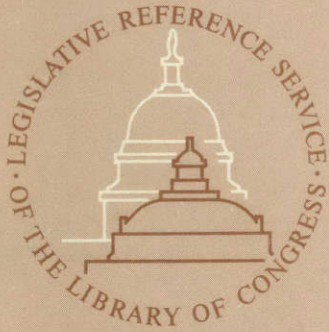


GP C3
1602

THE LIBRARY OF CONGRESS LEGISLATIVE REFERENCE SERVICE WASHINGTON, D. C.



BLOWOUT IN SANTA BARBARA CHANNEL:
BACKGROUND AND CHRONOLOGY

George A. Doumani
Specialist in Earth Sciences and
Oceanography

and

Nancy C. Price
Research Assistant
Science Policy Research Division

August 10, 1970

LIBRARY
SANTA BARBARA
UNIVERSITY OF CALIFORNIA
SEP 24 1971
GOVT. PUBLICATIONS DEPT.

OIL SPILL
INFORMATION
CENTER

NOV 11 1970

Table of Contents

	Page
INTRODUCTION.	1
GEOLOGICAL FACTS.	3
Origin of Petroleum.	3
Oil Reservoirs	3
Exploration for Oil.	5
Drilling for Oil	7
Casing	10
Drilling Mud	13
Subsurface Pressure.	14
Blowouts	15
SANTA BARBARA CHANNEL	18
Geological Setting	18
Geologic Hazards	21
Pre-Drilling Information	24
Drilling on Platform A	25
The Blowout.	26
Public and Official Reaction	29
CONGRESSIONAL RESPONSE.	30
Legislative Proposals.	30
Hearings	33
The President's Proposal	37
CHRONOLOGY OF EVENTS RELATED TO OIL POLLUTION IN SANTA BARBARA CHANNEL	39
Sources of Chronology.	61
ILLUSTRATIONS	
Fig. 1. Diagrammatic sketch showing typical oil and gas types of traps.	6
Fig. 2. Basic components and mud circulation of a rot- ary drilling rig.	9
Fig. 3. Typical casing strings in an oil well	11
Fig. 4. Geographic location of Santa Barbara Channel	19
Fig. 5. Sketch map showing California State leases, Federal leases, the Rincon trend, and location of Platform A.	20

INTRODUCTION

GENERAL FACTS

On the 1st of January 1950, the Government of India was established. The country was divided into states and territories. The states were formed on the basis of linguistic boundaries. The territories were formed on the basis of administrative convenience.

THE STATES

The states were formed on the basis of linguistic boundaries. The states were formed on the basis of linguistic boundaries. The states were formed on the basis of linguistic boundaries.

CONSTITUTIONAL PROVISIONS

The Constitution of India provides for the formation of states and territories. The Constitution provides for the formation of states and territories. The Constitution provides for the formation of states and territories.

THE TERRITORIES

The territories were formed on the basis of administrative convenience. The territories were formed on the basis of administrative convenience. The territories were formed on the basis of administrative convenience.

THE UNION TERRITORIES

The union territories were formed on the basis of administrative convenience. The union territories were formed on the basis of administrative convenience. The union territories were formed on the basis of administrative convenience.

THE STATES AND TERRITORIES

The states and territories were formed on the basis of administrative convenience. The states and territories were formed on the basis of administrative convenience. The states and territories were formed on the basis of administrative convenience.

INTRODUCTION

A catastrophic incident occurred on January 28, 1969, when an oil well being drilled offshore in the Santa Barbara Channel, California, blew out. Oil bubbled from the sea floor, thousands of barrels daily, covering more than a hundred miles of beach and recreation area, and causing considerable damage to property and aquatic life.

Reaction included violent and loud outcries throughout the Nation, facilitated by press and electronic news reporting. The Federal Government responded with investigations by a Presidential task force, a number of bills were introduced in Congress, and hearings were held in Santa Barbara, as well as in Washington, by several House and Senate committees.

Most of the reports, testimonies, and accounts of what happened had one thing in common: All started with the hour of blowout. This report takes the layman back prior to the blowout, in an attempt to explain in non-technical language, the geological and operational background. Briefly explained are what and where oil comes from, where and how it accumulates, how it is sought by exploration and drilling, and the actual mechanics of drilling.

These data are then related to the Santa Barbara Channel, leading to the blowout and ending with a brief description of Congressional action. For convenience, a section is added listing the highlights of events in chronological order. No analysis of congressional hearings

is presented, and controversial accounts of liabilities and damage are avoided. The report is restricted objectively to factual data gleaned from available literature.

GEOLOGICAL FACTS

Origin of Petroleum

Several theories exist on the origin of petroleum or oil and natural gas, but no one theory has been unanimously accepted. The reason is that so far it has not been possible to identify the exact location and materials from which certain oil accumulations originated.

One theory maintains that hydrocarbons are the result of inorganic processes which brought together hydrogen and carbon under favorable conditions of pressure and temperature, deep in the Earth. Eventually, these fluids found their way through the overlying rocks and accumulated in formations with characteristics requisite to the formation of traps.

A more accepted theory holds that the origin of oil is organic. The hydrogen and carbon originated from the remains of plant and animal life that existed millions of years ago in former seas or swampy environments. Such life forms were presumed to have been very small and, probably, microscopic. Support for this theory is derived from interpretation of the geological record, and studies of oil fields and oil-bearing formations that have already been explored and developed throughout the world.

Oil Reservoirs

After having been formed, oil accumulates in sedimentary layers called formations. The mountains and the surface of the Earth are slowly and relentlessly broken down into smaller fragments and particles.

These eroded sediments are carried by the rivers and deposited into the seas. As the millions of years pass into geological time, bodies of sand, silt, and mud gradually build up in the coastal areas bordering the continents. The sheer weight of these sediments forces the ocean floor downward, warping it into a trough in which more sediments are deposited.

This pressure results in two distinct processes: One is deformation of these layers; the other is changing them into hard rock.

As the layers are compressed, the oil accumulated in the sediments is forced to migrate into pervious sand bodies with pore spaces between the particles to facilitate the mobility of the oil. Meanwhile, solidification has turned the loose sediments into rocks, the sand becoming sandstone, the silt siltstone, and the mud mudstone or shale. While sandstone is the ideal medium to contain the oil, limestone and other porous rocks also are often oil-bearing. The shale or mudstone is the ideal rock to seal it. So, in order for the oil to stay in the pervious sandstone to which it had migrated, it has to have an impervious layer over it to check its migration. This layer is usually called the cap rock.

The Earth's crust is mobile and dynamic, forever on the move. These movements result in deformation which manifests itself in the form of uplifted mountains, downwarped valleys, and twisted and contorted sedimentary strata. The beneficial part of this upheaval is the creation of structural forms which provide the traps and reservoirs necessary for the containment of oil. The types of traps where oil has been

found are numerous; however, the most common structure is a dome called "anticline" (see Fig. 1).

In an ideal situation, then, a reservoir would be a dome of sedimentary rocks, including a layer of oil-bearing sandstone capped with a layer of shale or mudstone. The contents of this reservoir include some water left over from the former seas, the oil body floating over the water, and the natural gas at the very top, all in the pores and cavities of the host rock. These components are confined under high pressure, which will be discussed later in this paper.

Exploration for Oil

Among petroleum geologists and prospectors, there is a saying that oil is where you find it. Knowing the requisite conditions for the occurrence of oil, the geologists look for signs and indications that might reveal some of these conditions. Often there are enough surface outcrops that can be mapped and projected downward below the surface, later to be studied and interpreted.

The earliest surface indications of the presence of oil have been oil seeps. Since time immemorial such seeps have been known around the world. Some of the major oil discoveries have resulted from such telltale seeps. Archeologists have unearthed weapons made by early man, with the points held on to the weapons by asphalt. Indians in North America used tar from oil seeps for calking their boats and sealing water pitchers. In more recent times, tar was mined and distilled for lighting oil and as a source of roofing and paving material.

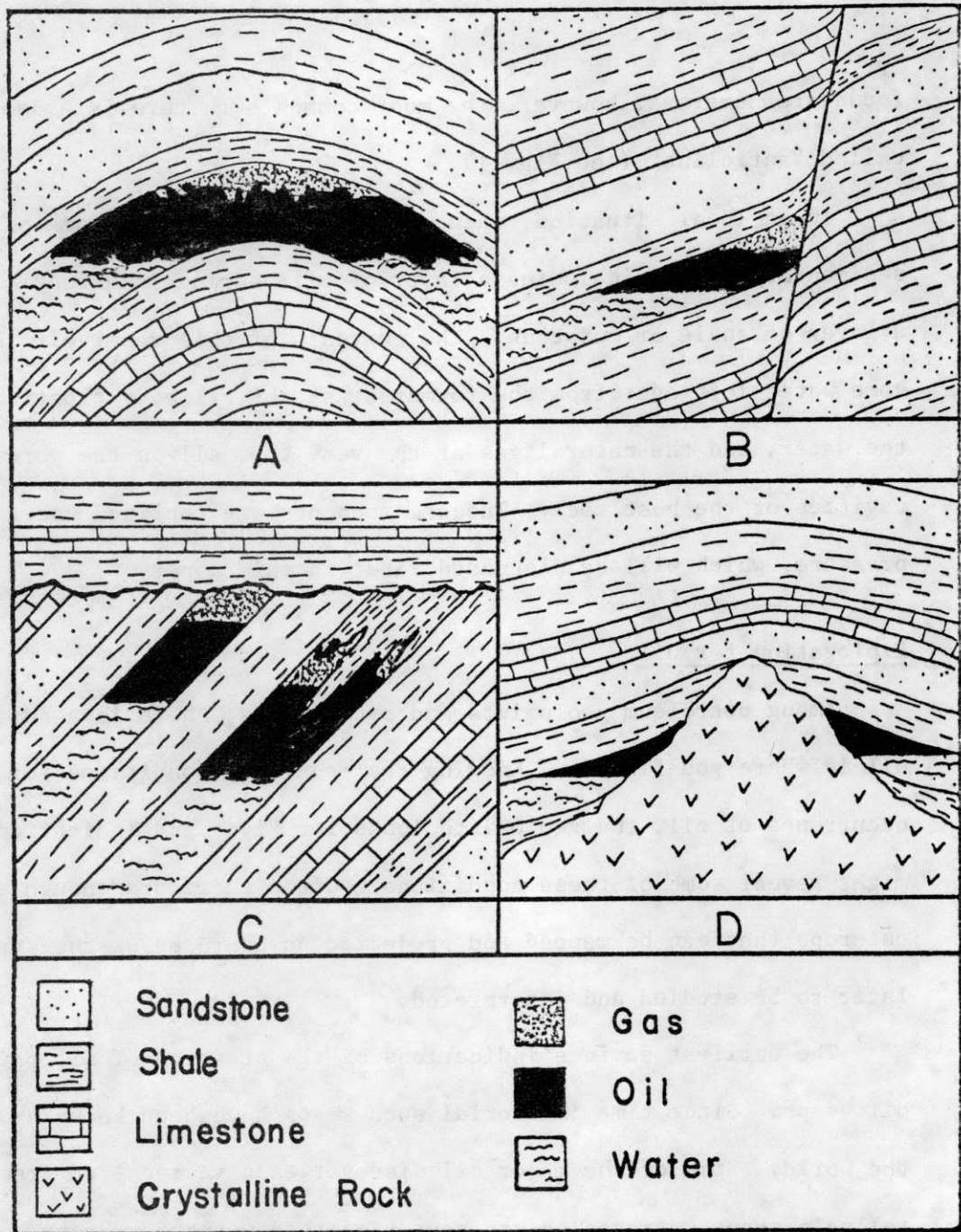


Fig. 1 -Diagrammatic sketch showing typical oil and gas types of traps. (A) Anticlinal trap showing gas accumulating in the crest of the structure with oil and water occurring successively lower on the flanks of the anticline; this diagram also shows the gradational relationship usually present at the oil and gas contact and at the oil and water contact. (B) Simple fault trap showing gas and oil arrested in its migration up-dip by the presence of a fault which has brought impervious shale opposite the porous and pervious sandstone which now forms the reservoir. (C) Stratigraphic traps where migration of oil and gas is arrested in the left hand pool by impervious shale unconformably overlying the porous reservoir sand, and in the right hand pool by porous sandstone gradually changing up-dip to an impervious shale facies. (D) Oil and gas accumulating against impervious crystalline rock; the crystalline rock may be an intrusive such as a volcanic plug or it may be an erosional remnant around which later sediments have been deposited.

[Figure adapted from Oil, Gas and Helium in Arizona: Its Occurrence and Potential. Arizona Oil and Gas Conservation Commission, c. 1966.]

Explorers in the eighteenth and nineteenth centuries described oil slicks observed on the sea surface, resulting from underwater seeping and bubbling.

In the last few decades oil discoveries intensified, spreading from land areas into the deep reaches of the outer continental shelf under the oceans. As discoveries increased, so did the knowledge gained from interpreting the new fields. Together with this knowledge, technological advance provided progressively better techniques and methods for petroleum exploration. From the days of surface seeps and wildcatting, exploration techniques have moved into the sophisticated electronic instrumentation, and the space-age methods of utilizing these instruments for remote sensing from spacecraft.

When these methods have been utilized, and the necessary data have been assembled, plotted, and interpreted, the actual finding of oil has not even begun. Drilling into the desired subsurface structure, completing the well, and putting it into production are the main ingredients of a petroleum discovery.

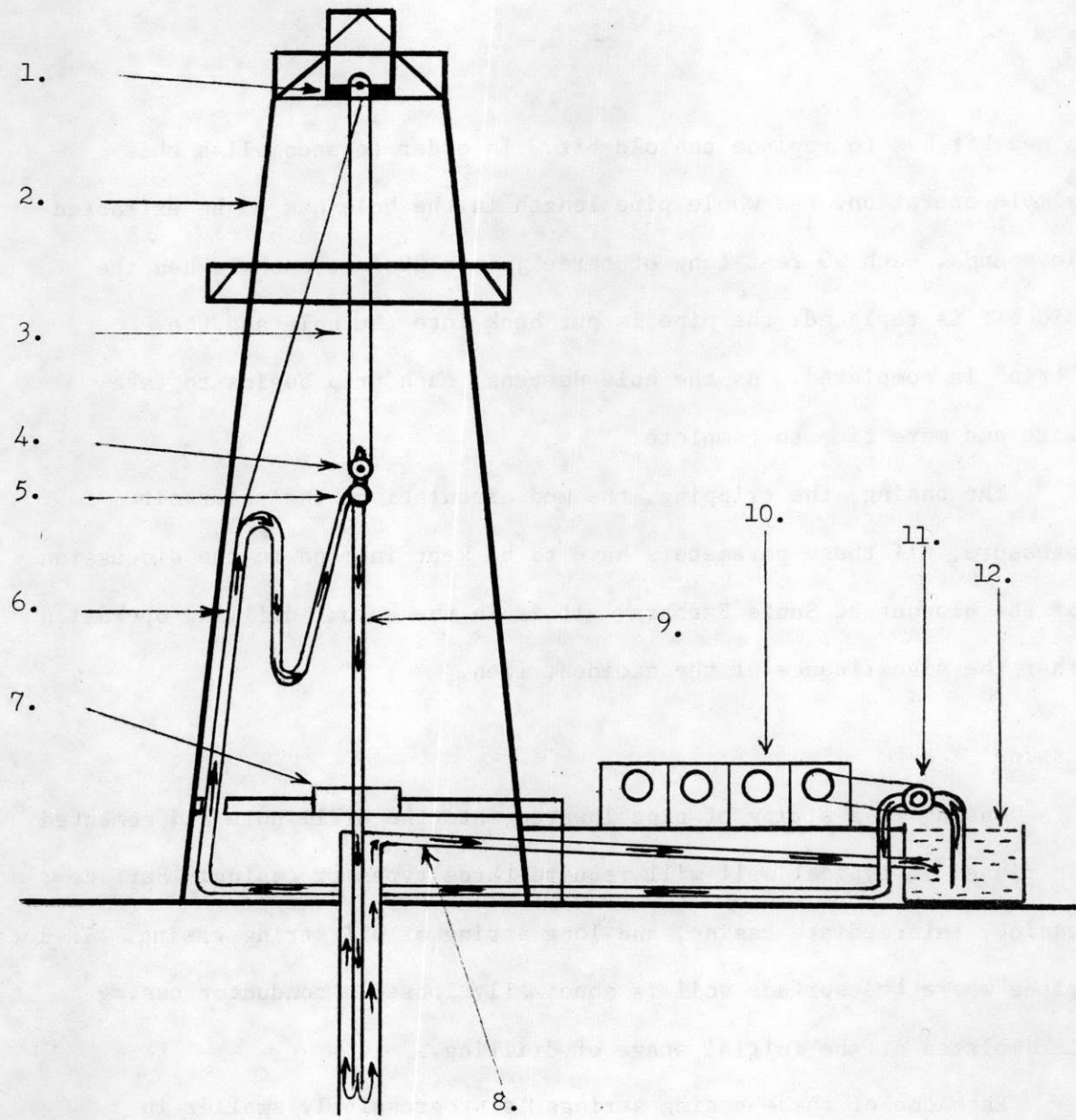
Drilling for Oil

Once a reservoir has been located, the next step is to drill a hole and permit the reservoir fluids to be extracted to the surface. The hole is then cased with pipe, usually steel or steel alloy, and cemented, and production equipment is placed in the cased hole and at the surface to control and regulate the extraction of the oil.

Boring holes in the ground to extract water, brine, or oil, has been practiced for centuries. The oldest method of drilling for oil was a simple percussion method, much like the pounding of the air hammer today. It is known as the cable-tool drilling, percussion being produced by the simple lifting and dropping of the tool or bit into the hole. It was known to the Chinese, and was later introduced into the United States where it ushered the petroleum era by drilling the Drake well of Titusville, Pennsylvania, in 1859. Although the cable-tool drill can reach depths far greater than the 65 feet of the Drake well, the economics and advance in drilling techniques have made this method obsolete.

A more advanced and more efficient method is rotary drilling. In this method, the hole is drilled from a rig (Fig. 2) by a rotating bit to which a downward force is applied. The bit is fastened to, and rotated by, a drill string composed of high quality drill pipe and drill collars, with new pipe sections or joints added as drilling progresses in depth. The cuttings are lifted from the hole by the drilling fluid which is continuously circulated down the inside of the drill string through water courses or nozzles in the bit, and upward in the annular space between the drill pipe and the bore hole or its casing.

In the case of offshore drilling, the derrick is mounted on a platform, with feet secured in the ocean floor, and protruding upward above the wave level. At certain intervals, when the bit wears out,



- | | |
|--------------------|------------------|
| 1. Crown block | 7. Rotary table |
| 2. Derrick | 8. Mud flow line |
| 3. Drilling line | 9. Kelly |
| 4. Traveling block | 10. Engine |
| 5. Rotary hook | 11. Slush pump |
| 6. Stand pipe | 12. Mud tank |

Fig. 2. Basic components and mud circulation of a rotary drilling rig.

a new bit has to replace the old bit. In order to accomplish this simple operation, the whole pipe length in the hole has to be extracted in stands, each 90 feet long of three joints 30 feet each. When the old bit is replaced, the pipe is put back into the hole and the "trip" is completed. As the hole deepens, each trip begins to take more and more time to complete.

The casing, the tripping, the mud circulation, the reservoir pressure, all these parameters have to be kept in mind in the discussion of the blowout at Santa Barbara. It is in the actual drilling operation that the significance of the accident lies.

Casing

Casing is a string of pipe lowered into the drill hole and cemented in place. A typical well will require three types of casing: Surface casing, intermediate casing, and long string or oil string casing. In locations where the surface soil is abnormally loose, a conductor casing is implaced at the initial stage of drilling.

Each one of these casing strings is progressively smaller in diameter, all starting at the top of the bore hole (Fig. 3). A casing string is cemented in place by a slurry pumped down the pipe and up the annulus between the casing and the open hole, and the cement is allowed to set for several hours before drilling is resumed.

In general, casing strings perform several functions. Normally they establish a permanent hole with a known and uniform diameter that facilitates future servicing. Because of the variation in the character

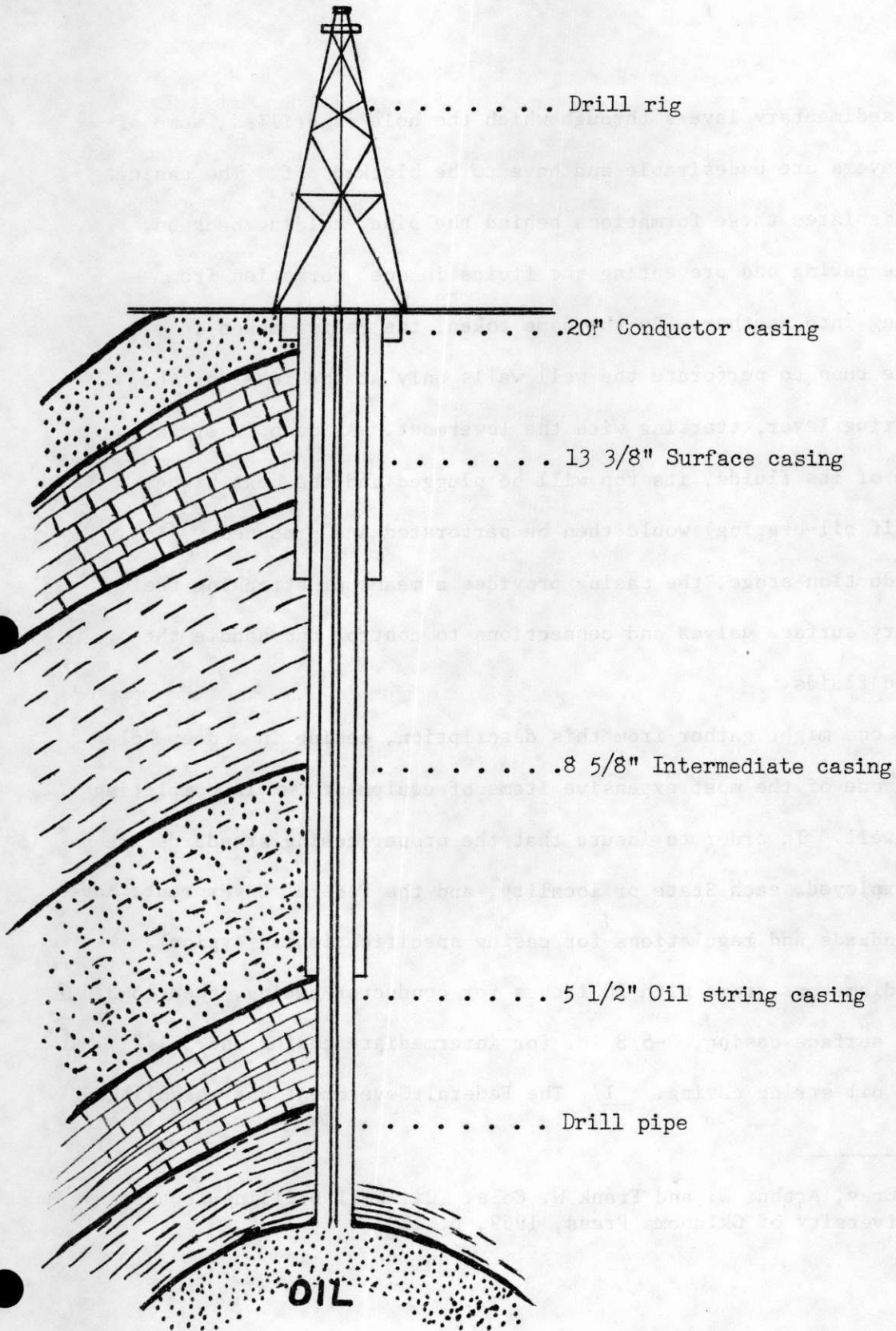


Fig. 3. Typical casing strings in an oil well.

of the sedimentary layers through which the hole is drilled, some of these layers are undesirable and have to be blocked off. The casing string isolates these formations behind the pipe, holding back any possible caving and preventing the fluids in one formation from migrating into another. By the same token, the casing makes it possible then to perforate the well walls only at the level of the oil-bearing layer, starting with the lowermost. As each layer is drained of its fluids, its top will be plugged and the next higher layer (if oil-bearing) would then be perforated and produced. In the production stage, the casing provides a means of attaching the necessary surface valves and connections to control and handle the produced fluids.

As one might gather from this description, casing in a deep hole becomes one of the most expensive items of equipment used in completing an oil well. In order to insure that the proper casing standards are being employed, each State or locality, and the Federal Government, have set standards and regulations for casing specifications. Typical casing diameters start with 20 inches for conductor casing, then 13-3/8 in. for surface casing, 9-5/8 in. for intermediate casing and 5-1/2 in. for oil string casing. 1/ The Federal Government has established

1/ McCray, Arthur W. and Frank W. Cole. Oil Well Drilling Technology. University of Oklahoma Press, 1959, p. 123.

minimum depths for each casing string as follows: 2/

<u>Casing type</u>	<u>Minimum depth</u>
Conductor casing	300 ft (not to exceed 500 ft)
Surface casing	
to 7,000 ft	25% of total well depth
7,000-10,000 ft	2,000 ft
10,000 ft and deeper	2,500 ft

Drilling Mud

Drilling with a rotary rig is accomplished by a bit chipping or cutting the rock as it rotates. These cuttings have to be extracted out of the borehole in order for the bit to progress downward. Removal of the drilled cuttings requires the circulation of a drilling fluid commonly referred to as mud. The mud is pumped from the surface, inside the drill pipe, and through the bit, returning to the surface through the annular space between the drill pipe and the hole walls (see Fig. 2).

At the surface, the returning mud is separated from the cuttings and then recirculated back into the hole. This circulation has the immediate effect of cooling the bit and the bottom of the hole where temperatures are usually much higher than at the surface. One of the primary functions of the drilling mud is the maintenance and preservation of that part of the hole already drilled. This is particularly effective in gelling the hole wall and reducing or eliminating the caving of incompetent and shaly layers. If such cavings are allowed

2/ OCS Order No. 2, March 31, 1965. U.S. Department of the Interior, Geological Survey, Conservation Division, Branch of Oil and Gas Operations, Pacific Region.

to proceed unchecked, appreciable amounts of sloughing would result in a stuck drill pipe, expensive fishing jobs, and even loss of the well.

Many liquids are used as drilling fluids, including fresh water, salt water, and crude oil. The mud is usually a suspension of solids in liquids or in liquid emulsions. Its composition is clay and water with a complex chemical mixture that has the desired density, viscosity, gelling, and other pertinent characteristics. These characteristics are chosen dependent on the type of rock being drilled. If drilling is to be done in hard rock, plain fresh water would suffice. However, since one of the major functions of the drilling mud is to control the hydrostatic pressure in the subsurface, the pressure to be expected from the mud column is of critical significance. Where the oil-bearing reservoir possesses a combination of delicate pressures, sensitive rock properties, and other factors in equilibrium, the slightest misapplication of the mud might upset this equilibrium and result in adverse and uncontrollable conditions.

These characteristics will be considered later in connection with the Santa Barbara blowout.

Subsurface Pressure

In the discussion of oil reservoirs, we have indicated briefly that the contents of the reservoir are often found under conditions of high pressure. The measurement of subsurface pressure is very critical and forms an important phase of petroleum engineering.

The pressure encountered in the well is either hydrostatic or lithostatic. Hydrostatic pressure is simply fluid pressure, imposed by the weight of the fluid (predominantly water) which fills the voids of the rocks above and around the reservoir. Lithostatic pressure is rock pressure, imposed by the weight of the rocks and their fluid content above the reservoir.

In places where the sedimentary layers of the reservoir are young and have not been fully consolidated and cemented, compaction, repacking, and other sedimentary changes take place. Two such places are the Gulf Coast and the Santa Barbara Channel where it is not uncommon to find that the rocks have failed to support the weight of the overburden, with the result that this total weight is supported by the enclosed fluid. The magnitude of such pressures is dependent on a pressure-depth gradient. The fluid (hydrostatic) pressure for fresh water, for example, is expressed as 0.44 psi/ft (pressure per square inch per foot of depth); the rock overburden (lithostatic) pressure is normally taken as 1.0 psi/ft.

These figures have to be taken into serious consideration during the drilling operation, in the application of mud circulation, and throughout the life of the well.

Blowouts

We have discussed the origin of petroleum, the shape and content of the reservoir rocks that confine it, the stages of exploration and drilling for oil, casing the well, mud circulation, and the subsurface pressures that can be encountered in the hole.

It is apparent from these discussions that oil exists in a reservoir, in a state of balanced pressure of fluid and rock, governed by such controlling factors as the looseness or consolidation of the host rock, the spacing (porosity) between its grains, and the permeability or the ease with which the fluids travel through this rock body.

The minute the ground is broken and a hole is drilled into the subsurface the balance among all these factors is broken. The mud and casing strings provide means for controlling the drilling operation, but if the equilibrium among these factors is very delicate, the balance could be upset very easily. This could result, for example, in the loss of mud circulation. If the mud pressure is larger than the well pressure the mud would actually fracture the rocks and escape into the fractured layers. If this happens close to the surface where the drilling is going on, the injected or embellished layers would rupture, releasing the mud injected into them, plus the oil if such oil is present in these layers. The presence of casing strings in the well at these levels was designed to avoid such a mishap; in the absence of such casing to the proper depth, the driller is taking a chance and the drilling technique is considered improper. This is why certain depth requirements have been established for casing strings.

If the mud pressure is lower than the subsurface pressures, the instant the bit penetrates the reservoir chamber, the reservoir pressure would overcome the mud pressure and the well blows out. A blowout is the most spectacular, costly, and highly feared hazard of drilling

and proper mud density is the principal factor in avoiding this problem. However, it is not always the weight of the mud that causes this anomaly. Rapid withdrawal of the drill pipe for making a trip can result in a sudden reduction in the mud column pressure and a subsequent blowout. This is known as swabbing.

Here, again, the absence of a casing string is critical. In drilling a hole where oil is present in the upper layers and at successive horizons below, casing would seal off the whole well and permit a gradual opening of each horizon individually. In the absence of casing, even if the oil-bearing layers close to the surface were not pressurized, the hole would provide easy access from the highly pressurized lower horizons, pushing the oil upward and injecting it into the surface layers. The injection effect here would be exactly as described for the mud: The oil (probably with gas and mud) enters the surface layers, raises the pressure to overcome the rock pressure, ruptures the surface rocks, and bursts out onto the surface. In an offshore field violent bubbling would be readily visible, and a slick would accumulate on the surface of the ocean, similar to what happened in Santa Barbara Channel.

SANTA BARBARA CHANNEL

Geological Setting

The Santa Barbara Channel off the coast of California trends roughly east-west between Port Hueneme and Point Conception, measuring approximately 75 miles in length and 25 miles in width, with an area about 1,750 square miles (Fig. 4). Geographically it lies within the province of the Transverse Ranges of California, forming a topographic as well as a structural basin between the county of Santa Barbara and the islands of Anacapa, Santa Cruz, Santa Rosa, and San Miguel. The basin has a maximum depth of 2,000 feet

The geological structure is essentially a continuation of a system of folded strata found under the Ventura oil field and the Rincon oil field on shore. The anticline of the Dos Quadras oil field where the blowout occurred is considered part of the Rincon trend (Fig. 5). The geological formations correlate fairly well with the known sequence on shore, with variation in the thicknesses of the individual units. Production from this field originates from the Repetto Formation of Pliocene age (about 5-10 million years).

The anticlinal structure plunges in such a way that the oil-bearing Repetto Formation is at varying depths in the onshore fields, rising gradually until it becomes exposed at the sea floor in the Dos Quadras field. The anticlinal dome is not completely closed: it is cut by major faults almost parallel to the long axis, plus other minor faults across the trend. It is at the

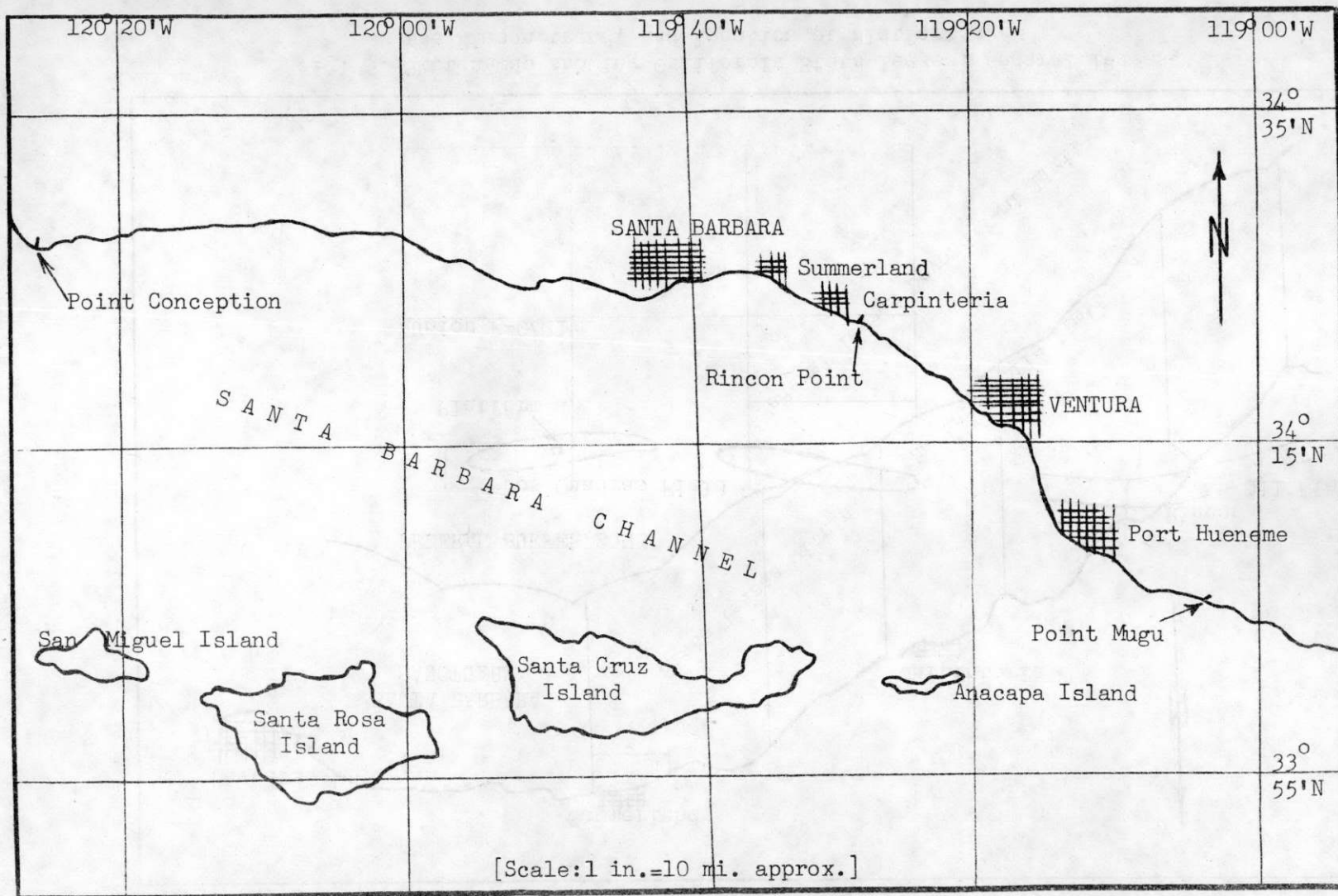


Fig. 4. Geographic location of Santa Barbara Channel.

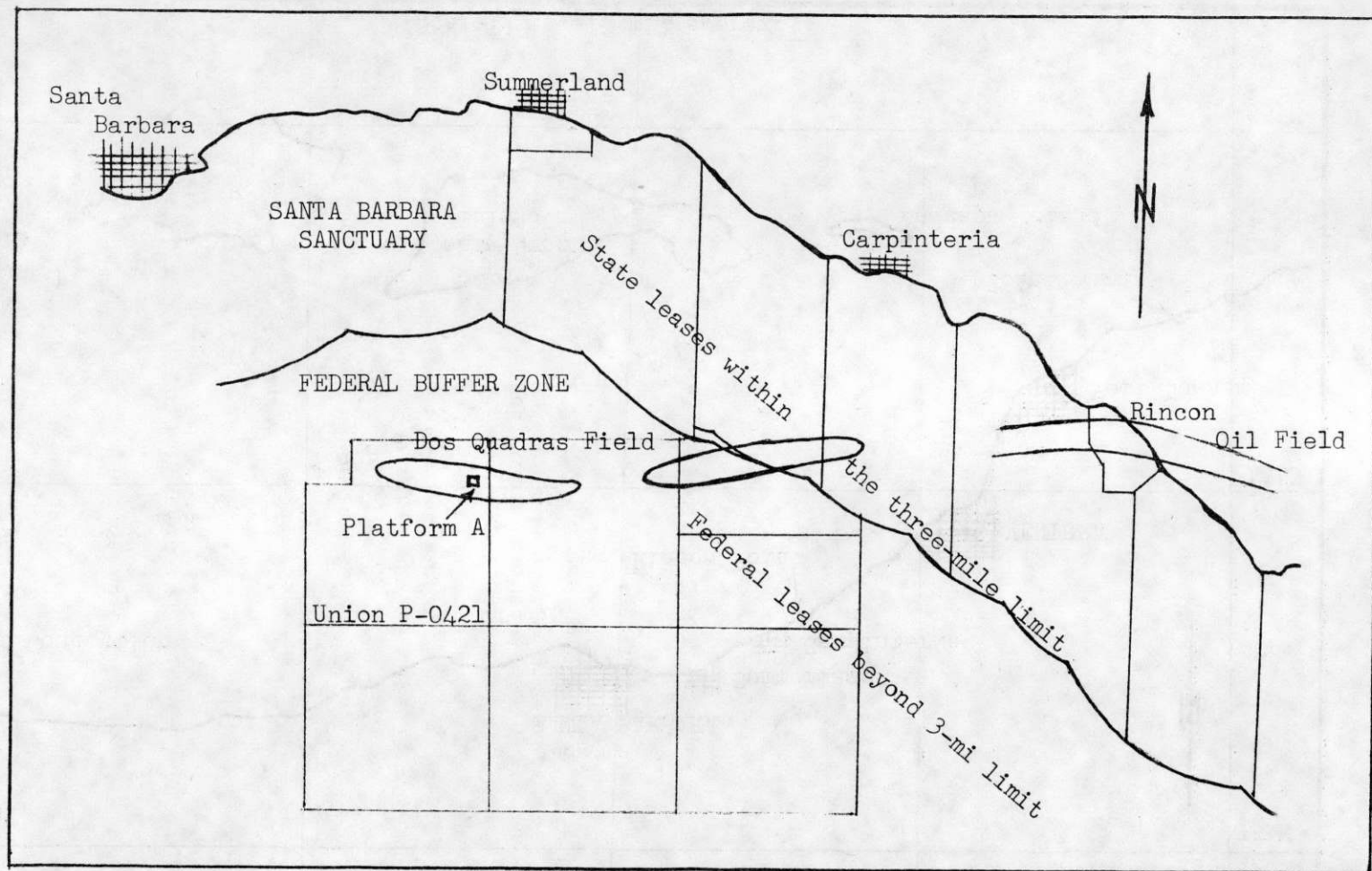


Fig. 5. Sketch map showing California State leases, Federal leases, the Rincon trend, and location of Platform A.

top of this anticline, the crest of the dome, that the drilling Platform A was constructed and drilling started.

It is significant to note here that the oil-bearing formation is not a single horizon, but several horizons (multiple reservoir) extending from the surface down to more than 3,000 feet.

Geologic Hazards

The Earth's crust is a dynamic body subject to surface and subsurface deformation agents which cause it always to seek a state of equilibrium. As it yields to these forces and seeks to adjust itself, the Earth produces motions that affect the human population, particularly in inhabited areas. This is usually more easily felt when such movements occur as a result of volcanic eruptions and violent earthquakes.

Geologic hazards, however, include many others such as submarine avalanches, tsunami or seismic waves, subsidence, faulting, compaction and settling of the surface.

In the Santa Barbara Channel area, the record shows a long history of earthquakes, most of them minor, dating back to 1800. The more major and destructive earthquakes occurred in 1812, 1925, 1927, and 1941. Besides the immediate destruction caused by the shaking, such events usually result in a seismic wave that can be much more destructive in bays and confined water bodies. Faults, which are cracks in the ground, are also common results of earthquakes. Faults often provide the Earth with the place to relieve itself from the accumulating stresses.

Although faults are considered useful as surfaces to seal off an oil reservoir and provide a good trap (see sketch B, Fig. 1), in unconsolidated sediments the neat fault face would be replaced with a jumble of loose rocks in a gouge zone. This crumbly gouge zone would provide the oil with easy access upward along the fault plane, serving essentially as a conduit rather than a trap. In a structure similar to the Dos Quadras field in the Santa Barbara Channel, such a fault gouge would permit the fluid of one layer to migrate upward and enter a higher layer if the lower layer is pierced by the drilled hole which had already cut across the fault path. More dangerous, however, is the prospect of an earthquake occurring after 50 or 60 wells had been completed from a single platform, as was planned for Platform A.

The type of sedimentary rocks or sediments of which the ground is composed is often a factor in the extent of damage. Shocks and shaking are more damaging in loose sediments and unconsolidated rocks than in more compacted and hard rocks. The Santa Barbara Channel is predominantly soft sediments and unconsolidated rocks susceptible to intense shaking. This type of terrain is subject also to another destructive phenomenon--subsidence.

As we mentioned in our discussion of reservoirs and subsurface pressure, the fluids in a reservoir are under high pressure from the rock column on top and themselves produce enough hydrostatic

pressure to balance the rock pressure. As soon as the fluid is allowed to escape from the reservoir, the pressure balance is immediately upset in favor of the rock pressure. The extracted oil or fluid leaves a void, which is immediately filled by subsiding rocks. This is a natural phenomenon normally expected in weaker rocks, and is usually remedied by injection of fluids back into the hole after the extraction of the oil. Unfortunately, it is being discovered now that injection itself may be hazardous and may cause earthquakes, as has happened under the Rocky Mountain Arsenal near Denver, Colorado.

Subsidence is sometimes accompanied by horizontal displacement usually apparent in surface installations such as foundations, piers, and piles. Such aftereffects of oil production have been known in California for years, the most spectacular being the Wilmington oil field where subsidence covers an area close to 30 square miles. The Wilmington field is located in the same region as the Dos Quadras field, it resembles it most closely and part of it is off shore. Other California examples include the oil fields at Huntington Beach, Long Beach, and Inglewood. The conditions contributing to subsidence result from excessive reservoir pressure being released, high porosity, high permeability, compaction of the grains, and large-scale settling of the stratigraphic (layering) sequence.

Although the Channel's Dos Oquedras field possessed all the characteristics of these potential hazards, effects of these hazards could normally be reduced by precautionary measures presently within technological capabilities.

Pre-Drilling Information

Most of these dangers and potential hazards were known prior to drilling the ill-fated well. Various oil companies had conducted geological mapping of parts of the Santa Barbara Channel floor for years before they leased these Federal offshore lands for oil and gas exploration. Data had been gathered on the looseness and unconsolidated formations, plus information on reservoir pressures and spectacular blowouts encountered in the same formation in correlated neighboring fields. Core samples taken at the drilling site prior to platform building showed traces of oil, and indications of the proximity of the oil horizons were discovered while preparing and building the drilling platform. Finally, data were also gathered from the earlier wells drilled from the same platform preceding the blowout well.

All collected data indicated a necessity for extra precautionary and safety measures. Apparently, the question of tighter regulation was never brought up to (then) Secretary of the Interior Stewart L. Udall, who stated before a Senate Committee that he had some misgivings about making the decision to drill, and that "we

probably should have been even more cautious and more careful." 3/
Furthermore, although the coring regulations 4/ stipulate that
coring well logs should be filed with Geological Survey, there
were indications that such information was not made available
to the Survey. "Now," testified Mr. Udall, "it is very clear to
me again that we have a shortcoming here and that particularly
in an area that is faulted that this information should be
available to the Department before the leasing ..." 5/

Union Oil Company officials testified before the Senate
Subcommittee on Air and Water Pollution that all the basic
information had been filed with the Department of the Interior,
except the Company's appraisal and interpretations of these
data. 6/

Drilling on Platform A

Platform A was approved on top of the Dos Quadras offshore
oil field with a plan to drill more than fifty wells from the same
platform. Slanted and directional drilling is common practice in
petroleum drilling, which is normally guided and intentionally

3/ U.S. Congress. Senate. Hearings before the Subcommittee on Air
and Water Pollution, of the Committee on Public Works, on S. 7 and
S. 544. March 10, 1969, p. 1281.

4/ U.S. Department of the Interior, Geological Survey, Conservation
Division, Branch of Oil and Gas Operations, Pacific Region. OCS Order
No. 8, Dec. 15, 1965, Amended July 15, 1968.

5/ Hearings on S.7 and S. 544 (Footnote 3), p. 1283.

6/ Hearings on S.7 and S. 544 (Footnote 3), p. 555.

deviated to reach oil within a large diameter. From Platform A, four wells had been drilled and more subsurface information gathered from the operation. The fifth well, No. A-21 was approved by the U.S. Geological Survey District Engineer on January 9, 1969.

The normal Federal requirements for the plan had been altered, and casing strings shorter than the minimum required were approved by the Survey. ^{7/} The conductor casing string (20") was embedded in the ocean floor only 15 feet (instead of 300-500 ft.) below the ocean floor, and the surface casing string (13 3/8") was only 238 feet (instead of the minimum 861 feet).

In testimony before the Senate, the Survey District Engineer testified that the plan called for further drilling to the desired depth and, later, casing all the way to the bottom.

Before this could happen, there developed some unusual circumstances. On the morning of January 28, it was time to run a log to the depth of 3,479 feet reached that day.

The Blowout

As the crew began pulling out the drill pipe, the first five stands of the pipe pulled tight. Tightness is an indication of cave-in above the bit and around the pipe. Forceful pulling and the slightest increase in speed would result in swabbing and an

^{7/} Hearings on S. 7 and S. 544 (Footnote 3), p. 684.

immediate upset in the balance of subsurface pressure. The next three stands pulled easier, but as the crew broke out the eighth stand, the well blew out through the drill pipe.

Attempts were made to stab the inside blowout preventer, unsuccessfully, and several other procedures were followed to no avail. The pressure was so enormous that some of the equipment was destroyed and the efforts of the crew were hampered by the slick mud-oil-gas mixture under the danger of fire. Finally, after a long struggle, the crew succeeded in shutting in the well. However, this was not the end of the blowout.

The closure of the well resulted in a huge buildup of pressure. The whole oil-bearing strata had not been cased, and formational pressure was allowed to enter freely any horizon, seeking the normal upward surge toward the top.

What happened here was the feared injection of the mud-oil mixture into the upper layers, upsetting their static pressure, and rupturing them. About one or two hours after shutting the well, the fluids began to erupt from the Channel floor about 800 feet east of the platform. This eruption eventually spread along a zone from 250 feet west of the platform to more than 1,000 feet east of the platform. Perhaps the faults in the rock formations below helped as a conduit also. Shortly after closing the well in, an attempt was made to pump heavy mud and sea water, which might have aggravated the situation.

Later efforts to control the spill were not very successful, and oil was still being seen on the ocean surface months after the blowout. Massive efforts were made, and numerous methods were employed to contain and control the slick, and cleanup operations involved the Union Oil Company, the Coast Guard, and numerous citizen groups and organizations. 8/

Within a few months, miles of beaches were hit by oil, resort and recreation areas were damaged, marine life in the form of birds, fish, and bottom dwellers was damaged. No final figures are available, and whatever has been documented constitutes conflicting and widely varying data. During the uncontrolled flow, estimates ranged between 500 and 5,000 barrels per day (bpd). An independent survey was made by Alan A. Allen of General Research Corporation, which showed that during the first twelve days before the well was killed a figure of 5,000 bpd was "conservative." 9/ By March 20, 1969, the U.S. Geological Survey and the Union Oil estimates were put at between 3,000 and 6,000 bpd; Allen estimated 60,000 bpd. The total discharge by the middle of May has been estimated at 3,250,000 gallons; by comparison, the discharge from the tanker Torrey Canyon totaled 30,000,000 gallons.

8 / Review of Santa Barbara Channel Oil Pollution Incident. Battelle Northwest. U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Pollution Control Research Series, DAST 20. July 18, 1969.

9 / U.S. Congress. Senate. Hearings before the Subcommittee on Minerals, Materials, and Fuels, of the Committee on Interior and Insular Affairs, on S. 1219, May 20, 1969, p. 149.

Public and Official Reaction

Although oil slicks in the Santa Barbara Channel area had been known for years, this particular blowout had much more attention from public and State organizations. Many of the reports in the newspapers had apparently been exaggerated, and liberty was taken by the press media in deviating from objective reporting. 10/ Numerous legislative proposals were introduced, and extensive hearings were held by several Senate and House Committees. Meanwhile, the Department of the Interior, Union Oil Company which had been made liable for all cleanup operations, and the Panel on Oil Pollution appointed by President Nixon continued to work during the late spring and summer to bring satisfactory measures to bear on the situation. On June 2, 1969, the President's Panel, headed by Dr. Lee DuBridge the President's Science Advisor, recommended that Union Oil continue to drain oil from the offshore field that had the blowout in order to relieve subsurface pressures.

10/ Dederer, Don. Santa Barbara and Beyond. Oceans Magazine, May-June 1970, p. 17-32.

CONGRESSIONAL RESPONSE

The Santa Barbara oil blowout occurred at a time when the attention of Congress was focused on issues of pollution and the protection of the environment. Numerous bills had been introduced which amended the Federal Water Pollution Control Act, many of which included provisions pertaining to oil pollution. The major bill in the House was H.R. 4148 which had been sent to the Committee on Public Works. In the Senate hearings on similar bills, S. 7 and S. 544, had been scheduled by the Subcommittee on Air and Water Pollution of the Senate Committee on Public Works. In addition, bills amending the Oil Pollution Act of 1924 were in preparation and were later considered by the House Committee on Merchant Marine and Fisheries. During the subsequent hearings on S. 7, S. 544, H.R. 4148 and other bills, the crisis in Santa Barbara served to focus attention on the issue of oil pollution.

Legislative Proposals.

Over 20 bills have been introduced specifically on the Channel area, a list of which follows:

90th Congress

S. 3267	Sen. Kuchel	4/2/68
H.R. 16421	Rep. Teague (Calif.)	4/2/68

91st Congress

S. 1219	Sen. Cranston	2/28/69
S. 2516	Sen. Murphy	6/30/69
S. 3093	Sen. Cranston	10/29/69
S. 3351	Sen. Murphy and Cranston	1/28/70
S. 3516	Sen. Muskie	2/26/70
S. 3993	Sen. Cranston	6/22/70
S. 4017	Sen. Murphy	7/24/70
H.R. 3120	Rep. Teague (Calif.)	1/13/69
H.R. 6495 (also H.R. 6609, 6794)	Rep. Garmatz	2/6/69
H.R. 7074	Rep. Teague (Calif.)	2/18/69
H.R. 7325	Rep. Keith	2/20/69
H.R. 9658	Rep. Waldie	3/27/69
H.R. 11226	Rep. Utt	5/13/69
H.R. 14618	Rep. Teague (Calif.)	10/30/69
H.R. 15748	Rep. Hanna	2/5/70
H.R. 18159	Rep. Aspinall	6/22/70

Two bill, S. 3267 and H.R. 16421, were introduced in 1968 by Sen. Thomas H. Kuchel and Rep. Charles M. Teague respectively. The bills proposed to prohibit mineral exploration and development under the Outer Continental Shelf Lands Act within a buffer zone adjacent to the Santa Barbara oil sanctuary established by the State of California. No action was taken during the 90th Congress.

Rep. Teague reintroduced his bill as H.R. 3120 at the beginning of the 91st Congress, fifteen days prior to the blowout at

Santa Barbara on January 28, 1969. The buffer zone would have included the site of Union Oil's Platform A. In his opening statement before the Senate Subcommittee on Air and Water Pollution, Sen. Robert Dole commented that "had the Teague bill been passed, you would not have this problem today." 11/

Additional bills were introduced to restrict the oil industry in the Santa Barbara area. H.R. 7074, terminating all drilling in the Channel, was introduced on February 18, 1969, and sent to the House Committee on Interior and Insular Affairs. H.R. 12540 provided that the Secretary of the Interior continue to permit drilling for the purposes of national defense or for the relief of potential pressures, pollution, or natural seepage, provisions which reflected the recommendations made by the President's Panel on Oil Spills. This bill was referred to the House Merchant Marine and Fisheries Committee. H.R. 12541 attempted to remove oil companies from the Santa Barbara Channel, or Naval Petroleum Reserve Number 1, to Naval Petroleum Reserve Number 5 (Elk Hills). This bill was referred to the House Armed Services Committee. Another bill, H.R. 14618, suspended further leasing by the Federal Government on Federal shelf lands by creating California marine sanctuaries. It was sent to the House Committee on Interior and Insular Affairs.

11/ Hearings on S. 7 and S. 544 (Footnote 3), p. 453.

Hearings.

Congressional response to the January 28 blowout was swift. Altogether seven hearings by different Congressional committees have been held which discussed the Santa Barbara oil spill. A list of the hearings follows:

Water Pollution-1969, Subcommittee on Air and Water Pollution, Senate Committee on Public Works, February 5, 6, 24, and 25, 1969.

Oil Spillage-Santa Barbara, Calif., Subcommittee on Flood Control and Subcommittee on Rivers and Harbors, House Committee on Public Works, February 14, 1969.

Oil Pollution, House Committee on Merchant Marine and Fisheries, February 25, 27, March 11, 12, 13, 18, 26, 27, 28, April 1, 1969.

Water Quality Improvement Act - 1969, House Committee on Public Works, February 26, 27, March 4, 5, 6, 1969.

Santa Barbara Oil Spill, Subcommittee on Minerals, Materials, and Fuels, Senate Committee on Interior and Insular Affairs. May 19, 20, 1969.

Santa Barbara Oil Pollution, Subcommittee on Minerals, Materials, and Fuels, Senate Committee on Interior and Insular Affairs. March 13, 14, 1970.

Hearings on S. 4017, Subcommittee on Minerals, Materials, and Fuels, Senate Committee on Interior and Insular Affairs. July 21, 22, 1970.

The Subcommittee on Air and Water Pollution of the Senate Public Works Committee discussed the Santa Barbara disaster on February 5, 6, 24, and 25, 1969, during hearings on S. 7 and S. 544. Field hearings in Santa Barbara were held on February

14, 1969, jointly by the Subcommittee on Rivers and Harbors and the Subcommittee on Flood Control of the House Committee on Public Works. In Washington, the House Committee on Public Works included the issue in hearings on H.R. 4148 from February 26 to March 6, 1969.

A series of bills amending the Oil Pollution Act of 1924 for the purpose of controlling oil pollution from vessels and from other technological structures and natural disasters was considered by the House Committee on Merchant Marine and Fisheries. These hearings were held from February 25 to April 1, 1969, on H.R. 6495, 6609, 6794 and 7325. Chairman Garmatz began by pointing out that "Marine and natural disasters involving oil pollution are increasing in frequency and magnitude. . . . It is also ironic that--despite all our impressive technology--we have not been able to develop a fool-proof method of dispersing, or at least controlling, a massive oil spill when it does occur." 12/

The Merchant Marine and Fisheries Committee found that dramatic oil spills such as that of the Torrey Canyon off southwest England in 1967, the Ocean Eagle disaster near Puerto Rico,

12/ U.S. Congress. House. Hearings before the Committee on Merchant Marine and Fisheries on Oil Pollution. February 25, 1969. p. 2.

the Witwater oil spill off Panama, the Yukon grounding and oil spill in Cook Inlet, and the blowout at Santa Barbara were only a few of the spills which occurred each year.

Sen. Cranston's bill. S. 1219, came before the Subcommittee on Minerals, Materials, and Fuels of the Senate Committee on Interior and Insular Affairs on May 19 and 20, 1969. It directed the Secretary of the Interior to take certain actions, make an investigation and study with respect to drilling and oil production under leases issued pursuant to the Outer Continental Shelf Lands Act. In Sen. Cranston's words, S. 1219 "in essence would terminate drilling wells off the California coast in the jurisdiction of the U.S. Government until satisfactory evidence is given to Congress that there will be adequate safeguards to prevent further spills like this if further drilling occurs in places other than the Santa Barbara Channel." 13/

In a letter dated May 16, 1969, to the Committee Chairman, Sen. Henry M. Jackson, the Under Secretary of the Interior Russell E. Train explained the opposition of the Department of the Interior to S. 1219: (1) a review by the State of California of new Federal regulations has produced coordinating efforts between State and Federal Governments; (2) the President has named a panel of

13/ Hearings on S. 1219 (Footnote 9), p. 8.

specialists to make recommendations for cleaning up the oil at Santa Barbara and preventing further such accidents; (3) a bill is pending now in the House with regard to oil spills and clean-up [H.R. 4148]; (4) the new regulations are stringent and impose high standards for offshore drilling; (5) amendments to the Outer Continental Shelf operating regulations have been proposed; (6) an order has been signed which has turned the existing 2-mile buffer zone opposite the Santa Barbara State Oil Sanctuary into a permanent ecological preserve; and, (7) all unleased areas south of the Santa Barbara Ecological Preserve will be held as an additional buffer zone. 14/

One year after the Santa Barbara oil spill, oil was still flowing intermittently from seafloor fissures. The Subcommittee on Minerals, Materials, and Fuels held field hearings in Santa Barbara March 13, 14, 1970, to assess the results of the clean-up and effects on the city. Damage suits against Union Oil Co. were numerous, but the beaches were clean and the ecology of the Channel seemed to have returned to normal. The citizens of Santa Barbara, however, continued to regard the Channel area in danger of future spills of equal magnitude and wanted the entire Channel to be a sanctuary.

14/ Hearings on S. 1219 (Footnote 9), p. 2.

The President's Proposal.

On June 11, 1970, President Nixon delivered a message to Congress in which he requested the passage of legislation to terminate twenty of the oil leases in the Santa Barbara Channel to create a Marine Sanctuary, excluding the three leases now bleeding off high pressure oil.

S. 4017, drafted and submitted by Department of the Interior Secretary Hickel and introduced by Senator Murphy on July 24, 1970, reflected the Administration viewpoint. It and other Senate bills (S. 3093, S. 3351, S. 2516, and S. 1219) were the subject of hearings held July 21 and 22, 1970, by the Subcommittee on Minerals, Materials and Fuels of the Senate Committee on Interior and Insular Affairs.

During these hearings strong opposition to relinquishment of the twenty oil leases was voiced by representatives of the oil industry. The representatives from Santa Barbara pointed out that the 20 leases which would be terminated by the bill had been geologically surveyed and were judged to be unproductive. On the other hand, the remaining fifty leases had proven oil reservoirs. George H. Clyde, Santa Barbara County Supervisor, stated bluntly that "Enactment of this bill would do virtually nothing--in fact, it would do worse than nothing . . . All

evidence leads to the conclusion that there is little oil in these 20 leases. By canceling these leases only, you would be doing little or nothing to prevent future oil spill disasters." 15/

In the House, the Chairman of the House Interior and Insular Affairs Committee Rep. Wayne Aspinall introduced H.R. 18159, the counterpart bill to S. 4017. The House Committee on Interior and Insular Affairs has tentatively scheduled hearings following Congress' 1970 summer recess.

15/ U.S. Congress. Senate. Hearings before the Subcommittee on Minerals, Materials, and Fuels, of the Committee on Interior and Insular Affairs, on S. 4017. July 21, 1970.

CHRONOLOGY OF EVENTS RELATED TO OIL POLLUTION IN SANTA BARBARA CHANNEL

1776 The Spanish Franciscan fathers establishing missions in the area reported oil seeps in the ocean and tar on the beaches. Such seeps were the earliest indicators of the presence of oil.

1792 Captain Cook's navigator, George Vancouver, anchored off Santa Barbara, described a "thick, slimy substance", which gave the sea "the appearance of dissolved tar floating on its surface."

[Tar from onshore seeps had been known much earlier in the region. Archeological records reveal that early man had used asphalt for holding points on weapons. Indians used tar for calking their boats and sealing water pitchers. Tar was also mined and distilled for lighting oil, and as a source of roofing and paving material. More recently (1963), tar mounds, estimated to be 9,000 years old, were photographed in 90 feet of water about two miles offshore from Point Conception. Such mounds are formed by extrusion from openings in the sea floor. If extrusion is slow, the mounds assume the shape of a volcanic cone; if the tar is fluid and less viscous, the mounds assume the shape of elongate features called "whips".]

1855 Submarine seeps were reported in the annual report of the U.S. Coast and Geodetic Survey. Similar reports appeared in several USC & GS annual reports before the turn of the century.

1889 A. B. Alexander of the U.S. Commission on Fish and Fisheries observed oil bubbling through the water about four miles south of Santa Barbara Light, causing extensive "slicks".

J. W. Fewkes, biologist, reported a "submarine petroleum well" spreading oil over the sea surface for considerable distances.

- 1896 The first drilling and production on the submerged lands bordering the continental United States was in the old Summerland oil field in Santa Barbara County. This was the first of 400 wells drilled from piers jutting out into the ocean. Not much drilling continued off the west coast because of the water depth.
- 1921 State of California introduced regulations governing offshore development, and began granting permits and leases.
- 1924 The Oil Pollution Act was passed. It prohibited oil discharges damaging to aquatic life, harbors and docks, and recreation, into the territorial sea and navigable waters.
- 1925 Major earthquake (intensity 6.3) destroyed most of the business district in Santa Barbara and caused an oil slick the entire length of the Channel.
- 1929 The Elwood field, eight miles north of Santa Barbara, was discovered. This was one of the richest in the West and drilling was done from piers. In that year the Capitan field was also discovered.
- 1938 Because of the probability that additional fields might exist in the ocean, the State of California legalized awarding of oil leases out to the three mile limit. These wells were slant-drilled from land.
- Sept. 28, 1945 President Truman issued a proclamation (No. 2667) which stated that the United States regarded the natural resources of the subsoil and seabed of the continental shelf beneath the seas, but contiguous to the coasts of the United States as appertaining to the United States, subject to its jurisdiction and control.

1945 Executive Order 9634 provided for establishing fishery conservation zones in areas of the high seas contiguous to the coasts of the United States and for establishing marine wildlife sanctuaries as a fishery conservation measure.

June 23, 1947 In the case of the United States vs. California the Supreme Court ruled that the United States, as sovereign power, was the owner of the submerged lands lying off its coasts, and that it alone had the authority to lease these lands.

May 1953 The United States Congress passed the Submerged Lands Act (P.L. 83-31). This Act relinquished to the States the interest of the United States in lands beneath navigable waters within the State boundaries and confirmed to the coastal States the right to extend their seaward boundaries three geographic miles from their coastline.

Aug. 7, 1953 The United States Congress passed the Outer Continental Shelf Lands Act (P.L. 83-212). This was the first time that Congress had actually asserted jurisdiction over the seabed and subsoil of the continental shelves. The Act did not extend the territorial boundaries of the Nation, but limited its authority to the seabed and subsoil. The respective coastal States owned their submerged lands out to three miles from the coastline and the Federal Government owned its outer continental shelf lands beginning at three miles from the coastline and proceeding seaward. But the coastline was not defined. The Act also gave jurisdiction over the OCS Lands to the Department of the Interior.

1953-1965 The State of California supervised drilling of about 500 core holes in the Santa Barbara Channel area on both State lands and Federal/State disputed lands. In material submitted for the record in the hearings of the Subcommittee on Air and Water Pollution (Part 3), Director Pecora stated that this information was withheld from the Federal Government.

- 1955 The Cunningham Shell Act was passed by the California Legislature creating a 16-mile long sanctuary, three miles out from shore, within which no drilling would be permitted unless it appeared to the State that its oil would be drained from adjacent areas. By this time the city and county of Santa Barbara had enacted zoning controls prohibiting oil drilling from shore along the 16-mile border of the sanctuary.
- July 9, 1956 Congress enacted the Federal Water Pollution Control Act (P.L. 84-660). This Act represented the first comprehensive effort to enhance the quality and value of the Nation's water resources and the prevention, control, and abatement of pollution by establishment of water quality standards for interstate and coastal waters.
- 1958 The first offshore platform (Hazel) in California waters was installed by Standard Oil Company. Rich oil and gas deposits were struck five months later in the Summerland offshore oil field. This was followed by the following offshore discoveries: Gaviota gas field in 1958, Cuarta and Conception fields in 1959, Naples gas field in 1960, Coal Oil Point field in 1961, and the Alegria, Caliente, and Molino fields in 1962.
- 1959 The first onshore processing plant was approved at Carpinteria, and by 1966 all California tidelands between Ventura County line (east) and Point Conception (west) had been leased except in the 16 mile sanctuary.
- 1965 Congress passed the Water Quality Act (P.L. 89-234), further amending the Federal Water Pollution Control Act. It established a Federal Water Pollution Control Administration in the Department of Health, Education, and Welfare. It required establishment of water quality standards for all interstate and coastal waters.
- May 17, 1965 The Supreme Court Channel Islands decision established that the Federal Government owned all the Santa Barbara Channel outside of the three mile limit of the State of California.

- July 29, 1965 A memo from Solicitor Frank J. Barry of the Department of the Interior to Attorney General T. C. Lynch of the State of California requested cooperation in a twin core drilling program to expedite a Federal leasing program offshore.
- Sept. 27, 1965 William T. Pecora was appointed Director of the U.S. Geological Survey, Department of the Interior.
- Oct. 12, 1965 A memo was sent from Director Pecora to Interior Secretary Udall proposing notice for a twin coring program on Federal lands. It was approved Nov. 3, and announced by the Federal Register Notice published on Nov. 10, 1965 (Public Release GS-Nov. 10, 1965).
- Nov. 1965 Mr. Luther Hoffman, Special Assistant to Interior Secretary Udall visited Santa Barbara city and county officials in anticipation of Federal leasing of shelf lands in the Channel area.

The leases by the State of California to Standard Oil of California of Parcel #21, and to Humble Oil Co. of Parcel #19, both abutting Federal offshore lands, created a situation of production drainage from the Federal lands by State leases.

- 1966 Congress passed the Clean Water Restoration Act (P.L. 89-753), further amending the Federal Water Pollution Control Act. It greatly increased authorizations for grants to help build sewage treatment plants, for research, and for grants to State water pollution control programs. It transferred administration of the Oil Pollution Act from the Secretary of the Army to the Secretary of the Interior.

Reorganization Plan No.2 was implemented. The Federal Water Pollution Control Administration was transferred to the Department of the Interior under the President's plan.

Executive Order No. 11288 required all Federal agencies to comply with provisions and standards of Federal Water Pollution Control Act and cooperate with the Department of the Interior and State governments in preventing or controlling water pollution.

May 10, 1966 Bureau of Land Management recommended to Secretary Udall (endorsed by Dr. Pecora) that sale be made of the drainage tracts.

Sept. 6, 1966 Secretary Udall approved notice to sell drainage tracts.

Dec. 15, 1966 Drainage Tract Sale (OCS -P-0166) was made covering 20,000 acres with high bid from Phillips Petroleum Co. of about \$21,000,000.

The American Association of University Women (AAUW) in the Santa Barbara area reported that county officials and representatives of the community tried every possible avenue to stop the leasing. Conferences were held in Washington and in Santa Barbara with Assistant Secretary of the Interior for Mineral Resources, J. Cordell Moore and his staff. Assistant Secretary of the Interior for Public Land Management, Harry R. Anderson, came to Santa Barbara and offered a two mile zone good only as long as the Department of Interior allowed it. County officials asked for an extension of the buffer zone eastward to further protect the Sanctuary. [The AAUW stated later that had this request been granted it would have prevented drilling of the well that caused the giant spill.]

Feb. 28, 1967 Santa Barbara county officials and representatives from the cities of Carpinteria and Santa Barbara held a conference in Washington, D.C., with Assistant Secretary of the Interior for Mineral Resources, J. Cordell Moore, and his staff. Other officials of the Department of the Interior such as Secretary Udall, Under Secretary Luce, Assistant Secretaries Anderson, and Cain met with people from Santa Barbara, both in Washington and in Santa Barbara prior to announcement of the lease sale.

[The purpose of these conferences was to impress upon Interior Department officials the concern of the people of Santa Barbara County that uncontrolled construction of platforms would have a detrimental effect on the esthetic values of the south coast area, resulting in irreparable harm to the tourist, convention, and vacation industry, as well as affecting the desirability of the area from a residential standpoint.]

- May 1, 1967 Assistant Secretary Moore and staff made a trip to Santa Barbara, inspected the area, and met again with local officials. Santa Barbara asked for a 1 year moratorium to study ramifications of the leasing.
- Sept. 22, 1967 Assistant Secretary of the Interior for Public Land Management, Harry R. Anderson, came to Santa Barbara. He said that the Federal Government was willing to establish a 2-mile wide zone to protect the sanctuary--a buffer zone. Interior wanted comments in a few days because bids for leasing were due to begin on October 15, 1967. Santa Barbara's pleas for 6 months to study the situation were rejected. Secretary Udall gave Santa Barbara 60 days.
- Nov. 1967 Santa Barbara officials returned to Washington with a study asking for an extension of the buffer zone eastward to further protect the sanctuary.
- Feb. 1968 Santa Barbara area was advertised for leasing and bids were opened.
- Feb. 6, 1968 Lease sale of 363,000 acres (71 tracts) brought \$603 million. Highest bid for Tract OCS-P-0241 [the tract where the blow-out occurred] was about \$62 million. It was sold to a combine of Gulf, Texaco, Mobil and Union Oil Companies.
- Feb. 27, 1968 Drilling began on the first of five exploratory wells in Lease OCS-P-0241 from Mobile drilling rig by Union Oil Co., as approved by the Geological Survey.
- Feb. 29, 1968 Oil slick reported by F.J. Simmons, District Drilling Superintendent for Union Oil Co., in a letter to D. W. Solanas, Regional Oil and Gas Supervisor for the Conservation Division of the Geological Survey. The first seep was observed on Feb. 23 and confirmed on Feb. 28 as a "fairly large oil slick with some gas bubbles" within OCS-P-0241. No documented observation had identified the Dos Quadras field as a seepage source prior to the commencement of work on that parcel following the lease sale.

May 6, 1968 Union Oil Co. of California as operator of OCS-P-0241 for the Gulf-Mobil-Texaco-Union group requested a permit authorizing the installation of a permanent drilling and production platform about six miles from shore off Summerland, Santa Barbara County, California, to be designated Platform A. Public notice was mailed to interested parties on May 15, 1968, with a limiting date of June 14, 1968, for receipt of comments.

June 12, 1968 Protest was filed by the city of Santa Barbara, which requested that the application for Platform A be considered at a public hearing. No public hearing was held by the Corps of Engineers because the statements were similar in nature to those presented at a public hearing held concerning a previously proposed drilling platform in the general area by another applicant.

4 Aug. 8, 1968 A Department of the Army Corps of Engineers permit was issued to Union Oil Co. containing two special conditions over and above the standard clauses:

The first condition bound the permittee to comply with any future regulations or instructions affecting the authorized work lawfully issued by any department of the Federal Government for the aid or protection of aerial navigation. The second condition pertained to water pollution, and is quoted here in full: The permittee, in the installation and maintenance of such structure at the authorized site, will take reasonable precautions for control of pollution to the navigable waters, particularly in the event of damage to the installation by tsunamis or earthquakes, and will observe and comply fully with those controls for pollution described by the Code of Federal Regulations for OCS mineral and development operations.

Nov. 8, 1968 First development wells from Platform A approved by the Geological Survey.

Jan. 9, 1969 Fifth development well from Platform A (A-21) was approved by the Geological Survey.

Jan. 13, 1969 Representative Teague of California introduces H.R. 3120 prohibiting mineral exploration and development under the OCS Lands Act within a buffer zone adjacent to the Santa Barbara oil sanctuary established by the State of California which is specifically described.

Jan. 14, 1969 Drilling Well A-21 commenced.

Jan. 28, 1969 Well A-21 drilled a total depth of 3,479 feet. Preparatory to casing, the drill stem was withdrawn. Five stands of drill pipe were pulled tight, 3 stands free, for a total of 720 feet. Mud flow began at 10:45 a.m., followed by gas and condensate. Well-head control was established in 13 minutes and relief of pressure started by flowing the well through connections below the blowout preventers. However, gas and some oil began to boil up through the water near the platform. Prompt attempts to regain control by pumping mud into the well failed.

12:50 p.m. The Coast was notified that Union Oil Co. was experiencing a gas blowout. Lt. George H. Brown III, Group Commander, U.S. Coast Guard Group, Santa Barbara was told of a blowout from the well being drilled from Platform A. The information was received from Mr. Don Craggs of Union Oil Co. who also stated that emergency action was being taken by dropping the drill pipe which was being withdrawn back into the well, and by closing the blowout preventers at the top of the casing on the platform.

Local city and county officials heard of the blowout as a result of an anonymous phone call to the news media in Santa Barbara.

At 6:10 p.m. Mr. Craggs informed Lt. Brown that the bubbling gas now contained oil and that a pollution situation was developing.

Jan. 29, 1969 After an early morning aerial surveillance of the area around the Platform, Lt. Brown conferred with Union Oil officials to discuss the causes and what efforts were being made to correct it.

At 9:00 p.m. Lt. Brown held a meeting with the officials of Santa Barbara, and State and Federal Government who were on the scene. Telegrams were sent to President Nixon and to Secretary of the Interior Hickel by the officials of Santa Barbara asking for an immediate cessation of all drilling in Federal waters.

Union Oil Co. accepted responsibility for all pollution control and cleanup activities. Subsequently the Deveroux Slough, Goleta Slough, Santa Barbara Harbor, Carpinteria Slough, Ventura Harbor, Mandolay Power Plant Intake, Channel Islands Harbor, Port Hueneme Harbor and Point Magu Lagoon were boomed or diked by Union Oil Co. Cleanup crews were provided to remove oil buildup on these booms.

Jan. 30, 1969 Union Oil Co. sprayed dispersant chemicals on the slick in order to prevent the oil from reaching the beaches. When the usage had exceeded the manufacturers recommended application ration based on Union Oil Co.'s estimates of the quantity of oil, it was stopped because of ineffectiveness.

Personnel from Red Adair, Inc. (Texas firm specializing in controlling blowouts) arrived and took over the task of regaining control of the well.

A group of citizens of Santa Barbara met and selected the name of GOO! (Get Oil Out) for a new organization whose purpose it was to rid the channel of all oil activity.

Jan. 31, 1969 The first reports of light oil on the beaches, came. The main slick was thickly packed in a 1-mile triangle around the well. The Federal Water Pollution Control Agency ordered the application of chemicals stopped due to possible toxic effects on marine life.

Feb. 1, 1969 California Fish and Game Department began a program to pick up oil-soaked birds; a Department spokesman said oil could harm the marine life in the area.

The United States Navy expressed concern that oil might harm the porpoises at Point Magu base.

San Francisco Coast Guard Command Post requested that a California Disaster Office representative go to Santa Barbara.

(Feb. 1, 1969 cont.) No encouraging report was received concerning the work on the Platform to contain the oil, and the weather forecast indicated southwest winds up to 25 knots by late afternoon. Lt. Brown recommended that Union Oil begin constructing a containment boom from telephone poles to supplement the 20-inch boom already in place. This recommendation was made in view of the worsening weather conditions and was intended to minimize the amount of oil which would reach the beaches. Union Oil Co. was advised of the location and availability of the necessary materials. All recommendations were accepted and followed.

Feb. 2, 1969 Drilling operations to slant a relief well into the original hole commenced at Platform A. Efforts to contain the oil surrounding the site by booms failed due to heavy weather.

The Director of the California Disaster Office attended a press conference on the oil slick problem. At 10:30 a.m. Director Samson relayed a request from Tom Gaines (Union Oil Co.) for hydraulic mulchers from the Division of Highways. Mulcher was obtained through Highways District Office in the California Disaster Office Region I. Mr. Gaines was advised of other sources of this equipment.

This emergency presented the first full fledged test of the Federal 'contingency plan' for interagency coordination in such pollution situations. Secretary Hickel dispatched Kenneth Biglane of the Federal Water Pollution Control Agency to the scene. Chemical dispersants were reapplied over a small area.

Feb. 3, 1969 Successful milling operations on the back pressure safety valve about 700 feet below the platform floor permitted a perforating gun to pass to 2,942 feet preparatory to killing the well with mud.

Secretary Hickel arrived in Santa Barbara. He made an aerial survey of the oil slick and consulted with all parties involved. He asked for a "voluntary suspension of drilling in six wells. . . until the pollution crisis had been studied. . . and until it can be determined whether corrective measures are necessary." The Secretary also said that the pollution was much more severe than he had anticipated. He did not, however, order the cessation of drilling in the channel. He attributed the pollution situation to be as much the fault of the Government as anyone's because the rules were not rigid enough.

The offshore winds were still holding the oil back from the beaches. Union Oil workmen seemed to have some success in corralling the slick with plastic sea curtains floating on foam pillows.

Feb. 4, 1969 At approximately 3:30 p.m. the winds shifted to southeast and increased, and within 2 hours Santa Barbara Harbor and adjacent beaches were covered with crude oil.

At 6:00 p.m. Lt. Brown briefed the Mayor of Santa Barbara of the situation and recommended that he evacuate all persons from the harbor, provide firemen to monitor the potential hazard, and restrict all unnecessary traffic in the waterfront area.

The California Disaster Office Operations Center was activated and all appropriate state and federal agencies were notified.

Approximately 3,000 barrels of mud reduced the flow of oil and gas for short intervals, but was insufficient to kill the well.

Feb. 5, 1969 The Coast Guard announced that the Federal Government had taken control of the oil containment and clean-up operations. Union Oil Company operations included pumping mud into the well in an attempt to seal the leaks; concentrating the oil on the water surface with log booms and pumping it into barges; and spreading mulched straw and perlite talc to absorb the oil near the beaches, where it could be picked up later for disposal at dumps.

Union Oil Co. provided straw, work crews, tank suction trucks, and other heavy equipment on the scene for removal of heavy concentrations of oil from the harbor and beaches.

Hearings on Water Pollution-1969 include 4 days of testimony on the Santa Barbara oil spill. The Subcommittee on Air and Water Pollution, Senate Committee on Public Works.

Feb. 6, 1969 Governor Reagan signed an Executive Order directing the Director of Conservation and the State Forester to assist Santa Barbara County officials in their efforts to prevent damage from the oil slick.

Heavy seas temporarily halted the efforts to plug the well.

The State of California said it would file suit in the Federal District Court against Sec. Hickel to require him to stop drilling on Federal leases until the regulations were revised. The city and county of Santa Barbara were cc-plaintiffs in the action.

Governor Reagan called for strengthening of Federal regulations on offshore drilling outside the three mile ocean limit, and said that Sec. Hickel agreed with him.

Feb. 7, 1969 President Nixon said he would give immediate consideration to using Federal troops to combat the 400-square-mile slick, and gave assurances to Rep. Charles M. Teague that the Interior Department would consider halting offshore drilling. Mr. Nixon suggested that 'very stringent regulations' should be applied to the oil companies to prevent spills. At a news conference he praised Sec. Hickel for acting promptly.

Secretary Hickel announced that he had ordered all companies operating on Federal lands off the coast of Santa Barbara to halt drilling and production operations. "It has become increasingly clear," said Mr. Hickel, "that there is a lack of sufficient knowledge of this particular area. This lack leaves us no other reasonable courses of action than to halt drilling."

Senator Muskie announced that Secretary Hickel and other officials will be questioned by the Senate Subcommittee on Air and Water Pollution in a probe of the disaster.

✓ Mr. Soames, Civil Defense Director for Ventura County, advised that they had double-boomed their harbors and marinas and were damming one waterway leading to the Ventura Keys area. They used a new type of styrofoam pontoon with attached slop shield. They reported no oil had entered the harbors or marinas, but quite a bit of oil had reached the exposed beaches.

(Feb. 7, 1969 cont.) On Platform A mud was injected at 30 barrels per minute and pressures up to 3,700 pounds per square inch beginning at 1:00 p.m. It was more successful this time.

Feb. 8, 1969 Union Oil Co. advised that it appeared the well had been brought under control and that the flow of oil and gas was invisible from the offshore tower.

At the request of the Chairmen of the Boards of Supervisors of Santa Barbara and Ventura Counties, the Governor declared the coastline covered with oil as a disaster area.

Former Secretary of the Interior Udall said he bore responsibility for the decision to permit drilling in the Santa Barbara Channel. He had asked the Department experts for opinions on drilling and there had been no dissent. The question of tighter regulations never came up, although the geological conditions in the area were known to be unstable. The Interior Department experts apparently had no doubts about the regulations. He expressed some doubt that drilling operations should ever be resumed in the channel.

Secretary Hickel ordered a study of the geological conditions in the area.

Feb. 9, 1969 With the capping of the runaway well with cement and mud, emphasis shifted to cleanup. Union Oil Co. stockpiled hay--620 tons were delivered on February 5 through 7. It was also anticipated that fifty men were required per lineal mile of beach to clean up the affected areas. Union Oil Co. announced that its insurance company claims office would be open in Santa Barbara on February 10, to process claims for cleaning boat hulls and other private equipment subjected to the oil contamination.

Feb. 10, 1969 The Coast Guard aerial survey indicated that the violent bubbling had stopped, but residue gas and oil was still flowing in lesser amounts.

Operation "Sea Sweep" was begun by Union Oil Co. Use was made of a suction pump for vacuuming oil from the water.

- Feb 11, 1969 President Nixon directed his Science Adviser, Dr. Lee DuBridge, to form a panel of experts to recommend ways to prevent sudden and massive oil pollution in the future.
- Feb. 12, 1969 It was noted that oil was seeping to the surface of the water in the vicinity of the Platform again. Containment, skimming, and chemical dispersal resumed. An attempt to survey the bottom in a submersible was not successful.
- Feb. 13, 1969 Coast Guard aerial and surface surveillance revealed that the oil seepage was definitely increasing. When queried, Union Oil Co. advised that they had been aware of this since February 11, and that they had anticipated this would happen as the pressure in the upper oil sands reduced. Mr. Solanas of the U.S. Geological Survey confirmed these facts.
- Feb. 14, 1969 Field hearings in Santa Barbara of the Subcommittee on Flood Control and the Subcommittee on Rivers and Harbors of the House Committee on Public Works began.
- Governor Reagan addressed a letter to President Nixon requesting (1) a State Representative be placed on Dr. DuBridge's Committee, and (2) the Federal Government reconsider California's request to regulate offshore drilling along its coast.
- Feb. 16, 1969 An aerial survey report revealed that oil concentrations were basically unchanged. Heaviest concentrations were 50 to 200 yards wide, extending from the platform north and west to 1 mile offshore of Goleta Point, with heavy oil in the kelp beds 2 to 3 miles east of Stearns Wharf. Weathered streaks of oil were near the beach between Santa Barbara and Carpinteria, and light film streaks between Carpinteria and Point Hueneme. Moderate to light streaks surrounded Anacapa Island, with very light oil patches on the south side of Santa Cruz Island.
- Feb. 17, 1969 Union Oil Co. had 300 men clearing beach areas between Santa Barbara and Carpinteria. They burned the oil-soaked straw, since the Santa Barbara County dump was filled.

(Feb. 17, 1969 cont.) Union Oil Co. asked and received Secretary Hickel's permission to perforate Platform A wells in the shallow sands to bleed the oil and gas that saturated and pressurized them during the time the well was out of control.

Feb. 18, 1969 Secretary Hickel, under the 1953 Outer Continental Shelf Lands Act, made the oil companies responsible for cleaning up any pollution resulting from offshore drilling operations even if there is no proof that the companies are at fault.

The Coast Guard aerial survey indicated that the seepage under the platform did not appear to have changed since the day before. The slick was about 10 to 30 feet wide and two miles long.

Feb. 19, 1969 The State of California announced that it would sue the Federal Government, Union Oil and three other companies for \$1.06 billion for damage caused by wells. State officials, pressing for a permanent cessation of the drilling in the channel, contended that industry ruins local economy and no one can guarantee that another disaster will not occur. California's Deputy Attorney General O'Brien said a claim for \$500 million will be filed against the Interior Department. Court suit would be started if the Department does not answer claim in six months. Texas, Mobil and Gulf Oil Companies were named as co-defendants. The city and county of Santa Barbara and the village of Carpinteria joined the State in two of the suits.

Feb. 24, 1969 Mr. Robert Abel of the National Science Foundation announced that the University of California would be given a grant of \$90 thousand under the Sea Grant Program to study current oil spills and their effects on the environment.

Feb. 25, 1969 Hearings on Oil Pollution begin in which the oil spill in Santa Barbara is discussed. House Committee on Merchant Marine and Fisheries.

Feb. 26, 1969 Hearings on H.R. 4148 begin. The Santa Barbara incident is discussed in connection with water quality improvement by the House Committee on Public Works.

Feb. 27, 1969 A new leak in the well at Platform A as well as that which originally blew out began to gush crude oil into the ocean. The U.S. Geological Survey reported that a new slick six miles long and 150 yards wide had formed. Union Oil Co. said that the leak was caused by faults in the ocean floor.

Feb. 28, 1969 In drilling through a bridge plug in Well A-21, Union Oil found the mud in the lower part of the well to be in such a condition as to indicate no communication between the lower and upper sands.

S. 1219 was introduced by Senator Cranston. The bill provided for the control and prevention of further pollution by oil discharges from Federal lands off the State of California.

March 3, 1969 Coincident with low-pressure, large scale cementing operations in Well A-21, the oil and gas bubble flattened and only a minor seep remained.

March 4-8, 1969 Minor intermittent seepage of oil and gas at a maximum rate of approximately 20 barrels of oil per day continued. Wells A-38, A-41, and A-21 were further conditioned for controlled bleeding of oil at low pressures from the upper sand.

March 12, 1969 Secretary Hickel drafted a plan to enlarge the area where drilling is prohibited off Santa Barbara. The plan was part of a package to control pollution and afford full public review of future leasing of Federal offshore lands. Secretary Hickel considered shutting down Union Oil Co. wells, and demanded full access to exploratory and drilling records of the companies holding leases. It was understood that he told key Congressional members that he would not decide on resumption of offshore operations until after California officials reviewed the proposed 'tougher regulations'.

March 21, 1969 Secretary Hickel issued more detailed amendments to the regulations affecting safety controls, training of platform crews, antipollution devices, and Federal inspection. These new provisions specifically call for the following:

- (March 21, 1969 cont.)
- (1) More casing is required on all wells, including specific requirements for near-surface casing to prevent blowouts in shallow formations.
 - (2) Any major variance from the new casing requirements must be submitted to the U.S. Geological Survey Headquarters in Washington for approval.
 - (3) Tests to ensure isolation of zones of oil, gas and fresh water from each other must be witnessed by representatives of the U.S. Geological Survey.
 - (4) Pressure tests in each casing string now are required to meet a standard of not more than 10 percent pressure decline in 30 minutes.
 - (5) Blowout prevention requirements are more stringent and, in some cases, additional preventers are required.
 - (6) While the drilling is in progress, blowout preventers will be tested daily rather than weekly as required before.
 - (7) A weekly blowout prevention drill is required for each crew to ensure proper training in emergency duties.
 - (8) A standby blowout preventer assembly and a safety valve will be kept on the rig floor to aid in case of the potential loss of control during drilling.
 - (9) Safety valves will now be required both above and below the Kelley which is part of the drive mechanism for drilling.
 - (10) Warning devices are required to indicate automatically the condition and level of the drilling mud in the hole during drilling and withdrawal procedure.
 - (11) Additional safety and antipollution devices now are required on platforms. These include gas detector and alarm systems, fire-fighting systems, automatic shutdown devices for the wells and equipment on the platform, pipeline alarm, and auxiliary power equipment for safety.

(12) Pollution control equipment is required to be located nearby each fixed platform, drilling ship or floating platform, and must be available prior to undertaking drilling operations. This includes booms to control the spread of oil slicks, skimming apparatus to remove oil slicks from the surface of the water, and approved chemical disperants.

(13) More scheduled and unscheduled inspections of all operations will be conducted by representatives of the US Geological Survey. Failure to comply with orders and regulations can result in immediate suspension of operations.

Secretary Hickel signed a second order which turned an existing 2-mile buffer zone opposite the existing Santa Barbara State Oil Sanctuary into a permanent ecological preserve. The current buffer zone of 21,000 acres is augmented by an additional 34,000 acres south of the preserve, totalling 55,000 acres where no drilling or production will be permitted. This is intended to protect the view and coastal amenities of Santa Barbara. The city itself already has regulations prohibiting oil drilling or oil exploration on the ocean front within the boundaries of the municipality. 16/

April 2, 1969 Secretary Hickel authorized the resumption of five Federal leases (held by Phillips, Mobil and Humble Oil) in Santa Barbara Channel and maintained the shutdown order on 67 other leases. The Geological Survey gave assurance that operations could be undertaken with minimum hazard to the channel. The resumption was approved after a review of the geological data and after guarantees that companies would abide by the new regulations. Santa Barbara County Board of Supervisors said it still wanted the Government to order complete drilling cessation in the channel area.

16/ April 21, 1969, Peter W. Rodino, Jr. Congressional Record, E3444.

- April 7, 1969 President Nixon directed Dr. Lee DuBridge to assemble a special panel including experts in geology, petroleum engineering and reservoir management to make recommendations to him about future steps that should be taken on the Union Oil lease.
- April 10, 1969 Oil companies (Pauley Petroleum, J.M. Huber Corp., Husky Oil, Colo. Oil & Gas, Mesa Petroleum and McCullough Oil) sued Federal Government for insisting on 'absolute liability' for any pollution from leaks in Santa Barbara Channel. The companies whose leases were not involved in the pollution crisis earlier in the year said the liability proviso makes exploitation of the field economically and practically impossible.
- April 16, 1969 The U.S. House of Representatives by a 392-1 roll call vote passed the Water Quality Improvement Act of 1969 (H.R. 4148) which, among other things, is designed to protect public waters from future oil pollution.
- May 19, 1969 Hearings on S. 1219 entitled Santa Barbara Oil Spill began. The Subcommittee on Minerals, Materials, and Fuels of the Senate Committee on Interior and Insular Affairs discussed Sen. Cranston's bill to terminate all oil drilling in the Santa Barbara Channel.
- June 2, 1969 The DuBridge Panel released its report which called for the withdrawal of oil as rapidly as possible to reduce pressure and to "forever prevent future spillage" from the Repetto reservoirs off Santa Barbara, California.
- Dr. DuBridge said, "I am aware that some have urged withdrawal from this oil bearing structure immediately. The Panel concluded that this would be hazardous at the present time, and would not provide a permanent end to the oil leak".
- June 5, 1969 GOO! was incorporated as a non-profit organization and dedicated to "The preservation and conservation of the natural charm and beauty of the Santa Barbara Channel together with particular attention to the removal of all oil drilling and oil platforms therefrom".

June 30, 1969 S. 2516 is introduced by Senator Murphy. The bill provides for the termination of Naval Petroleum Reserve Numbered 1, to establish certain submerged lands under the Santa Barbara Channel as Naval Petroleum Reserve Numbered 5.

Aug. 2, 1969 Secretary Hickel announced that the seepage had been reduced through emergency measures and that he was satisfied that resumption of the drilling at the blowout site and other measures were steps in the right direction. He ordered additional remedial drilling under the same safeguards he decreed after the blowout. Dr. Pecora said that the reduction in seepage through the use of new techniques was striking. Sec. Hickel praised DuBridge and the special panel for 'sound advice'.

Sept. 18, 1969 The rate of oil seepage from the seafloor near Platform A dropped to about 10 bbls/day.

Oct. 17, 1969 Secretary Hickel scheduled the first sale of Federal offshore leases since Santa Barbara incident. The lease sales included the new stringent regulations to adequately safeguard against a repetition of the Jan. 28, blowout.

Nov. 12, 1969 The New York Times noted that the damage suits resulting from the blowout total more than \$1 billion.

Dec. 1, 1969 The Supreme Court refused to halt emplacement of drilling platforms in the Santa Barbara Channel. A petition filed on Nov. 24, and a plea for a temporary injunction made to Justice Douglas by representatives of Santa Barbara were both rejected.

Jan. 15, 1970 Representatives of GOO! met in Washington with Sec. Hickel and other officials of the Department of the Interior to present petitions and discuss the sales of leases in the Channel.

Jan. 28, 1970 A commemorative rally/^{was} held in Santa Barbara to support and emphasize the Santa Barbara Declaration of Environmental Rights.

(Jan. 28, 1970 cont.) The Administration begins to take a look at the total environmental problem, which gives renewed momentum to the cause of the citizens of Santa Barbara. Several compromise bills are introduced in the Senate to enlarge the sanctuary area in the Channel by terminating twenty of the leases owned by the oil industries.

March 13, 1970 Field hearings held in Santa Barbara on the reaction to oil pollution one year later. The Subcommittee on Minerals, Materials, and Fuels of the Senate Committee on Interior and Insular Affairs.

June 11, 1970 President Nixon proposed that the Congress take legislative action to make the area seaward of the Santa Barbara Marine Sanctuary which is owned by the Federal Government also a part of the Marine Sanctuary.

July 21, 1970 Hearings on S. 4017 held in Washington by the Subcommittee on Minerals, Materials and Fuels of the Senate Committee on Interior and Insular Affairs. S. 4017 is the administration's bill to create a marine sanctuary by terminating twenty leases in the Santa Barbara Channel.

SOURCES OF CHRONOLOGY

- Marine Science Affairs--Selecting Priority Programs. Annual report of the President to the Congress on marine resources and engineering development. Washington: U.S.G.P.O., April 1970.
- U.S. Congress. Senate. Water Pollution-1969. Hearings before the Subcommittee on Air and Water Pollution, Committee on Public Works, on S. 7 and S. 544, 91st Congress, 1st session. February 3-June 4, 1969.
- U.S. Congress. House. Oil Spillage-Santa Barbara, Calif. Hearings before the Subcommittee on Flood Control and Subcommittee on Rivers and Harbors, Committee on Public Works. 91st Congress, 1st session. February 14, 1969.
- U.S. Congress. House. Oil Pollution. Hearings before the Committee on Merchant Marine and Fisheries on H.R. 6495, H.R. 6609, H.R. 6794, and H.R. 7325, 91st Congress, 1st session. February 25-April 1, 1969.
- U.S. Congress. Senate. Santa Barbara Oil Spill. Hearings before the Subcommittee on Minerals, Materials, and Fuels, Committee on Interior and Insular Affairs on S. 1219, 91st Congress, 1st session. May 19, 20, 1969.
- U.S. Congress. Senate. Santa Barbara Oil Pollution. Hearings before the Subcommittee on Minerals, Materials, and Fuels, Committee on Interior and Insular Affairs on S. 1219, S. 2516, S. 3351, S. 3516 and S. 3093, 91st Congress, 1st session. March 13, 14, 1970.
- The New York Times, Index and issues January 1969-June 1970.

THE BOARD OF DIRECTORS OF THE NATIONAL ASSOCIATION OF REALTORS

RESOLUTIONS PASSED AT THE ANNUAL MEETING HELD AT THE HOTEL MAYFLOWER, BOSTON, MASSACHUSETTS, ON DECEMBER 15, 1934

RESOLUTION NO. 1. That the Board of Directors do hereby recommend to the members of the Association that they vote for the re-election of the following members of the Board of Directors for the year 1935:

W. H. BROWN, Chairman
J. H. HARRIS, Vice-Chairman
C. H. HARRIS, Secretary

RESOLUTION NO. 2. That the Board of Directors do hereby recommend to the members of the Association that they vote for the re-election of the following members of the Board of Directors for the year 1935:

W. H. BROWN, Chairman
J. H. HARRIS, Vice-Chairman
C. H. HARRIS, Secretary

RESOLUTION NO. 3. That the Board of Directors do hereby recommend to the members of the Association that they vote for the re-election of the following members of the Board of Directors for the year 1935:

W. H. BROWN, Chairman
J. H. HARRIS, Vice-Chairman
C. H. HARRIS, Secretary