National Transportation Safety Board
Washington, D.C. 20594

Report Date: May 28, 2008

Addendum to Environmental Response Group Chairman's Factual Report

A. Accident Identification

Description:	*Cosco Busan* Allision with San Francisco-Oakland Bay Bridge
Commodity:	Intermediate Grade Fuel Oil (IFO-380)
Location:	San Francisco Bay
Date/Time:	November 7, 2007, 08:30 PST
NTSB No.:	DCA08MM004

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C. Local Oil Spill Contingency Plans

The California Department of Fish and Game, Office of Spill Prevention and Response (OSPR) oversees a grant program that allows counties that are adjacent to marine waters in California, including those in the San Francisco Bay and Delta Area, to apply for funding that can be used for the development and maintenance of local oil spill contingency plans, specific to their locality, among other areas. Title 14 of the California Code of Regulations (14 CCR)[1], Section 852.60 discusses the Local Government Grant Program currently in place for the State. The objective of this program is to "encourage local governments to complete, update or revise an oil spill contingency plan element and to help provide a coordinated response and cleanup effort between local governments and State and Federal officials in order to provide the best achievable protection of the California Coast."

14 CCR 852.60 also discusses the makeup of the Unified Command. According to this regulation the Unified Command shall include the Federal On-Scene Coordinator (FOSC), State Incident Commander (IC), the representative of the responsible party, and the representative from the local jurisdiction(s) directly impacted by the spill, who should be designated within the local plan. However, participation by local representatives in the Unified Command is ultimately the decision of the Federal government and if included the local representative would have no authority. Participation is also contingent upon several factors, including completion of a local plan that meets the established State requirements[2], recognition of the FOSC and State IC's authority to issue orders and direct the responsible party, participation in the port area planning process, and upon completion of this process entrance into a memorandum of understanding (MOU) among the State and all local governments within the county.

Conditions of grant application are discussed in 14 CCR Section 852.61 including but not limited to the application process, eligibility, contents of the applications, the review process, recipient selection, the grant agreement, and grant monies available. Counties who applied for grant funding were initially awarded $50,000 for the development of their local plan. Once local plans were in place, the counties were then eligible to apply for roughly $5,000 per year afterward to cover expenses associated with the following:

- Plan maintenance
- Participation in Area Committee planning and sub-committee meetings
- Review of Area Contingency Plans
- Providing local government input to revisions to Area Contingency Plans
- Comparison of information contained in Area Contingency Plans with the local oil spill contingency plans
- Documentation of the differences as a result of the updates made to the Area Contingency Plan in 2008

[1] California Code of Regulations, Title 14, Division1, Subdivision 4, Office of Oil Spill Prevention and Response, Chapter 5 Loans, Claims and Grants, Subchapter 1: Local Government Grant Program, Sections 852.60-852.65.
[2] California Government Code, Title 2, Division 1, Chapter 7.4, Section 8670.35.

This grant program is a voluntary, not mandatory one. Thus while regulations promote local governments' development and maintenance of oil spill contingency plans to aid in a coordinated effort, it does not require that the local governments create a plan.

The format and consistency requirements for local oil spill contingency plans are detailed in 14 CCR Section 852.62.1. Under this section regulations mandate that all plans be consistent with the National Contingency Plan, Marine Oil Spill Contingency Plan, applicable Area Contingency Plan, and the local government's coastal program[3]. Further, Section 852.62.2 outlines the minimum planning requirements expected to be included in plans to be submitted for grant consideration. According to this section, all local plans are required to at a minimum contain the following sections: Emergency Notification and Coordination, Emergency Planning and Procedures, and Local Resource Information, the expected contents of which are laid out in detail in this Section. Based on this section 14 CCR, a "Minimum Planning Requirements Checklist" was created by OSPR to assist interested counties in the development of their local oil spill contingency plans.

Under the San Francisco Bay and Delta Area Contingency Plan (ACP-2) the planning area extends through portions of Marin, Sonoma, Napa, Solano, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco. According to OSPR, with the exception of Napa, Sacramento, Santa Clara, and San Joaquin, each of these counties applied for and received $50,000 in grant money to develop a local oil spill contingency plan in accordance with 14 CCR 852.60 when the program was introduced in 1993. San Joaquin attempted to participate in the grant program in 2000 by submitting a local plan to OSPR, but it did not meet requirements and thus was not approved; the county did not attempt to resubmit the plan. Since the development of existing local plans however many of the counties that originally applied for the $50,000 grant have not applied for funding to maintain the plans and as a result many of them are out of date.

The Local Government Grant Coordinator for OSPR indicated that San Francisco, Marin, Solano and Sonoma have the most current oil spill contingency plans in the San Francisco Bay and Delta area, meaning that they have been updated within the last three years. Additionally these four counties were the most active participants in Area Committee planning prior to the *Cosco Busan* accident. On the opposite end of the spectrum Alameda, Contra Costa and San Mateo counties have not updated their local plans since their initial development in 1995-96. These three counties have however periodically participated in Area Committee planning over the past several years.

SEE ATTACHMENTS 1 & 2

D. Regional Contingency Plan

The purpose of the Federal Region 9 Regional Contingency Plan (RCP) is to act as a comprehensive reference guide for coordinating responses to hazardous materials

[3] This section refers to the Interim Marine Oil Spill Contingency Plan and the USCG designated Area Plan, once developed. Since the latest revision to these regulations was completed in 1997, the Marine Oil Spill Contingency Plan was finalized and Area Contingency Plans were established.

releases, including oil spills, within the States of Arizona, California and Nevada and the 146 tribal nations, as mandated by Section 300.205 of the National Contingency Plan. It is intended for use by Local, Tribal, State, and Federal emergency response personnel as a tool for obtaining resources to respond to an oil or hazardous materials incident. It outlines the response mechanisms that would be activated among the various levels of the response community in the event of an emergency situation. It is not intended to coordinate with Local plans and build on the mechanisms set forth in State emergency response plans.

According to the RCP, the national standard for incident management adopted by the USCG is the National Incident Management System (NIMS) Incident Command System (ICS). The ICS includes five management functions; Incident Command, Operations, Planning, Logistics, and Finance, some of which may or may not be necessary for a particular incident. In the event that multiple agencies have jurisdictional responsibility for an incident, a Unified Command, representing joint decision making authority, is incorporated into ICS to allow these agencies to work together to develop a common set of objectives and strategies, and manage the incident. The Unified Command would consist of the Federal IC [Federal On-Scene Coordinator], the State's IC [State On-Scene Coordinator], the Local IC, and the Responsible Party IC[4].

Section 2002 of the RCP[5] describes the Unified Command structure as one that brings federal and state agencies, and the responsible party together to achieve an effective and efficient response. Within this structure, the Federal On-Scene Coordinator (FOSC) holds the ultimate authority for all decision making related to the response, and responsibility for worker health and safety concerns. Section 2004 of the RCP explains the shared command response authorities on the Federal and State level. Pursuant to National Contingency Plan and OPA, for all responses under their jurisdiction, the FOSC assumes the role of the Federal IC. On the State level, the plan discusses the roles of California DFG and OES, and goes on to say that DFG shall serve as the State IC when natural resources are at risk.

The responsibilities of the FOSC are discussed in detail in Section 2005 of the RCP. The plan explains the role of the FOSC as directing Federal response efforts and coordinating other Federal efforts at the scene of a discharge or release, ensuring adequate oversight of response actions, and if not being properly conducted; ultimately having the authority to take over or federalize the response. In accordance with the NCP, upon notification of a discharge or release the RCP lists 10 specific FOSC responsibilities. These responsibilities include notifying appropriate State and Federal agencies, determining whether appropriate response actions have been initiated, collecting information concerning the discharge or release, coordinating efforts with appropriate Federal, State

[4] There appears to be an internal conflict within the Command section of the RCP (Section 2000), which discusses the entire region, and Appendix VII (B) of the RCP, which discusses the California State Response System specifically. Appendix VII (B) indicates that the Unified Command would consist of the USCG, OSPR, and the responsible party, whereas Section 2000 indicates that the Unified Command would consist of the Federal IC, State IC, Local IC, and Responsible Party IC.

[5] ACP-2 refers to the parallel command sections of the RCP for guidance.

and Local agencies, consulting with and informing Regional Response Team members via pollution reports, implementing community relations activities, and addressing worker health and safety issues both before and during the response, among other responsibilities. The specific responsibilities of the State IC and the Responsible Party are not discussed in the RCP.

SEE ATTACHMENT 3

E. Nontank Vessel Contingency/Response Plans

State of California Requirements

The California Lempert-Keene-Seastrand Oil Spill Prevention and Response Act was enacted in 1990 with the purpose of preventing and cleaning up oil spills and mitigating associated environmental damage. OSPR and the California State Lands Commission have primary responsibility for implementing this Act. OSPR requires all nontank vessels to prepare and implement an oil spill response contingency plan approved by the OSPR Administrator.[6] The nontank vessel oil spill contingency plan (NTVCP) must ensure the undertaking of prompt and adequate response and removal of spilled oil, consistent with the State and National contingency plans. The NTVCP must identify a Qualified Individual (QI) and at least one appropriately State-rated[7] oil spill response organization (OSRO) that shall be directly responsible by contract to provide oil spill response capability pursuant to the plan.

Following the enactment of the Act, regulations[8] were adopted defining spill prevention and response planning requirements for nontank vessels of 300 tons or greater and prohibiting operation in California marine waters unless the owner/operator has an approved NTVCP. Among numerous requirements specific to nontank vessels, the owner/operator must own or have contracted on-water recovery resources sufficient to respond to all oil spills up to the reasonable worst case spill volume[9] in the time frames specified. The regulation also requires the vessel owner/operator to demonstrate through contracts or other approved means that it has the resources necessary to deploy appropriate shoreline and sensitive site protections.

The response capability standards, Section 827.02(h)(2) of 14 CCR, states that the equipment and personnel necessary to address the reasonable worst case spill are brought to the scene of the spill within a period of time that is dependent upon the particular risk

[6] California Government Code, Title 2, Division 1, Chapter 7.4, Section 8670.29(a).

[7] California Government Code, Title 2, Division 1, Chapter 7.4, Section 8670.30, states that the Administrator shall establish rating levels for classifying OSROs based on compliance with criteria established by the Administrator, including the geographic region of operation, response times, equipment resources, and capabilities.

[8] California Code of Regulations, Title 14, Division 1, Subdivision 4, Office of Spill Prevention and Response, Chapter 3, Oil Spill Prevention and Response Planning, Subchapter 4, Oil Spill Contingency Plans, Non-tank Vessels, Sections 825.01 – 827.02 (effective November 5, 2007).

[9] The reasonable worst case oil spill is defined by Section 825.05 as the total volume of the largest fuel tank on the non-tank vessel. In the case of the *Cosco Busan*, this amount is 5874 barrels.

zone in which the nontank vessel is located. Nontank vessels operating on certain high volume ports, such as San Francisco, are required to have the on-water recovery capability to address worst case oil spill volume at the scene within six hours. Resubmission for review is to take place once every 5 years.

On October 15, 2007, the *Cosco Busan* was added to Fleet Management's NTVCP in accordance with California regulations. Fleet Management's plan identifies the O'Brien's Group as the Qualified Individual. The Notification Procedures section of this plan, Section (d), includes three notification checklists that are to be followed by the Master of the vessel, Qualified Individual, and Owner/Operator. According to this section, the Master of the vessel shall make rapid and accurate notification of all actual and potential oil discharges without delay to the appropriate organizations and agencies, as shown in the following checklist:

	Master Checklist
1	Qualified Individual (QI)
2	USCG National Response Center (NRC)
3	California Office of Emergency Services (OES)
4	MSRC & NRCES (contracted oil spill response organizations)
5	Out of State Reporting: Notify Immediately California DFG-OSRR / California OWCN
6	California State Land Commision
7	Additional important notification contacts are listed in the Response Directory Section
8	Fleet Management LTD
9	Port Agents - (if in port)

FIGURE 1 – NTVCP MASTER CHECKLIST

Similarly, the Qualified Individual and vessel Owner/Operator are responsible for the notifications found in the following checklists:

	Qualified Individual Checklist
1	An immediate decision regarding spill response equipment and personnel will be required. The contracted Oil Spill Response Organizations (OSRO), MSRC and NRCES, must be notified and activated as required.
2	Remain in constant communtication with the Federal On-Scene Coordinator (FOSC) and State Incident Commander to relay information about the vessel's position, report the action initiated and coordinate initial shore-based response actions.
3	Notify other required State and other agencies, for the section of the *Initial Response Acitivity Manual* , for the location of the vessel
4	Notify Spill Management Team, and vessel Owner/Operator, and commence response activity. Take charge of salvage and clean-up operations until relieved by the Spill Management Team's Incident Commander or Owner's representative. The Spill Management Team is O'Brien Oil Pollution Service, Inc.

FIGURE 2 – NTVCP QUALIFIED INDIVIDUAL CHECKLIST

Fleet Management LTD Checklist	
1	Notify Vessel's National Authorities
2	Notify Insurance Manager
3	Notify Protection & Indemnity representatives. Also notify additional legal representative as desired.

FIGURE 3 – NTVCP OWNER/OPERATOR CHECKLIST

SEE ATTACHMENT 4

Federal Requirements

The Coast Guard and Maritime Transportation Acts of 2004 and 2006 (CGMTA 2004 & 2006) requires owners and operators of nontank vessels to prepare and submit to the USCG plans for responding to a worst case discharge, and to a substantial threat of such a discharge, of oil from their vessels. This Act defines "nontank vessel" as a self-propelled vessel of 400-tons or greater, other than a tank vessel, that carries oil or any kind of fuel for main propulsion, and that is a vessel of the United States, or operates on the navigable waters of the United States. CGMTA 2004 also mandates that the USCG issue regulations requiring the submission of these plans, which were to have been submitted to the USCG by August 8, 2005. The CGMTA 2006 clarified applicability of this Act with respect to tonnage convention measurement.

To assist the maritime industry in complying with the plan submission deadline, the USCG announced the availability of a Navigation and Vessel Inspection Circular (NVIC) No. 01-05, in the Federal Register on February 16, 2005 (70 FR 7955). This NVIC provided voluntary guidance to nontank vessel owners and operators for preparing plans and submitting them to the USCG pursuant to this Act. Additionally, on June 17, 2005, the USCG published a notice and request for comments on Nontank Vessel Oil Response Plans (70 FR 36649).

Among the issues addressed by the notice was the question of when CGMTA 2004 would be enforced by the USCG. Because of the length of time needed to provide for consideration of public comment, the USCG anticipated that final regulations would not be in place by the August 8, 2005 deadline. Consequently, the USCG determined that it would not enforce the Act until regulations are issued and in effect.[10] The Notice further advises that NVIC 01-05 is a voluntary process for submitting response plans and for obtaining interim authorization letters from the USCG, and is not in itself enforceable by the USCG. However, vessel owners and operators who wanted to secure interim authorization letters because they believe their vessels may ultimately be covered by regulation were highly encouraged to use the authorization process under NVIC 01-05.

With the continued absence of nontank vessel response plan (NTVRP) regulations, on February 14, 2006, the USCG announced the availability of revised guidance (71 FR

[10] August 1, 2005 USCG message to ALCOAST 398/05 from the Commandant, USCG Washington D.C.

9367) in the form of NVIC No. 01-05 Change-1. This interim guidance closely paralleled existing regulations for Tank Vessel Response Plans found in 33 CFR 155. Among other things required in the plan, is the identification of a Qualified Individual who has full authority to implement spill removal actions and communicate with Federal officials and oil spill response organizations. The plan must also identify, and ensure by contract or other approved means, the availability of private personnel and equipment necessary to remove to the maximum extent practicable a worst case discharge[11], and to mitigate or prevent substantial threat of such a discharge. The revised guidance suggests that planning for high volume ports, such as the port of San Francisco, should account for response equipment necessary to address a worst case discharge. The guidance dictates that response equipment should be capable of arriving on scene within 12 hours, and should be en route to the scene of a discharge within two hours of notification.

In accordance with NVIC 05-01, on October 15, 2007, Fleet Management added the *Cosco Busan* to its NTVRP that has been on file with the USCG since February 15, 2005. In addition to the *Cosco Busan*, this plan includes 76 other vessels operated by the company. The Qualified Individual is identified as The O'Brien Oil Pollution Service, Inc, and the plan further indicates that Fleet Management had made response coverage arrangements with two primary oil spill response organizations; MSRC and NRCES.

In the event of an oil spill, the Notification Procedures Section of Fleet Management's NTVRP outlines the notifications to be made immediately. The section includes three checklists for "person in charge of a vessel", the Qualified Individual, and the owner/operator, respectively. According to this section, rapid and accurate notification of all or potential oil discharges shall be made without delay. The following checklists mirror those found in the NTVRP, and outline notification responsibilities:

	Notifications Checklist
1	Qualified Individual (QI): O'Brien Oil Pollution Service, Inc. - Inform QI to notify National Response Center
2	If not able to nottify QI, make ALL notifications required *as per the applicable GSA in Appendix A of this plan.*
3	Owner/Operator
4	Port Agents - (if in port)

FIGURE 4 – NTVRP "PERSON IN CHARGE OF A VESSEL" CHECKLIST

[11] Worst case discharge means a discharge in adverse weather conditions of a vessel's entire fuel capacity.

Qualified Individual Checklist	
1	Immediately notify USCG National Response Center
2	An immediate decision regarding spill response equipment and personnel will be required. The appropriate Oil Spill Response Organizations (OSRO) and/or Salvage/Firefighting provider must be notified and activated as required.
3	Remain in constant communtication with the Federal On-Scene Coordinator to relay information about the vessel's position, report the action initiated and coordinate initial shore-based response actions.
4	Notify all required State and other agencies listed under *Appendix A Foreward* , relevant to the location of the vessel
5	Notify Spill Management Team, and vessel Owner/Operator, and commence response activity. Take charge of salvage and clean-up operations until relieved by the Spill Management Team's Incident Commander or Owner's representative.

FIGURE 5 – NTVRP QUALIFIED INDIVIDUAL CHECKLIST

Owner/Operator Checklist	
1	Notify Vessel's National Authorities
2	Notify Insurance Manager
3	Notify Protection & Indemnity representatives. Also notify additional legal representative as desired.
4	Cargo Owner/Charterer

FIGURE 6 – NTVRP OWNER/OPERATOR CHECKLIST

In the absence of current federal regulations enabling the USCG to enforce the provisions of CGMTA 2004 & 2006, NTRVPs are only currently required by certain States, notably California, Alaska, Oregon, Texas and Washington. The USCG is in the process of drafting a Federal Register Notice that will change their enforcement posture. This change will not begin until 60 days after the Federal Register Notice has been published.

SEE ATTACHMENTS 5 – 7

F. Remote Oil Spill Detection and Assessment Technologies

Timely response and effective direction of cleanup resources to oil spills requires rapid reconnaissance to determine the exact location of the spill, the extent of oil contamination, and verification of predicted oil slick movements. As was the case in the *Cosco Busan* incident response, Unified Command and oil spill response organizations relied primarily on visual observation from aircraft for gaining situational awareness. Although overflights can be a valuable tool in the response effort, visual observations and quantifications are often subjective. The quality of oil slick visual observation is dependent upon the training and experience of the observer, and is limited by foul weather and lighting conditions.

Overview

Remote sensing equipment mounted in aircraft has increasingly been used to supplement visual observations in the identification of illegal pollutant discharge sources, and assessment and monitoring of marine oil spills. In remote sensing, a sensor other than human vision or conventional photography is used to detect or map oil spills. Remote sensing devices are capable of detecting changes caused by oil spills in physical properties of the sea surface such as color, reflectance, temperature or roughness. These sensing devices include such technologies as infra-red (IR) video and photography, infra-red/ultraviolet (IR/UV) combination system, thermal infrared imaging, airborne laser fluorosensors (LF), synthetic aperture radar (SAR), side-looking airborne radar (SLAR), microwave radiometer (MWR), and optical sensors.

The IR/UV sensor class represents the lowest cost alternative; however it is limited by fog and poor lighting conditions. LF has the ability to positively identify oil on a variety of surfaces, including sunken oil at depths of 1 to 2 meters, and may even differentiate between certain classes of oil. LF however requires highly trained operators, is very costly to operate and maintain, and has limited utility in fog and other conditions where particulates interfere with laser. SAR and SLAR sensors offer the potential for conducting large area searches and the capability of providing data under poor weather conditions and darkness; however these methods are limited by relatively high expense, the need for dedicated aircraft, and results are affected by low or high wind conditions. At the present time, because of extreme costs there are no SAR/SLAR systems with foul weather capability operated commercially in the United States. MWR detection is similar to IR/UV, except that it detects the higher relative temperature of oil as compared to seawater. Optical and radar satellite sensors continue to be used on major oil spills where coverage is available, but are limited by slow revisit rates and low spatial resolution and therefore this method is not considered optimum for real-time spill assessment or tactical operations[12].

SEE ATTACHMENTS 8 & 9

Remote Sensing Technologies in Use or Development

International

The governments of Belgium, Denmark, France, Germany, Netherlands, Norway, Sweden, and the United Kingdom are signatories to the 1983 Bonn Agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances. These eight countries routinely conduct surveillance operations from remote sensor equipped aircraft in order to locate oil spills and other pollution threats, and to deter vessels and offshore installations from breaching anti-pollution international

[12] *Remote Sensing and Surveillance of Oil Spills*. U.S. Department of the Interior, Minerals Management Service. http://www.mms.gov.

agreements.[13] During 2006, North Sea surveillance flights had detected 347 confirmed oil spills.

The Canadian government equipped a DC-3 aircraft with remote sensing equipment that included a Scanning Laser Environmental Airborne Fluorosensor (SLEAF). This sensor is capable of operating during daylight or total darkness to detect and classify oil slicks. Canada's SLEAF system has been tested in two flight demonstration programs, where several oil slicks were successfully located first in the waters around Newfoundland and the Gulf of St. Lawrence during 2004, then around Vancouver during 2006.

SEE ATTACHMENT S 10 – 12

U.S. Coast Guard

USCG aircraft are not outfitted with sensors that are dedicated solely for the remote sensing of oil spills, unlike the aircraft employed by European nation participants in the Bonn Agreement. In November 2006, the USCG Research and Development Center published a cost-benefit analysis to determine the feasibility of implementing LF remote sensing technology to assist in its response to heavy oil spills. USCG statistics indicate that between 1995 and 2004, over 2000 incidents involving at least 500 gallons have occurred on navigable waters of the U.S., resulting in nearly 25 million gallons of oil spilled. Heavy oil spillage, defined as No. 5 fuel, No. 6 fuel, heavier fuels, bunker fuels and heavy crude oil, comprise 10-percent of the reported oil spills during the past decade. There have been 115 heavy oil spills of at least 500 gallons in navigable waters of the U.S. during this time period.

The average annual number of oil spills has decreased from an average of 16 spills per year during the first half of the decade to an average of 7 spills per year during the last half of the past decade. There has been a corresponding decrease in the volume of heavy oil spillage as well, from an annual average of 348,000 gallons to 123,000 gallons, respectively. USCG data further indicates that during the past decade, California experienced little more than one significant heavy oil spill per year into navigable waters from all sources, averaging approximately 14,700 gallons per event. The study concluded that acquiring a long-term LF capability within the USCG was not warranted on the basis of projected operational costs and savings in terms of response costs, natural

[13] *Bonn Agreement Aerial Surveillance Handbook*, 2004: The Belgium Ministry of Environment conducts aerial surveillance using a Britten Norman Islander (B02) aircraft fitted with SLAR, IR/UV and camera systems. The Royal Danish Air Force operates three Challenger aircraft that are equipped with SLAR, IR/UV, video/photo cameras, with planned upgrade to include SAR. France operates two Cessna 406 aircraft that are equipped with SLAR, IR/UV, FMS and MWR systems. The German Federal Waterways and Shipping Administration operates two Dornier Do 228-212 LM aircraft that are outfitted with SLAR, IR/UV, MWR, laser fluorosensor, FLIR/CALI, video and camera systems. Royal Netherlands Navy pilots operate a Dornier 228-212 aircraft equipped with SLAR, IR, video and photo cameras. Norway leases a Fairchild Merlin 3B/LF-SFT aircraft that is equipped with SLAR, IR/UV, and photo and video cameras. The Swedish Coastguard operates three CASA 212 aircraft that are fully equipped with remote sensing systems. The United Kingdom Maritime and Coastguard Agency uses two aircraft; a Cessna 404 and Cessna 406 that are equipped with SLAR, IR/UV, video and digital cameras, night identification and data transmission systems.

resource damages, and socioeconomic costs. However, the study suggested that the USCG should evaluate short-term acquisition of LF capability to further investigate the utility and performance of this technology.

At the time of the *Cosco Busan* accident, the USCG possessed two North Carolina-based C130 aircraft equipped with SLAR remote sensing systems capable of detecting and mapping oil spills at night and during adverse weather conditions. For many years the main mission for these aircraft has been ice patrol; however USCG aerial sensor equipped aircraft have also provided reconnaissance during the *Exxon Valdez* and Persian Gulf oil spills. The ability of these aircraft to detect oil in harbors is diminished by interferences caused by such factors as wind shadowing and seaweed beds. In order to detect oil with SLAR technology, wind speed over the water surface must exceed 5 knots. The circumstances of the *Cosco Busan* incident would not have been ideal for deployment of these aircraft because of wind shadowing interferences caused by the harbor topography, the lack of wind as evidenced by the fog on Day 1, and the crowded airspace nearby the San Francisco and Oakland airports.

The USCG also has thermal IR and visual imaging capability on many of its HH65 helicopters, long-range HC-130 aircraft and medium-range jets. This equipment is primarily used for search and rescue and law enforcement missions, but could also be capable of observing oil slicks in fair weather and light precipitation conditions. The USCG may soon discontinue the use of SLAR since the equipment is getting old and is not supportable. Some of the USCG's next generation airborne radars will have a similar "strip SAR" mapping capability to replace the SLAR functionality. The USCG is replacing or upgrading nearly all of its aircraft over the next few years and most of them will have radar and/or IR sensors that can be used to assist with oil spill response.

SEE ATTACHMENTS 13 – 16

California OSPR and Others

On March 2, 2007, Ocean Imaging Corporation received funding for research and development of a portable multispectral aerial sensor for real-time oil spill thickness mapping that could be quickly deployed during an oil spill emergency. Locating and mapping the thicker portions of an oil slick would allow for the more efficient deployment and positioning of spill recovery resources. This project is being funded by the Department of Interior Minerals Management Service (MMS) and the California Department of Fish and Game OSPR. The goal of this project is to develop a marketable, easy to use, and inexpensive portable instrument that can be quickly placed in an aircraft or helicopter of opportunity. Because this system is based on UV/near IR and visible green/yellow wavelengths, it would not be considered useful for operation in fog or poor weather conditions.

The current MMS/OSPR research project is expected to lead to the deployment of an operational oil spill remote sensing system within the next year[14]. Future testing of this equipment includes a USCG prep-drill that is scheduled in San Diego California during June 2008, during which the downlink capability of remote sensing data to the incident command post will be attempted. FIGURE 7 displays an example of experimental imagery obtained from aerial sensors showing natural oil seeps in the Santa Barbara Channel.

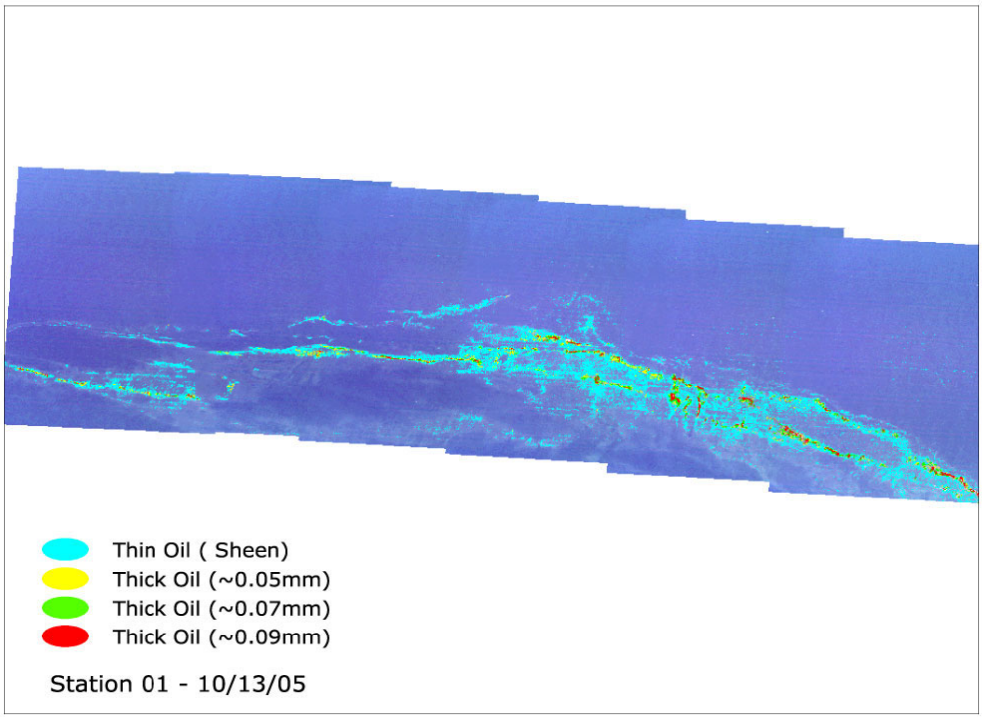

FIGURE 7 – EXAMPLE OF MULTI-FRAME MOSAIC OF DIGITAL MULTI-SPECTRAL CAMERA IMAGERY AND OIL THICKNESS CLASSIFICATION[15]

OSPR's ultimate goal for the use of remote sensing technology includes daily satellite SAR (RADARSAT) imaging of a portion of the CA coastline for proactive maritime surveillance. If a potential oil slick target is detected a Department of Fish and Game aircraft carrying Ocean Imaging's sensor would be deployed to verify that the target is oil, map the spatial extent of the slick then transmit the image to OSPR and the USCG.

SEE ATTACHMENTS 17 – 19

Crystal G. Thomas
Hazardous Materials Investigator

[14] U.S. Department of the Interior, Minerals Management Service Project Number 594: Development of a Portable Multispectral Aerial Sensor for Real-time Oil Spill Thickness Mapping in Coastal and Offshore Waters.
[15] Adapted from Figure 8 of *Real-Time Detection of Oil Slick Thickness Patterns with a Portable Multispectral Sensor*

ATTACHMENTS

ATTACHMENT 1 – *LOCAL GOVERNMENT OIL SPILL CONTINGENCY PLAN, MINIMUM PLANNING REQUIREMENTS CHECKLIST*

ATTACHMENT 2 – *MEMO TO FILE: CINDY MURPHY, OSPR, MAY 2, 2008*

ATTACHMENT 3 – *FEDERAL REGION 9 REGIONAL CONTINGENCY PLAN, SECTION 2000*

ATTACHMENT 4 – *FLEET MANAGEMENT NONTANK VESSEL CONTINGENCY PLAN, SECTION D*

ATTACHMENT 5 – *AUGUST 1, 2005 USCG MESSAGE 398/05 TO ALL USCG UNITS FROM THE COMMANDANT*

ATTACHMENT 6 – *FLEET MANAGEMENT NONTANK VESSEL RESPONSE PLAN, SECTION 2*

ATTACHMENT 7 – *MEMO TO FILE: LT. JARROD DEWITZ, USCG, MAY 12, 2008*

ATTACHMENT 8 – *OIL-SPILL REMOTE SENSORS: NEW TOOLS THAT PROVIDE SOLUTIONS TO OLD PROBLEMS, ENVIRONMENT CANADA, 1998*

ATTACHMENT 9 – *MEMO TO FILE: DR. JAN SVEJKOVSKY, OCEAN IMAGING CORP, MAY 12, 2008*

ATTACHMENT 10 – *BONN AGREEMENT AERIAL SURVEILLANCE HANDBOOK, 2004*

ATTACHMENT 11 – *BONN AGREEMENT ANNUAL REPORT ON AERIAL SURVEILLANCE, 2006*

ATTACHMENT 12 – *PROTECTING CANADA'S COASTS USING LASER REMOTE SENSING TO DETECT AND TRACK OIL SPILLS, MINISTER OF THE ENVIRONMENT, 2007*

ATTACHMENT 13 – *MEMO TO FILE: KURT HANSEN, USCG, MAY 21, 2008*

ATTACHMENT 14 – *U.S. COAST GUARD OIL SPILL RESPONSE RESEARCH AND DEVELOPMENT PROGRAM, A DECADE OF ACHIEVEMENT, JUNE 2003*

ATTACHMENT 15 – *USCG AVIATION FACT SHEET, SEPTEMBER 2007*

ATTACHMENT 16 – *COST-BENEFIT ANALYSIS FOR USING LASER FLUOROSENSOR FOR DETECTING HEAVY OIL, USCG, NOVEMBER 2006*

ATTACHMENT 17 – *REAL-TIME DETECTION OF OIL SLICK THICKNESS PATTERNS WITH A PORTABLE MULTISPECTRAL SENSOR, DR. JAN SVEJKOVSKY & JUDD MUSKAT, JULY 31, 2006*

ATTACHMENT 18 – *MEMO TO FILE: JOSEPH MULLIN, MMS, MAY 12, 2008*

ATTACHMENT 19 – *FINAL REPORT: CALIFORNIA POLLUTION WATCH AND TARGET DETECTION, RADARSAT INTERNATIONAL INC, MARCH 18, 2005*