

Ellwood Onshore Oil and Gas
Processing Facility
Amortization Study



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TABLE OF CONTENTS

LEGAL NOTICE	1
EXECUTIVE SUMMARY	3
INTRODUCTION	5
ELLWOOD FACILITIES	7
HISTORICAL OVERVIEW.....	7
EXISTING FACILITIES	8
ELLWOOD ONSHORE FACILITY	8
LINE 96	12
PLATFORM HOLLY	12
PIER 421	15
FUTURE DEVELOPMENT.....	15
ELLWOOD LEASE LINE ADJUSTMENT PROJECT.....	16
PIER 421 PROJECT	17
EOF CLOSURE	18
OPERATION OF PLATFORM HOLLY	18
TREATMENT OF PRODUCED GAS AND LIQUIDS.....	19
AMORTIZATION METHODOLOGY	21
AMORTIZATION MODEL.....	22
CAPITAL INVESTMENT.....	23
ORIGINAL INVESTMENT	23
SUSTAINING CAPITAL INVESTMENT.....	24
DEPRECIATION	24
INCOME ANALYSIS	25
REVENUES	25
OPERATING COSTS.....	26
CHANGES TO THE ORIGINAL STUDY	26
SCENARIO ANALYSIS	27
DETERMINATION OF AMORTIZATION PERIOD	28
ORIGINAL INVESTMENT ANALYSIS.....	28
VENOCO INVESTMENT ANALYSIS	28
SCENARIO ANALYSIS	28
CONCLUSION.....	30
LIST OF EXHIBITS	31

TABLE OF CONTENTS

EXHIBIT A – LIST OF INFORMATION CONSIDERED
EXHIBIT B – LOCATIONS OF ELLWOOD FACILITIES
EXHIBIT C – ELLWOOD ONSHORE FACILITY
EXHIBIT D – PIER 421
EXHIBIT E – LOS FLORES CANYON PROXIMITY TO PLATFORM HOLLY
EXHIBIT F – AMORTIZATION OF ORIGINAL INVESTMENT
EXHIBIT G – AMORTIZATION OF VENOCO INVESTMENT
EXHIBIT H – AMORTIZATION OF VENOCO INVESTMENT WITH LLA PROJECT
EXHIBIT I – AMORTIZATION OF VENOCO INVESTMENT WITH EOF RELOCATED TO LFC
EXHIBIT J – AMORTIZATION OF VENOCO INVESTMENT AT A 5% RETURN ON CAPITAL
EXHIBIT K – AMORTIZATION OF VENOCO INVESTMENT AT A 14% RETURN ON CAPITAL
EXHIBIT L – AMORTIZATION OF VENOCO INVESTMENT WITH THE DOE/EIA HIGH PRICE FORECAST
EXHIBIT M – AMORTIZATION OF VENOCO INVESTMENT WITH THE DOE/EIA LOW PRICE FORECAST

LEGAL NOTICE

The City of Goleta (the “City”), located in Santa Barbara County, California, retained Baker & O’Brien, Inc. (“Baker & O’Brien”) to assist the City Attorney on existing and proposed non-conforming use regulations as they relate to termination procedures for oil and gas-related uses, as provided in the agreed *Contract Authorization for Non-Conforming Use Consulting Services* between Baker & O’Brien and the City, dated December 17, 2014. Except as provided in this agreement, Baker & O’Brien makes no warranties; either expressed or implied, and assumes no liability with respect to the use of any information or methods disclosed herein.

The City of Goleta Ellwood Onshore Oil and Gas Processing Facility Amortization Study, prepared by Baker & O’Brien, was originally issued by the City on March 4, 2016. The analysis and conclusions presented in the March study were based on publicly available information as well as upon confidential information provided by Venoco, Inc. (“Venoco”), the current owner of the Ellwood Onshore Oil and Gas Facility. Because the confidential information was provided by Venoco subject to a confidentiality agreement, it was not reproduced or otherwise included in the March report, which has since been posted to the City’s website and made generally available for public review.

A new version of the study, dated September 6, 2016, has now been prepared to include the confidential information previously considered and utilized by Baker & O’Brien when it developed the analysis and conclusions presented herein. This information includes proprietary, confidential, or trade secret information provided by Venoco for Baker & O’Brien’s consideration when preparing the study, but which is not generally available to the public and which Venoco had previously deemed to be confidential. In a memorandum to the City Attorney dated August 16, 2016, Venoco authorized Baker & O’Brien to include all relevant confidential information in an updated version of the study, pursuant to Venoco’s agreement that such information is not subject to the confidentiality agreement. Aside from the inclusion of the aforementioned confidential information, nothing in the study has changed since its original issuance on March 4, 2016.

The analysis, opinions, and findings in this report are based on Baker & O’Brien’s experience, expertise, skill, research, analysis, discussions, and related work to date. In

preparing this report, Baker & O'Brien has relied upon proprietary information and representations provided by the property owner, as well as other public and proprietary information available for this assignment. In the event that additional information should subsequently become available that is material to the conclusions presented herein, Baker & O'Brien reserves the right to supplement or amend this report. All conclusions, forecasts, and projections presented in this report represent Baker & O'Brien's best judgment utilizing its skill and expertise and are inherently uncertain due to the potential impact of factors or future events that are unforeseeable or which are beyond Baker & O'Brien's control.

Baker & O'Brien prepared this report for the sole benefit of the City. Any reproduction, distribution, or disclosure of this information is strictly prohibited without Baker & O'Brien's prior written authorization. Baker & O'Brien expressly disclaims all liability for the use, disclosure, reproduction, or distribution of this information by or to any third party.

EXECUTIVE SUMMARY

Baker & O'Brien, Inc. ("Baker & O'Brien") has been retained by the City of Goleta California, (the "City") to assist the City Attorney on existing and proposed non-conforming use regulations as they relate to termination procedures for oil and gas-related uses. This report presents Baker & O'Brien's analysis of the Venoco Inc. ("Venoco") Ellwood Onshore Processing Facility ("EOF") for the purpose of determining an appropriate amortization period for the possible termination of a legally non-conforming use. The EOF is located within the City limits and is subject to the jurisdiction of the City's land use regulations.

Before the City's incorporation, the land on which the EOF is situated was rezoned as Recreation and Planned Residential by Santa Barbara County on September 16, 1990. As a result of the rezoning, the EOF became a legal non-conforming use under California law. Other oil and gas production facilities owned by Venoco, including Platform Holly and Pier 421, are situated offshore in State-regulated waters and are not generally subject to the zoning regulations of either Santa Barbara County or the City.

Since the City was incorporated in 2002, the EOF has continued to operate as a legal non-conforming use. Under California law, a municipality may require termination of a legal non-conforming use by one of two "*constitutionally equivalent alternatives: it can eliminate the use immediately by payment of just compensation, or it can require removal of the use without compensation following a reasonable amortization period.*"¹ California courts have determined whether the amount of time given to a property owner to terminate a non-conforming use was a reasonable amortization period for recoupment of its investment.

Baker & O'Brien previously prepared an amortization analysis of the EOF in 2001 for Santa Barbara County (the "SBC Study"). The SBC Study examined all of the oil and gas production facilities owned by Venoco (the "Ellwood Facilities") to produce oil and gas from the Ellwood leases. Based on historical data supplemented with contemporaneous estimates between 1964 and 2000, the SBC Study determined that the original investment cost for the

¹ Tahoe Reg'l Planning Agency v. King, (1991) 233 Cal. App. 3d 1365.

Ellwood Facilities was amortized in 1990, assuming abandonment. The SBC Study is incorporated in this report by reference and in its entirety.

The purpose of this study is to update the SBC Study and to determine an appropriate amortization period for the EOF based on historical and forecasted capital investment in the Ellwood Facilities. This study considers historical information as presented in the SBC Study through 2000 and adds historical information between 2001 and the present. This study also considers recent estimates of potential abandonment and relocation costs for the EOF prepared by Venoco. The methodology used in this study to determine the amortization period is the same as presented in the SBC Study. Baker & O'Brien has updated certain economic assumptions used in the analysis, extended the analysis to include historical information from 2000 through 2015, and developed forecasts for investment costs and revenue from 2016 through 2030. Baker & O'Brien has also developed an Amortization Model to test the impact of key assumptions on the amortization period for the EOF.

We conclude that Venoco's original capital investment in the Ellwood Facilities was fully amortized by 2009, including estimated costs for abandonment. Therefore, capital investments and income after 2009 have no impact on the amortization period. Venoco plans to develop its Lease Line Adjustment project and has considered the relocation of the EOF outside of City limits, but neither initiative is material to the amortization period. Furthermore, current economic assumptions and forecasts of natural gas and crude oil prices are not material to the amortization period.

INTRODUCTION

In 1964, the Atlantic Richfield Company (“ARCO”) began development of an integrated operation to produce oil and gas from State Land Leases PRC 3242.1, 3120.1, and 280.1 (often referred together as the South Ellwood Field) and State Land Lease 421.1 (often referred to as the North Ellwood Field). The production operation originally included the Ellwood Onshore Processing Facility (“EOF”) and Platform Holly, which were constructed between 1965 and 1967. In 1966, ARCO and the Mobil Oil Company (“Mobil”) formed a joint venture as equal equity partners, with ARCO as the operator of the South Ellwood Field and the North Ellwood Field (the “Ellwood Leases”). In 1986, the joint venture purchased a nearby marine terminal and pipeline from successors to the Burmah Oil Company, which was used to ship Ellwood crude oil by barge to refineries. In 1993, ARCO sold its interest in the Ellwood operation to Mobil. In 1997, Venoco Inc. (“Venoco”) acquired the Ellwood Leases, along with the oil and gas production facilities required to operate the leases (the “Ellwood Facilities”) from Mobil.

This report presents Baker & O'Brien’s analysis, opinions, and conclusions regarding the appropriate amortization period for the EOF. Venoco decommissioned and abandoned the marine terminal and pipeline between the EOF and the marine terminal in 2013, after installing Line 96 to deliver crude oil to markets. Other portions of the Ellwood Facilities, including Platform Holly, seep tents, and Pier 421, are not located in the City and are regulated under the jurisdiction of the California State Lands Commission (“CSLC”).

The EOF is essential to the operations of the other Ellwood Facilities, which cannot continue to operate without the EOF, either in place or relocated outside of City limits. For this reason, the amortization period for the EOF alone is assumed to be the same as for the Ellwood Facilities as a whole. Therefore, this amortization analysis considers capital investment and income for the Ellwood Facilities to determine an appropriate amortization period for the EOF.

Baker & O’Brien consultants visited the Ellwood Facilities, including the EOF, Platform Holly, and Line 96, and met with representatives of Venoco to discuss current operations and field development plans in February 2015. In addition, we reviewed public and proprietary information about the Venoco operation, including information and documents provided to us by Venoco, the City, Santa Barbara County, the CSLC, and the California Department of

Conservation's Division of Oil, Gas, and Geothermal Resources ("DOGGR"). Documents considered in developing our analysis and preparing this report are listed in **Exhibit A**.

The analysis and the conclusions presented in this report rely upon information available as of March 4, 2016, the time when the original report was issued. No additional research or analysis has been completed in the preparation of this report which was revised only to include information previously deemed confidential by Venoco. Baker & O'Brien reserves the right to amend or supplement this report if additional information should subsequently become available that would materially change the analysis or conclusions presented herein.

ELLWOOD FACILITIES

The EOF is located within the City limits and is subject to the City's zoning and land use regulations. In 1990, the EOF became a legal non-conforming use after the property on which it is located was rezoned by the County of Santa Barbara as Recreation and Planned Residential. Since incorporation of the City in 2002, the EOF has continued to operate as a legal non-conforming use. Other oil and gas production facilities owned by Venoco, including Platform Holly, Pier 421, and seep tents are located on State Lands under CSLC jurisdiction, and the City has no regulatory authority over these facilities. Portions of a pipeline between Pier 421 and EOF may be within the City's jurisdiction, but the pipeline does not appear to have been identified as a non-conforming use. The locations of the various Ellwood Facilities relative to the City are presented in **Exhibit B**.

HISTORICAL OVERVIEW

Venoco has produced natural gas and crude oil from the Ellwood Leases since 1997. The South Ellwood field is located about two miles offshore, extends along the coastline, and is produced from Platform Holly. The North Ellwood field runs along the shoreline and has been produced from Pier 421. Raw natural gas and crude oil emulsion from the Ellwood Leases are both processed at the EOF to produce pipeline-quality natural gas and Ellwood crude oil.

Production rates from the Ellwood Leases averaged between 2,000 and 2,500 barrels per day ("B/D") of crude oil between 2000 and 2010. Venoco represents that the low historical production rates resulted from two significant factors:

- *Closure of the Ellwood Oil Terminal:* Venoco leased the Ellwood Oil Terminal from the University of California, Santa Barbara ("UCSB"). The lease agreement was scheduled to terminate in 2016 and Venoco was notified that the lease would not be extended. With no marine terminal, Venoco would have had no means to deliver crude oil to customers and Platform Holly would be shut-in. Therefore, there was no incentive to increase production rates until Line 96 was put into operation in 2012.
- *Failure to Approve a Full Field Development program:* Venoco representatives have claimed that Venoco was unable to get its "Full Field Development" program

approved. Without approval for this program, there was no opportunity to significantly increase production rates.

Since 2010, Venoco has spent \$100 million at Platform Holly for a variety of capital projects, including new wells. This investment has increased crude oil production rates to between 3,500 and 4,000 B/D.

Venoco reorganized its Full Field Development program from a single multi-phase project (requiring a permitting process extending to a variety of regulatory agencies) to a series of smaller development projects, each with its own jurisdictional hurdles for agency permitting and approvals. By approaching elements of the Full Field Development program as separate projects, Venoco was able to complete Line 96 before closure of the marine terminal, obtain approvals to produce oil from Pier 421, and seek approvals for extending the South Ellwood Field lease boundaries to produce more oil from Platform Holly. However, all of these plans depend upon the continued operation of the EOF as a legal non-conforming use.

EXISTING FACILITIES

The existing Ellwood Facilities include the EOF, Line 96, Platform Holly, and Pier 421. Baker & O'Brien consultants toured the Ellwood Facilities and met with Venoco management representatives to discuss the condition, capabilities, and limitations of these facilities.

ELLWOOD ONSHORE FACILITY

The EOF is located within City limits on Hollister Avenue, just off of Highway 101. The EOF is bordered on the east by the Sandpiper Golf Club, on the north by Hollister Avenue, on the west by the Bacara Resort and Spa ("Bacara"), and on the south by the Pacific Ocean. The EOF has minimal visual exposure to Hollister Avenue and cannot be seen from Highway 101. Lush perennial vegetation provides a visual boundary between the EOF and its neighbors. Hollister Avenue extends beyond the EOF along the Bacara property to the gate for the Ellwood Pier, although there is minimal traffic on this road. While we were able to identify the EOF from the sea as we travelled by crew boat to Platform Holly, the EOF has a relatively low profile in comparison to Bacara and other landmarks. An aerial photograph of the EOF is presented in **Exhibit C**.

Platform Holly delivers raw gas to the EOF via a six-inch, subsea pipeline. The raw gas is delivered directly to the EOF gas treating facilities in order to remove water, hydrogen sulfide, carbon dioxide, and condensable hydrocarbons (propane and heavier components). The treated natural gas is compressed for injection into the Southern California Gas (“SCG”) pipeline. Propane and butane condensed from the raw gas are sold as Liquefied Petroleum Gas (“LPG”). Natural gas liquids (“NGL”), including pentanes and heavier components, are also condensed from the raw gas and injected into the Ellwood crude oil. Hydrogen sulfide is removed and converted to elemental sulfur.

Platform Holly delivers crude oil emulsion to the EOF via a second six-inch, subsea pipeline. The crude oil emulsion is about 30 percent (“%”) water (by volume), which is needed to maintain subsea pipeline velocities and temperatures within an acceptable operating range. The crude oil treating facilities at the EOF reduce the hydrogen sulfide content of the crude oil to less than 70 parts per million (“ppm”) and separate water from the crude oil. Hydrogen sulfide is converted to elemental sulfur and produced water is injected into a deep disposal well. The treated Ellwood crude oil is delivered via Line 96 to the All American Pipeline (“AAPL”) at a temperature of 130 degrees Fahrenheit (“°F”).

The EOF has also processed small quantities of oil and gas from subsurface “seeps,” where gas and oil naturally leak from underground formations. Previously, Venoco operated subsea “seep tents” (in which ConocoPhillips currently owns a 22% interest) that collect and recover oil and gas released from natural seeps. Venoco does not currently recover seeps because production to the seep tents is nil, which Venoco attributes to increased oil production from Platform Holly.

The EOF nameplate capacity is 20,000 B/D of crude oil emulsion (which is 14,000 B/D of dry crude oil). However, significant portions of the EOF are currently underutilized or abandoned in place. Of three “heater-treaters” available to separate water from crude oil, two are used and one is abandoned in place. The EOF operates a heated oil circuit that replaces the functionality of the old tank heaters and operates more efficiently with lower air emissions. The Lo-Cat sulfur recovery unit also operates well below capacity, which reduces energy efficiency. There are four bullet tanks for NGL storage, but two are out of service.

The EOF delivers four products for sale to third parties: natural gas, crude oil, LPG, and sulfur.

- Natural Gas: Natural gas production meets SCG pipeline quality requirements, including a gross heating value of 1,100 British thermal units per cubic foot (“Btu/cf”). The pipeline-quality gas is sold into the SCG pipeline through a Lease Automatic Custody Transfer (“LACT”) meter adjacent to the EOF. However, a significant portion of the natural gas produced at the EOF is returned to Platform Holly for use in compressor engines and the flare pilot.
- Crude Oil: Ellwood crude oil may be characterized as heavy-sour crude oil, with a typical quality of 22°API,² 4% total sulfur, and a Reid Vapor Pressure (“RVP”) of eight pounds per square inch (“psi”). Ellwood crude oil is delivered through a LACT meter at the EOF to Line 96. Ellwood crude oil also contains all of the NGL recovered from natural gas processing, which is injected into the crude oil through a separate LACT. At the junction of Line 96 and AAPL, Ellwood crude passes through a second custody transfer meter. AAPL can take the Ellwood crude oil north for delivery to a refinery in Santa Maria or south to Los Angeles area refineries.
- LPG: LPG is a mixture of propane and butanes, which are stored and transported in pressurized tanks at ambient temperatures. LPG meets certain compositional requirements, and contains no hydrogen sulfide or water. LPG is sold in truckload quantities to Occidental Petroleum Corp. in Bakersfield. LPG is sold in truckload quantities or is injected into crude oil up to the pipeline RVP limit.
- Sulfur: Sulfur is produced as a non-toxic sulfur cake, containing about 65% elemental sulfur and 35% water. This material is sold in truckload quantities to fertilizer companies in Bakersfield for use as a soil amendment and plant nutrient.

The EOF had operated under an Abatement Order issued in 1999 by the Santa Barbara County Air Pollution Control District (“APCD”) following several hydrogen sulfide releases. After meeting all obligations of the Abatement Order in 2009, Venoco has continued to operate

² The American Petroleum Institute (“API”) scale is used to measure the specific gravity of crude oil.

the facility under a rigorous preventive maintenance program to meet safety and environmental requirements. Venoco represents that the EOF now complies with API Recommend Practice 14C.³ The EOF is well-instrumented with monitoring and alarm systems for hydrogen sulfide, Lower Explosion Limit (“LEL”), Reactive Organic Compounds (“ROC”), and fire. In addition, monthly and annual inspections of pipe thicknesses are conducted at the EOF, with pipeline replacements scheduled on a preventative basis.

The EOF operates a deep-injection well on the property for disposal of produced water, which is permitted by the DOGGR. Produced water is pumped more than 5,600 feet below ground level. The capacity is rated to be 3,000 B/D of water. The water injected into the well is classified as a Class 2 Oil Field Waste since it has been separated from crude oil. Sanitary wastewater is delivered to the City treatment plant and has not been injected into the deep-well.

Storm water at the EOF is collected, tested, and discharged to the sea if it meets all regulated limits. If storm water does not meet regulated limits, it is hauled by truck from the site for further processing. Collected storm water is sampled three times each year. In recent years, storm water accumulation has been minimal due to continuing drought conditions, and there has been no need for disposal of storm water.

The EOF obtains firewater from lagoons on the neighboring Sandpiper Golf Club. Since there has not been a fire at the EOF since the 1980s, the only need for firewater has been for testing purposes.

The Line 96 project included installation of a pipeline pig launcher, which is located under the entrance road between Hollister Ave. and the EOF. The location of the pig launcher was mandated by local agencies, and requires enclosed entry permits for normal use and maintenance which is located at the EOF. Following the start-up of Line 96, a new NGL injection skid was installed at the EOF that is used to inject produced NGL into the Ellwood crude oil product. All custody transfer meters are proven monthly.

Venoco installed a new power cable between the EOF and Platform Holly in the summer of 2013, which cost approximately \$8 million. The cable is rated at 25 kilovolts and 200 amps,

³ *Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms.*

and replaced a cable that was originally installed in 1969. The new cable is about four inches in diameter, armored, and laid on the seabed with mat covering a portion of its length.

Operating costs for the EOF are dominated by costs for electrical power. Power is used at the EOF for processing natural gas and crude oil, and is delivered from the EOF to Platform Holly for operation of equipment. Power costs are typically 26 cents per kilowatt hour, although there are seasonal differences. A meter located in the EOF control room prominently displays the month-to-date kilowatt hours.

At the time of our visit, the EOF was in clean and orderly condition and appeared to be well-maintained. Venoco representatives described significant improvements that had occurred since 2010. Idle equipment appeared to have been preserved, subject to detailed mechanical inspection. While Baker & O'Brien did not perform an environmental, health, and safety ("EHS") audit, we noted that appropriate training was provided for visitors, alarm systems were demonstrated, and no EHS hazards were observed during our visit.

LINE 96

Line 96 began operation in 2012, prior to shut down and abandonment of the Ellwood Oil Terminal and an interconnecting pipeline between the EOF and the marine terminal. The right-of-way for Line 96 runs west from the EOF along Highway 101. Line 96 follows Highway 101 for a distance of about 9 miles, where it connects to AAPL on private property about one-half mile west of Las Flores Canyon.

Ellwood crude oil is injected into Line 96 at the LACT meter for CSLC lease accounting. There are pressure monitoring stations and shut-off valves at approximately one-mile intervals along Line 96. Line 96 has an easement for a pigging station at the termination site. An interconnection and custody transfer meter between the pigging station and AAPL provides for injection of Ellwood crude oil into the AAPL.

PLATFORM HOLLY

Platform Holly is located approximately two miles offshore in State of California waters. The CSLC regulates the use of all submerged land from the mean high-tide line to three miles

from shore. Other offshore platforms observed in the area are farther than three miles offshore and are located in Federal waters.

Platform Holly and other offshore platforms are accessed by crew boat from the Ellwood Pier, which is located west of Bacara. Venoco has an easement to use a portion of the roadway on Bacara property between the EOF and the Ellwood Pier. The Ellwood Pier is owned and maintained by CSLC and is used exclusively by Venoco and ExxonMobil. Crew boats are operated by contractors to shuttle workers to and from Platform Holly. As we approached Platform Holly by crew boat, an oily sheen was observed on the water and the odor of petroleum was noticeable. Venoco representatives attributed the free oil to naturally occurring seeps from the ocean floor. Notwithstanding the sheen on the water, wildlife was abundant on and around the platform, including sea lions, ducks, gulls, and pelicans.

Platform Holly is a medium-size drilling and production platform that consists of 30 “slots” or wellheads. The platform was originally designed to serve only as a production platform and a portable jack-up drilling rig was brought to the site to drill wells as needed. A permanent drilling rig was first installed on the platform in 1987, and the platform is currently used to drill one or two wells each year. Of 16 production wells, 10 are mobilized by gas lift and five are mobilized by Electrical Submersible Pumps (“ESPs”), with a sixth ESP to be added. Five of the wells have been drilled horizontally to the eastern boundary of Venoco’s lease. In addition, the platform currently operates three water injection wells and two gas injection wells

The platform recovers a mixture of natural gas, crude oil, and water from wells utilizing gas lift and ESPs. Produced gas, hydrocarbon liquids, and water are separated on the platform. Produced gas is recompressed for gas-lift or sent to the EOF for processing. Liquids are produced from the wellhead at a typical temperature of 170°F and are more than 75% water. Approximately 15,000 to 16,000 B/D of produced water is separated and re-injected into the wells. A portion of the produced water is re-injected into the crude oil to produce the crude oil emulsion containing 30% water, which is sent to the EOF. A portion of the produced water is re-injected into the crude oil to produce a crude oil emulsion, which is sent to the EOF for processing. The remainder of the water is re-injected into the wells. The EOF returns pipeline-quality gas and supplies electrical power to Platform Holly. About two-thirds of gas production is used at the platform for gas-lift and as fuel for compressor engines. The platform is currently

producing 3,500 to 4,000 B/D of oil and 1.0 to 1.5 million standard cubic feet per day (“MMScf/D”) of pipeline-quality natural gas to sales.

The Loading/Landing Deck is the top level of Platform Holly, where the helicopter pad and the drilling rig are located. A new drilling rig and supporting equipment were installed in 2000. The derrick is 160 feet in height and can support up to three sections of 30-foot pipe.

The Drilling Deck is the level below the Loading/Landing Deck, where drilling equipment, the crane, and gas compressors are located. Two large compressors driven by natural gas engines are used to compress gas for re-injection into the wells and for transporting raw gas to the EOF. New generators were installed in 2000 and a new crane was installed in 2008. A flare extends over the water from the northeast corner of the Drilling Deck. At the time of our visit, there was no drilling activity on the platform.

The Mezzanine level is located between the Drilling Deck and the Production Deck. This level houses offices and oil and water surge tanks.

The Production Deck is the next major level below the Drilling Deck. The Production Deck includes “Christmas trees” for each of the 30 wells, chemical injection pumps, gas-oil-water separation equipment, the control room, a switchgear room, and the galley. Approximately 30 new chemical injection pumps were installed within the last five years. A new electrostatic precipitator was recently installed and was in operation to separate oil and water. The switchgear room houses the original motor control center, which currently delivers power to the production and processing equipment. An emergency diesel engine/generator package is also located in the switchgear room. New motor control centers have been installed on the Production Deck for the ESPs and drilling equipment.

The platform is currently certified to withstand a 500 year seismic event with full drilling loads, in accordance with CSLC requirements. A number of improvements have been implemented over the past 10 years to achieve this certification. The platform was fitted with structural reinforcement in 2004. Level 4 structural improvements were completed in 2014, which extend from the platform to the seabed. The jacket is cleaned and inspected annually. Structural components are subject to continuous maintenance, including inspection and painting

over an annual cycle. During our visit, a crew was inspecting, preparing, and painting the lower jacket structure between the waterline and the Production Deck.

The platform's operations are controlled by a "Wonderware" programmable logic control system and monitored from computer screens in the platform control room. The current control system was installed within the last five years. During our site visit, a test of the different platform alarm systems was conducted, including alarms for fire, ROC, hydrogen sulfide, and abandon-platform. The ROC and hydrogen sulfide alarms are repeated at the EOF and the APCD for monitoring purposes. Noise levels are tested on a quarterly basis to meet regulatory requirements.

At the time of our visit, Platform Holly was in good condition, appeared to be well-maintained, and has had significant investment since 2000. Some equipment on the platform had been removed from service for some time and effectively abandoned in place. However, additional improvements are planned in the near future, including new office space, a new galley, and an additional ESP. While Baker & O'Brien did not perform an EHS audit, we noted that appropriate training was provided for visitors, alarm systems were demonstrated, and no EHS hazards were observed during our visit.

PIER 421

Pier 421 is located on the beach about one-half mile east of the EOF. Pier 421 includes two physical piers: Pier 421-1 is the western structure and is used for water injection; Pier 421-2 is the eastern structure and is used for crude oil production. Neither of the Pier 421 structures is within City limits. Venoco has received permits from the CSLC to resume oil production at Pier 421-2, which would be processed at the EOF. However, wells at both piers are currently plugged, and environmental review of the project is currently being litigated. An aerial photograph showing the relative locations of Pier 421 and the EOF is presented in **Exhibit D**.

FUTURE DEVELOPMENT

During a meeting with management representatives, Venoco provided insight regarding its current development plans. Venoco highlighted the importance of the Ellwood development to the future of the company, stating that "*Ellwood is the company.*" Company representatives

reviewed the current development plan with respect to expected costs and benefits from continued development of Venoco's Ellwood Leases.

ELLWOOD LEASE LINE ADJUSTMENT PROJECT

Venoco's original Full Field Development program was presented in an application to the CSLC in 2000. The basis for the Full Field Development program was to modify Venoco's original lease by extending the lease boundary eastward to include the entire South Ellwood reservoir. While the CSLC is prohibited by State law from granting new leases for exploration and development of offshore oil fields, the CSLC may approve modifications to existing offshore leases to incorporate a contiguous reservoir. Venoco applied for modification of its South Ellwood lease so that it could drill beyond its original lease boundary from Platform Holly. Venoco estimated that the Full Field Development project would recover 60 million barrels of oil in addition to proven reserve estimates for its existing lease.

The Full Field Development program envisioned a variety of individual projects, including new horizontal wells, a new crude oil pipeline to AAPL, a new power cable to Platform Holly, and other infrastructure. In 2009, Venoco abandoned the Full Field Development program as a single application due to a lack of forward progress on permits and multi-jurisdictional challenges. A key factor in abandoning the Full Field Development program was Venoco's need to permit and install Line 96 before termination of the marine terminal lease. Since 2009, Venoco has been successful in obtaining permits and implementing elements of the Full Field Development program as separate projects, including Line 96 and replacement of the electrical power cable.

Venoco has renamed its application for lease modification as the "*Adjustment to the Existing Easterly Boundary of Lease 3242*," which is referred to as the Lease Line Adjustment Project (the "LLA Project"). Venoco is currently preparing the Environmental Impact Report ("EIR") for the LLA Project, which is expected to be submitted to regulatory agencies in 2016. Venoco's main objective for the LLA Project is to produce 10,000 B/D of crude oil. The number of wells operated from Platform Holly will not change, although Venoco plans to abandon six existing wells and drill six new wells to the eastern part of the adjusted lease. A variety of factors would constrain crude oil production to this level:

- Minor changes to the Platform Holly drill rig structure may be required in order to drill much longer wells. Larger or additional mud pumps and ESPs may be required.
- No significant changes in processing equipment at Platform Holly are required to deliver this volume.
- The APCD permit limit for pumping rates between Platform Holly and the EOF is 13,000 B/D of dry oil.
- No changes in processing equipment at the EOF are required to process and deliver this volume. The existing pump capacity to deliver to Line 96 is rated for 10,000 B/D of crude oil.
- No equipment at the EOF that is currently out of service is required to be returned to service in order to deliver this volume.

Venoco has retained an independent consulting firm, DeGolyer & MacNaughton (“D&M”) with headquarters in Dallas, Texas, to provide reserve and production estimates for the LLA Project. D&M’s analysis considers the physical characteristics of the South Ellwood reservoir, which slants upwards towards the east, away from Platform Holly. The LLA Project plans to use horizontal drilling to extend wells about 25,000 feet (nearly five miles) to the east of Platform Holly, with no hydraulic fracturing.

PIER 421 PROJECT

Venoco described a project to reactivate oil production from Pier 421, which will include: inspection and work-over of the existing oil well on Pier 421-2; installation of an ESP to produce oil from that well; “slip-lining” of the underground pipeline between Pier 421-2 and the EOF for mechanical integrity; decommissioning and plugging of the water injection well at Pier 421-1; and removal of Pier 421-1. No drilling is required to reactivate the oil well. Venoco believes that these production volumes will justify its investment. Besides the production of small amounts of crude oil, Venoco theorizes that removing oil from Pier 421 will reduce the amount of seeps to provide a positive environmental impact. However, no tests have been made to confirm the production capacity of the well or the impact on seeps.

In December 2014, CSLC approved the EIR for the project and the project received permits. Venoco's lease requires it to produce oil from Pier 421 in order to maintain the lease in effect. Subsequently, the City wrote a letter to the CSLC objecting to the project and later filed a lawsuit under the California Environmental Quality Act ("CEQA") alleging that the EIR was inadequate. Venoco offered no outlook as to when the CEQA challenge would be resolved.

EOF CLOSURE

Venoco management representatives provided insight regarding removal of the EOF as a non-conforming use. Company representatives discussed a variety of challenges that would be presented if the EOF were to be closed or relocated outside of the City limits. These challenges are of two types: 1) decoupling the integrated operation of Platform Holly and the EOF; and 2) treatment of produced gas and liquids to meet market requirements. Venoco noted that it was in the process of evaluating these issues and would be issuing a comprehensive report in 2015.

OPERATION OF PLATFORM HOLLY

Removal or relocation of the EOF would have significant impact on Platform Holly, since the EOF supplies natural gas and electrical power to the platform. In addition, real-time operating data is transmitted from Platform Holly to local agencies through a communications node at the EOF.

Platform Holly is required by its permits to use pipeline quality natural gas in compressor engines and the flare, which is supplied from the EOF. Pipeline quality natural gas is dry, free of sulfur, and free of heavy hydrocarbons. If the EOF were to be removed or relocated, Venoco would have two potential options to supply natural gas to Platform Holly:

- Install gas treating equipment on Platform Holly to provide sufficient natural gas to operate the platform. However, there is no space available for additional processing equipment on Platform Holly. In particular, the produced gas contains significant levels of sulfur compounds that would need to be removed and transported to shore, using equipment of significant size.
- Deliver natural gas to Platform Holly from a commercial natural gas pipeline. Since the EOF injects into the SCG pipeline on Venoco property, it may be possible to

convert the connection to receive natural gas for supply to the platform. However, a number of permitting hurdles and commercial agreements would need to be negotiated in order to implement this option.

Platform Holly depends upon electrical power provided by the EOF. The EOF does not generate power, but delivers electrical power received from the local power company, Southern California Electric Power (“SCE”), through a power cable to the platform. A number of permitting hurdles and commercial agreements would be needed to supply Platform Holly directly from SCE.

Platform Holly provides operating data to the EOF and local agencies, including safety and environmental alarms and notifications, through a fiber-optic cable that runs between the two facilities. The fiber-optic cable is built into the new power cable that was recently installed. While it may be possible to maintain the current communications system as is, it is likely that a new communications system would be required if EOF operations were transferred to another location.

TREATMENT OF PRODUCED GAS AND LIQUIDS

In order to continue operation of Platform Holly, Venoco would need to transfer the EOF operations for treatment of produced gas and liquids to an existing plant or a newly constructed plant outside of the City limits. Venoco has considered establishing facilities at Las Flores Canyon (“LFC”) to process produced gas and crude oil. Las Flores Canyon (“LFC”) is one of two facilities currently approved by Santa Barbara County for this purpose. LFC is currently owned by ExxonMobil and is located about 9 miles northwest of Platform Holly. Challenges include: 1) installing pipelines to deliver produced gas and liquids to LFC; 2) the capacity of the LFC facilities to take produced gas and liquids from Platform Holly; and 3) disposal of produced water. An aerial photograph that shows the locations of Platform Holly and LFC is presented in **Exhibit E**.

Delivery of produced gas and liquids to LFC would involve either construction of new subsea pipelines and/or repurposing of existing subsea and land pipelines. The routing of new private pipelines involves significant hurdles with respect to obtaining permits, approvals, and right-of-ways. Subsea pipelines must be installed to preserve environmental integrity during

construction and during long-term operation. Onshore pipelines carrying produced gas or liquids do not qualify for common-carrier status and Venoco would need to arrange for right-of-ways as private pipelines. Based on Venoco's experience with the Line 96 project, which was developed as a regulated, common-carrier pipeline and exercised eminent domain to assert right-of-ways, arranging right-of-ways for private pipelines would be extremely costly. There is potential to convert Line 96 to a private pipeline for transporting emulsion from Platform Holly to LFC, but regulatory hurdles may be significant.

Venoco has engaged ExxonMobil in discussions about processing gas and liquids produced from Platform Holly at LFC. While LFC has capacity to treat crude oil emulsion from Platform Holly, ExxonMobil is planning to shut down a gas processing facility at LFC. It appears that there may be space at LFC for Venoco to relocate its existing gas processing facilities, to build new facilities of appropriate size, or to take over operation of idled gas processing facilities at LFC. For any of these options, significant permitting hurdles and commercial agreements would be needed before the EOF operation could be replaced.

Disposal of produced water appears to be a significant hurdle to Venoco in transferring EOF operations to LFC. According to Venoco representatives, water produced from Platform Holly originates from State lands, and water recovered from the emulsion at the EOF is injected into strata below State lands. If the EOF operations were transferred to LFC, Ellwood crude emulsion could be mixed with crude oil produced from Federal leases for processing. Consequently, LFC would produce a mixture of produced water from State and Federal lands, which would be disposed by platforms on Federal leases. Venoco represents that it is generally unacceptable to re-inject water produced from State leases into Federal leases. While there are technical options that may be used to segregate State and Federal produced water during processing of crude oil, Ellwood produced water would need to be segregated and disposed on State lands at Platform Holly, to the EOF deep-well, or to a new deep-well. For any of these options, significant permitting hurdles and commercial agreements would be needed before the EOF operation could be transferred to another location.

AMORTIZATION METHODOLOGY

Under California law, a municipality may require termination of a legal non-conforming use by one of two “*constitutionally equivalent alternatives: it can eliminate the use immediately by payment of just compensation, or it can require removal of the use without compensation following a reasonable amortization period.*”⁴ California courts have determined whether the amount of time given to a property owner to terminate a non-conforming use was a reasonable amortization period for recoupment of its investment.

The land on which the EOF and marine terminal are situated was rezoned by Santa Barbara County on September 16, 1990, as Recreation and Planned Residential. As a result, the EOF, marine terminal, and interconnecting pipeline became legal non-conforming uses. With incorporation of the City in 2002, the EOF, marine terminal, and interconnecting pipeline located within the City limits became subject to City permitting requirements and land use regulations. The marine terminal and interconnecting pipeline were shut down and abandoned in 2013, after Line 96 was placed in service. The EOF has continued to operate as a legal non-conforming use. The City zoning ordinance prevents non-conforming uses and structures from being enlarged, expanded, or extended, or being used as grounds for adding other structures or uses prohibited by the district in which the nonconformity is located.⁵

Typically, only capital investments made prior to the rezoning of a property are considered for amortization. Investments made after the use became non-conforming are, by law, done at the landowner’s risk. However, the City can consider such investments in determining an appropriate amortization period. For the purposes of this report, the amortization period is defined as the time required for recovery of Venoco’s capital investment along with a reasonable rate of return on that investment.

Baker & O’Brien prepared an amortization analysis of the Ellwood Facilities in 2001 for Santa Barbara County.⁶ In the SBC Study, historical data was supplemented with contemporaneous estimates of original investment and revenues between 1964 and 2000 to

⁴ Tahoe Reg'l Planning Agency v. King, (1991) 233 Cal. App. 3d 1365.

⁵ City of Goleta Zoning Ordinance Division 9.

⁶ County of Santa Barbara Energy Division Ellwood Amortization Analysis, October 2001.

determine an appropriate amortization period for the Ellwood Facilities. The SBC Study is incorporated in this report by reference and in its entirety.

The purpose of this study is to update the SBC Study and to determine an appropriate amortization period for the EOF based on Venoco's capital investment, with analysis of historical and forecast capital investments in the Ellwood Facilities since 1997. This study also considers recent estimates of abandonment costs and potential relocation costs for the EOF prepared by Venoco. Historical information through 2000 and the methodology used to determine the amortization period are the same as presented in the SBC Study. Baker & O'Brien has updated certain economic assumptions used in the analysis, extended the analysis to include historical information from 2000 through 2015, and developed forecasts for investment costs and revenue from 2016 through 2030. Baker & O'Brien has also developed an Amortization Model to test the impact of key assumptions on the amortization period for the EOF.

AMORTIZATION MODEL

The Amortization Model organizes available historical data on oil and gas production, revenues, costs, and investments for the Ellwood Facilities into a format which facilitates the determination of an amortization period in a variety of scenarios. The Amortization Model is a discounted cash flow model that calculates cash available from operation of the Ellwood Facilities each year after allowances for operating costs, income taxes, and sustaining capital investments. In this analysis, when the internal rate of return for the net after-tax cash flows exceeds a fair rate of return on capital, the capital investment has been amortized.

The Amortization Model calculates net cash flow after taxes from the Ellwood Facilities on an annual basis. Revenues are calculated net of all royalties. Operating costs, which consist of direct costs (both fixed and variable) and indirect costs (such as corporate general and administrative expenses, property taxes, and production taxes) are deducted from revenues. Depreciation of capital investment is calculated for the sole purpose of estimating state and federal income taxes, but depreciation is not subtracted from cash flow. Historical interest expenses and financing costs have been included in the analysis. The net after-tax cash flow is determined by subtracting income taxes and capital expenditures from operating income.

To determine an appropriate amortization period, the Amortization Model compares the internal rate of return for the project, calculated cumulatively for each year in the analysis, to a fair rate of return on capital. The end of the amortization period is determined as the year in which the internal rate of return meets or exceeds the fair rate of return on capital. For this analysis, a fair rate of return is considered to be the weighted average cost of capital (“WACC”) for oil and gas exploration and development companies. Estimates of the WACC for oil and gas companies similar to Venoco are available from various public sources. Industry sector WACCs ranged from about 8% to about 12% near the time when Venoco purchased the Ellwood Facilities. Generally, a higher fair rate of return on capital extends the amortization period.

In addition to determining the appropriate amortization period, the Amortization Model is used to test the impact of key assumptions on the amortization period. We have evaluated the impact of abandonment and relocation costs on the amortization period, the impact of the LLA Project, variability in prices for natural gas and crude oil, and a range of fair returns on capital.

CAPITAL INVESTMENT

The capital investment for the Ellwood Facilities was determined from historical financial and technical data available from ARCO, Mobil, and Venoco. Capital investments until 2000 are documented in the SBC Study. Capital investments since 2000 were provided by Venoco for this study.

ORIGINAL INVESTMENT

The original capital investment until the time that the property became a legal non-conforming use is one basis for an amortization analysis. The total original investment cost for the Ellwood Facilities, between 1964 and 1990, was determined from historical financial and technical data available from ARCO and Mobil. Capital investments to be amortized as original capital investment are documented in Appendix C of the SBC Study.

An alternative basis for an amortization analysis is the original capital investment by the current property owner. Venoco purchased the Ellwood Facilities in 1997 for \$15,944,200.

SUSTAINING CAPITAL INVESTMENT

Sustaining capital investment is required for every oil and gas facility to maintain the capabilities of the facility to generate income. These investments are needed to replace equipment and components that have reached end-of-life and to make improvements that have no direct economic benefits, such as those mandated to meet regulatory, health, or safety requirements. For the Ellwood Facilities, sustaining capital investment includes costs for workovers of producing wells and replacement of compression and separation equipment. For this analysis, sustaining capital investment is considered to be similar to maintenance, since this investment is periodic and cumulative in maintaining the operation of the Ellwood Facilities. The key difference between sustaining capital investment and maintenance expenses in this analysis is the impact on income taxes from depreciation of capitalized replacements.

Venoco provided detailed data on major maintenance at South Ellwood during 1997 to 2014. These costs were identified as Surface Repairs, Surface Special Work, Subsurface Repairs, and Subsurface Special Work. We have included sustaining capital investment and maintenance expenses in the Amortization Model that are consistent with Venoco's historical practice.

DEPRECIATION

The Amortization Model incorporates calculations of depreciation of drilling costs and capitalized expenditures for the purpose of estimating income taxes. Depreciation is calculated using a four-year, straight-line depreciation schedule for drilling costs. For capital expenditures, depreciation is calculated using the Internal Revenue Service Modified Accelerated Cost Recovery System ("MACRS") method and its definitions to determine applicable class lives and recovery periods.

Asset Class 13.2 includes "*assets used by petroleum and natural gas producers for drilling wells and production of petroleum and natural gas, including gathering pipelines and related storage facilities*" as well as "*petroleum and natural gas offshore transportation facilities used by producers and others consisting of platforms (other than drilling platforms...), compression or pumping equipment, and gathering and transmission lines to the first onshore transshipment facility.*" Onshore assets, including "*separation equipment, compression or pumping equipment, and liquid holding or storage facilities,*" are also included in this class.

Asset Class 13.2 has a Class Life of 14 years and is eligible for use of a seven-year MACRS depreciation schedule.

Asset Class 49.23 covers “*Natural Gas Production Plant(s)*,” which would include the natural gas treating facilities at the EOF. Asset Class 49.23 has a Class Life of 14 years and is eligible for the seven-year MACRS depreciation schedule.

INCOME ANALYSIS

Historical revenues and operating costs were evaluated to determine the actual internal rate of return on investment achieved by the Ellwood Facilities. The following summarizes the factors contributing to income of the Ellwood Facilities.

REVENUES

Revenue from the Ellwood Facilities is determined from the volumes and prices of crude oil, natural gas, LPG, and NGL sold from the EOF. Limited historical production data was available from Venoco, which was supplemented with production data obtained from public sources. Historical information available from the California Department of Conservation was used to determine Ellwood production volumes of crude oil, natural gas, and NGL from 1966 to 2014. For periods after 2014, the forecast for production volumes of crude oil, natural gas, and NGL is based on estimates provided by Venoco in its LLA Project.

Historical prices for Ellwood crude oil were determined based upon discounts to publicly available market assessments of prices for West Texas Intermediate (“WTI”) crude oil. Based on location and quality factors, prices for South Ellwood crude oil are estimated to be the lower of: a) 43.6% of the price for WTI crude oil; or b) the price of WTI less a discount of \$8.31 per barrel.

Historical prices for Ellwood natural gas were compared to the publicly available Southern California Border price assessment for natural gas to determine typical discounts or premiums. Prior to 1993, Ellwood natural gas prices are estimated using the United States (“U.S.”) average price of natural gas at the wellhead reported by the U.S. Department of Energy’s Energy Information Agency (“DOE/EIA”). Between 1993 and 2014, Ellwood natural gas prices are estimated as the average Southern California Border price plus a premium of 9.0%.

Future commodity price projections in the Amortization Model are based on forecasts prepared by the DOE/EIA. The DOE/EIA publishes an annual outlook that provides benchmark price forecasts for natural gas at Henry Hub and WTI crude oil through 2040.⁷ Ellwood natural gas is projected to sell at a premium of \$0.05 per million British thermal units (“Btu”) to DOE/EIA forecast prices for natural gas at Henry Hub. Ellwood crude oil is projected to sell at a discount of \$8.31 per barrel to DOE/EIA forecast prices for WTI crude oil.

OPERATING COSTS

Operating costs for the Ellwood Facilities include labor, utilities, operating materials, maintenance materials, spare parts, office leases, general and administrative expenses, insurance, property taxes, and permits. Baker & O'Brien estimated operating costs for periods when historical information was not available, based on our experience with similar crude oil and natural gas production and treating facilities.

Forecasts for fixed and variable operating costs are based upon Venoco's historical costs. Fixed operating costs were adjusted for inflation using the Nelson-Farrar Labor Cost Wages Index. Variable operating costs were restated in terms of the cost per barrel of crude oil or the cost per million cubic feet of natural gas and applied to forecasted production volumes.

CHANGES TO THE ORIGINAL STUDY

This study includes changes to certain cash flow assumptions in the SBC Study. These changes have no material effect on the amortization period determined in the SBC Study, and include the following:

- ***Escalation rates:*** The SBC Study assumed an escalation rate of 3%. This analysis considers several escalation rates, each of which are applied to specific categories of expenditures. In particular, the Personal Consumption Expenditure (“PCE”) Chain Deflator is a general measure of inflation in goods and services published by the U.S. Department of Commerce, Bureau of Economic Analysis (“BEA”). The PCE has exhibited an annual compounded growth rate of about 1.9% over the past 10 years and is projected to be 1.5%. Lower escalation rates result in less cash flow over time,

⁷ DOE/EIA *Annual Energy Outlook 2015*, April 14, 2015.

and represent a conservative assumption for purposes of determining the amortization period.

- *Price Forecasts:* The SBC Study forecasted natural gas and crude oil prices based on New York Mercantile Exchange (“NYMEX”) futures contract prices for WTI crude oil and natural gas delivered at Henry Hub (commonly referred to as “strip” prices). Strip prices are considered to be useful for short-term price forecasting, but have become less reliable for long-term price forecasting due to limited liquidity in contracts beyond 18 to 24 months. This study forecasts crude oil and natural gas prices based upon long-term forecasts published by the DOE/EIA, which consider a variety of impacts on the supply and demand of crude oil and natural gas. In any case, the impact of this change on the amortization period is not material since the amortization period does not extend beyond the historical period.

SCENARIO ANALYSIS

The Amortization Model was used to: a) confirm the amortization period reported in the SBC Study; and b) determine an appropriate amortization period based on the amortization of Venoco’s original capital investment. Each of these cases was also evaluated with amortization of estimated abandonment costs in the year after the original capital investment was amortized. These cases assume that production volumes follow recent trends and do not incorporate major new developments, such as the LLA Project. These cases also include historical levels of operating expenses and sustaining capital investment.

The appropriate amortization period was tested by recalculating the period using alternative assumptions. These tests included the following: adding costs and benefits related to the LLA Project; adding costs for relocation of the EOF outside of the City limits; changes in the fair return on capital investment; and alternative price forecasts.

DETERMINATION OF AMORTIZATION PERIOD

This study determines an appropriate amortization period for the EOF based upon amortizing capital investment with after-tax cash flow generated by the Ellwood Facilities. The EOF is essential to the operations of the other Ellwood Facilities, which cannot continue to operate unless the EOF operates in place or is relocated outside of City limits. The amortization period for the EOF alone is assumed to be the same as that for the Ellwood Facilities as a whole. Conclusions of this study are summarized below.

ORIGINAL INVESTMENT ANALYSIS

The SBC Study considered amortization of the original capital investment in the Ellwood Facilities by ARCO and Mobil. This study, with updated assumptions, confirms that the original capital investment in the Ellwood Facilities was amortized by 1987. If estimated costs for abandonment of the Ellwood Facilities are included, the amortization period is extended until 1990. **Exhibit F** shows the cumulative internal rate of return and amortization period for the original investment in the Ellwood Facilities.

VENOCO INVESTMENT ANALYSIS

This analysis considers amortization of Venoco's capital investment to acquire the Ellwood Facilities in 1997, well after the land was rezoned and the legal non-conforming use was established. This study concludes that Venoco's capital investment in the Ellwood Facilities was amortized by 2007. If estimated costs for abandonment of the Ellwood Facilities are included, the amortization period is extended until 2009. **Exhibit G** shows the cumulative internal rate of return and amortization period for Venoco's investment in the Ellwood Facilities.

SCENARIO ANALYSIS

A number of key variables in this analysis were evaluated using the Amortization Model to determine whether other circumstances may result in later amortization of Venoco's costs. The impact of these variables on the amortization period is summarized as follows:

- *LLA Project:* Adjustments to the analysis to evaluate the LLA Project include allowance for new capital investment to drill wells and incremental amounts of sustaining capital investment. These costs are offset by increased revenues with higher crude oil production from the current 4,000 B/D to 10,000 B/D. Addition of the LLA Project to the analysis does not extend the amortization period since all of the costs and benefits related to the LLA Project would occur in the future, long after Venoco's capital investment has been amortized. **Exhibit H** shows the cumulative internal rate of return and amortization period for Venoco's investment in the Ellwood Facilities with the LLA Project.

- *EOF Relocation:* Adjustments to the analysis to evaluate the relocation of the EOF to LFC include capital investment to establish the new operation, construction of pipelines from Platform Holly to LFC, and modifications to continue operation of Platform Holly without the EOF. Venoco has recently estimated that relocation costs could range between \$48 million and \$250 million, depending upon requirements for new facilities and pipelines. This investment is planned to occur in 2020 or later. Costs for relocation of the EOF do not extend the amortization period since all of the costs for relocation occur in the future, long after Venoco's capital investment has been amortized. **Exhibit I** shows the cumulative internal rate of return and amortization period for Venoco's investment in the Ellwood Facilities with relocation of the EOF to LFC, using the highest estimated cost.

- *Fair Return on Capital:* The amortization period is not materially sensitive to the fair return on capital. Within a range of 8% to 12% fair return on capital, the investment including abandonment is amortized in 2009, plus or minus six months. The investment including abandonment is amortized between 2006 and 2008, if the fair return on capital is between 5% and 14%. **Exhibit J** shows the cumulative internal rate of return and amortization period for Venoco's investment compared to a fair return on capital of 5%. **Exhibit K** shows the cumulative internal rate of return and amortization period for Venoco's investment compared to a fair return on capital of 14%.

- ***Price Forecasts:*** The DOE/EIA provides three price forecasts for crude oil and natural gas: a Reference Case, which assumes that historical market forces restore the equilibrium global supply and demand for crude oil; a High Price forecast; and a Low Price forecast. The *Annual Energy Outlook 2015* was issued after the collapse in crude oil prices in late 2014, and includes a Reference Case forecast for WTI crude, which extends from \$52.72 per barrel in 2015 to \$99.48 in 2030, and \$135.67 in 2040 (all real prices in 2013 dollars). The alternative price forecasts do not extend the amortization period since these impacts occur in the future, long after Venoco's capital investment has been amortized. **Exhibit L** shows the cumulative internal rate of return and amortization period for Venoco's investment using the DOE/EIA High Price forecast of \$115.35 in 2015 to \$187.54 in 2030 (real 2013 dollars). **Exhibit M** shows the cumulative internal rate of return and amortization period for Venoco's investment using the DOE/EIA Low Price forecast of \$45.85 in 2015 to \$62.80 in 2030 (real 2013 dollars).

CONCLUSION

Venoco's capital investment in the Ellwood Facilities and estimated costs for abandonment were fully amortized by 2009. Capital investment and cash flow subsequent to 2015 do not change the amortization period. Future actions do not change the amortization period, such as development of Venoco's LLA Project or relocation of the EOF outside of City limits. Alternative economic assumptions do not have a material impact on the amortization period, including escalation rates, the fair return on capital, and price forecasts.

LIST OF EXHIBITS

Exhibit A: List of information Considered

Exhibit B: Locations of Ellwood Facilities

Exhibit C: Ellwood Onshore Facility

Exhibit D: Pier 421

Exhibit E: Los Flores Canyon Proximity to Platform Holly

Exhibit F: Amortization of Original Investment

Exhibit G: Amortization of Venoco Investment

Exhibit H: Amortization of Venoco Investment with LLA Project

Exhibit I: Amortization of Venoco Investment with EOF Relocated to LFC

Exhibit J: Amortization of Venoco Investment at a 5% Return on Capital

Exhibit K: Amortization of Venoco Investment at a 14% Return on Capital

Exhibit L: Amortization of Venoco Investment with the DOE/EIA High Price Forecast

Exhibit M: Amortization of Venoco Investment with the DOE/EIA Low Price Forecast

EXHIBIT A

Documents Considered

<i>Document Title</i>	<i>Originator</i>	<i>Date</i>	<i>Status</i>
PRC 421.1 OG Lease Agreement	CSLC/Bankline Oil	October 22, 1949	Public
PRC 3120.1 OG Lease	TS Bishop/Bankline Oil	October 31, 1952	Public
PRC 3242.1 OG Lease	CSLC/Richfield/Socony	April 29, 1964	Public
PRC 5515.1 OG Lease	CSLC/Atlantic Richfield	October 28, 1971	Public
PRC 3904.1 OG Lease Agreement	CSLC/Exxon/Atlantic Richfield	October 13, 1973	Public
Consent to Assignment	CSLC/Aminoil	February 11, 1983	Public
Ellwood Purchase and Sale Agreement Volume 2	University/Phillips	October 24, 1985	Public
Quitclaim of PRC 302 and 309 and Cert.	University/Phillips	October 24, 1985	Public
South Ellwood Field Transfer	Various	June 27, 1990	Confidential
Project Execution Plan Ellwood Facilities Abandonment	CSLC/Atlantic Richfield	January 24, 1992	Public
Assignment of Marine Terminal Lease	ARCO/Mobil	March 1, 1993	Confidential
Conveyance Assignment and Bill of Sale	Mobil E&P US	January 1997	Confidential
Memo of Option	Mobil/Venoco	April 1, 1997	Public
Ellwood Amortization Study - Oil and Gas Processing at Las Flores Canyon	Mobil/Venoco	April 1, 1997	Public
Information and Analysis for Santa Barbara County's Amortization of Venoco's South Ellwood Field	Aradon/Venoco	March 13, 1998	Public
Development Plan Application for Full Field Development for South Ellwood Field	Jacobs Engineering Group	July 20, 2000	Confidential
County of SB Energy Division Ellwood Amortization Analysis	Venoco	January 25, 2001	Confidential
Ellwood Amortization Economic Analysis	Venoco	February 2001	Public
Draft EIR for the Venoco Ellwood Oil Development and Pipeline Project	Baker & O'Brien	October 2001	Public
South Ellwood Gas Liquids Composition	Santa Barbara County	November 5, 2001	Confidential
South Ellwood Crude Analysis	CSLC	June 2008	Public
Adjustment to Existing Easterly Boundary of PRC 3242.1	OEC	May 10, 2013	Public
South Ellwood Gas Compositional Analysis	Intertek	January 27, 2014	Public
Venoco Ellwood Onshore Facility (EOF) Aboveground Facilities Removal Cost Estimates	Venoco	June 30, 2014	Confidential
Venoco Ellwood Onshore Facility (EOF) Relocation Alternatives and Costs Agreement	OEC	February 18, 2015	Public
Ellwood Net Lease Operating Expenses	Interact	March 2015	Confidential
Summary of Ellwood Capital Project Cost 1997 to 2014 excludes las flores an	Interact	March 2015	Confidential
Las Flores Pipeline Operating and Capital Costs 2005-2014	TS Bishop/Bankline Oil	August 2, 2029	Public
Venoco Annual Reports - 2006-2014	Venoco	1997-2014	Confidential
Ellwood Documents and Leases Volume 1	Venoco	1997-2014	Confidential
Ellwood Documents and Leases Volume 2	Venoco	2005-2014	Confidential
Ellwood Purchase and Sale Agreement Volume 1	Venoco	2006-2014	Public
South Ellwood Joint Operating Agreement Vol 1 (Selected)	Various	Various	Confidential
South Ellwood Joint Operating Agreement Vol 2 (Selected)	Various	Various	Confidential
South Ellwood Joint Operating Agreement Vol 3 (Selected)	Various	Various	Confidential
Mobil Venoco Assignment (Selected)	Various	Various	Confidential
Mobil and Venoco Purchase and Sale Agreement	Mobil/Venoco	Various	Confidential
2015 Annual Energy Outlook	Mobil/Venoco	Various	Confidential
Historical NYMEX Contract 1 Prices	Energy Information Administration (EIA)		Public
Historical Natural Gas Futures Contract 1	Energy Information Administration (EIA)		Public
Historical Crude Oil and Natural Gas Production - Ellwood and South Ellwood	Energy Information Administration (EIA)		Public
Historical Personal Consumption Expenditures (PCE) Index	California Department of Conservation		Public
Historical Nelson-Farrar Indices	U.S. Department of Commerce		Public
Cost of Capital Quarterly 1997 Yearbook	Oil & Gas Journal		Public
	Ibbotson Associates		Public

EXHIBIT B

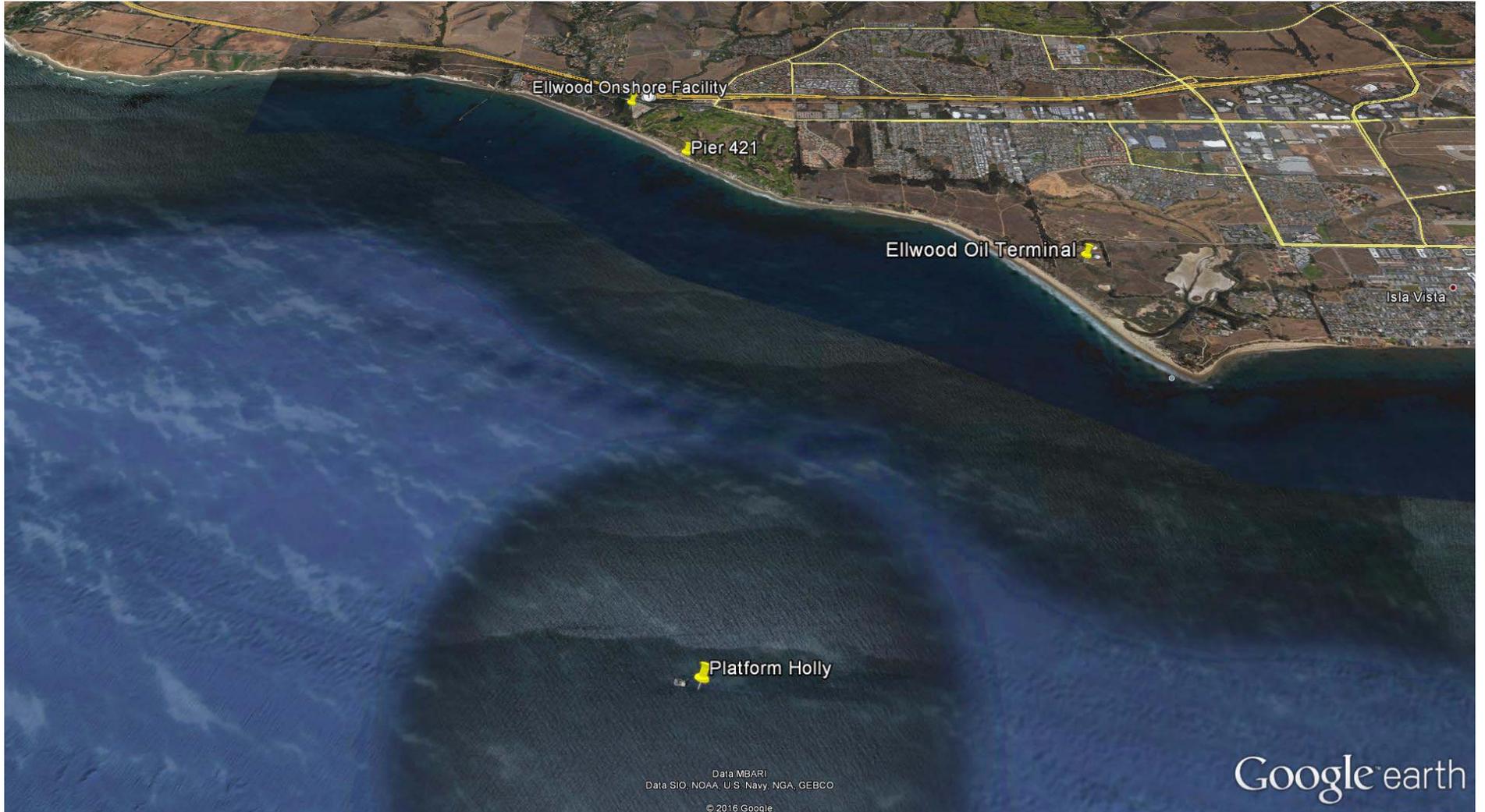


EXHIBIT C

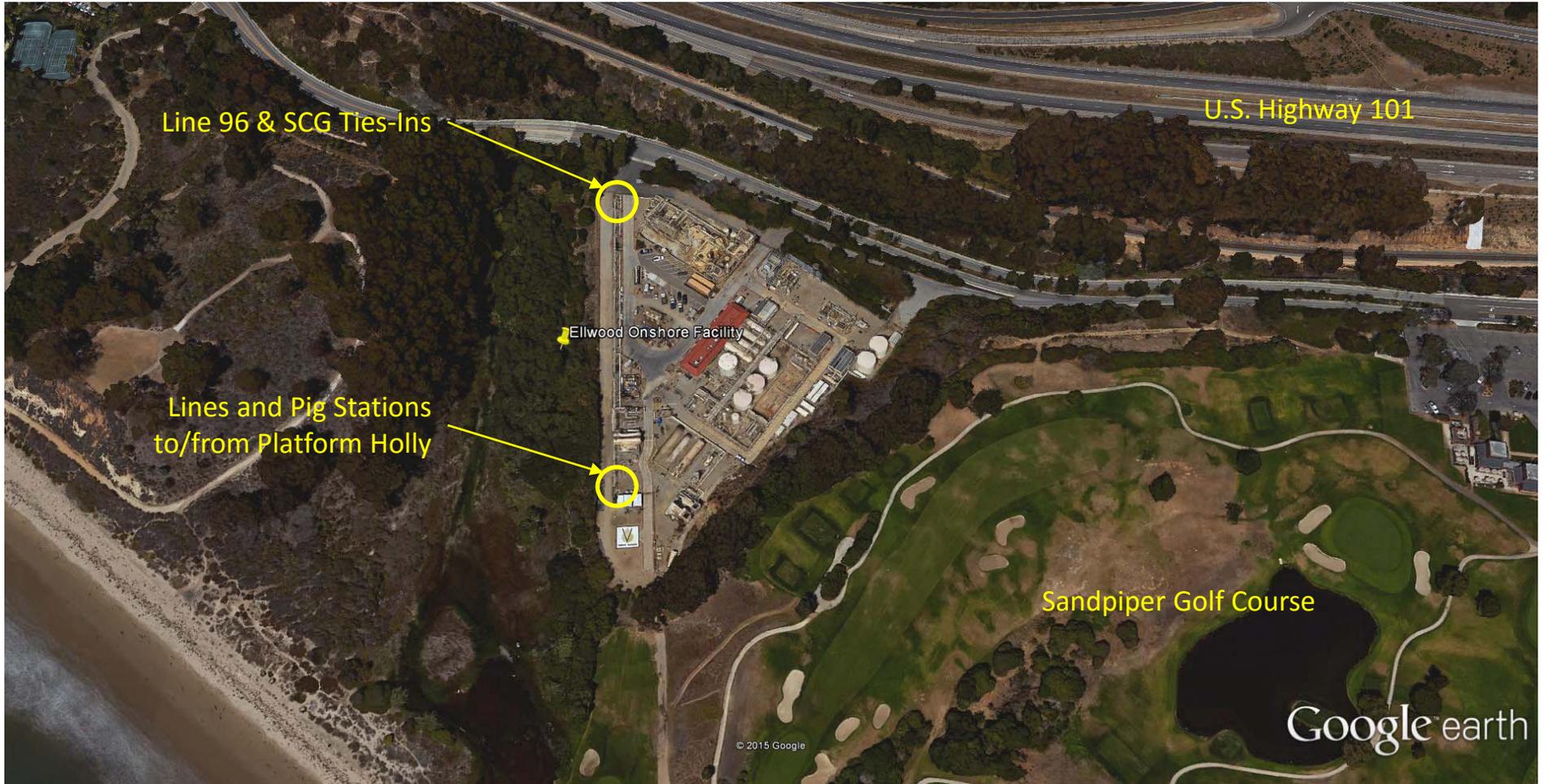


EXHIBIT D

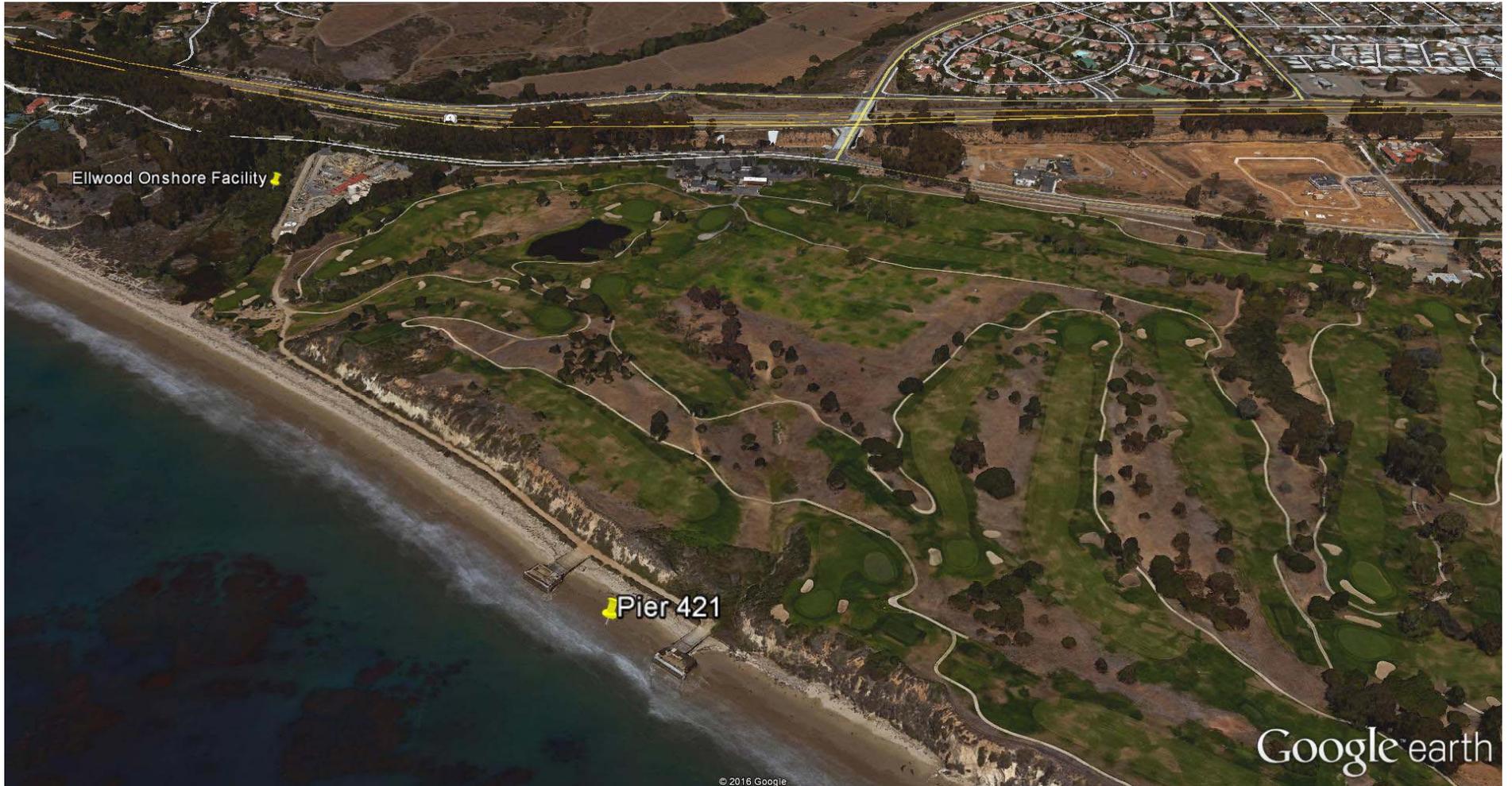


EXHIBIT E

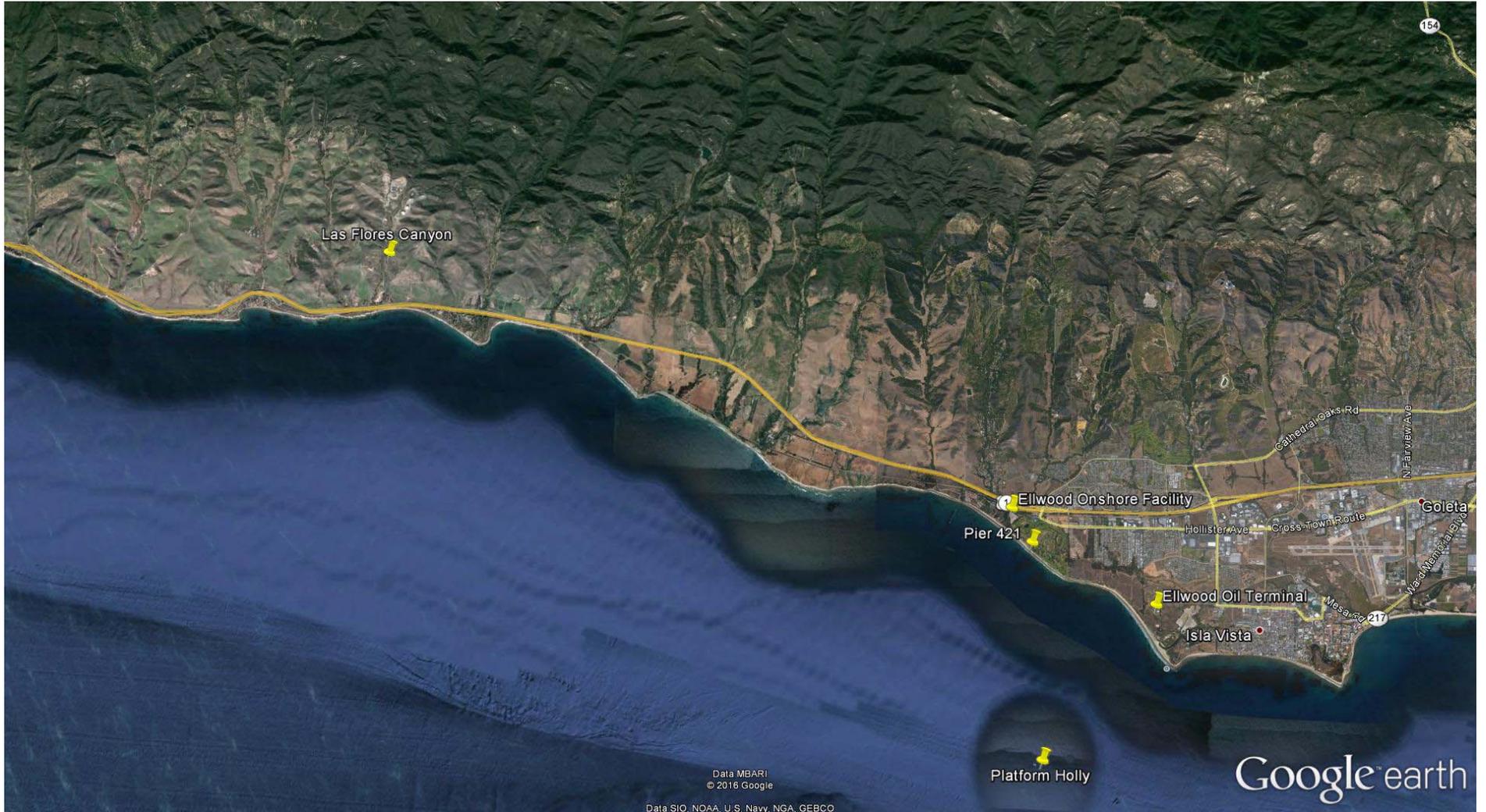


EXHIBIT F

Amortization Model Summary - Original Investment

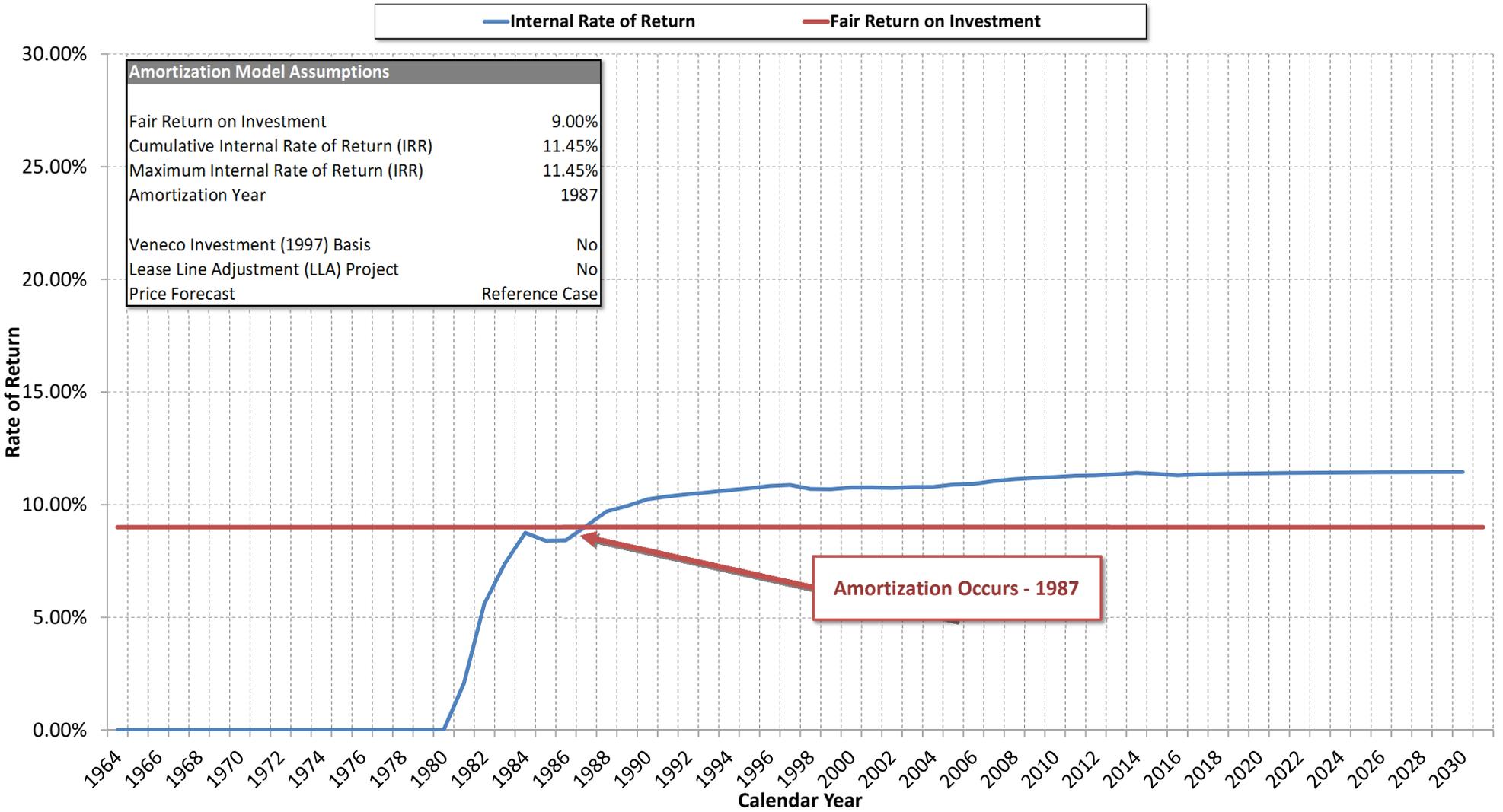
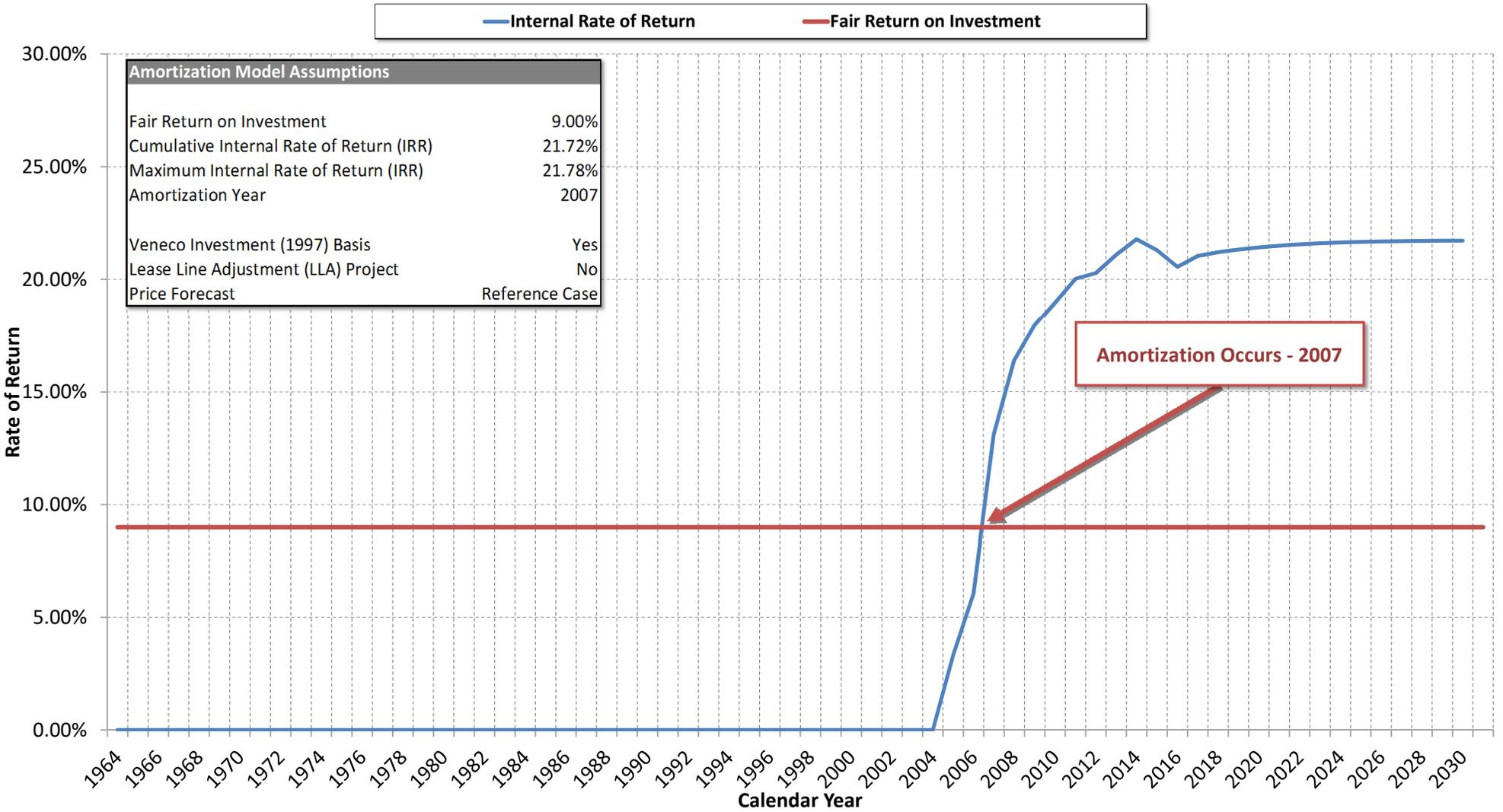


EXHIBIT G

Amortization Model Summary - Venoco Investment

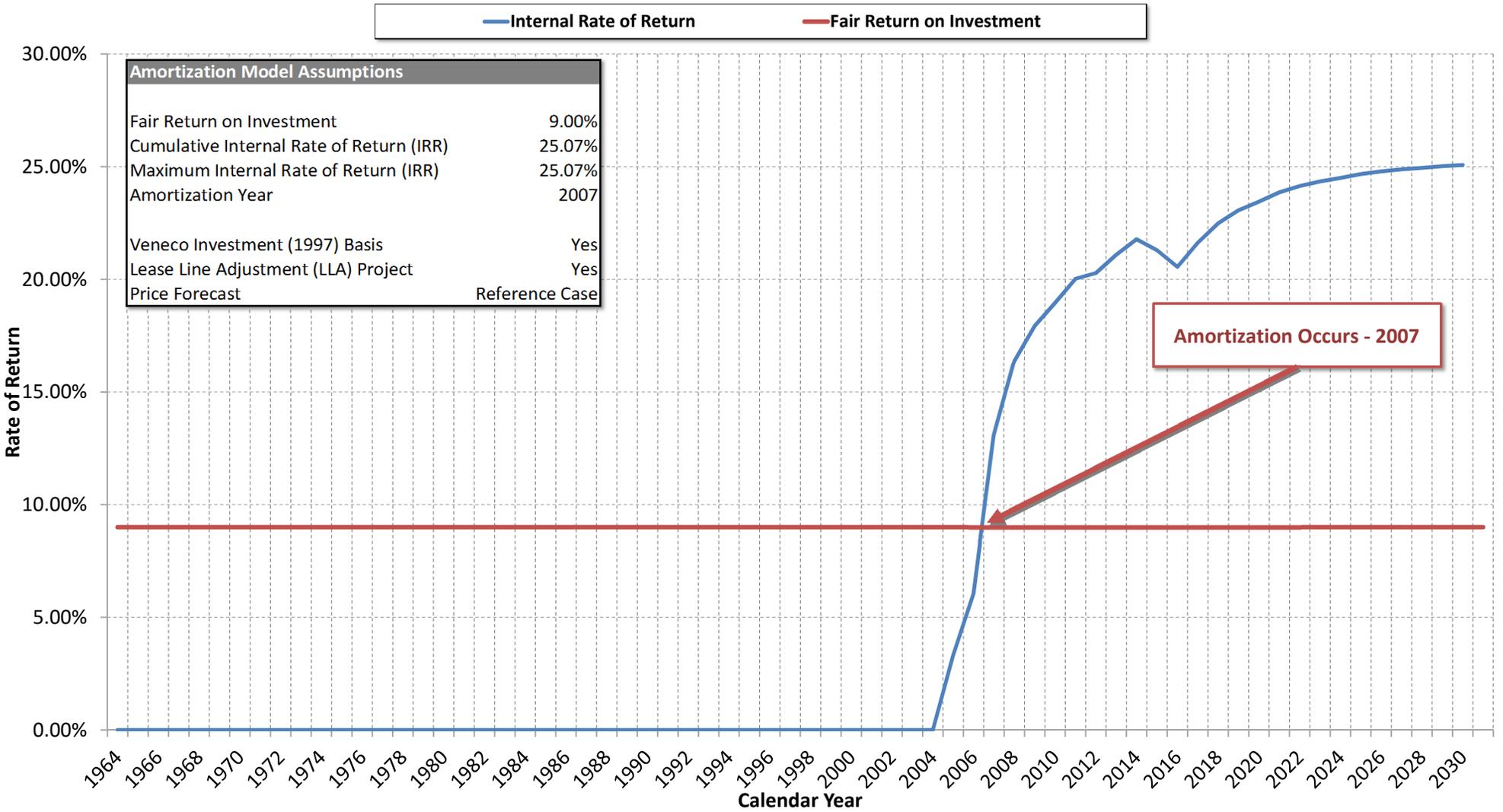


Amortization Model Assumptions	
Fair Return on Investment	9.00%
Cumulative Internal Rate of Return (IRR)	21.72%
Maximum Internal Rate of Return (IRR)	21.78%
Amortization Year	2007
Venoco Investment (1997) Basis	Yes
Lease Line Adjustment (LLA) Project	No
Price Forecast	Reference Case

Amortization Occurs - 2007

EXHIBIT H

Amortization Model Summary - Venoco Investment with LLA Project



Amortization Model Assumptions	
Fair Return on Investment	9.00%
Cumulative Internal Rate of Return (IRR)	25.07%
Maximum Internal Rate of Return (IRR)	25.07%
Amortization Year	2007
Venoco Investment (1997) Basis	Yes
Lease Line Adjustment (LLA) Project	Yes
Price Forecast	Reference Case

Amortization Occurs - 2007

EXHIBIT I

Amortization Model Summary - Venoco Investment with EOF Relocated to LFC

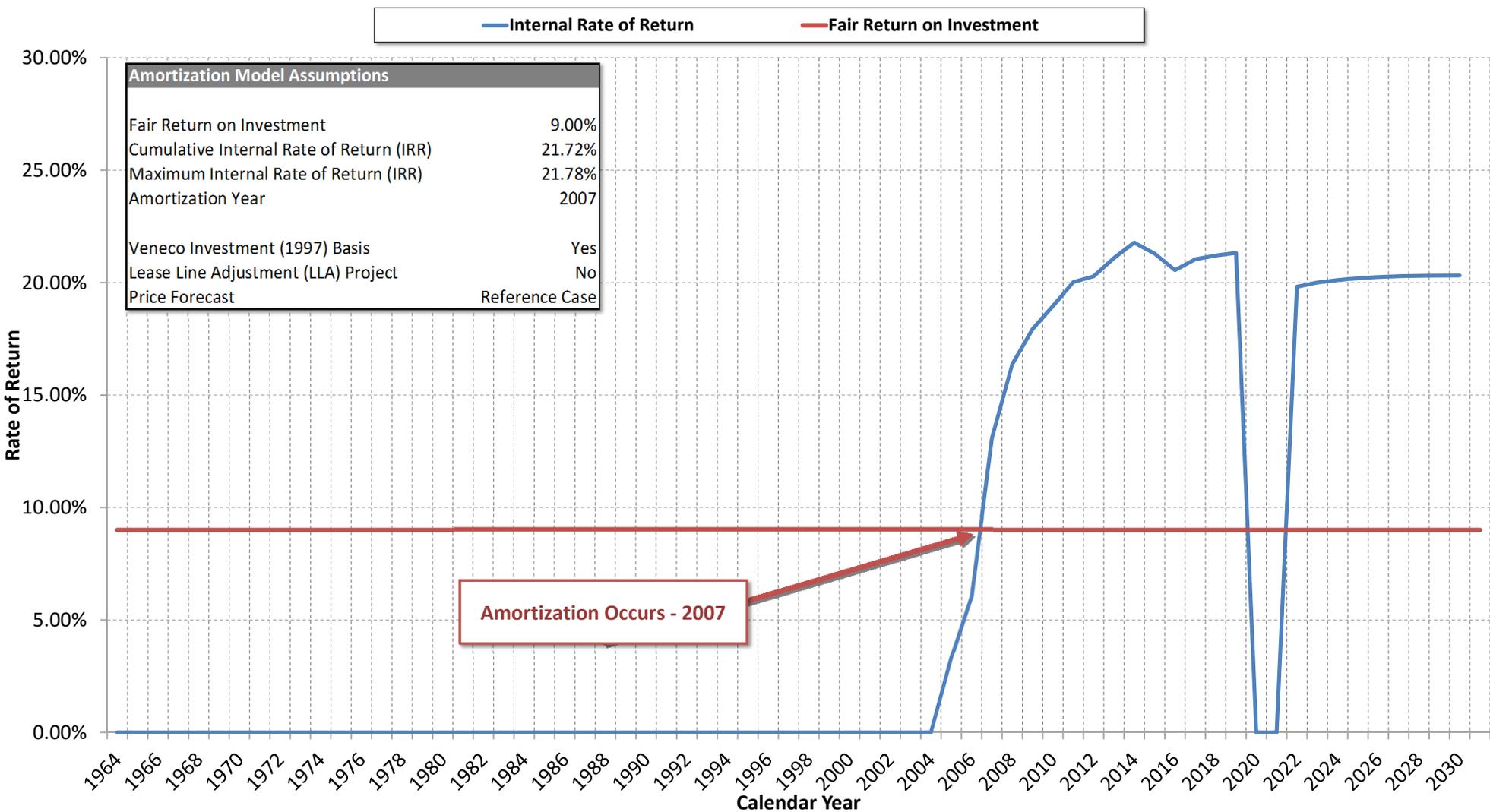
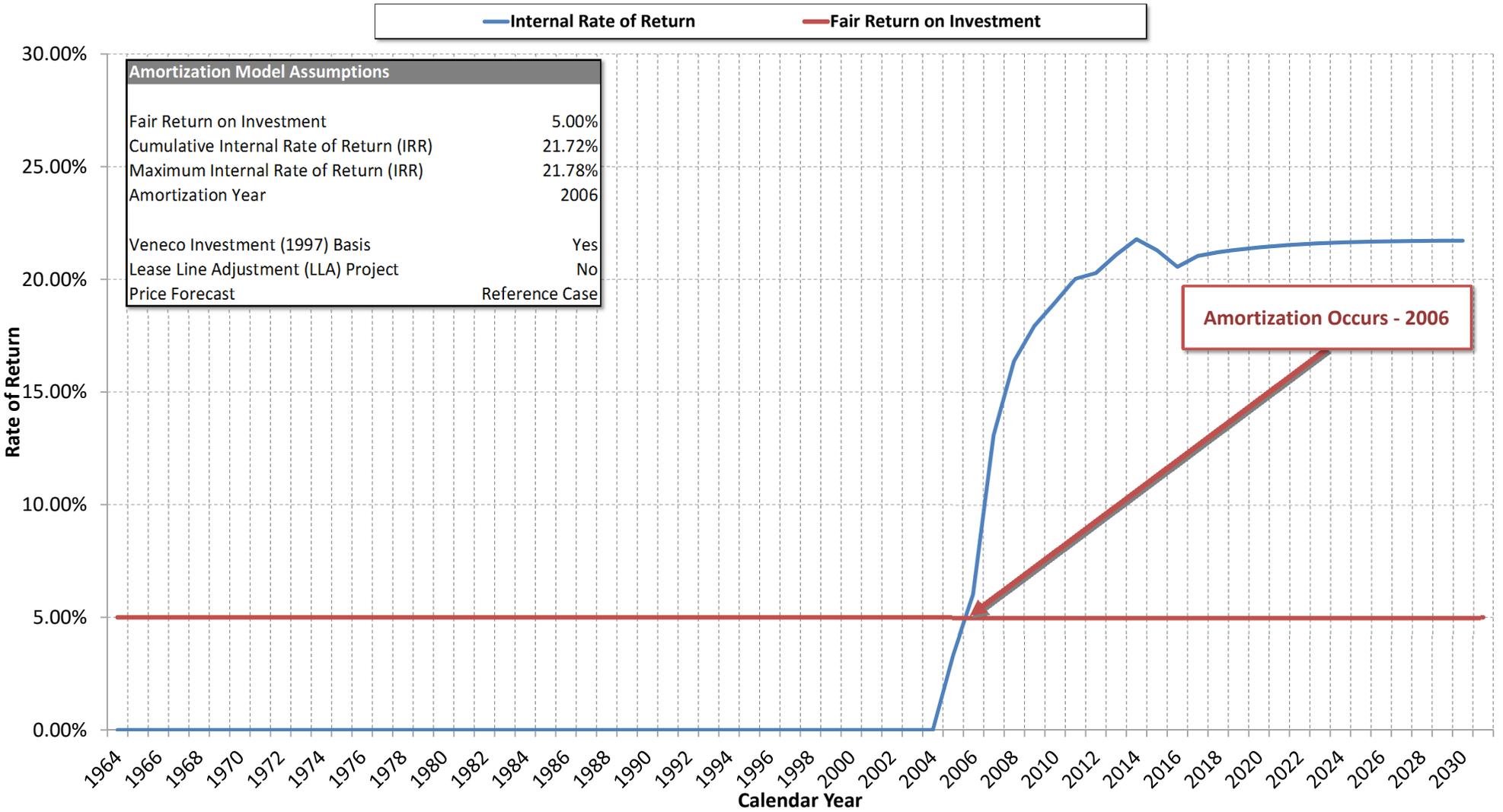


EXHIBIT J

Amortization Model Summary - Venoco Investment at a 5% Fair Return on Investment

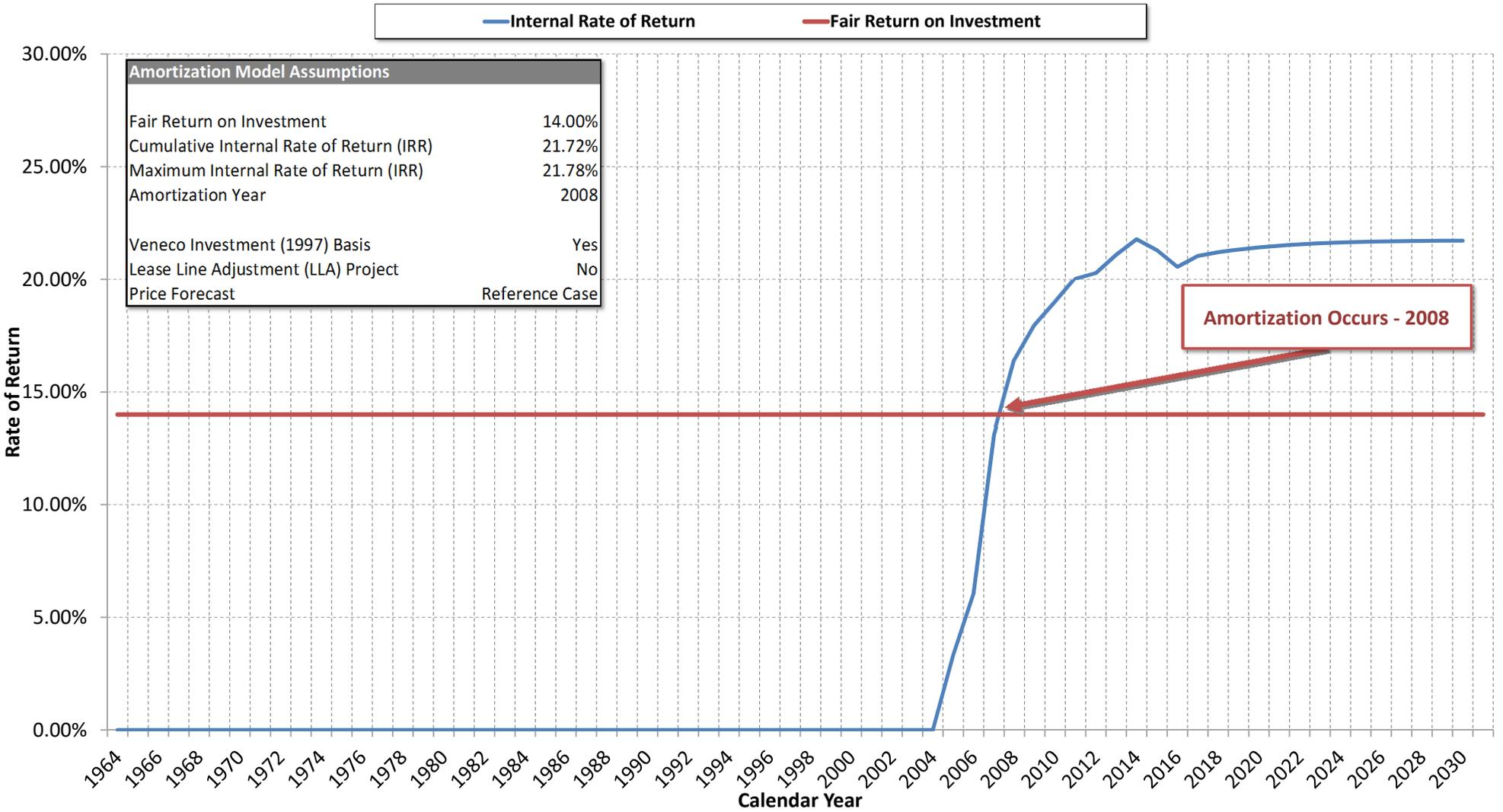


Amortization Model Assumptions	
Fair Return on Investment	5.00%
Cumulative Internal Rate of Return (IRR)	21.72%
Maximum Internal Rate of Return (IRR)	21.78%
Amortization Year	2006
Venoco Investment (1997) Basis	Yes
Lease Line Adjustment (LLA) Project	No
Price Forecast	Reference Case

Amortization Occurs - 2006

EXHIBIT K

Amortization Model Summary - Venoco Investment at a 14% Fair Return on Investment



Amortization Model Assumptions	
Fair Return on Investment	14.00%
Cumulative Internal Rate of Return (IRR)	21.72%
Maximum Internal Rate of Return (IRR)	21.78%
Amortization Year	2008
Venoco Investment (1997) Basis	Yes
Lease Line Adjustment (LLA) Project	No
Price Forecast	Reference Case

EXHIBIT L

Amortization Model Summary - Venoco Investment with the DOE/EIA High Price Forecast

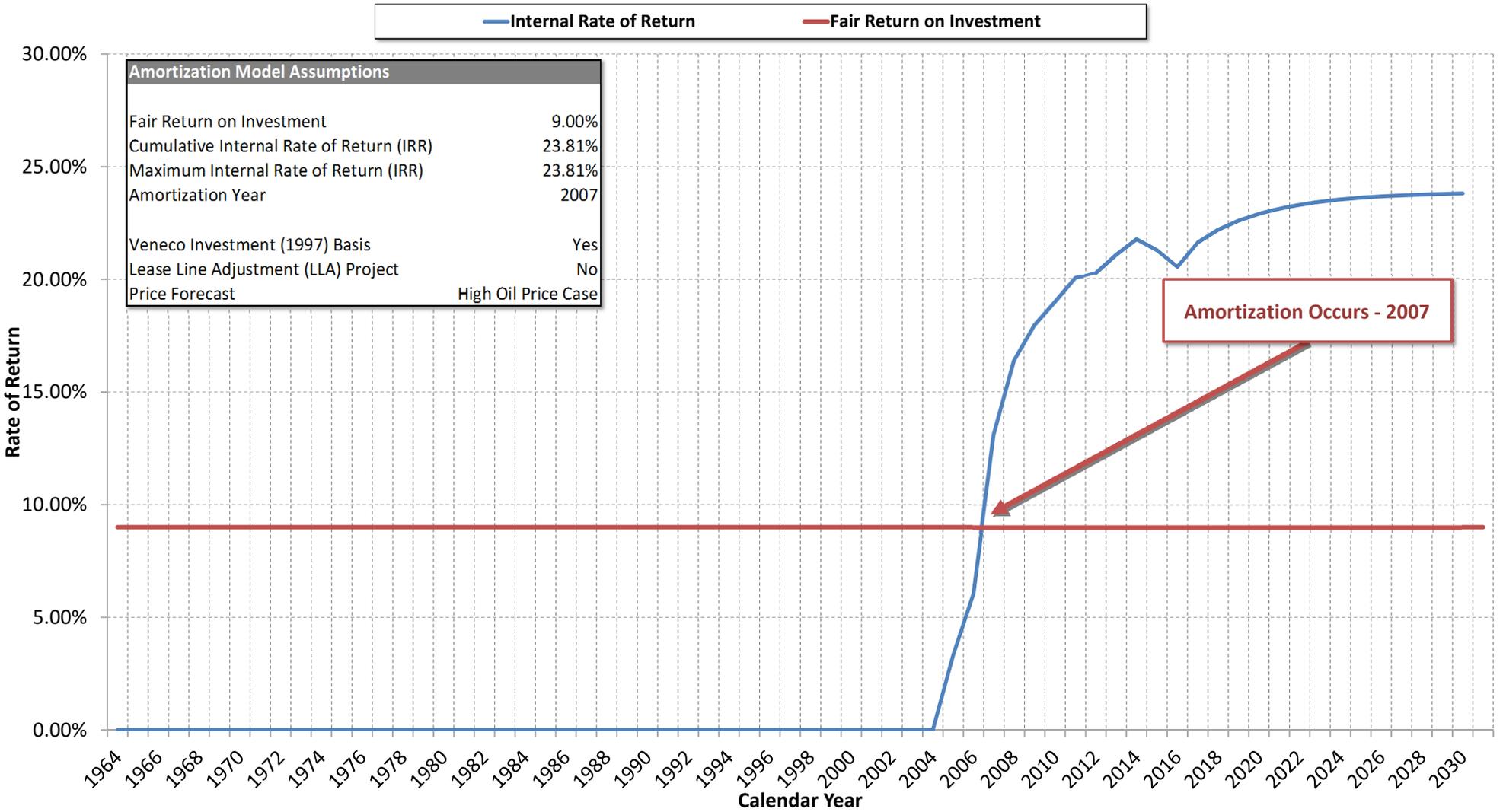
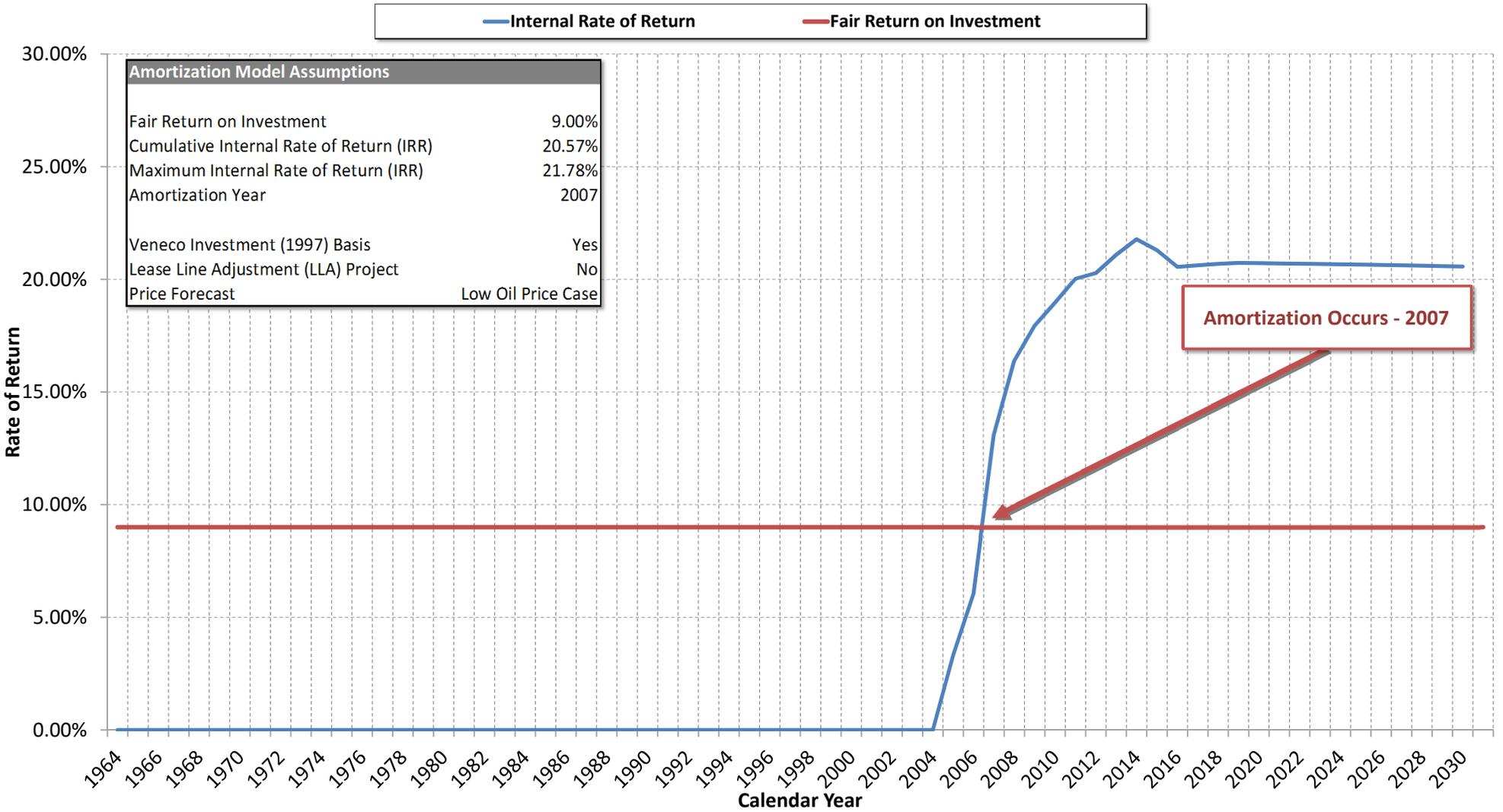


EXHIBIT M

Amortization Model Summary - Venoco Investment with the DOE/EIA Low Price Forecast



Amortization Model Assumptions	
Fair Return on Investment	9.00%
Cumulative Internal Rate of Return (IRR)	20.57%
Maximum Internal Rate of Return (IRR)	21.78%
Amortization Year	2007
Venoco Investment (1997) Basis	Yes
Lease Line Adjustment (LLA) Project	No
Price Forecast	Low Oil Price Case

Amortization Occurs - 2007