August 31, 1998

To: Members of Oil Spill Committee and Maritime Staff

Fr: Henry Feniger HF.

Re: Suggested storyline for oil spill display

The exhibit will be divided into five major parts.

Part One
- An introductory statement to aquaint the visitor with the oil mining activities that were present in the Santa Barbara Channel in 1969.
- The offshore platforms operated by Union Oil and their proximity to Santa Barbara, specifically platform A where the blowout occurred.

Part Two
- A graphic cutaway (approximately 2ft.by 4ft.) of the drilling operation below platform A.
- A view of the various geological layers and the method used of drilling through them to reach the oil deposits with arrows pointing to notes clarifying the more technical illustration. The News Press illustrations of January 28, 1989 are a good example to be used as a guide by the artist.

Part Three
- The same basic cutaway to identify where the blowout occurred.
- An explanation of what caused the the spill.

Part Four
- A description of the magnitude of the spill and the damages caused, augmented by photographs of soiled beaches, marine life etc.

Part Five
- Public reaction on the local level and due to extensive media coverage on the national level as well.
- The formation of grassroots organizations in Santa Barbara opposing further oil development in the channel.
- Their impact on significant federal and state legislation regulating offshore oil production as to safety and oil spill preventive measures.
- The creation of an environmental studies program at UCSB, the first of its kind in the nation.

1969 OIL SPILL EXHIBIT

I. EXHIBIT SUBCOMMITTEE

Chair: Marc McGinnes
Members: Jim Bray
Henry Feniger
Jack Hundley
Bill Kennett
John Romero
Al Reynolds
Al Willard
Museum liaison: Angela Scott

II. CONCEPT

The 1969 oil spill was the result of a blowout at Platform A, which ultimately spurred national legislation and the hastening of the budding environmental movement in the United States. The exhibit will include photos, text, newspaper headlines, possibly video and an interactive to show how the spill occurred.

III. EDUCATIONAL GOAL OF THE EXHIBIT

To inform the public about the oil spill and its national and worldwide impact.

A. How the Educational Goals are to be Achieved

The exhibit will primarily comprise photographs and graphics and some interactive. The exhibit is mostly artifact free.

1. Artifacts

Magazine (on loan from Bob Schwemmer)

2. Photographs and Graphics

From SBMM's collection, GOO, and other sources.

3. Interactives and Committee Recommendations

The most recent meeting was held on February 24, 1999, and at that meeting, all agreed that the concept for the 1969 Oil Spill Exhibit was well along. At the last meeting, the committee had these recommendations:

The exhibit will consist of the following:
Photographs
Text (much of it based on already written history)
Newspaper clippings
Map showing where blowout occurred

Possible video footage
Goal: To show the controversy and local sentiment and its powerful impact.

3-D demonstration of the blow-out, possibly using beads or some king of 3-D graphic this would include a cross-section of the seafloor, platform, and sea's surface.
Goal: To show how the oil spill happened.

IV. STATUS OF EXHIBIT

A. Work-to-Date on Oil Spill Exhibit

The concept is well developed, after a series of meetings that took place for over a year.

B. Work Remaining

The subcommittee asked the curator to go over photographs and other components and choose the best examples for a future meeting. Text will need to be written and peer reviewed. The exhibit will need to have final Curatorial and Board approval.

C. Action Plan

To be determined by subcommittee.

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DRAFT for comment

19 Jan 97
Oil 69

THE 1969 OIL SPILL

In 1966 an area of the central Santa Barbara Channel was leased by the Federal Government to several oil companies for oil development. A Platform "A" was installed about 5 1/2 miles offshore Summerland and oil development was commenced. In the course of drilling in the winter of 1969, as a well was approaching total depth , drilling mud circulation was lost allowing oil and gas to escape from shallow oil sands in the wellbore.
The blow out preventers were closed, shutting of the flow temporarily; however, oil and gas then migrated up the hole, by passed the surface casing and leaked out from the Channel floor.
A light west wind blew the crude oil out to sea to the West for a couple of days; this was followed by a strong winter South-East wind which blew several days of "leaked oil" directly onto to Santa Barbara - Ventura beaches.
The well was eventually killed with new drilling mud. The clean up took many weeks, and there was much talk of permanent environmental damage. Five years later, no permanent environmental damage could be noted. Among other things learned was that fact.
Oil exposed to air and sea and sunlight, both vaporizes and decomposes (oxidizes)leaving behind a relatively small amount of hard black asphaltum. This vaporization and decomposition action has been observed for many years on the seepage from the Coal Oil Point seeps near the UCSB Campus.
A small change in the permitting requirements for the area makes any future problem extremely unlikely.

Jack : We could expand on this evaluation of impact. As you know there were many studies made ,and even after on year thee was very little evidence on the incident. Further, the Valdez spillage resulted in the overall conclusion that the best way to cope with crude oil is to let it oxidize, heavy scrubbing of the tidal areas results in killing everything.

Bill Kennett's text

1969 OIL SPILL
SANTA BARBARA, CALIFORNIA

REGIONAL SETTING: The Santa Barbara Channel with the Channel Islands to the south and the Santa Ynez Range on the north form the westernmost part of the East-West trending Transverse Range Province of southern California. The eastern part of the Province, which has numerous oil fields including the giant Ventura Avenue Oil Field, extends from Ventura to the Newhall area.

ILLUSTRATE: 1) Use colored relief map for geomorphic display. Satellite image--(Santa Barbara Research or Pacific Travelers Supply on west Anapamu)
2) Use oil field map to show fields (U.S.G.S. professional Paper 679)

GEOLOGICAL SETTING: The principle geologic structural features in the Transverse Province are in east-west alignment. The Province is bounded on the South by the Malibu Coast fault and by the Santa Ynez Fault on the North. Other important faults within the western portion of the Province are Oat Ridge and Red Mountain Faults. Major folded structures extending into the Santa Barbara Channel are the Rincon (Anticlinal) Trend and the Montalvo (Anticlinal) Trend. The giant Ventura Avenue Oil Field is located on the eastern portion of the Rincon Trend. Other oil fields on the Rincon Trend from east to west are: San Miguelito, Rincon onshore and offshore, Carpinteria Offshore and Dos Cuadros offshore.

ILLUSTRATE: Map with faults, anticlines and oil fields from Ventura Avenue to Dos Cuadros Professional Paper 679

DOS CUADROS OFFSHORE OIL FIELD

The Dos Cuadros Oil Field is an elongate east-west trending, double plunging anticline situated on the highest culmination on the Rincon Trend. Oil is produced from numerous pay sands in a sequence early Pliocene sands and shales in the interval between the sea floor and about 3500 feet subsea. Within this interval, multiple layers of oil sands add to about 1500 feet of net pay sands. **It is important to recognize that the Dos Cuadros petroleum accumulation is unique when compared with other large oil fields in the world where oil accumulations are covered and confined by a thousand or more feet of impermeable strata which secures the oil in the underlying porous strata.** By contrast, at Dos Cuadros the uppermost oil saturated sands are **covered by less than 200 feet of relatively impermeable strata.** This unique feature is the primary reason for the 1969 Spill.

ILLUSTRATION: prepare a computer model 3-D structure map and geologic cross section using data in the US Geological Survey Paper 679. Oil Companies have software for this.

DRILLING WELL No, A-21 FROM PLATFORM A

Platform A is set in 188 feet of water and the derrick floor is approximately 80 feet above sea level. It is a dual rig platform; one being a normal vertical rig and the other is tilted 30 degrees from vertical. Well No. A-21 was the fourth well to be drilled from the platform. It was programmed from the vertical rig and drilled as a directional hole with a 15 degree angle to a measured depth of 3400 feet or 3124 true vertical depth (All depths are measured from the kelly bushing which is 8 feet above the derrick floor, or 268 feet above the sea floor - ASF). Notice to drill the A-21 well was approved by the U.S.G.S. District Engineer on January 9, 1969. A 20 inch conductor pipe was driven to 15 feet below sea floor - BSF. The well was spudded with full circulation of drilling mud on January 14th, using the vertical rig. A 17-1/2 inch hole was drilled to 520 feet (244 feet BSF) and 13-3/8 inch surface casing was run to 514 feet (238 feet BSF). The casing was fully cemented to the sea floor with 300 sacks of oil well cement. Blowout prevention equipment was installed and pressure tested prior to drilling out the cement shoe in the casing. Between January 17th and 28th, a 12-1/4 inch directional hole, 15 degrees from vertical, was drilled to a total depth of 3479 feet (3202' BSF) The true vertical depth is about 3140 feet BSF. **At this point, the well was open, uncased from 238 feet to 3140 feet BSF.**

1969 OIL SPILL
SANTA BARBARA, CALIFORNIA

On the morning of January 28th, the drilling crew started pulling the drilling tools out of the hole to run a series of down hole electric logs to evaluate the hydrocarbon bearing zones. **It was reported that the first 5 stands pulled tight (each pipe stand is 90 feet in length, thus 5 stands equals 450 feet off bottom)** The next3 stands pulled freely. While breaking out the 8th connection, at 10:45 a.m., the well started blowing a "gassy condensate mist" for 13 minutes with a deafening roar through the drill pipe. The drill pipe was dropped in the hole and **the blow was controlled by the blowout preventors at 11:00 a.m.** Shortly after controlling the blow through the casing, the surface pressure gauge was **400 psi** (pounds per square inch) and **boils of oil and gas began to appear on the surface of the water.** Most of it was surfacing near the northeast corner of the platform and some was surfacing about 100 feet away. **The oil and gas was now escaping from outside of the casing and was spilling an estimated 500 barrels per day** Attempts to kill the well continued until Friday, February 7th when by 5.30 p.m. the A-21 well was finally killed with 13,000 barrels of heavy mud

Although the well was killed, **oil and gas continued to boil turbulently on the surface of the water**. The main boil was about 800 feet east of the platform. The seep area expanded over time from a point 250 feet west of the platform to about 1,050 feet east of the platform. Special studies generated estimates of 30 barrels per day from March to about July 15th, after which the flow appeared to subside significantly. But it was not until drilling was resumed and production of oil was commenced, resulting in reduction of the sub surface pressures that seepage ceased.

ILLUSTRATE: Physical details of the well bore and the blowout by computer animation.
Work with Kennett. It is likely that Schlumberger and/or Haliburton have software for this. (Check with Catherine Gautier of UCSB)

EVENTS LEADING UP TO THE SPILL

1) **The Dos Cuadros Oil Field is unique among oil fields in that the first occurrence oil reservoir sands are within 200 feet from the sea floor.** Other fields usually have 1,000 feet to over 10,000 feet of impervious "cap" rock to trap the oil in the reservoir. The first three well drilled from the platform were drilled under provisions in the regulations without incident nor were any abnormal subsurface reservoir pressures noted. Were it not for these shallow reservoirs and the attempt to accommodate them in the development plan, in all likelihood this spill never would have happened.

2. The operator requested and was granted a deviation in the casing regulations, presumably to capture oil from the shallow sands along with the deeper sands. Surface casing was set only 238 feet below sea floor. **Insufficient surface casing contributed to the uncontrollable spill.**

3. Drilling mud serves multi purposes in the drilling process. It controls subsurface formation pressures; cools and lubricates the bit and drill pipe; lifts rock cutting to the surface; yields information on the hydrocarbon content {(or lack of) in the formation penetrated by the bit. Earlier drilling on the Rincon Trend and in the first three wells drilled from Platform A revealed subsurface pressures at Dos Cuadros are normal hydrostatic. That means subsurface pressures are equal to the weight of a vertical column of fresh water (0.433 psi/foot) Drilling mud weighted to 0.500 psi would be over balanced to control the expected formation pressure, but not so overbalanced to lose circulation into the formation.

On reaching total depth of 3479 feet (3400' true vertical), the driller started pulling pipe in preparation of running electric logs. **The record shows the first five stands {5 x 90' = 450') pulled tight** This indicates that mud balled around the bit and it acted as a swab. As 450 feet of drilling mud was swabbed from the annulus of the 12-1/4 inch hole, the mud column in the orifice of the drillpipe dropped dramatically (probably to about 300 feet and only 150 psi) to fill the voided area below the "swab". Within a short time, as the crew was breaking the eighth stand, gassy oil blew violently through the drill pipe The inside drill pipe blowout was controlled within 15 minutes. Had the driller insured there was mud circulation when pulling out, the reason for the blowout would have been eliminated.

1969 OIL SPILL
SANTA BARBARA, CALIFORNIA

The blowout, having occurred, left the hole purged of drilling mud and now filled with gassy oil. The shut-in surface pressure on the casing was reported to be 400 psi. It was probably greater because some oil and gas was boiling to the surface from outside the casing. With the casing set 238 feet BSF and 188 feet of water, lithostatic pressure at the casing shoe was 320 psi and hydrostatic pressure of 185 psi vs. hole pressure in excess of 400psi, gassy oil easily penetrated into the shallow sands and ruptured the thin cap rock at the apex of the structure located about 800 feet east of the platform. **Now there was seepage of oil and gas through fractures induced by this blowout. Only by drilling and producing oil from the field to reduce pressures could seepage be reduced.**

ILLUSTRATE: Computer animation of events in bore hole leading up to blowout. We need to investigate the availability to acquire software to accomplish these details. Schlumberger and/or Haliburton, Chevron, Venoco (?)

THE SPILL

The January 28, 1969 Oil Spill in the Santa Barbara Channel was initiated by a blowout while breaking out the 8th drill pipe connection at 10:45a.m. Although the inside casing blowout was brought under control by 11:00a.m. (15 minutes), oil and gas continued to seep to the surface of the sea through fractures created when over pressured oil and gas entered the shallow sands below the 238 feet of surface casing in the well. These over pressured hydrocarbons moved laterally to the apex of the geologic structure, broke the cap rock and escaped to the surface.

It was reported that about 500 barrels per day was spilling on the waters. Initially, winds and current moved the oil to the confines of the Channel. On Sunday, February 2nd, sail boats out were at normal strength. On Tuesday evening, February 4th, a powerful southeaster slammed slugs of heavy oil under Stearns wharf and onto the main beaches of Santa Barbara from Arroyo Burro to the Ventura line. The small boat harbor was protected by an inflated plastic tube stretched across its entrance. That night, a boat cut across the tube and destroyed its effectiveness. Heavy, emulsified oil moved into the boat harbor and onto the small craft

ILLUSTRATE: by animation the movement of the oil in the channel, into the boat harbor and onto the beaches. I have a number of 35 mm color slides of the oil and cleanup.

CLEAN UP

Straw was spread on the sandy beaches and the oily stuff was picked up and ~~pulled~~ hauled away. Straw was spread on the water in the harbor and the oily stuff was sucked into vacuum trucks and hauled away. Boat hulls were cleaned. Rocks, rip-wrap and sea walls were sand blasted/ Mother nature did much to clean the beaches and rocks.

ILLUSTRATE: as needed

POSITIVE AFTERMATH

Tighter regulations and technology improvements resulted from the spill.

Regulations: New casing programs when shallow hydrocarbon zones are present, No deviation from any regulation shall be authorized by the district engineer without prior approval from Washington For further information, check with John Romero of MMS

Technology: Since 1969 many advancements have been made in drilling technology and in monitors that give adequate advance warnings of approaching danger. For example, loud warning signals inform the

driller when a problem arises with the drilling mud system. From my experience and perspective, the technology was available at the time.
Clean Seas was born. Since I have been retired from active work in the industry over the past 15 years, perhaps others can add to technology advancements.

Bill Kennett Registered Geologist CA-476 Registered Petroleum Engineer CA-325

3 causes:
① shallow oil

4th well from platform
no pressure problems from previous three, but
there was oil on the water