

SANTA ROSA ISLAND GEOLOGIC MAPPING AND OIL EXPLORATION

Marla Daily

Santa Cruz Island Foundation, 1010 Anacapa Street, Santa Barbara, CA 93101
(805) 963-4949, FAX (805) 963-9433, E-mail: scifmail@west.net

ABSTRACT

The story of oil exploration on Santa Rosa Island under Vail & Vickers ownership (1901 to 1986) covers the 43 year period from 1932 to 1975, and includes efforts by several companies, four of whom actually drilled: Standard Oil Company, Signal-Honolulu-Macco, J. R. Pemberton, and Mobil Oil Corporation. Despite repeated drillings in a variety of island locations, no significant oil was ever found. To obtain historical information, Vail & Vickers files were reviewed, and oral history interviews were conducted with Al and Russ Vail. In addition, surviving geologists and oil company employees were interviewed: Thomas W. Dibblee, Jr., Robert E. Anderson, Lloyd Edwards, William "Bill" E. Kennett, John A. Forman, and K. B. "Pete" Hall. In 1980, Santa Rosa Island became part of Channel Islands National Park. No further search for oil will be conducted on Santa Rosa Island.

Keywords: Santa Rosa Island, oil exploration, Vail & Vickers, drilling, geology.

INTRODUCTION

Santa Rosa Island is one of a chain of four islands (Anacapa, Santa Cruz, Santa Rosa and San Miguel) which makes up the westerly extension of the east-west trending Santa Monica mountains of the mainland. The islands are primarily composed of familiar sedimentary rocks with some interbedded volcanics much like those exposed on the mainland. However, basement rocks exposed on Santa Cruz Island are a rather exotic suite quite different from the granitics and metamorphics of the mainland basement. Like Santa Cruz Island, Santa Rosa Island is split by a major strike slip fault. On the low-relief northern one third of the island, Late Tertiary sediments and tuffaceous volcanics outcrop, with the major folding being a broad, gentle anticline. The more rugged, high-standing southern two thirds of the island exposes older, more resistant Lower Tertiary sandstones and shales overlain by red beds of the Sespe formation.

Just as the upturned Santa Ynez mountains form the north rampart of the Ventura/Santa Barbara sedimentary basin, so also do the Channel Islands define the south margin of this basin. For nearly 100 years, oil fields have been producing within this basin. It seemed possible to some exploration-minded oil companies that oil might be found along the south margin of the basin as it has been along the north edge.

The first formal geological exploration of Santa Rosa Island was conducted by William S. W. Kew (1890-1961), E. D. Lynton, and Paul Henderson in January of 1926. They had spent ten days on the island with permission of "Messrs. N. R. and Ed Vail," and had great assistance from the island foreman, C. W. Smith. A year later, Kew presented a paper, *Geological Sketch of Santa Rosa Island, Santa Barbara, County, California*, which he read before the Cordilleran Section of the Geologic Society of America on January 29, 1927. His work was subsequently published in the Bulletin of the Geological Society of America (Vol. 38, pp. 645-654), December 30, 1927). Kew noted his findings were published "with permission of Vail & Vickers and G. C. Gester, Chief Geologist of the Standard Oil Company of California."

Thomas Wilson Dibblee, Jr. (b. 1911) paid his first visit to Santa Rosa Island in September of 1928 during his high school years. He remembers vividly what happened on that trip:

Mr. Ed Vail had invited my father to visit the island, and Dad took me along for the one-day trip. We left by boat from Santa Barbara, about 7:00 A.M. The boat trip took well over two hours, and when we got near the island the ocean got very rough, with large swells. We weathered the swells pretty well, but Mr. Vail's cocker spaniel got awfully sick. After we landed at the pier, we visited with Ed's brother, Russell, at the ranch house, and had lunch. Then I decided to go for a walk, as I have done all my life. It was great to explore this island, so new and unfamiliar to me. I walked and walked - all the way to Black Mountain. When I got there, I was worn out and fell asleep by a bush. After an hour or so, I walked back down to the ranch house. When I got there, the Vail brothers told me the boat could wait no longer, and had just left for Santa Barbara with my dad onboard! So there I was, stranded on the island with Russell and Ed Vail.

They told me I was to accompany Mr. Russell Vail on their cattle boat, the *Vaquero*, already loaded with a herd of cattle that was being shipped overnight to San Pedro. The boat would be leaving shortly. So I embarked with Mr. Vail.

This slow trip was most interesting. The cattle down in the hold moored and bawled constantly pretty much the entire trip. As the *Vaquero* lumbered along the south side of Santa Cruz Island, I stayed up on the deck and saw some pretty spectacular geology in the late afternoon sun - the huge white bluffs of volcanic ash layers, dipping toward the ocean, and further east, a thick section of Monterey Shale dipping into the coastal bluffs. I had just learned some geology on our Rancho San Julian earlier that same year, so seeing the island geology was really exciting. By the time we got to the east end of Santa Cruz Island it was getting dark, and time for dinner. The boat had a great cook. I remember he made corn muffins that tasted so good I could not stop eating them.

The boat finally arrived at San Pedro Harbor just before dawn the next morning. On the way to the harbor, the *Vaquero* somehow collided with a small yacht, which really stirred up the cattle and caused a lot of commotion all around, but I think no one was hurt. After the boat landed, Mr. Vail called my father and put me on a bus back to Santa Barbara. I had a very long day - at some inconvenience to the Vails; however, they never did bawl me out. And who would have known that almost exactly ten years later [1938], I would return to Santa Rosa Island to map its geology! (Thomas Wilson Dibblee, Jr., pers. comm., 1998).

Four years after Dibblee's premier island adventure, Standard Oil conducted the first exploration for oil on Santa Rosa Island.

The story of oil exploration on Santa Rosa Island covers a 43-year period (1932-1975), and includes efforts by several companies, four of whom actually drilled: Standard Oil Company, Signal-Honolulu-Macco, J. R. Pemberton, and Mobil Oil Corporation. Despite repeated drillings in a variety of locations, no significant oil was ever found.

STANDARD OIL COMPANY (1932-1933)

The Standard Oil Company exploration on Santa Rosa Island began in 1932 as reported in a local Santa Barbara paper:

Santa Rosa Island Oil Lease is Filed. Plans of the Standard Oil Company to extend the oil development activities, already launched upon Santa Cruz Island, to Santa Rosa Island as well, are indicated with the filing of a lease on Santa Rosa Island. The lease provides that drilling must be started before June 22 [1932]. The island has an area of 62,600 acres. The new Santa Rosa Island lease was signed by the Vickers Company, Margaret R. Vail, N. R. Vail, Mahlon Vail, Mary Vail Wilkinson, William Banning Vail, Edward N. Vail and Margaret Vail

Bell, as lessees. Negotiations were handled through the Security Title Insurance and Guarantee Company. [Santa Barbara Morning Press, 30 April 1932]

Standard Oil geologist, Carl St. John Bremner (1895-1944), surveyed the island by horseback and did the field mapping in preparation for his company's drilling. Before actual drilling operations could proceed however, first an infrastructure had to be provided for not only crew accommodations, but also for access on and around the rugged island. Supplies, construction materials and drilling equipment were off-loaded from Vail & Vickers boat, *Vaquero*, onto the pier located at Bechers Bay. In addition, an amphibious plane was used to fly crew and supplies from a bean field in Carpinteria to a field on Santa Rosa Island just east of the main ranch. Three wooden cabins were constructed on the flat field to the south and west of the pier head which accommodated up to 16 men. The first roads on the island were roads that Standard Oil built using a steam shovel. Dynamite blasting was necessary in areas on both Black Mountain and to the west of Scott's camp (Figures 1 and 2). Standard Oil Company only drilled one well, named Santa Rosa #1. It was drilled on Vail Peak to a total depth of 6,298 ft using a stationary rig. According to Al Vail, "they

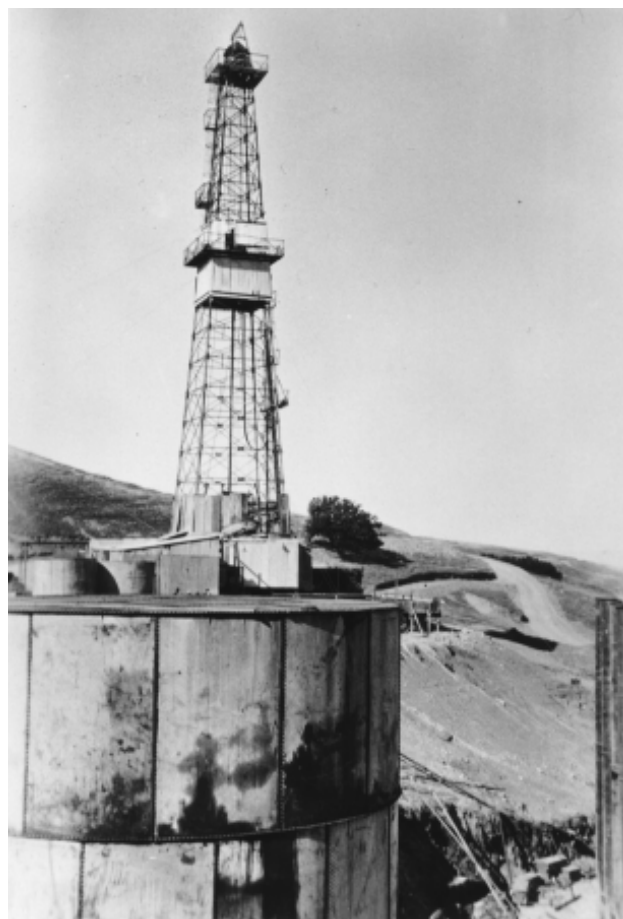


Figure 1. Standard Oil Company erected the first well on Santa Rosa Island in 1932. The stationary rig drilled to a depth of 6,298 ft on Vail Peak.



Figure 2. Laura “Dusty” Vail, daughter of William Banning Vail, preparing blasting holes for the roadway construction to Vail Peak in 1932.

hit a lot of dust.” The following year, in 1933, the well was capped and abandoned. The cabins and oil rig were removed by Standard Oil when they left the island, but today their road building efforts remain in use. Bremner also mapped Santa Cruz Island (1932) and San Miguel Island (1933), both of which were published (see references). His Santa Rosa Island work was considered proprietary, and hence not published. Bremner eventually left the service of Standard Oil to join the California-Ecuador Petroleum Company. He was killed in a plane crash in Peru on September 18, 1944.

RICHFIELD OIL COMPANY (1938)

Geologist Frank A. Morgan who had discovered the Elwood oil field in 1928, and Harold Hoots, chief geologist for the Union Oil Company, were well aware of the oil potential of Santa Rosa Island. In 1938, five years after Standard Oil Company pulled off the island, Morgan and Hoots arranged with Russell and Ed Vail to visit Santa Rosa on behalf of Richfield Oil Company. They included two local geologists who had been classmates at Stanford, Rodman K. Cross (1911-1970) and Thomas Dibblee, Jr., to help determine the island’s oil potential. As Tom Dibblee remembered:

When the four of us arrived, we rode horseback over the northern part of the island for a day or two to see the geology. After Morgan and Hoots

departed to their office suite in the black and gold Richfield building in downtown Los Angeles, Cross and I remained on the island for over two weeks in November 1938 to map the geology primarily north of the Santa Rosa Island fault, where the Vaqueros and Sespe sands that might contain oil are buried beneath the impervious Rincon Shale. It was thought there was a better chance of finding oil there than where Standard had drilled south of the fault. We also spent a day or two on the steep southeast side of the island to see the Vaqueros and Sespe sands wherever exposed. Rodman Cross and I spent most nights at the ranch house with Mr. Vail or his foreman, and we rode horseback each day to where we mapped the geology, usually one or two canyons a day, using aerial photographs to map on, as topographic base maps did not exist until years later. We camped a few nights on the western part of the island due to the long ride just to get back to that part to do field work. During our stay, the weather was surprisingly hot for that time of year, and in some of the canyons the temperatures ranged into the nineties. It was a strenuous effort, but when we returned to the mainland, we produced a geologic map of the part of the island we had mapped, showing what area would be most favorable for a test well. We found the best conditions to be in the vicinity of Tecolote and Garañon canyons, and at shallow depths. (Thomas Wilson Dibblee, Jr., pers. comm. 1998)

No lease resulted from these investigations, presumably because of existing heavy lease commitments by the company on the mainland. However, a few years later the island was leased by competitors that tested the area they had recommended, with negative results.

THE SUPERIOR OIL COMPANY (1947)

In 1947, William E. “Bill” Kennett (b. 1914) spent six weeks mapping the geology of Santa Rosa Island for The Superior Oil Company. (He mapped Santa Cruz and San Miguel islands as well). Permission for geological work on Santa Rosa Island was handled for Vail & Vickers by their friend and geologist, J.R. Pemberton. Pemberton warned Kennett: “the wind blows so hard out there that it takes three men to close a barbed wire gate.” Undaunted, Kennett proceeded. In his private report to The Superior Oil Company, he noted that Standard Oil Company’s well, Santa Rosa # 1, had been favorably located on one of the few major structures on the island. It had penetrated Early Miocene, Oligocene and a significant thickness of Eocene strata without shows of hydrocarbons. Kennett added that the most attractive untested closure of significant magnitude was in the northwestern part of the island where the northeasterly plunging Black Mountain anticline converged on the Santa Rosa Fault. The anticipated section would be similar to Standard’s

well, but may benefit from migration from the Channel. No test was proposed, although this area was later tested by Signal-Honolulu-Macco and Pemberton. At the time of Kennett's visit, he lived with the island's manager, Walter Lynch and his wife, Helen Kennett well remembered:

Our diet consisted mainly of beef, wild boar, fish, lobster and abalone. The midnight oil was burned many a night with Al Vail with our foursome playing cribbage. The losers got a smell of the cork while the winners took a snort. Scores began to even toward midnight. (William E. "Bill" Kennett, pers. comm., 1998)

Al Vail recalled Kennett was "the walkinest geologist ever born." (Al Vail, pers. comm., 1998)

SIGNAL-HONOLULU-MACCO (1948-1949)

Just after World War II, and fifteen years after Standard Oil Company drilled the island's first hole on Vail Peak, Signal-Honolulu-Macco [a partnership of Signal Oil & Gas Company, Honolulu Oil Corporation, and Macco Construction] entered into a lease agreement with Vail & Vickers to drill for oil. Honolulu Oil Company geologists Lowell E. Redwine (1911-1982) and Paul McGovney, and Signal Oil geologist Robert E. Anderson (b. 1920), stayed at the ranch house while they conducted field mapping and location preparation. Signal Oil & Gas was the partnership operator, and thus Anderson stayed on for the drillings as well. A total of three wells were drilled: Soledad #1, Garañon #3, and Tecolote #1. Although Signal-Honolulu-Macco was able to use the road previously constructed by Standard Oil as far as Soledad Mountain, this new partnership had to construct about four miles of road from Soledad Mountain northward to their drilling locations. During World War II, an Army encampment had been constructed on Santa Rosa Island and left abandoned after the war. Employees of Signal-Honolulu-Macco rehabilitated several of the barracks for their island operations. Vail & Vickers boat, *Vaquero*, had been commandeered for the war effort and not returned, and thus supplies for Signal-Honolulu-Macco had to be barged to the island by tow boat and beached at Water Canyon. Santa Barbara Aviation provided air service, and the Santa Fe Drilling Company brought an Ideco H-30 tilt-up rig to the island for the drilling operations. Soledad #1 was drilled to a depth of 3,772 ft before it was capped and abandoned in 1948. Garañon #3 was drilled to a depth of 3,360 ft before it was capped and abandoned in 1949. Tecolote #1 was drilled to a depth of 3,563 ft. Although it had a minor non-commercial showing of oil, it was capped and abandoned in 1949. At the time, oil was selling for \$3 a barrel and this meager finding was judged uneconomic. Robert E. Anderson remembered:

As a rule, the drilling of a well was never shut down, not even for Christmas. In 1948, the companies got kind-hearted however, and shut down the drilling

on Christmas Eve day. The plan was to fly back and restart the day after Christmas. Someone jokingly asked me if it ever snowed on Santa Rosa Island. I laughed and said of course not. We all went home, and guess what? It snowed. The plane couldn't fly. So much for my weatherman's forecast. We couldn't get back to the island until almost New Years. That New Year's Day, we all enjoyed a 15-pound lobster caught by hand in a tide pool. (Robert E. Anderson, pers. comm., 1998)

Although Signal-Honolulu-Macco pulled off Santa Rosa Island in 1949, they retained their rights to use the island's surface for offshore operations until 1953. Today the island's Signal Road commemorates their efforts.

J. R. PEMBERTON (1949-1950)

Encouraged by the non-commercial showing of oil from Tecolote #1, and by Signal and Honolulu geologists, Vail and Vickers family members decided to form an in-house joint venture on the heels of the departure of Signal-Honolulu-Macco from Santa Rosa Island in 1949. John Roy "Bill" Pemberton (1884-1968), Vail family representative in oil matters, wrote:

This joint venture group intends to drill to the base of the Sespe formation at a location between 1500' and 3000' northeast of Tecolote #1 in hopes of finding a thickening down structure of the oil zone found in that well. The well will be under the supervision of Mr. Harold Hoots and myself. (John Roy "Bill" Pemberton, pers. comm., April 25, 1949)

Since Robert E. Anderson was so familiar with the island's geology, he was "loaned" by his employer, Signal Oil & Gas, to assist with the J. R. Pemberton venture. Signal Oil & Gas attorney, Sloan Flack, also invested in the syndicate. Louis H. Scott of Chino, California was hired as the drilling contractor. Three shallow holes were drilled: Tecolote #2 which ran to a depth of 2,284 ft, Tecolote #3, which ran to a depth of 1,585 ft, and a core hole located towards the island's west end. All proved dry and were capped in 1949 and 1950. During the Pemberton operations, Louis Scott and his crew stayed at the rehabilitated World War II barracks previously used by the Signal-Honolulu-Macco crew. Henceforth this island location has been known as Scott's Camp. All materials were barged and landed on the beach at Water Canyon.

K. B. HALL (1967-1971)

From 1967 through 1971, K. B. "Pete" Hall (b. 1916), as a consulting geologist with offshore and Channel Islands experience, represented Vail & Vickers in facilitating arrangements for geological investigations. During this time, several oil companies expressed an interest in oil and gas

leasing, but none was consummated. "Tiger" Mike Davis out of Denver, used Hall to negotiate a lease on his behalf. Hall remembered:

In 1969 and 1970, Bill Osborn, Exploration Services Company and myself negotiated a lease for Tiger Oil Company. No wells were drilled under this lease when it expired in 1971. I remember a sign on Santa Rosa Island which said *All our guests bring us happiness. Some on arrival, some on departure.* (K. B. "Pete" Hall, pers. comm., 1998)

MOBIL OIL CORPORATION (1971-1975)

Two decades after Pemberton's unsuccessful drilling venture on Santa Rosa Island, Mobil Oil Corporation developed an active interest in further island drilling. Thus far, a total of seven holes had been drilled, and only Tecolote #1 has shown any slim promise. Mobil's interest came hot on the heels of the now-famous Santa Barbara Oil Spill of 1969, which had served to heighten public awareness of environmental issues. As a result, loud concern was voiced that drilling would upset the island's ecological balance or disrupt archaeological sites. Mobil agreed to some of the most stringent environmental controls ever adapted for onshore drilling, and on October 14, 1971 they entered into a lease with Vail & Vickers. Terms of the agreement stated Mobil had to begin drilling no later than July 14, 1973.

Each location was treated like an offshore drilling platform, and we took the same precautions that are normally required in the North Atlantic, the Pacific offshore and the Gulf of Mexico. The whole operation was sort of a test case. We had to reconfirm that an oil company could successfully drill in an environmentally hypersensitive area. (Mobil World, March 1975)

During the threat of the Cold War in the 1950's, the U. S. Air Force had built a large facility on the south side of the island at Johnson's Lee. It was manned from 1951 until 1963, and abandoned in 1965. Mobil Oil worked out of the abandoned facility, and barged their supplies to nearby Officer's Beach. By the early 1970s, no additional road building was required. Al Vail remembered, "Mobil had good equipment and it was a different ball game. It was a big operation. Most of them were flown out of Santa Barbara Aviation." (Al Vail, pers. comm., 1998)

Mobil maintained a 25-to-55-man crew on the island, all of whom had to adhere to strict rules. Hunting was forbidden and hiking was restricted. Smoking was limited to designated areas, and alcoholic beverages were banned. The men accepted the conditions in good grace, and apparently they found the operation something of a challenge. John Forman (b.1927) and Lloyd Edwards (b.1937) conducted preliminary field work. Using mapping by Weaver and Doerner et al (1969) together with Mobil surface mapping and two years of seismic exploration, they outlined Mobil's

drilling program. Geologists Lloyd Edwards, Jack Ells (b. 1946), Gene Hill and others sat the wildcats for Mobil. Within two years, six wells were drilled, all of them dry. The most notable well drilled was Santa Rosa #5 located in La Jolla Canyon. It was drilled on the crest of a large surface anticline to a depth of 11,003 ft—the deepest hole ever drilled on the island. It had tar shows at 3,090 ft, and gas shows from 10,849 to 10,851 ft. It effectively tested almost all of the Eocene section and bottomed in tight Cretaceous sandstones. Like all the other island wells ever drilled, it too was capped and abandoned. The last well drilled by Mobil was actually for Diamond Shamrock, named DS-SRI #1. Edwards remembered:

That well was particularly discouraging because they lost about 1,000 ft of structural elevation, having moved only about 1,000 ft to the southwest. Obviously a large hidden fault lies between the DS-SRI #1 and Santa Rosa #9 in Tecolote Canyon. In spite of this, Jack Ells reports that the DS did have a five-foot Vaqueros oil sand. We really pounded every nail in the coffin on that island. It was over. (Lloyd Edwards, pers. comm., 1998)

In 1980, Santa Rosa Island became part of Channel Islands National Park. No further search for oil will be conducted on Santa Rosa Island.

LITERATURE CITED

- Kew, W. S. W. 1927. Geological Sketch of Santa Rosa Island, Santa Barbara, County, California. Cordilleran Section of the Geologic Society of America, January 29, 1927.
- Kew, W. S. W. 1927. Geologic Sketch of Santa Rosa Island, Santa Barbara County, California. Bulletin of the Geological Society of America 38:645-654.
- Santa Barbara Morning Press, April 30, 1932.
- Mobil World, March 1975, Mobil Oil Corporation.

SOURCES OF UNPUBLISHED MATERIALS

- Anderson, Robert E. 2776 Club Drive, Los Angeles, CA 90064. Personal communication, 1998.
- Dibblee, Jr., Thomas Wilson. 316 East Mission Street, Santa Barbara, CA 93105. Personal communication, 1998.
- Edwards, Lloyd, 8022 South Albion Street, Littleton, CO 80122. Personal communication, 1998.
- Hall, K. B. "Pete". 1303 Manzanita Drive, Santa Paula, CA 93060. Personal communication, 1998.
- Kennett, William E. "Bill". 737 Sea Ranch Drive, Santa Barbara, CA 93109. Personal communication, 1998.
- Pemberton, John Roy "Bill". Personal communication with Vail & Vickers, April 25, 1949.
- Vail, Al. Vail & Vickers, 123 West Padre Street, Santa Barbara, CA 93101. Personal communication, 1998.