

**COUNTY OF SANTA BARBARA
PLANNING AND DEVELOPMENT**

MEMORANDUM

TO: Board of Supervisors

FROM: Steve Chase, Deputy Director

MEMO DATE: September 19, 2002

HEARING DATE: September 24, 2002

RE: Tranquillon Ridge Appeal (94-DP-027 RV02) Response to Questions

This memorandum provides the additional information requested by the Board during the September 10 hearing on the appeal of the Tranquillon Ridge Project. The issues raised and the responses are provided below.

1.0 Subsidence at the Lompoc Oil and Gas Plant.

Supervisor Naomi Schwartz raised concerns regarding subsidence at the Lompoc Oil and Gas Plant and the potential impacts to the facilities if the Tranquillon Ridge Project were approved and the life of the facilities extended.

Construction of the Lompoc Heating, Separation and Processing facility (HS&P, now the Lompoc Oil and Gas Plant) was completed in 1987. After heavy rains in 1991, soil subsidence became evident at the facility. The subsidence appeared as minor to moderate shifting, cracking, and sinking of concrete slabs and vessel and piping support footings, settling and distortions in the north end of the operations building, and small sink holes. The subsidence was observed primarily in a north/south trend from the west end of the oil shipping vessel, through the northwest corner of the operations building, and down into the pig receiver area. Based on geotechnical studies prepared by the Torch/Nuevo's geologic consultants, the cause of the subsidence was believed to be the penetration of localized surface water into a layer of soil prone to significant compaction when wet.

To prevent further subsidence and mitigate existing subsidence, Torch/Nuevo has undertaken several remedial measures. Critical vessels and piping have been surveyed and relieved of stress through additional structural support and modifications. Extensive areas of the facility were paved, and drainage improved to minimize surface water percolation on site. In addition, Torch/Nuevo undertook a program of subsurface grout injection. The program involves injecting concrete grout columns in a regular pattern in the areas that have been affected by subsidence. Soil between the columns becomes compressed and dewatered and is capable of supporting the facilities. The rate/level of subsidence is monitored by regular elevation surveys of the facility.

As a part of an annual facility audit conducted by the System Safety and Reliability Review Committee (SSRRC) Nuevo provided additional documentation (letter from Nuevo dated July 5, 2002) regarding the current status of subsidence at the LOGP. According to the documentation, three applications of grout injection have occurred at the LOGP. The first application was in 1995, the second in 1999, and the third in 2002. The most recent elevation survey of the LOGP was completed in April 2002. Maps showing areas affected by subsidence have been prepared by Nuevo and reviewed by the SSRRC. The survey data indicate that the grout injection has been successful in arresting soil subsidence in the grout treated areas. Nuevo is evaluating the subsidence at the facility annually.

With respect to the treatment of this issue in the Tranquillon Ridge EIR, Section 5.3.1.8 of the FEIR (page 5.3-7) includes a discussion on Expansive and Collapsible Soils. The second paragraph of this section reads as follows:

"Portions of the LOGP facility have experienced subsidence since installation. The oil plant has experienced subsidence near the crude tank and the processing equipment, as well as the control building. These areas have required remedial action to prevent damage to the facility, which has ranged from additional bracing to concrete injection to form columns down to stable soils (about 50 feet). The gas plant (installed after the oil plant) was completely excavated before installation and therefore has not exhibited any subsidence issues".

On page 5.3-17, under impact GR.3 it is acknowledged that "Extending the life of the facility would extend the risk of geologic disturbance". This is identified as a Class II impact (significant but mitigable). The impact discussion and associated mitigation measures predominantly address additional geologic hazards that could be experienced during ongoing maintenance of the facilities. Because the grout injection involves subsurface remediation, very little above ground disturbance has occurred.

Remedial actions to control ground subsidence at the LOGP are subject to existing permit conditions (i.e., B1 - "Construction Review by SSRRC" and D-1 - "Geologic Investigation, Design, and Mitigation Program"). Nuevo's remedial action plan for subsidence has been reviewed by the SSRRC under the aforementioned conditions. To date, all information submitted to the committee has shown that the grout injection program appears to be successfully controlling/remediating the subsidence. Other areas of the facility that have not been treated by grout injection have shown additional subsidence and are being monitored to determine if grout injection or other remedial measures are warranted. The subsidence issue and remedial activities will continue to be reviewed by the SSRRC. As a component of its existing monthly operations report, Nuevo is required to report to the SSRRC on the status of subsidence at the facility and any corrective actions taken.

2.0 Probability of Failures of the Pipelines and Processing Facilities.

Supervisor Susan Rose raised concerns regarding the integrity of the pipeline and other facilities over the extended operating life of the Tranquillon Ridge Project and the increased likelihood of a spill or rupture with the increased life and the increased volume of oil and gas.

As noted in Section 2.3.1.6 of the EIR, the Tranquillon Ridge Project would extend the life of the Point Pedernales facilities by 10 to 25 years. Many parameters were considered in the risk modeling conducted as a part of the Tranquillon Ridge EIR. These factors include all of the following:

Factors which would increase operational risk:

- 10-25 year increase in operational timeframe
- increased activity (drilling) offshore
- higher reservoir pressures and re-introduction of risk of well blow-out
- higher volume of oil throughput
- older facilities

The risk modeling used in the EIR is considered to be conservative since it includes the historical performance of pre-1980's facilities. In general, newer facilities are constructed and maintained under more stringent requirements¹, and may prove to have lower failure rates.

The effect that this extension of life would have on the various facilities (oil pipeline onshore, oil pipeline offshore, gas pipeline and LOGP) and the methodology for determining the effect are described below. Taking all of these factors into account, the EIR concludes that the Tranquillon Ridge Project would increase both the likelihood and the potential consequences of hazards such as leaks and ruptures associated with the Point Pedernales facilities.

2.1 Onshore Oil Emulsion Pipeline

As part of the EIR, estimates were made of the annual spill frequency and lifetime spill probability for the various pipelines. These estimates were made for two cases, both with and without the Tranquillon Ridge Project. The annual spill frequencies for the onshore portion of the oil emulsion pipeline from Platform Irene to the LOGP were estimated using data contained in a report by the California State Fire Marshall (CSFM), which is based upon the failure history of oil pipelines throughout the state of California. Pipeline age is one of many factors considered in the assessment of the annual spill frequency.

The data in the CDFM report were used to estimate the annual frequency and lifetime probability of a leak or rupture from the Point Pedernales oil emulsion pipeline, taking into account the specific conditions of the pipeline. Table 1 provides the estimated annual spill frequency and lifetime spill probabilities for the onshore portion of the Point Pedernales oil emulsion pipeline, with and without the Tranquillon Ridge Project.

¹ Advanced pipeline coatings, cathodic protection, internal inspections, etc.

Table 1 Onshore Oil Emulsion Pipeline Spill Frequency/Probability with and without the Tranquillon Ridge Project

Scenario	Spill Frequency per year	Tranquillon Ridge Lifetime Spill Probability, %	Current Operations Lifetime Spill Probability, %
Onshore Emulsion Pipeline ruptures	5.12×10^{-4}	1.6	1.0
Onshore Emulsion Pipeline leaks	2.1×10^{-3}	6.1	4.1

The annual spill frequency would not be expected to significantly change with the Tranquillon Ridge Project over the total projected lifetime of the Point Pedernales facilities (45 years). However, the lifetime spill probability would increase due to the longer life of the pipeline. As shown in Table 1 the probability of an onshore pipeline rupture increases by 0.6% and a leak by 2.0% with the Tranquillon Ridge Project (60% and 48.8% increase respectively).

Internal pipeline inspections are conducted on an annual basis as required by the SIMQAP. Tests indicate that the corrosion control program Nuevo implemented in the late 1990s has been effective in reducing the rate of internal corrosion. There has been little evidence of external corrosion, an additional element of pipeline failure. In estimating the spill probabilities for the onshore portion of the oil emulsion pipeline with the Tranquillon Ridge Project, the EIR assumed that Nuevo would continue the implementation of the internal corrosion control program for the life of the pipeline, which would serve to limit the amount of future corrosion in the pipeline.

2.2 Platform Irene and Offshore Oil Emulsion Pipeline

In estimating the annual spill frequency and lifetime spill probability for the offshore facilities a number of databases were used. The offshore pipeline annual spill frequencies were estimated using the Department of Transportation (DOT) pipeline failure rate database. For Platform Irene, a number of industry and governmental failure rate databases were used. The failure rates from these various databases were adjusted to account of the specific operating conditions of the Point Pedernales facilities. Table 2 provides the estimated annual spill frequency and lifetime spill probability for the offshore portion of the Point Pedernales oil emulsion pipeline and Platform Irene combined, both with and without Tranquillon Ridge Project.

Table 2 Combined Platform Irene and Offshore Oil Emulsion Pipeline Spill Frequency/Probability with and without the Tranquillon Ridge Project.

Scenario	Tranquillon Ridge Spill Frequency per year	Current Operations Spill Frequency per year	Tranquillon Ridge Lifetime Probability of Spill, %	Current Operations Lifetime Probability of Spill, %
Leaks and Small Spills	4.94×10^{-3}	4.94×10^{-3}	13.8	9.4

Table 2 Combined Platform Irene and Offshore Oil Emulsion Pipeline Spill Frequency/Probability with and without the Tranquillon Ridge Project.

Scenario	Tranquillon Ridge Spill Frequency per year	Current Operations Spill Frequency per year	Tranquillon Ridge Lifetime Probability of Spill, %	Current Operations Lifetime Probability of Spill, %
Ruptures and Large Spills	3.40×10^{-3}	6.24×10^{-4}	9.7	1.2
Any Spill Size	8.34×10^{-3}	5.57×10^{-3}	22.1	10.5

The annual spill frequency of a rupture or large spill from the offshore oil emulsion pipeline and Platform Irene would increase with the Tranquillon Ridge Project over what was projected for current operations. This increase is due to the addition of the Tranquillon Ridge wells, which would reintroduce the potential for a well blow-out and increase the annual frequency of a blowout or large spill from a well. The annual spill frequency for leaks and small spills would not be expected to change significantly with the Tranquillon Ridge Project, but the lifetime spill probability would increase due to the longer life of the pipeline.

The lifetime probability of a leak and small spill increases by 4.4% (46.8% increase) and a rupture or large spill by 8.5% (708% increase). A significant portion of the 8.5% increase is due to the increase potential for a well blowout. The cumulative increased probability for any size spill would be 11.6%.

It should be noted that the 1997 rupture was the result of a mechanical failure resulting from faulty construction (faulty flange weld) during the original pipeline installation. The failure was not due to the age of the flanges or due to internal or external corrosion. In addition, all but one of the flanges has been replaced and the remaining flange must be tested every 6 months pursuant to County requirements.

As noted in the EIR and Planning Commission staff report, Past internal surveys of the oil pipeline identified a number of anomalies (defects). As part of the overall pipeline maintenance and monitoring plan, some sections of the old pipe with significant anomalies were removed and replaced with new pipe. More recent smart pig data (October, 2000) indicates that an excess of 600,000 wall anomalies, most of these minor and not a safety issue, exist in the emulsion pipeline with the deepest being 51 percent of the wall thickness. Most of these are on the bottom of the pipe and are internal to the pipe. All of the most significant anomalies (ranging in depth from 35 to 53 percent) are located in the onshore portion of the pipeline. The 2001 report indicated 1,400 anomalies² with none greater than 50 percent, 173 between 40-49 percent and 1,212 between 30-39 percent. The pipeline maximum allowable operating pressure has been reduced (de-rated) due to the presence of anomalies.

² The significant change in the number of anomalies reported in 2000 and 2001 (over 600,000 in 200 and ~1,400 in 2001) was due to a change in the reporting format. In 2001, only anomalies greater than or equal to 30% were reported.

Based on the analysis contained in the EIR, the Tranquillon Ridge Project would increase the probability of a spill from the existing Point Pedernales facilities. In addition, as noted in the Marine Biology, Water Quality, and Terrestrial Biology sections of the EIR, the increased percentage of oil in the oil/water emulsion (from 10% under current conditions to approximately 30% with Tranquillon Ridge) would increase the severity of the impacts to project area resources if a release occurs. The increase in risk and the environmental consequences are considered significant and unavoidable.

2.3 Lompoc Oil and Gas Plant (LOGP) and Sour Gas Pipeline

A review of the hazards associated with the LOGP analyzed in the EIR shows that the primary hazard is associated with a gas release from the facility or pipeline. Oil releases at the facility would be contained within the facility, which is equipped with an oil containment system. In estimating the probability of a gas release from the LOGP and the sour gas pipeline, a number of industry and governmental databases were used. In particular, data from the Center for Chemical Process Safety (CCPS) was used to estimate the failure rates for various pieces of equipment at the facility. This data was combined with consequence modeling results to estimate the annual frequency and lifetime probability of a fatality or injury to the public from a release. Table 3 provides a summary of the risk assessment results for the LOGP and sour gas pipeline combined, both with and without the Tranquillon Ridge Project.

Table 3 LOGP/Sour Gas Pipeline Gas Release Risk Frequency/Probability with and without the Tranquillon Ridge Project

Scenario	Frequency per year	Tranquillon Ridge Lifetime Probability, %	Current Operations Lifetime Probability, %
LOGP Facility –One or More Fatalities	1.27×10^{-6}	0.004	0.003
LOGP Facility –One or More Injuries	3.23×10^{-5}	0.097	0.065

Based upon data contained in the various databases, the failure rates would not be expected to significantly increase due to the Tranquillon Ridge Project. One of the main reasons the annual failure rates are projected to remain the same over the extended life of the facilities is because of the maintenance and equipment integrity programs that are required as a part of Nuevo's current permit and that would be required for the Tranquillon Ridge Project. As such, the annual frequency of a fatality or injury would be the same with or without the Tranquillon Ridge Project, but the lifetime probability would increase due to the longer life of the facilities. Based on the County's safety thresholds, the risk of a release from the LOGP or gas pipeline is considered to be an adverse but less than significant impact due to its low likelihood.

The County requires that Nuevo conduct internal inspections of the sour gas pipeline on an annual basis. The smart pig results provide information on the extent of corrosion in the pipeline, which allows for corrective action to be taken before a leak occurs. Nuevo is also required to implement a mechanical integrity program for the LOGP facility as part of the County permit, as

well as to meet other regulatory requirements. These programs along with the SSRRC's annual safety audit help to ensure that the equipment is maintained at or above industry standards.

2.4 Natural Gas Liquids Transportation

Risks associated with the transportation of natural gas liquids (NGLs) and liquid petroleum gases (LPGs) would be significant and unavoidable. With the Tranquillon Ridge Project, the risks would increase above current levels and would occur over the extended operating life of the LOGP. However, this added risk is not directly associated with the integrity of the facilities but with the truck transportation of the NGLs and LPGs through the surrounding communities.

Staff Contacts

Should you have any questions on these technical matters, please contact Alice McCurdy, Energy Specialist at 568-2542 or Joddi Leipner, Project Manager at 568-2514. I can be reached at extension 2520.