S.S. *Montebello*: Assessing Potential Pollution Effects to the Marine Environment and California Coast.

Introduction

On March 24, 2009, California's Department of Fish and Game's (DFG) Office of Spill Prevention and Response (OSPR) organized a meeting based on a letter from California Assemblyman Sam Blakeslee to DFG/OSPR, expressing concern about the integrity of S.S. *Montebello* and its cargo, and its potential impact to the central coast. OSPR considers S.S. *Montebello* California's No. 1 shipwreck oil threat. The meeting included several individuals from OSPR, representatives from Assemblyman Blakeslee office, Monterey Bay Aquarium Research Institute (MBARI), NOAA's Office of National Marine Sanctuaries and Emergency Response Division, NPS Submerged Resources Center and Cal-Trans.

Prompted by recent incidents along the coast of California and around the world have directed Federal Agencies and OSPR to begin to look proactively at catastrophic oil and other biological or chemical releases from submerged sources. Reactive strategies in addressing these threats, once a release has occurred, have proved to be ineffective and costly, as evidenced by the *Jacob Luckenbach* case.

The decade long release of heavy fuel oil from the *Jacob Luckenbach* not only caused the loss of over 51,000 seabirds and 8 Sea Otters along the coast of California, but also impacted 4,000 square miles of Pacific Ocean along with near shore tidal flats, wetlands, rocky intertidal areas, coastal beaches, sub tidal reefs, kelp forests, and underwater canyons over at least a ten year period. What was expected to cost $8 million to remove the oil and eliminate the risk eventually cost the nation over $20 million to mitigate the environmental damage and to remove the oil from the sunken cargo ship.

Background

Montebello lies 7.0 statute (6.9 nautical) miles off the California coast (outside State waters), just south of the Monterey Bay National Marine Sanctuary boundary. Built in 1921 at the Southwestern Shipbuilding Company in San Pedro California, the shelter deck tanker had an overall length of 457 feet (139 meters). The Union Oil tanker's career carrying petroleum products was for the most part uneventful, making regular runs to ports like the Hawaiian Islands, Siberia, British Columbia and other ports in the Pacific.

Figure 1: S.S. *Montebello. Courtesy of Vancouver Maritime Museum*

On December 22, 1941, *Montebello* loaded a cargo of 73,571 barrels (3,089,982 gallons) of Santa Maria crude oil at the Union Oil Company's facility in Port San Luis, California, Cargo: 21.81 Gravity. Bunker fuel oil reported on board: 2477 barrels (104,034 gallons) and unknown quantity of lubricating oil (capacity 1358 gallons).

On December 23rd at 1:30 a.m., the tanker now loaded with the cargo of oil and sitting low in the water, cleared Port San Luis breakwater proceeding on a northbound course. At around 3:30 a.m. the crew was called to station and ordered to put on life jackets, the ship was notified tanker *Larry Doheny* had been fired upon north of their location.

December 23rd at 5:40 a.m. Japanese submarine *I-21* fires a single torpedo into the starboard bow. At 5:55 the Captain Olof Ekstrom gave the order to abandoned ship, all thirty-eight crewmen left the tanker in four lifeboats as *I-21* opened fired on the boats with its deck gun. Ultimately all 38 crewmen were rescued and with no loss of life.

The crew watched the tanker settle in the bow, submerging below the surface at 6:45 a.m. As the bow started downward, the crew witnessed the stern clearing the ocean surface by 150 feet (45 meters). They concluded the tanker was struck amidships around the No. 2 tank, but couldn't understand why the cargo, with a Grade A Flash point at room temperature, why the oil did not ignite? The crew speculated the torpedo struck between decks above the oil storage tanks.

Previous Reconnaissance

In 1943 the Union Oil Company filed a million-dollar claim with the U.S. War Damage Corporation for the loss of the *Montebello*, stipulating in the claim that the vessel had been within the three-mile continental limits of the United States when sunk. War Damage Corporation in 1945 produced key evidence to substantiate their claim to the final resting place of the tanker *Montebello*, implying she was outside the three-mile limit. A shipwreck was located where locals reported the *Montebello* sunk and John

Ewing of Woods Hole Institute of Oceanography was hired to take photographs of the wreck that revealed a deck arrangement of pipes, valves and tank covers. *La Placentia*, a sister ship to the *Montebello*, had the same deck equipment that was unique to only these two vessels. The team located the *La Placentia* at Martinez, on the Sacramento River, and the vessel's equipment matched those images captured in the still photographs. This provided evidence that the *Montebello* was outside the 3 mile territorial waters of the United States at the time of the attack and ultimate sinking.

Montebello was largely forgotten with the exception of local fisherman who found the site to be a productive fishing spot. It was not until members of the Central Coast Maritime Museum Association considered nominating the shipwreck to the National Register to properly memorialize the historic event. Further, there was the growing concern whether the shipwreck still contained its toxic cargo of crude oil potentially threatening the nearby waters of the Monterey Bay National Marine Sanctuary. A proposal to investigate the site of the *Montebello* and document the integrity of its hull was submitted to NOAA's West Coast National Undersea Research Center. NOAA agreed to fund the investigation utilizing Delta Oceanographics' submersible, *Delta*, which is capable of working at depths up to 1200 feet (365 meters). Archaeologist Jack Hunter, President of the Central Coast Maritime Museum Association, was the project director and principal investigator.

On November 7, 1996, working aboard the research vessel *Cavalier*, the science team included archaeologists, historians, and biologists. Utilizing a Furuno depth finder, a large target was located in approximately 850 feet (259 meters) of water. *Delta* was launched off the *Cavalier* and navigated towards the target site. Radio communications from *Delta* confirmed a large shipwreck had been located at a depth of nearly 900 feet (274 meters) and that the submersible would ascend up to the main deck to confirm the identity. It was discovered that the shipwreck was covered in fishing nets, and the pipe configuration on main deck confirmed the vessel was a tanker. This dive was the first direct observation of the tanker since the historic event of being torpedoed by the Japanese Imperial Navy in California waters 55 years earlier. Three additional *Delta* dives were made to the *Montebello*, with a total of fourteen full circumnavigations of the site recording the condition of the tanker through still photography and videotape footage. Observations made during the four dives concluded the hull was remarkably intact and resting on an even keel on the ocean floor. The bow had become detached separating just forward of the foremast where twisted metal indicated the torpedo impact zone. It was not until the end of the fourth reconnaissance dive that the bow section was located. It was discovered that the cutwater was buried in the sand some yards ahead of the main hull, with the aftermost part of the bow rising above the sea floor at a 40-degree angle with a slight list to port.

Based on this observation, it was determined that during the sinking, *Montebello* hit the ocean floor with enough force to drive the bow deep into the bottom sediment, separating at the torpedo impact zone. The aft 90 percent of the hull then recoiled back and settled squarely in its keel. More importantly the investigation concluded that the torpedo had not penetrated the region of the tanker's oil cargo storage holds as reported by

Montebello's crew, but actually struck forward in the pump room and dry storage cargo hold.

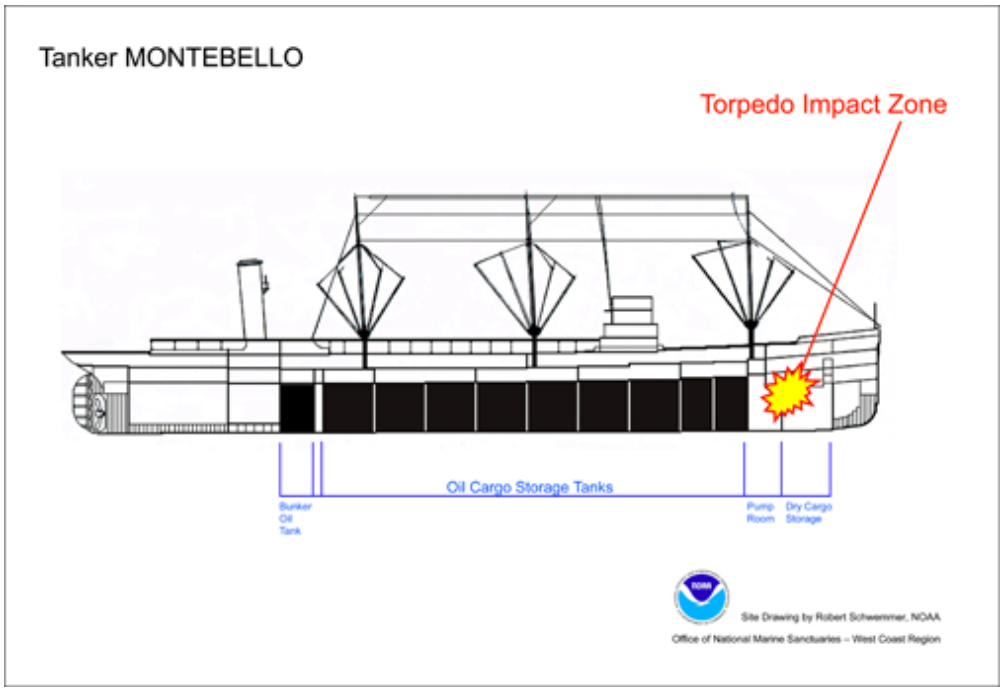

Figure 2: S.S. *Montebello* torpedo impact zone recorded during 1996 reconnaissance

It is the opinion of principle investigator Jack Hunter *Montebello*'s cargo of Santa Maria crude oil is still entombed in the tanker. During the four videotaped reconnaissance dives in 1996, there were no observations of oil being introduced into the water column.

In September of 2003 the Monterey Bay National Marine Sanctuary led an expedition to t shipwreck as part of their shipwreck-monitoring and site characterization program. The ex once again utilized the *Delta* submersible launched from the R/V *Velero IV*.

The science team included archaeologists Robert Schwemmer (Principal Investigator), Jac and John Foster; biologists Jean de Marignac and Eric Burton; educator Michele Roest; ar specialist David Lott. The mission goals were to record the structural integrity of the hull signs of degradation since the 1996 reconnaissance and investigate areas of the tanker not during the 1996 expedition. The team would also investigate and record signs of oil discha well as *Beggiatoa* bacteria feeding on hydrocarbons, and document the extensive marine l colonized at the shipwreck site

Over the course of two days, 8 successful dives were completed revealing greater details c tanker, with no observations of oil being discharged into the water column. Further, no ob of *Beggiatoa* bacteria feeding on hydrocarbons were reported. There were observations m region of the starboard stern quarter that suggests possible advances in steel corrosion may

occurred since the 1996 expedition. Sixteen fish species and 29 invertebrate species were during two 1-hour submersible dives. These numbers are conservative since there are prob more species, especially smaller and cryptic species. The shipwreck is an artificial reef tha compared to an oasis in the desert.

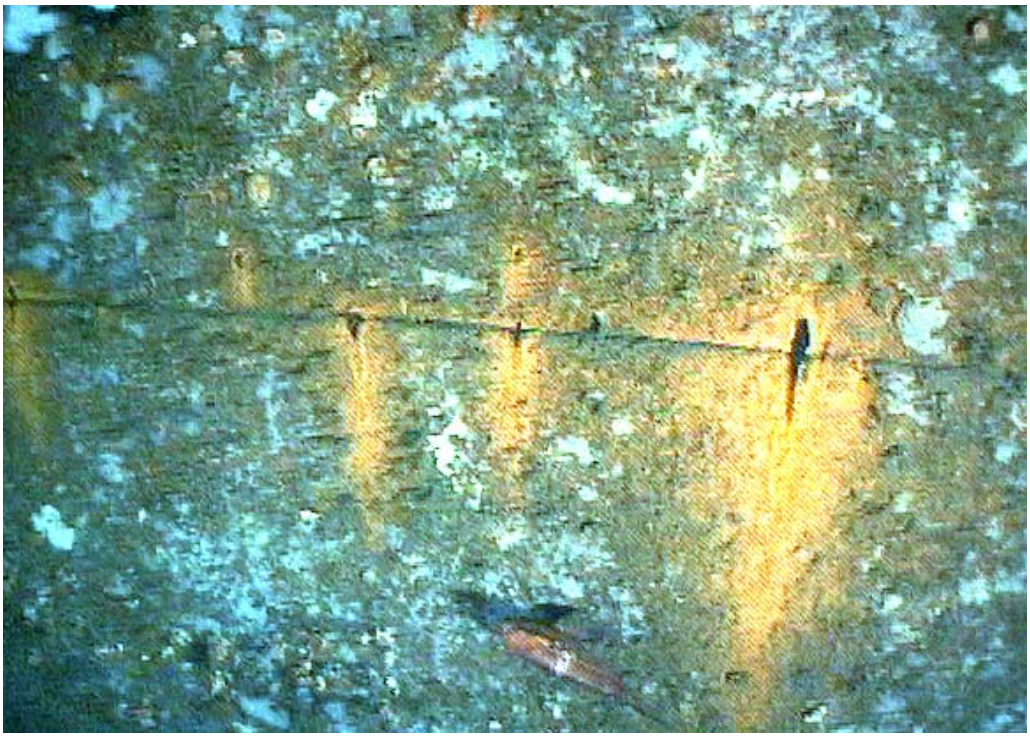

Figure 3: Possible hull corrosion recorded during 2003 reconnaissance

Research Questions

Two main questions need to be answered regarding *Montebello*'s potential risk. The first is does *Montebello* still contain her original cargo? and if so, what risk to marine resources and the California coast does the tanker pose?

Risk Assessment

Beyond the necessity to assess wreck stability to assure safe working conditions during an eventual remediation, it is also desirable to make a detailed risk assessment with focus on possible consequences of a sudden spill of all the verified remaining oil volume onboard the wreck. Today environmental issues are hand-in-hand with socioeconomic issues and the risk assessment that was started when mapping this potentially polluting wreck and will have to be more detailed prior to remediation. Before discussion of suitable remediation technique, the environmental benefit of a remediation must be economically defensible, in other words; is it possible to verify that the socioeconomic

consequences of a major spill from a specific wreck is severe enough to call for remediation?

Background Information

The wreck inspection is predominately of practical nature, but to facilitate the practical work, it is preferential to have as much theoretical information as possible about the wreck the following data needs to be assembled:

• Technical drawings of the wrecked tanker construction. In lack of drawings of a specific ship, drawings of similar ships should be studied.
• Eye-witness depictions and/or photos from the point of wreckage
• Documentation from the last journey, such as cargo and bunker reports etc
• Documentation from previous wreck assessments and remediation

Site Assessment

- What is the size, type, and construction of the sunken vessel?
- What is the likely quantity of oil on board?
- How assessable is the wreck from shore or nearest port?
- Has the wreck a history of previous oil releases?
- What oil types are contained in the wreck (cargo/bunker/lubricants)? Are they persistent oils once spilt at sea?
- Is the wreck subject to severe weather events, such as hurricanes, storms, etc.
- What is the stability of the seabed and what are the sediment effects on the wreck movement and integrity?
- Is the wreck subject to strong undersea currents and do the current direction change with the seasons?

- What is the condition of the wreck, degree of deterioration, and its fragility to natural disturbance effects?
- Is the wreck subject to high levels of hydrodynamic forces on the seabed?

Environmental Assessment

- Are there areas of high environmental sensitivity in the region?
- Does spill trajectory modeling indicate significant environmental resources at risk from oil release?
- How unique, rare or diverse is the ecology of the area likely to be affected?
- Are rare or endangered wildlife located with the region or potential spill impact zone?
- What sensitive wildlife species are at risk? Consider the diversity, number, location, and seasonality?
- Are there routes for transitory species, such a migratory birds or marine mammals?

- What is the preservation or protection status of the area at risk? Considerations include: marine protected areas, wilderness, world heritage, and conservation status?
- Are there any historical, cultural or archaeological resources in the area at risk, including war graves?
- Does the area at risk have subsistence fishing, traditional hunting/gathering or fish traps in the wreck area?
- What is the extent of scientific, educational, or research interest in the area at risk?

Economic Assessment

- Are licensed commercial fisheries, fish farms, aquaculture in the area at risk?
- What other significant industrial uses, economic resources or important uses of the ocean are present in the area at risk?
- What important recreational or tourism activities are carried out in the area at risk (sport fishing, diving, snorkeling, boating, sightseeing, surfing, and coastal recreational use?
- What levels of marine use occur within the area of the wreck?
- Is the region used a marine transport corridor?

Physical Site Assessment

Physical assessment of the *Montebello* site can be made in two phases. Each phase may or may not run concurrently as part of the same project.

Phase 1

The first phase can be conducted as a remote assessment using and Remotely Underwater Vehicles (ROV) and Autonomous Underwater Vehicles (AUV). In order to plan for detailed site assessment and potential long-term monitoring, it is important to gather comprehensive data about the site and its surrounding environment. At minimum, this should include high resolution side scan sonar, multibeam bathymetry, and photomosaic of the site and its surroundings.

A detailed three dimensional survey of the wreck and its surroundings will be made with a multibeam / side scan sonar coupled with GPS. This will provide detailed information on the wreck position, net hangs on the wreck, how intact the wreck is, and if technical drawings are available can comparisons between the sonar images and the drawings. From this information it may be possible to conclude where the structural integrity of *Montebello* has be compromised and whether piping or hatch covers have been altered or changed significantly over time. It will also serve as a baseline against which future surveys can be compared. It is therefore an important tool for long-term site monitoring. This work can be completed with unmanned ROV and AUV.

In general a sinking ship reaches its maximum sinking velocity at approximately 100 to 300 meters (328 to 984 feet) depth. The span is due to variations in e.g. different hull design, cargo and/or wreckage related damage. The present condition of *Montebello* is, besides damage from the torpedo and impact when reaching the sea floor, dependant on the environmental conditions at the site such as:

- Water depth
- Exposed or protected waters
- Current conditions
- Water temperature
- Biological activity
- Water chemistry

Water depth, in combination with wind and current conditions can increase the oxygenation of the water around the wreck, which might contribute to enhanced corrosion of the hull. Strong current running port to starboard was reported during the 2003 dive.

Other contributing parameters are salinity, biological growth and degree of burial in the sediment. These parameters are all more or less interconnected or interdependent. Hence, corrosion rates are difficult to calculate theoretically as reduction of one key parameter might induce increase of another. Beside its effect on corrosion rate, the water temperature also affects the viscosity of oil, which can cause seasonal oil spills. Finally, the water depth governs the choice of method for wreck inspection, either AUV's and/or ROV's.

Direct measurement of water chemistry and oceanographic parameters such as current can be accomplished with monitoring instruments deployed by ROV. It is recommended that a monitoring strategy be developed that may include long-term deployment of instruments to collect data over the course of several weeks or months.

Phase II

The second phase of the assessment should focus on assessing *Montebello*'s hull, oil cargo and bunker fuel oil directly. This could possibly be accomplished with an ROV, but may require a manned submersible. This may include sampling hull concretion from the vessel's hull at strategic points for later analysis to estimate hull corrosion rate. This may also involve
partnering with outside organizations to deploy private-sector technology to assess the oil cargo or hull thickness remotely.

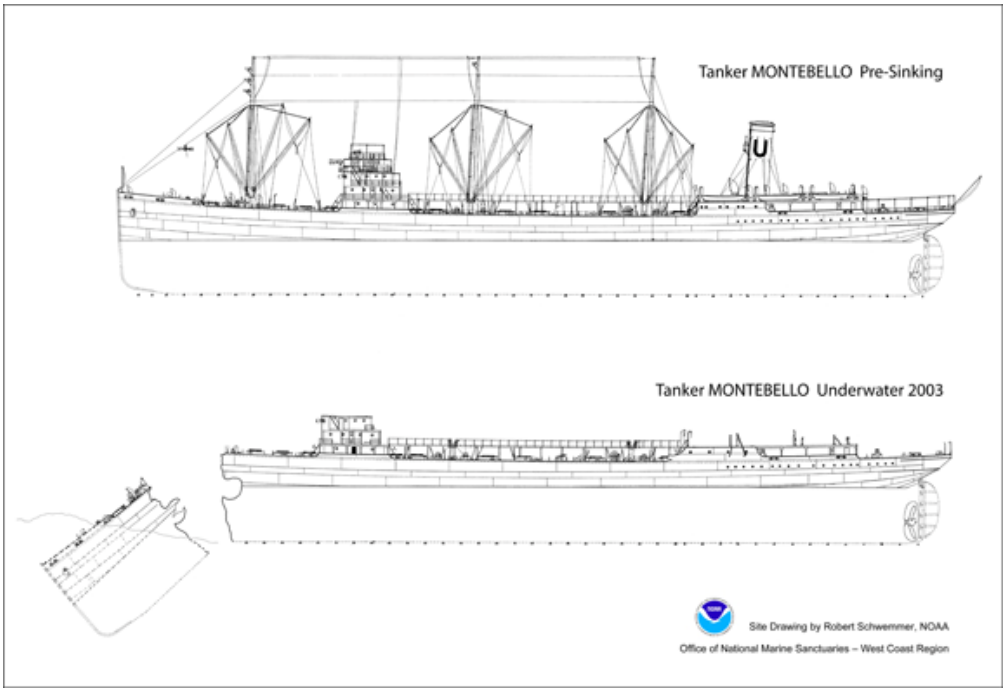

Figure42: S.S. *Montebello* condition pre-sinking and as recorded in 2003 reconnaissance

Funding

Currently the DFG/OSPR has a $100,000 imminent threat fund that could be applied to the first phase risk assessment, but doesn't have funding to conduct further monitoring assessment surveys on intervals of 5-7 years. Seeking partners to collaborate to acquire resources and expertise.

U.S. War Damage Corporation proved *Montebello* was outside U.S. Territorial waters. Unocal received $629,000 from U.S. Treasury for vessel/cargo under War Claims Act, 1948 (as amended by P.L. 187846). Their claim was made to the "War Commission" apparently under Treasury, Claim # 13274. Last payment was made in 1964. Assembly member Blakeslee has had preliminary talks with Chevron (who bought Unocal assets) – DFG/OSPR will pursue this avenue also. They may want to be player without admitting liability.

Transportation Enhancement Act (TEA) could have provided funding – but the Act is suspended until reenacted by congress
Earmarks in budget next year? Need to generate interest from federal legislators.

Grants from non-government agencies? Oil Spill Liability Trust fund has money, but U.S. Coast Guard (USCG) has historically taken a reactive strategy. If this is an imminent threat to coastline – this will kick in the fund. Need biological impacts if catastrophic release from vessel. Will check to see if USCG has jurisdiction over site?

Appendix I

S.S. *Montebello* Specifications

Keel Laid: 20 April 1920 **Hull Number:** 21 **U.S. Official Number**: 221100
Launched: Southwestern Shipbuilding Company, San Pedro, California, 24 January 1921
Owner: Union Oil Company of California
Home port: Los Angeles, California
Construction:
Steel riveted hull with machinery located aft
Isherwood longitudinal system to the highest class of the American Bureau of Shipping for carrying petroleum in bulk

Tonnage
Gross: 8272
Net: 5107

Underdeck: 6010
Displacement: 17,415
Deadweight: 12,000

Dimensions (feet)
Length: Registered: 440.0 Moulded: 440.0 Overall: 457.0
Beam: 58.2 Moulded: 50.0
Depth of Hold: 32.8 Moulded: 41.0 shelter
Freeboard: 11’ 4 ½” Draft: 29’ 3" 1/16” (loaded) 9’ 10 ½” (light)

Cargo Capacity (barrels)
Main cargo tanks 72,858
Summer tanks: 9,192
Total: 82,050 barrels
Main Cargo "Tanks One Side Only" 42Gals =BBL (2% allowed for expansion) Summer Tanks

Tanks	Frames	CU.FT.	Gals.	Gals. x2	BBLS	BBLS x 2	Frame BBLS x 2
No. 9	22-25	24469	183027	366054	4358	8716	
No. 8	25-28	24269	181532	363064	4322	8644	
No. 7	28-31	24158	180704	361408	4302	8604	
No. 6	31-34	24082	180134	360268	4289	8578	
No. 5	34-37	24299	181755	363510	4327	8654	22-25 1108

No. 4	37-40	24677	184581	369162	4395	8790	25-31 2214
No. 3	40-43	25277	189074	378148	4502	9004	31-37 2214
No. 2	43-45	16883	126288	252576	3007	6014	37-43 2212
No. 1	45-47	16434	122923	245846	2927	5854	43-47 1444
Total(s)		204548	1530018	3060036	36429	72858	9192

Main Cargo + Summer Tanks = 82050 BBLS
80,000 barrel capacity Average Cargo Loaded 76,500 BBLS
Cargo Average Time Loading: 10 hours - Cargo Average Time Discharging: 27 hours

Tanks Available for Fuel Oil

Tanks	Frames	CU.FT.	Gals.	BBLS	One Side	Both Sides
Fuel Oil	19-21	16426	122871	2925	430	860
Summer	19-22	2587	19351	461	68	136
Coffer Dam	21-22	4095	30629	729	107	214
Deep Tank	49-52	8242	61649	1468	216	432
Total(s)		31350	234500	5583	821	1642

Fitted For Fuel Oil 1454 ton capacity

Lubricating Oil Tanks
Engine Columns 1 @ 175 gallons
3 @ 703 gallons
One Tank 300 gallons

Three Tanks 180 gallons
Total 1358 gallons

Number of Hatches & Holds: 3 Watertight to Freeboard, 1 Watertight to 2nd Deck, 10 Oil-Tight Long Bulkheads, 1 Hatch 9' 6" x 10', 9 Cargo Tanks 28' 6"

STATUS OF OIL:

The cargo of Santa Maria crude oil is heavy viscous oil, with a gravity of 0.923 (API 21.81). It has the consistency of tar at this depth (885 feet / 269 meters) and temperature (41 ^{0}F / 5 ^{0}C). It would be difficult to heat to pour point: mid-80 degrees. How will this oil behave if it leaks? It would have the consistency of peanut butter and melt as it heats up. Or it may not come out at all, assuming the cargo is still contained in the 18 cargo storage tanks and bunker fuel tanks. At present research has not revealed information on the chemical properties of the bunker fuel oil or lubricants onboard at the time of sinking.

Appendix II

Further Actions

Oil Observations

Continue to conduct research in newspapers for reports large quantity of oil on beaches or observations by passing vessels (may be difficult due to WWII censorship)

Obtain court records referenced in The Three-Mile Limit: The Case of the Montebello. "The War Damage Corporation obtained the loan of a Coast Guard cutter to resume the search. Initial success was the finding of oil bubbling to the ocean surface where the depth was about eight hundred feet and the distance from the coastline more than three miles. *Because of currents under the surface it was not known if the oil was from a source directly below*. Following Fathometer (sonic depth finding) and other tests, the crew of the Coast Guard cutter located a large object, believed to be a ship, on the ocean floor."

Determine if insurance reimbursement occurred
Montebello Insurance Underwriters:
Edinburg Assurance Co., Ltd. Edinburgh, Scotland
$30,495.00
Cornhill Insurance Co., Ltd., England
$59,902.50
British Law Insurance Co., Ltd., England
$30,495.00
British Law Insurance Co., Ltd., England
$21,562.50
Economic Insurance Co., Ltd., England
$44,152.50
Northern Maritime Insurance Co., Ltd., England
$26,820.00
Lloyds Underwriters, London, England
$193,672.50
National Provincial Insurance Co. Ltd., England
$26,317.50

Planet Assurance Co., Ltd., England
$10,530.00
Elders Insurance Co., Ltd., England
$5,265.00
Merchant's Marine Insurance Co., Ltd., England
$3,945.00
Fine Art & General Insurance Co., Ltd., England
$10,530.00
Edinburgh Assurance Co., Ltd., Edinburgh, Scotland
$13,155.00
Ulster Marine Insurance Co., Ltd., England
$10,530.00
Orion Insurance Co., Ltd., England
$4,207.50
Andrew Weir & Co., England
$5,265.00
Excess Insurance Co., Ltd., London, England
$13,155.00
North British & Mercantile Insurance Co., Ltd.
U.S. Branch, Marine Dept., 90 John St., New York
$30,000.00
Insurance Company of North America, Philadelphia
$12,000.00
North British & Mercantile Insurance Co., Ltd.,
15,000.00
Parrott & Co., Pacific Coast Marine Agents,
320 California St., San Francisco
The London Assurance, Marine Dept., Head Office,
15,000.00
157 Leadenhall St., London, E.C. 3
H.M. Newhall & Co., Principal Agents,
San Francisco, California

The Indemnity Marine Assurance Company, Limited,
12,000.00
of London, Appleton & Cox, Inc. Attorney
111 John Street, New York
Eagle Star Insurance Company, Ltd., of London, England
12,000.00
Talbot, Bird & Co., Inc. U.S. Marine Managers,
114 Sansome St., San Francisco, California
The Century Insurance Co., Ltd.,
9,000.00
Pacific Coast Agency, Rathbone King & Seeley
114 Sansome St., San Francisco, California

Providence Washington Insurance Company of
12,000.00
Providence., R.I.
Westchester Fire Insurance Company of New York
12,000.00
The Commonwealth Insurance Company of New York
9,000.00
The Continental Insurance Company,
9,000.00
80 Maiden Lane, New York, N. Y.
Standard Marine Insurance Co., Ltd., of
27,000.00
Liverpool England
Aetna Insurance Company, Hartford, Conn.
27,000.00
The British and Foreign Marine Insurance
27,000.00
Company, Limited, Liverpool, England
Firemen's Fund Insurance Company,
42,000.00
San Francisco, California
American Marine Insurance Syndicate "C"
600,000.00
New York, N.Y.
American Marine Insurance Syndicate "C"
120,000.00
New York, N.Y.

Total
$1,500,000.00

What was the oil cargo ventilation configuration for the *Montebello*?

American Bureau of Shipping Rules for Ships Intended to Carry Oil in Bulk

(1) General. Vessels which are intended for the carriage of petroleum in bulk and to receive the classification mark (Oil Carrier) are to have an expansion truck over each oil compartment with a capacity of not less that 6 per cent. of the capacity of the compartment with which they are connected. The oil holds are not to exceed 30 feet in length and are to be divided longitudinally by an oil-tight bulkhead which is to extend from the keel to the top of the expansion truck. The attention of owners is drawn to the Panama and Suez Canal regulations for ships laden with oil in bulk.

(2) Cofferdams a least 3 feet wide, thoroughly oil-tight and well ventilated, are to be fitted at each end of each section of the vessel intended for the carriage of oil, so as to completely isolate

that section from cargo and machinery spaces. All machinery, boilers and galleys much be completely isolated from the oil spaces and oil pump rooms. Where it is necessary to run a shaft tunnel through oil spaces, the tunnel is to be circular, isolated from the engine room, entered by a separate trunkway from the deck and provided with a large ventilator at each end.

(3). ALL OIL COMPARTMENTS ARE TO BE EFFICIENTLY VENTILATED; THE FREE ESCAPE OF GASES FROM ALL PARTS OF THE OIL SPACES MUST BE SECURED BY MEANS OF HOLES IN EVERY PART, WHERE OTHERWISE THEIR MIGHT BE A CHANCE OF THE GASES BEING 'POCKETED." Special attention must also be paid to the effective ventilation of cofferdams, pump rooms and other spaces; efficient means are to be provided for clearing oil spaces of dangerous vapors by means of artificial ventilation or by steam. Where a double bottom is fitted at least four large ventilation pipes should be fitted to each double bottom compartment. the outlet and inlet of all ventilators above deck must be fitted with wire gauze protectors Plans of the ventilating arrangements are to be submitted for approval.

Reference: Standard Seamanship for the Merchant Service 1936

Could the cargo pipe system a failure point, such as the *Jacob Luckenbach* and is the pump room accessible through the torpedo impact area?

A NEW CARGO PUMP
We illustrate herewith a steam cargo oil pump of the horizontal duplex displacement type built at the Joshua Hendy Iron Works, Sunnyvale, California, for the Southwestern Shipbuilding Company. This pump, with others of identical dimensions, is to be used in the 12,000-ton tankers Montebello and La Placentia now being built at the Southwestern Shipbuilding Company for the Union Oil Company of California. They were redesigned from a type in use in Los Angeles by O. B. Kibele, works manager of the Southwestern Shipbuilding Company, with the idea of easy accessibility for repairs and increasing the ruggedness and reliability of the design. *The cylinders, both steam and oil, on this pump are of very dense gray cast iron*. They were designed and built for a discharge pressure of 200 pounds per square inch and were tested successfully to 250 pounds. The normal working condition of the pumps will be with a steam pressure of 100 pounds and a discharge pressure of 125 pounds. The steam cylinders are 14 inches and 20 inches in diameter, and the oil cylinders 14 inches in diameter with a common stroke for all 18 inches. The oil suction of the pump is 12 inches in diameter and the discharge 10 inches in diameter. Under normal conditions the capacity of each pump is 2500 barrels per hour, and it is figured that with these pumps the entire cargo of these big tankers, 80,000 barrels, can be discharged in twenty hours. Crane's semi-metallic packing is used on the rods, and Crane flat gasket packing on the flanges of these pumps. The illustration shows the arrangement of two of these pumps in the cargo pump room of the steamship Montebello. A complete description of this fine tank steamer and of her propelling machinery and auxiliary arrangements will be published in the April issue of Pacific Marine Review. Pacific Marine Review March 1921

Montebello Surveys: Highest Classification of Hull; Built under Special Survey and Supervision
Equipment Tested and In Accordance with the Requirements of the Rules
With Freeboard Oil Carrier 10-34
Special Survey No. 2 San Pedro 5-30 - Annual Survey 10-34; Dry-docked 10-34
Highest Classification of Machinery 10-34 - Machinery Survey 5-30
Boiler Survey 10-34 - New Tailshaft 10-30 - Tailshaft Drawn 09-33
Auxiliary Electric Installation Surveyed and Certified In Accordance with the Rules
Reference: American Bureau of Shipping1935

TWO "SOUTHWESTERN" TANKERS

The Southwestern Shipbuilding Company, East San Pedro, California, has recently delivered to Union Oil Company the 12,000 tanker Montebello after very successful trails. The Montebello is first of two duplicate tankers building at this yard. The second ship, the La Placentia, will be delivered in April. These vessels have a over-all length of 457 feet, length between perpendiculars of 440 feet, and beam molded of 58 feet. They are of the shelter deck type with a depth molded to shelter deck of 41 feet and a deadweight capacity of 12,000 tons, with 29 feet 2 inches draft. The gross tonnage 5300 tons. The ships are built on the Isherwood longitudinal system to the highest class of the American Bureau of Shipping for carrying petroleum in bulk. The cargo space is dived into 18 main cargo tanks, 10 summer tanks, 2 fuel oil tanks, and 2 deep ballast tanks forward. Very commodious quarters have been provided for both crew and officers, rooms being comfortable, well lighted and ventilated, and the commissary and sanitary arrangement perfect in every detail. Through the courtesy of the Southwestern Company, we are reproducing herewith the piping plans for steam, oil and water on these ships and a general arrangement drawing of the main engines. The power plant is composed of three Scotch type marine boilers built by the Willamette Iron & Steel works of Portland. These boilers are 15 feet 6 inches diameter by 12 feet long with a combined heating surface of 10,000 square feet and are fitted with Howden forced draft system and designed to give a working pressure of 220 pounds gauge. Fuel oil is burned under these boilers by the Bethlehem-Dahl system, two No. 8 heaters being used and two 6 X 4 by 6 Dean horizontal duplex fuel pumps. Pacific Marine Review 1921