

# BETA

The BETA Field lies 13 miles south of Long Beach, California in Federal water depths ranging from two hundred to eight hundred feet. The field extends across four OCS leases



OCS-P 0296, 0300, 0301, and 0306. The leases were issued during Federal Oil and Gas Lease Sale 35 on December 11, 1975.

Beta Offshore holds a 100% working interest on OCS-P 0300, 0301 and 0306.

Beta was discovered in July of 1976.

Geological and petro physical data obtained from 2-D seismic survey

and exploratory wells was used to construct a reservoir water flood model which led to Beta's development in the 1980's.

Development was based on 2-D and 3-D seismic data and simplified simulation modeling that led to a five spot water flood development pattern. Initial development in the BETA Field began with the installation of 80 slot platform Ellen and processing platform Elly in 240 feet of water on Lease OCS-P 0300 in January 1980. First production began from platform Ellen in January 1981. A 60 slot platform Eureka was installed in the southern portion of the field in 720 feet of water on Lease OCS-P 0301 in July 1984. First production from platform Eureka was in March 1985.

## Ownership

Initially, Shell, as a majority working interest owner in the project, was the operator and the non-op partners were Aminoil, Occidental, and a couple of smaller independents. Over the years the ownership changed and effective December 30, 2009 Beta Offshore purchased the asset. Beta Offshore was approved as operator by the Minerals Management Service on May 14, 2010.

# Geology

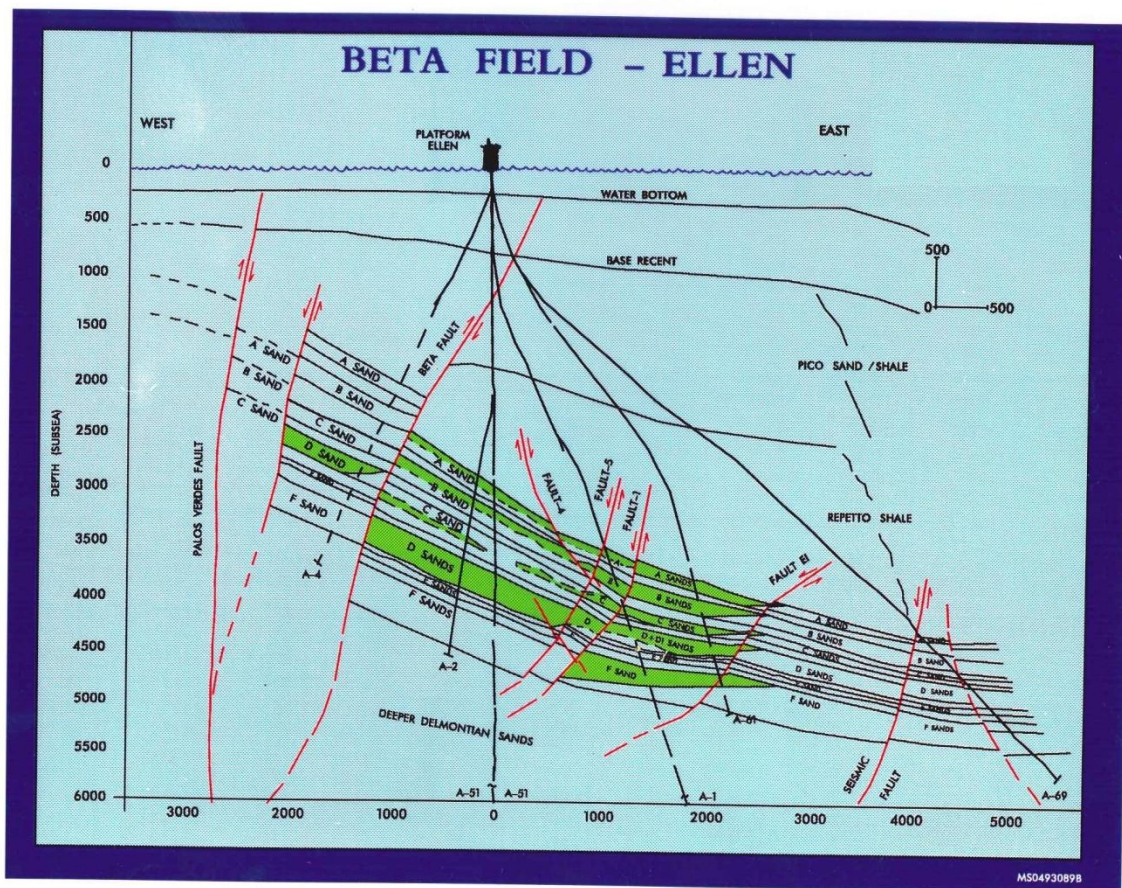
Beta Field is located on a structural high on the east side of the northwest-southeast trending Palos Verdes Fault. This high angle reverse fault has over one thousand feet of throw, in addition to having a significant right lateral slip component.



The Beta accumulation is located against a three way closure on the right lateral Palos Verdes strike slip fault in subsea depths ranging from 3,000 to 7,000 feet. The subsurface at Beta is highly faulted and elongated in a NNW-SSE direction with a productive area covering approximately 5,800 acres. Regional tectonics has caused both normal and reverse faulting on large and small scales. The limits of the Beta accumulation are currently defined by the trapping Palos Verdes fault system and the individual sand water levels. A typical Beta development well will encounter roughly 400 feet of oil pay spread over a 1000 foot gross interval. The total hydrocarbon column height at Beta is estimated at 1300 feet. The oil gravity distribution varies from 8-22 API

## Reservoir and Production

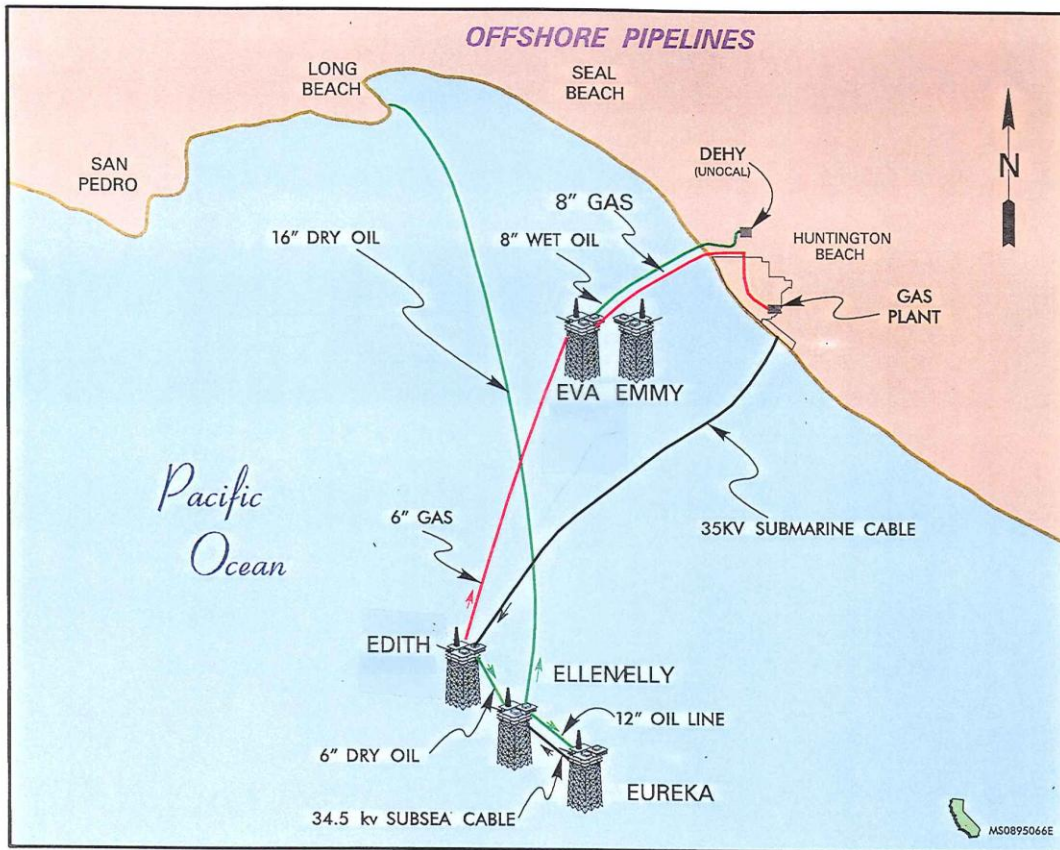
The typical development well has a completion with all major sands and subdivisions open to either production or injection. The current drainage scheme utilizes a 5 spot 30 acre patterns providing a one to one producer injector ratio in the heart of the field. Artificial lift is achieved with the use of electrical submersible pumps and with hydraulic wells.



The primary reservoir drive mechanism in the Beta Field is pressure depletion. The secondary drive mechanism is water flood. Peak yearly production was reached in 1987.

## Facilities

Beta Offshore operates three platforms as part of the Beta production Unit. Beta Offshore's platforms Ellen and Elly are located on OCS-P 0300 in approximately 240 feet of water and are connected by a bridge. Beta Offshore's third platform Eureka is located on OCS-P 0301 in approximately 720 feet of water.



Beta Offshore's oil is produced from wells located on platform's Ellen and Eureka and is processed in facilities located on platform Elly. Reservoir fluids produced on Ellen are transported to Elly via a 12" line which is supported by the bridge between the two platforms. Reservoir fluids produced on Eureka are transported to Elly in a 6" subsea pipeline connecting the two platforms.

The electric power for Beta Offshore's three platforms is generated with turbine driven generators located on platform Elly. Power from these generators is distributed from Elly to Platform Eureka via two 34.5 kv subsea cables and to platform Ellen with standard high voltage cables. Three water injection turbines on Platform Elly are gas fired. Two drilling workover rigs on Ellen and Eureka are diesel electric and the seven cranes are diesel fired.

In order to conserve energy the waste heat from the turbine exhaust at Elly is recovered and utilized in a series of heat exchangers and vessels located on Elly to assist in separating the produced oil and water streams. The combined Beta Offshore/DCOR oil stream is metered and shipped in a 16" line approximately 17 miles to an onshore pumping station in Long Beach California where it is distributed to various Los Angeles area refineries.

After being separated from the oil, produced water is treated in a series of vessels and filters on Elly to remove essentially all remaining oil and solids. After being treated, the produced water is pumped to a pressure of approximately 2000 psig. This high pressure water is then transported across the bridge to Ellen in a 8" and 10" line where it is re-injected into the oil-bearing reservoir to implement a water flood and improve recovery efficiency.

The 16" sales line to shore, operated by Beta Offshore for San Pedro Bay Pipeline Company, is inspected every two years. The 6" and 10" lines between platforms Eureka and Elly are on a once a year inspection cycle. All subsea pipelines are under cathodic protection, chemical protection, routine clean pigging operations, and corrosion and fluids monitoring. The liquid hydrocarbon containing lines are also under continuous leak detection and monitoring.