plankton productivity.

- Because certain heavier oils sink and mix with sediment, there are inherent benefits to protecting sediment quality through prevention/minimization of oil spills reaching these areas.

- This project is consistent with the SDUPD's stated goals in the to "ensure the long-term health, restoration, and protection of San Diego Bay's ecosystem in concert with the Bay's economic, Naval, navigational, recreational, and fisheries needs". And by guarding against spills and providing an early warning alert, the implementation of this project will also help protect the survival of indicator species and "sensitive and declining species including those that are listed as threatened or endangered" as proposed in the NRMP.

- Any and every oil spill event in the bay can be considered a new threat to the South Bay's water quality and ecological system. This project will provide a system for detecting and monitoring hydrocarbons entering the South Bay.

ii. Habitat and Endangered Species Protection

- As noted the major objective of this project is to prevent hydrocarbons from entering the South Bay ecosystem during a diurnal tidal period. By providing around the clock monitoring of these tidal water movements for oil, a real-time alert will be sent to first responders for response in accordance with ACP plans and procedures. With proper booming accomplished in a timely manner during an oil spill event, damages or losses to the ecosystem and biologic life in South Bay can be prevented or at least significantly reduced. Marshes are particularly vulnerable to oil spills and very difficult to remediate and rehabilitate; thus the concentration of ESI points within the confined (southern) end of the bay.

- The SDUPD's Environmental Dept. is very aware and familiar with the list of endangered and threatened species and other sensitive biology residing in this area. Green Sea Turtles, Least Terns and many other bird species, fish nurseries, and various wildlife reside or transit the Eel Grass, estuary, tidal flats and marshes within South Bay. Each of these species is vulnerable to contact with hydrocarbons. This project will help to prevent/reduce this threat to habitat and biology and will enhance/support resident and migratory birds and other species by preventing or at least minimizing oils spills in the bay from reaching these habitats.

iii. Research & Education

- The only statistics currently known to be kept for San Diego Bay regarding oil on water are USCG *reported* spill statistics. Naturally all spills are not reported. This project will generate meaningful data to help correct the spill data gap, establishing a baseline for future measurements. Results will be shared with stakeholders, public, and scientific communities.

- The data regarding the frequency and magnitude of oil entering the areas where Slick Sleuth™ sensors are installed will be researched, evaluated and analyzed to assess spill frequency in these particular areas and determine the effectiveness of the proposed system.

- Increased public awareness regarding the effects of oil spills on the environment helps to decrease the likelihood of oil being spilled. Public awareness and real-time environmental information were key elements in OSPR's decision to fund the San Diego Marine Information System (SDMIS). By bringing attention to oil spill issues and the implementation of this monitoring system [through press releases, presentations, SDUPD's website and other vehicles], local awareness will be enhanced regarding oil spill prevention and response issue.

- An 'unintended' positive consequence of publicizing this system is that it may also act as a deterrent. If tenants/users of SD Bay do spill oil, intentionally or otherwise, they'll be aware that they could "be caught" due to new remote oil spill detection sensors deployed in SD Bay.

iv. Generalized Criteria

- ***Maximize Funds --*** In addition to the in-kind matching contribution, this proposed IOS project incorporates volunteers donating their professional expertise as members of the Advisory Panel. They will assist in determining the optimum location of the oil detection sensors and participate in the evaluation of the Slick Sleuth™ system performance. If a spill is detected and first-responders effectively prevent the ecologically sensitive areas from being impacted, the system will clearly maximize its value. The system lends itself to positive publicity that will be created through informing the public and San Diego Bay stakeholders about the SDUPD's implementation of this system. And the system will remain installed and operational well beyond the proposed one-year project period, providing maximized cost-benefit and lasting value to SDUPD and the San Diego Bay.

- ***Proven Effectiveness --*** Several users have provided feedback expressing that their Slick Sleuth spill alarm system has detected accidental spills in real time, enabling them to respond and resolve the issue. Were it not for the effectiveness of the sensors, the spills would have gone undetected for a length of time that would have been considerably more problematic.

- ***Complements Port Vision*** -- This proposed system is consistent with SDUPD's stated goals and environmental mission intent. This system is also deemed to complement elements of the "Port's Vision", including SDUPD's Green Port Policy (BPC Policy No. 736), which states: "Objectives: To effectively administer the Green Port Policy, the district will strive to: 1) Minimize, to the extent practicable, environmental impacts directly attributable to operation in San Diego Bay and the tidelands... 3) Prevent pollution and improve personal, community, and environmental health, 4) When possible, exceed applicable environmental laws, regulations and industry standards… 7) Monitor key environmental indicators and consistently improve performance."

- ***Community Involvement*** – Community involvement is realized through the recommendations of the aforementioned volunteers who offer their expertise on the Advisory Panel. We are open to other suggestion SDUPD has for community involvement.

- ***Regional Benefit*** -- San Diego Bay is utilized by many in the greater San Diego County community, as well as tourists, local businesses and industry, transiting pleasure craft, recreational fishermen and commercial shipping, etc. This system is intended to help protect and preserve the natural habitat and water quality of the "Big Bay", to the benefit of all.

Improved environmental health benefits the entire regional community. Furthermore, this system provides a positive example, an environmental 'blueprint' so to speak, for other San Diego Bay entities to emulate (i.e. US Navy, public/commercial fuel docks, marinas, etc). And the system is expandable, so once initiated it would be relatively easy and cost-effective to add new sensors within the greater San Diego Bay, Mission Bay or other coastal areas of San Diego County that could benefit form real-time oil spill awareness.

- ***Partnerships*** -- For this project we are partnered with Judd Muskat of OSPR for system and time-series data analysis and the final project report. The Advisory Panel also acts as an IOS partner in this project. We would be amenable to add non-profit(s) or local University groups to the project team, at the Port's behest.

- ***Feasibility*** -- Although the Slick Sleuth™ detection sensors are new technology, they have been proven to work in many other locations and in varying configurations. The technical feasibility of the proposed oil detection system is very sound. These sensors, like many environmental monitoring systems engineered and supplied by IOS, commonly use wireless telemetry, solar power, and a base station for system monitoring and control.

- ***Environmental Justice*** -- In certain cases there may be early detection of an intentional spill, such as oily water discharges from bilges, or even early detection of an inadvertent spill for which the perpetrator might try to evade responsibility. If spill alarm(s) activate a rapid response, the responsible party may be identified - leading to disciplinary action as merited.

- ***Innovation*** -- This system is built around new environmental sensor technology, developed here in San Diego. Whereas we have observed great strides made in recent years in the areas of oil spill *response* planning and improved *response* equipment, there has been disproportionately little advancement with respect to ***prevention*** using new technologies. If the old adage remains true, that an ounce of *prevention* is worth a pound of cure, then innovation is warranted for *prevention* and not just *response* capabilities. This project will showcase the SDUPD as using 'best available technology' in a new and proactive approach for the protection and preservation of sensitive habitats, species, and water quality, using real time monitoring and early warning for spill prevention/minimization.

- ***Matching Funds*** -- Matching or "in-kind" funds are detailed in the cost proposal. Additional in-kind support [donation of time by experts and IOS] is also referenced in the cost proposal.

- ***Multiple Specific Criteria Categories*** -- The proposed project has applicability to multiple categories, including water quality, habitat protection, endangered species, and research, as detailed above.

III. Qualifying Experience

a. InterOcean Systems

IOS Company History

For over sixty (60) years InterOcean Systems has been a world leader in the design and manufacture of the highest quality oceanographic and environmental equipment and systems. Our product lines continue to broaden as new technologies are developed and each customer's unique application requirements are accounted for in new designs. Our dedication to service ensures that customers are supplied with the optimal products and services for their oceanographic and environmental projects.

Facilities – InterOcean's facilities in San Diego include in-house manufacturing, machine and welding shop, electronics assembly, calibration and testing laboratories, CAD design, electrical and mechanical engineering, project and after-sales support facilities, and other business functions.

Products – InterOcean Systems supplies more than 150 standard products, including: a complete line of marine winches, acoustic releases, environmental and oceanographic sensors, and oil detection sensors, as well as integrated systems that often include wireless data telemetry, solar power systems, and base

station communications that provide users with remote system control, data archive, and real-time data and alarm notification. For many decades InterOcean Systems has successfully supplied commercial off the shelf (COTS) and custom turnkey system solutions, designed and manufactured to meet rugged environmental conditions and customers' specific requirements.

Slick Sleuth™ Oil Detection & Alarm Systems is proven to detect oil spills and leaks as they occur in real-time -- thereby significantly reducing response time. Slick Sleuth™ is an automated, optical (non-contact) oil-on-water sensor system used to remotely alert users to the presence of oil as an early warning device.

b. Examples of IOS Related Experience

The following is an example of a project in San Diego performed by InterOcean Systems, relevant to the proposed environmental system. Additional references will be furnished upon request.

- **SDMIS Project Example:** The San Diego Marine Information System (SDMIS) was designed to provide comprehensive environmental data and San Diego Bay–specific information for use by SDUPD, USCG, San Diego Pilots, US Navy, and public dissemination. It utilizes three integrated sensor packages that provide real-time wind and water conditions. The sensors are currently placed at SPAWAR Pier 160a, 10th Avenue Marine Terminal, and 24th Avenue Marine Terminal. Additionally three web cameras and a warehouse of information are available through the website www.SDMIS.org. **Client:** San Diego Unified Port District Operations. **POCs:** Mark Taylor, Assistant Director Marine Operations, and Paul Libuda - who at the project outset and first several years of operation was the Assistant Director of Marine Operations.

- **Slick Sleuth User References:**

  Client: Buckeye Pipeline. **POC:** Mr. Steven Mengel, Manager, Environmental Engineering Dept.
  email: smengel@buckeye.com tel: 620-217-3323

  Client: Madison Gas & Electric. **POC:** Mr. Jeff Marcouiller, Instrumentation & Controls Engineer.
  email: jmarcouiller@mge.com tel: 608-712-1612

  Client: BP Amoco. **POC:** Mr. Carl Lumbarkoski, Manager, Engineering and Analyzer Group
  email: lumbarc@bp.com tel: 219-545-3459

  Client: Entergy Corporation. **POC:** Mr. Barry L. Snow, Senior Environmental Specialist
  email: bsnow@entergy.com tel: 501-904-5772

  Many Additional System examples and User References Available Upon Request

c. Advisory Panel Members (not including representatives from SDUPD and IOS)

Mr. Judd Muskat is a staff environmental scientist and GIS coordinator for the California Department of Fish and Game, [OSPR]. Mr. Muskat's primary responsibilities at OSPR include geographic information system (GIS) support for oil spill contingency planning, field deployment of GIS during emergency oil spill response, GIS support for natural resource damage assessment (NRDA), GIS technology training and research project management. Mr. Muskat's current research involves the use of remote sensing technology for oil slick detection and thickness determination. He has a BA in Geology from Humboldt State University, 1976, and a MS in Geology from California State University, Northridge, 1983.

Dr. Hany Elwany, Dr. Elwany, Ph.D., Engineer and Oceanographer, currently has an academic position at Scripps (SIO) and owns a successful consultancy in La Jolla (Coastal Environments Inc.). He has extensive experience with near shore oceanography, coastal processes, coastal engineering, and estuarine dynamics. He was the principal investigator for one of the largest environmental studies ever conducted on the U.S. West Coast (at San Onofre). He has measured and analyzed coastal currents and waves extensively along the southern California coast, as well as performed important high-profile lagoon studies in San Diego County. He has conducted in-depth studies of Nile Delta erosion, particularly since

construction of the Aswan Dam, as well as coastal processes, design of coastal and offshore structures, data analyses, simulation, and dynamic modeling of ocean and coastal conditions. His experience also includes projects involving circulation, numerical modeling, and oil spill assessment, to determine the associated risks of spills reaching shorelines using state of art numerical modeling [OILMAP and CHEMMAP]. As an educator, both at Liverpool and Alexandria Universities, he has taught courses in dynamics, statistics, numerical analysis, computer applications, and maritime engineering. Dr. Elwany received a BS in Engineering from Alexandria University in 1971. In 1977, he completed his Ph.D. at the University of Dundee in the UK. He obtained an additional B.S. degree in Mathematics and Statistics at Alexandria University in 1980.

Captain Debra Marks served as Chair of the San Diego Harbor Safety Committee for ten years. She is currently Chair of the Navigation and Safety Advisory Council for the Federal Government. She has over 25 years' experience operating vessels based in San Diego Bay. She was one of the founding members of the organization which originally conceived and implemented San Diego Bay's Operation Clean Sweep. Captain Marks attended Coe College, Iowa, and possesses a USCG 500 ton Masters License.

IV. Objectives of Grant Proposal

The primary objectives of this grant proposal are to secure funding to initiate a real-time spill alert system capable of helping preserve San Diego Bay water quality protect habitats. In particular, the sensitive areas and biologic life in South Bay are deemed to constitute the some of the most vulnerable ESI areas should a spill occur within the bay. By accomplishing this, we will provide a valuable environmental safety system using progressive new environmental technology in a proactive, well conceived manner.

Once our primary objective is achieved, the year-end report provided to SDUPD by IOS, Judd Muskat of OSPR, Chris Chase of IOS, and the aforementioned project Advisory Committee, will provide thorough assessment of the system's successes and weaknesses. The report will also provide approximately ten months' data on the frequency and magnitude of any oil detected [providing a baseline study], and will chronicle any significant events for which information is available, as well as suggest recommendations for further use of the system

If a significant spill were to occur, the impact of this early warning system would make a significant difference. The objectives of this project will ultimately reduce the risks associated with oil spills in San Diego Bay, in a manner consistent with SDUPD's proactive environmental stewardship. The SDUPD is in the unique position of having a bay-wide regional purview and responsibility. Without this grant, it seems unlikely a system such as this will be installed in SD Bay any time soon.

We feel that these objectives are exemplary of going "beyond compliance" for the benefit of San Diego Bay. IOS is a San Diego company, and the project team members are devoted long-time San Diego residents, who recreate, enjoy, work in the bay, value the bay, and have a personal interest in this issue and the success of this proposed project and its objectives.

This initial system will provide lasting benefit – and the system could eventually be expanded to provide comprehensive early warning prevention and response capabilities throughout San Diego Bay, going well beyond the scope and time period of this initial installation and first-year evaluation phase. And finally, the truest and most rewarding measure of success would be realized whenever the oil spill sensors actually do function as intended; to help to avert the catastrophic effects of an accidental oil spill.

V. Cost Proposal

A detailed cost proposal is shown in Appendix C. Major cost items are shown in the table below. The final cost of this project is $119,006. IOS and the Advisory Panel are making a total in-kind contribution of $43,523 or 26.78% of the total price of this proposed project. The in-kind contribution from the voluntary Advisory Panel will consist of the panel members donating their time to provide expert input on optimizing the locations of the Slick Sleuth™ sensors, base station, and related response protocols, as well as their input to the final technical and evaluation report. Additionally, Mr. Judd Muskat of OSPR will donate time in his role as Co-Investigator and co-author of the final report. IOS will contribute in-kind funds toward system supply, as well as in-kind time for system operation, Quality Assurance testing, site visits (tri-monthly) system support, ongoing system analysis and co-authoring of final report.

Cost Item	Total Price	In-Kind Contribution	Final Cost
System Hardware	$117,255	$25,796	$91,459
System Installation	$29,390	$8,229	$21,161
Operation, Site Visits and Advisory Panel	$15,886	$9,449	$6,386
Total Project Cost	**$162,531**	**$43,523**	**$119,006**

VI. Personnel

InterOcean will engineer, fabricate, install, operate and support this system consistent with the same management, quality control and customer interface skills that we have developed in our business practices of 60-plus years. The following are the key members of our project team, who are in turn supported by the entire staff of IOS (approx. 35 employees) and various channel suppliers and partners:

Christopher Chase – Program Manager and Environmental Division Manager

Mr. Chase is the Environmental Division Manager for IOS. He will be the PM for all aspects of the proposed project, including contract managment. Currently his work is devoted to development and commercialization of new sensors and products for oceanographic, environmental and the oil-spill prevention and response sectors. He's been in his current job with IOS since 1999. He has been instrumental in development of the Slick Sleuth system product family at IOS and has participated in all aspects of introducing, managing and supporting the product for domestic and international oil spill markets. He has written several technical papers on this new technology, available upon request.

Mr. Chase was (and remains) the Project Manager for the SDMIS. He worked closely with the SDUPD, together with the HSC subcommittee for Marine Information System for San Diego Bay, to develop, plan, install, operate and support this system, which is now in its 8th year of continuous operation.

He graduated Mesa College with a degree in Business Administration (1995), and San Diego State University with a degree in International Business (1997).

Steve Van Bibber - Chief Electronic Engineer

Mr. Van Bibber will have engineering oversight of the proposed project. He has wide experience in industrial sensors, oceanographic, and naval underwater instrumentation throughout his career. He is head of the IOS Electronics Team and is responsible for all product engineering, research and development. Mr. Van Bibber has specialized expertise in underwater acoustics and has designed hydro acoustic transducers, low power hydrophone receivers and signal processing equipment, in addition to specialized marine sensor hardware and software design. Mr. Van Bibber designed and developed Slick Sleuth and has remained the principal engineer since development.

He has a BS in Applied Physics from San Diego State University and has experience with the following companies: InterOcean Systems Inc. Chief Electronic Engineer since 2001; Intelligent Technologies, San Diego, Program Manager; Design Engineer Nautronics Inc, San Diego; Fluid Components International, Principal Engineer; General Dynamics Electronics, San Diego, Electronic Design Engineer and Honeywell Marine Systems, Seattle WA, Transducer Design Engineer.

Robert Spurr - Project Engineer

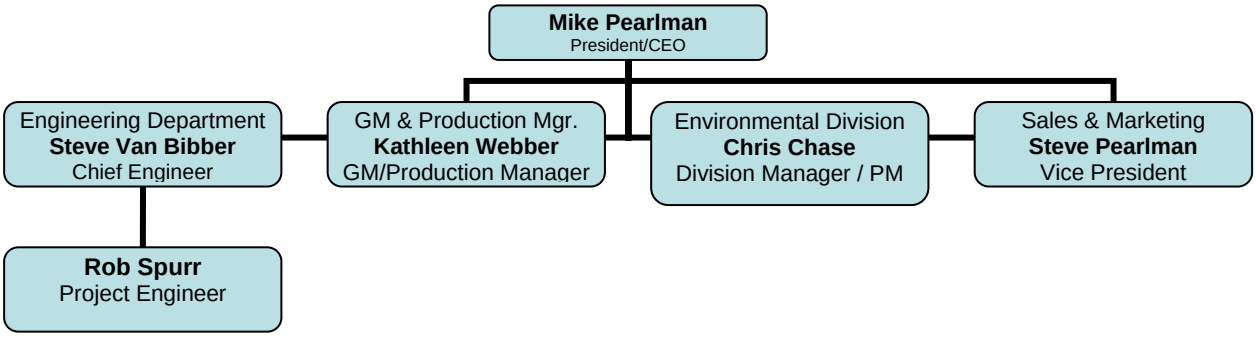
Mr. Spurr will be the system engineer for this project. Currently at IOS he supervises development of, and program management for, specialized integrated instrument systems including data acquisition and telemetry systems. He also conducts installation supervision, troubleshooting, testing, commissioning and training for both standard products and specialized systems. These systems include moored equipment installations, advanced buoy-mounted acquisition systems, vessel mounted systems, tsunami-sensing systems, and real-time oil spill monitoring systems.

He has a BSME from Virginia Polytechnic Institute and has experience with the following companies: InterOcean Systems Inc, Project Engineer since 1997; Power & Wind Marine Electronics, San Diego; Kettenburg Marine, San Diego, and Wheaton Industries, Millville NJ.

Advisory Panel - See Section 3 for brief description of voluntary Advisory Panel members' qualifications.

InterOcean Project Team Org Chart

Organization chart for IOS Management including three key members of the IOS team for this project.



VII. Sub-Consultants

There will be no sub-consultants used on this project.

VIII. Non-Profit Status

Not Applicable as InterOcean Systems is an incorporated company in the state of California.

IX. Applicant Disclosure

No citations have been issued against InterOcean Systems Inc. or subcontractors for environmental or other violations.

X. Agreement

Pursuant to selection of this proposal by the Port, InterOcean Systems Inc. accepts the agreement, insurance, and indemnification clauses included in this RFP.

XI. Conflict of Interest

InterOcean Systems Inc. is not currently under contract or performing services of any kind, for any person or entity that would conflict with the services and scope of supply to be provided to the SDUPD under this agreement.

XII. Additional Information

There are three appendices included in this proposal. They include a conceptual drawing of the proposed Slick Sleuth™ network for San Diego Bay; a sample screen capture for the Base Station monitor; some examples and installation photos of Slick Sleuth™ applications; the system specification, and the detailed cost proposal for this proposed project. Additional information is available on request.

Appendix A -- Slick Sleuth™ Detection and Alarm Network

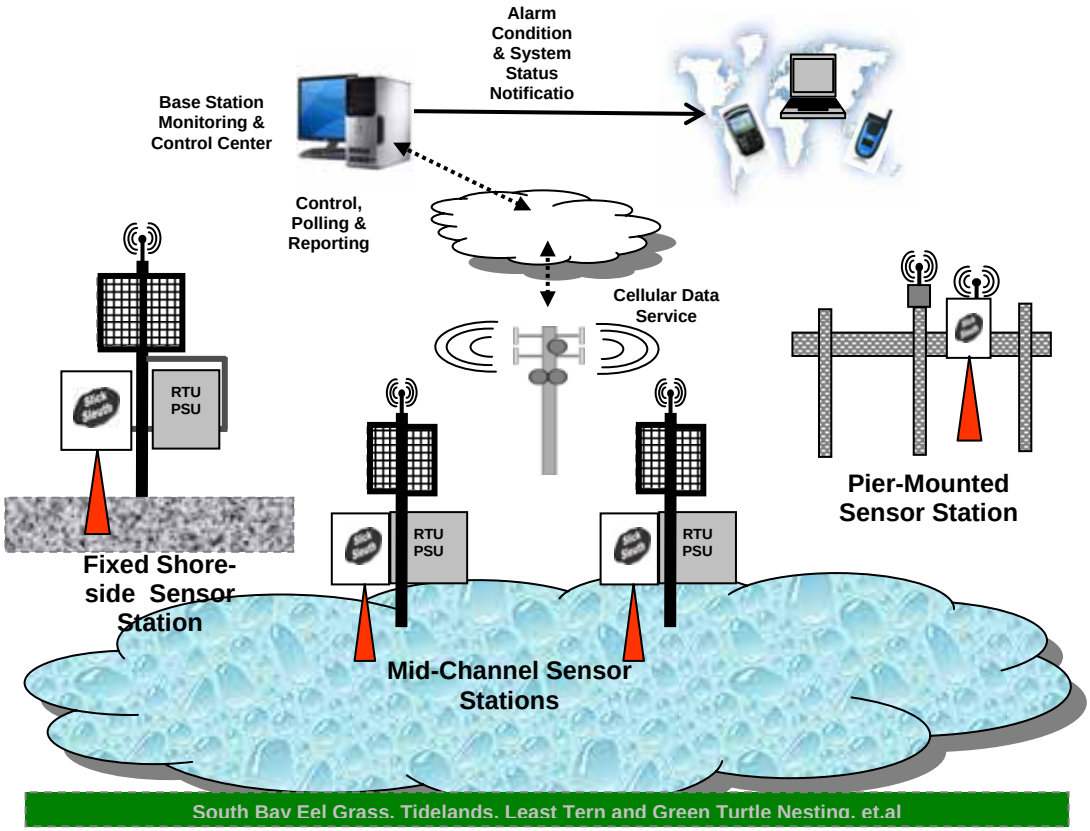


Figure 2. Conceptual System Diagram of Oil Spill Sensor Array w/ Remote Wireless (Cellular) Reporting for Harbor Applications.

Figure 3A. Slick Sleuth System Array w/ Base Station and WiFi Wireless.

Figure 3B. Marine Terminal Pier-side/Wharf Installation.

Figure 3C. Container Port Pier-side/Wharf Installation.

Figure 4. Sample Screen Capture of Slick Sleuth Base Station. In addition to Real Time Data and Alarm, Every Sampling the System Reports & Archives: Station Name, Oil Detect/No-Detect, Date & Time Stamp, Actual Measurement, Sensitivity Setting, and System Diagnostic Health.

Figure 5A. Offshore Loading Buoy Application. System Array w/ Wireless Radio & Solar Power.

Figure 5B. Harbor - Fuel Pier Application w/ Wireless GSM Cellular Communications.

Figure 5C. Slick Guard Environmental Platform w/ Slick Sleuth Sensor, Wireless Radio (900 MHz) and Solar Power.

Appendix B -- Detailed Slick Sleuth™ System Specification

SLICK SLEUTH™ OIL SPILL MONITORING SYSTEM FOR SAN DIEGO BAY

MODEL SS200 RDS – REMOTE DETECTION SENSOR STATIONS

- NEMA 4X IP66 Stainless Steel Weatherproof Housing Solid State Electronics and Optics
- Sensor Excites and Detects Fluorescence Indicative of Oil [eg. Bunker/fuel oils, diesel, lube, motor, etc.]
- User Selected Sampling Period for Automated Detection and Alarm Notification
- 24/7/365 Operation --All Weather, Night or Daylight
- 4 Corner Tabs for attaching sensor enclosure above water
- Dimensions: 20cm x 30cm x 38cm -- Weight: approx. 13 kg
- External Ports: Power Input, Analog Signal Output(s), RS232 Serial Interface
- For operation with: 85-230 VAC or +12 / -12 VDC Power sources

COMMUNICATION PROTOCOLS

- RS232 Serial Communication for Data I/O & Setup/Maintenance Interface
- Oil Detection Relay (DPDT), and Equipment Status Relay (SPDT)

SLICK SLEUTH UTILITY PROGRAM

- For initial installation, setup, periodic QA/inspection and troubleshooting
- Communication over the RS232 Serial Interface
- Allows the user to control sensitivity (detection threshold) and other monitoring parameters

SLICK SLEUTH SERIAL INTERFACE CABLE

- 5 Meter Serial Cable with Serial to USB Adapter

LOCAL STATUS / ALARM INDICATORS

- Integral Red/Green 'Dummy Lights'. Oil/No-Oil and Fault/No-Fault Indication
- Rated for Class I, Div II Hazardous Installation

SOLAR POWER SOURCE (PSU) & WIRELESS DATA TELEMTRY (RTU)

- PSU – includes solar panels, power management unit, battery and interconnect cabling for continuous operating power for each Slick Sleuth RDS and Wireless RTU location
- RTU - includes wireless communications (cellular) and real-time alarm notification between remote sensor stations and Base Station
- PSU & RTU housed in single Stainless Steel Enclosure

BASE STATION – MONITORING & ALARM NOTIFICATION

- Dedicated Base Station PC configured with Wireless Modems and Graphic User Interface (GUI)
- Provides network control and management, central system supervisory control, and automated remote monitoring and alarm notification functions of the Slick Sleuth Remote Detection Stations
- Records and archives alarm history, system health, and data archive
- Real time alarm (event alert notification) via text message to cell phones and/or email addresses

Appendix C – Cost Proposal for Slick Sleuth™ System

Major Cost Items	Qty	Unit Price	Total Price	In-Kind	Final Cost
Hardware at IOS list price					
SS200-RDS Oil Spill Sensor	4	$14,995	$59,980	$13,196	$46,784
Local LED Indicators on Sensor	4	$565	$2,260	$497	$1,763
Serial Cable & USB Adapter	2	$275	$550	$121	$429
Solar Power (PSU) & Remote Telemetry (RTU)	4	$9,875	$39,500	$8,690	$30,810
Base Station GUI, Network & RTU Receiver Interface	1	$14,965	$14,965	$3,292	$11,673
Hardware Subtotal			**$117,255**	**$25,796**	**$91,459**
Installation Labor and Materials					
Installation & Start Up			$29,390	$8,229	$21,161
Installation Labor and Materials Subtotal			**$29,390**	**$8,229**	**$21,161**
Operational and Advisory Panel Support					
Site inspections			$8,443	$6,057	$2,386
Wireless Data Service (Cellular)			$4,000	$0	$4,000
Advisory Panel & IOS In-Kind Volunteer Support			$3,443	$3,443	$0
Operational and Advisory Panel Subtotal			$15,886	$9,499	$6,386
Total Project Cost			**$162,531**	**$43,523**	**$119,006**

LABOR DETAILS

Labor and Materials for Engineering, Installation, QA / Field Visits, Reporting	Hours	Hourly Rate	Total Price	In-Kind	Final Cost
System Engineering [inc. Drawings & Docs]	32	$167.10	$5,347	$1,497	$3,850
Field Technicians for installation - 3 people, 4 days ea	96	$113.40	$10,886	$3,048	$7,838
Base Station Communication Hook up	8	$167.10	$1,337	$374	$962
4 sets of Installation Hardware -- custom mounting brackets and hardware for pilings/piers			$5,820	$1,630	$4,190
Lease Work Boat for system installation -- 4 days			$6,000	$1,680	$4,320
Installation Subtotals	136		$29,390	$8,229	$21,161
Two site inspections for quality assurance testing					
Field Technicians for site visit - 2 people for 2 days	32	$113.40	$3,629	$3,629	$0
Lease Smaller Work Boat for site inspections - 2 days			$1,500	$1,500	$0
Year-end system check for quality assurance testing					
Field Technicians for check out -- 2 people for 1 day	16	$113.40	$1,814	$508	$1,306
Lease Work Boat for final system check out -- 1 day			$1,500	$420	$1,080
Site Inspections Subtotals	48		$8,443	$6,057	$2,386
Advisory Panel & IOS In-Kind Volunteer Support					
Sensor location analysis -- 3 people for 1 day	24	$19.56	$469	$469	$0
Ongoing system and data analysis and Final Evaluation Report -- 2 people for 1 day plus 1 person for 4 weeks	176	$19.56	$3,443	$3,443	$0
Advisory Panel Subtotal	200		$3,912	$3,912	$0
Total Labor Details	**384**		**$41,746**	**$18,198**	**$23,547**

NOTE: All Material Prices are Based on IOS List Price. IOS Labor Rates are Based on IOS' Rates with SDUPD for the Operation and Maintenance of SDMIS, FY 2008/2009, District Agreement # 52-2008. Volunteer Rates are Based on Approved Federal Rates, per the RFP.