



BOARD OF SUPERVISORS  
AGENDA LETTER

**Agenda Number:**

**Clerk of the Board of Supervisors**  
105 E. Anapamu Street, Suite 407  
Santa Barbara, CA 93101  
(805) 568-2240

**Department Name:** Planning and Development  
**Department No.:** 053  
**For Agenda Of:** November 12, 2013  
**Placement:** Departmental  
**Estimated Time:** 30 Minutes  
**Continued Item:** Yes  
**If Yes, date from:** October 8, 2013  
**Vote Required:** Majority

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**TO:** Board of Supervisors  
**FROM:** Department Glenn Russell, Ph.D. Director, (805) 568-2085  
Director(s)  
Contact Info: Kevin Drude, Deputy Director, (805) 568-2519  
**SUBJECT:** Pacific Coast Energy Company Seep Cans Emergency Permits, Case No's  
12EMP-00000-00006; 12EMP-00000-00008; 12EMP-00000-00009  
12EMP-00000-00012; 13EMP-00000-00001; 13EMP-00000-00002;  
13EMP-00000-00003; Fourth Supervisorial District

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**County Counsel Concurrence**

As to form: Yes

**Auditor-Controller Concurrence**

As to form: N/A

**Other Concurrence:** N/A

As to form: No

**Recommended Actions:**

That the Board of Supervisors receive and file this report on Emergency Permits 12EMP-00000-00006, 12EMP-00000-00008, 12EMP-00000-00009, 12EMP-00000-00012, 13EMP-00000-00001, 13EMP-00000-00002, and 13EMP-00000-00003, which authorized the placement of seep cans to prevent the seepage of fluids from impacting the environment (Assessor Parcel number 101-020-074).

**Summary Text:**

This item was presented to your Board on October 8, 2013, as an Administrative Agenda item. Your Board continued this matter to November 12, 2013 as a Departmental item and directed staff to present additional information regarding Pacific Coast Energy Company (PCEC) oil production and oil seeps. A copy of the October 8, 2013, Board of Supervisors Agenda Letter and Emergency Permits is included herein as Attachment A.

The following information was requested by your Board.

- 1) *Historical overview of the Orcutt Oil Field development.*

- 2) *Explain the difference between a surface expression and a seep.*
- 3) *Where on the PCEC site are the other oil and gas operations, and describe those operations?*
- 4) *Provide additional information about the 85 seep can locations on the PCEC lease. Describe what factors dictate their location.*
- 5) *Discuss whether the seeps and surface expressions associated with PCEC operations are an anomalous situation or a regular occurrence.*
- 6) *Provide a map of the entire parcel and the PCEC and Santa Maria Energy (SME) lease areas showing parcel boundary, the lease line, the location of traditional wells (no steaming), cyclic steaming well. Also, where cyclic steaming is occurring on the PCEC lease (Newlove) and adjacent SME lease (Careaga).*
- 7) *Discuss the initial reporting of the seep cans.*
- 8) *Did the County assess any fines for the Notice of Violation?*
- 9) *Will PCEC pay for all costs incurred to process the Emergency Permits?*

### **Historic Oil Development-Orcutt Oil Field**

Pacific Coast Energy Company (PCEC) is located in the State designated Orcutt Oil Field in the Solomon Hills, three miles southeast of Orcutt. The oil field was discovered as a result of seeps in the area<sup>1</sup> and mapped and developed in 1901 by William Warren Orcutt. Over the last 100 years, the Orcutt Oil Field has yielded approximately 180 million barrels of oil. PCEC currently has 271 producing wells in the Orcutt Oil Field. In 2012, PCEC produced approximately one million barrels of oil and anticipates the same volume of production in 2013.

### **Surface Expressions and Seeps**

A surface expression of oil is the result of human or mechanical activities, resulting in releases of oil at the surface. Because they are mechanically induced, surface expressions are generally located at or in proximity to active wells. However, the releases may find other conduits to the surface such as fissures and cracks, and sometimes turn up at a distance from the well. The injection of steam into the ground can increase the energy and volume of a surface expression by reducing the oil viscosity, thus allowing it to flow more readily to the surface. Seeps on the other hand are the result of natural processes and are generally low energy, non-eruptive leakages of oil seeping to the ground surface, commonly from shallower oil bearing zones. Although able to flow to the surface on their own, the use of steam is known to contribute to the volume and frequency of occurrence of seeps, making them sometimes difficult to distinguish from surface expressions. Any oil that migrates to the surface is required to be reported to the Department of Oil and Gas and Geothermal Resources (DOGGR) as well as to the County's Petroleum Office. Field inspections are conducted and operations are adjusted, repairs made or seep cans installed depending upon the whether a seep or surface expression is determined to be the cause of the release.

### **Current PCEC Production and Processing Facilities**

The seep cans included in the subject Emergency Permits are located within a portion of the Newlove lease on PCEC's 4,024.7-acre property as shown in Attachment B included herein. PCEC currently operates an oil production and processing facility permitted under an existing Oil Drilling and Production Plan. Existing operations include 96 wells using cyclic steaming, steam generators, an oil and gas processing and separation facility, and pipelines. The 96 wells are producing the Diatomite Formation, a relatively shallow oil-bearing crystalline formation that yields oil most effectively using

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<sup>1</sup> Source: *Onshore Oil & Gas Seeps in California*, California Department of Conservation, Division of Oil Gas and Geothermal Resources (DOGGR)

cyclic steaming, as explained below. Diatomite oil wells are sited on six well sites referred to as “Pods” as they contain multiple wells. These Diatomite oil wells are located on Pods 1, 2, 4, 5, 6, and 7.

The PCEC cyclic steaming process involves drilling a well into the Diatomite formation, typically at a depth between 500 to 700 feet. Steam, created from recycled produced water (water pulled from the formation during the drilling process and treated and purified), is injected into the formation and the well is allowed to “soak” with the steam for 2 to 3 days. No chemicals or additives are involved in the cyclic steaming process. Following the “soak” period, the well is opened and oil and water flow up the well pipe and into piping to be transported to their production facility for separation and transportation. After initial flow of the wells (typically 10 to 20 days), a pump is turned on to further remove oil and water. The pumping period typically lasts for 2 to 3 weeks. The steaming, soak and production process is then repeated a number of times, hence the term “cyclic”.

PCEC operations include a combined total of 271 producing wells (96 of which are Diatomite wells) located throughout their Orcutt Oil Field leases. Conventional wells are used to produce oil from the deeper formations (1,500 to 5,000 feet) using traditional well producing methods, such as the familiar “horsehead” pumping rig. Cyclic streaming is not used in the deeper reservoirs due to their different geology, and instead water injection is used to increase reservoir pressures and stimulate production.

### **PCEC Seep History**

A thin Careaga Sand zone, located at a relatively shallow depth (surface to 130 feet below the surface) across most of the PCEC Orcutt Hill area, has resulted in natural seeps. These seeps are the result of the proximity of the Careaga zone to the surface when the zone is occasionally exposed at the surface due to the natural topography in the area (“outcrops”) with a thin soil overlay. Some recent seeps are suspected to be caused from oil production operations, such as the over-injection of water (steam) which has resulted in minor ground uplift over time, further exposing the Careaga zone, resulting in some cases surface cracks which serve as conduits for seeps.

The majority of seeps reported from the Diatomite production occurred in connection with wells drilled during initial operations. During the early phase of Diatomite production (Pods 1 & 3 from 2007-2009), a number of seeps were identified. These seeps primarily originated in areas to the southwest of Pod 1. To date, 50 active seep cans (71% of total new seep cans) are located in this area. The remaining new seeps are isolated occurrences and are scattered mainly throughout the Pod 1 & 3 areas. Few seeps have occurred in the later drilled Pod areas and very few have occurred in the last 2 years. Extensive oil fingerprinting confirmed the seep oil is from the Careaga zone and not from the Diatomite zone.

In response to the seeps and other factors, PCEC has added specialized pumps to reduce over injection of water in the Diatomite zone, as well as modifying their wellbore design to increase thermal insulation in the shallow section of well through the Careaga tar zone, a condition required by the California Division of Oil, Gas, and Geothermal Resources (DOGGR) in their letter dated June 9, 2012 and attached to each Emergency Permit. This design change is intended to minimize heat transfer to the Careaga zone and reduce the mobility of tar. These measures, as well as more aggressive pressure controls and monitoring required by DOGGR, have been effective. The overall result has been a 90% reduction in the number of new seeps over a five year period. The number of active seeps by year is chronicled below:

Year	Number of New Seeps
2008	22
2009	18
2010	8
2011	13
2012	8
2013	1

Mapped locations showing PCEC leases, well sites, wells and emergency permit seep cans are provided in Attachment B included herein.

### **Proposed PCEC Oil Development and Production Plan**

PCEC has submitted an application for a revised Oil Drilling and Production Plan, to supersede its existing Oil Drilling and Production Plan and which includes the addition of 96 new oil wells to the existing 96 oil well operation, for a total of 192 wells. The proposed new wells would use cyclic steaming at depths ranging from 700 to 1000 feet to produce oil from the Diatomite formation, deeper than the existing steaming operations (500 to 700 feet). Additionally, the project proposes a Supplemental Pollution Control Plan which sets forth procedures and protocols for monitoring, assessing, controlling, and reporting surface expressions and seeps, consistent with requirements established by the DOGGR, and the County. Of the proposed 96 well locations, 20% are inside or near the Careaga zone boundary and 80% are outside the Careaga zone completely.

The proposed project also includes the 85 seep cans previously installed under the Emergency Permits. The project does not propose converting the existing and potential future seep cans to long-term cyclic steaming or conventional wells. Seep cans are temporary diversionary structures which are removed when an oil seep has been abated.

### **Seeps/Surface Expressions: SME Environmental Impact Report**

The Orcutt Oil Field also includes the Careaga lease, owned by Santa Maria Energy (SME), which currently operates an oil and gas facility where it produces and processes crude oil from two different oil bearing geologic formations, the deeper Monterey and the shallower Sisquoc (the latter contains oil-bearing Diatomite). For the past three years, SME has been employing the cyclic steam enhanced oil recovery method within the Diatomite formation through its temporary 26-well commercial “pilot” project. This pilot project is currently recovering oil from the Diatomite formation at a depth of approximately 800 to 1,000 feet below the surface.

The Environmental Impact Report (EIR) for the SME expansion project identifies that steam injection would continue in the Diatomite zone. The EIR explains that that seeps or surface expressions could occur on the SME lease during proposed steam injection activities, but also identifies that with the exception of one mechanical failure, which resulted in a surface expression in proximity to an active well, drilling and development of wells using steam injection technology on the SME lease has not resulted in seeps or surface expressions of oil. The EIR also noted several theories to explain the lack of seeps or surface expressions on the SME lease. The tar-soaked Careaga Sand outcrops on the SME lease are not present at ground level. In contrast, the Careaga zone on the PCEC lease is observed at ground level to 130 feet below the surface, with occasional outcrops of full exposure. Consequently, the depth of the Careaga Sand on the SME lease inhibits vertical migration of oil. In addition, the operators on the

SME lease started with steam injection rates lower than rates initially used on the PCEC lease and the SME operators have used a more robust well cement than was used on the PCEC lease. Finally, it is not likely that the steaming operations on the SME lease would exacerbate the conditions on the PCEC lease. There would be a distance of approximately 1000 feet between proposed cyclic steaming activities on the SME and PCEC leases.

Mapped locations showing PCEC leases, wells, and PCEC/SME proposed project areas are provided in Attachment C included herein.

**Performance Measure:**

N/A

**Fiscal and Facilities Impacts:**

The total cost to process the emergency permits was \$15,646.00, and is budgeted under the line items Development Review Permits and Energy Permits, as shown under the Source of Funds Summary on page D-138 of the 2012/2013 and 2013/2015 fiscal year budgets, respectively.

The County did not assess fines for the Notice of Violation (NOV) issued for the seep cans because PCEC has been compliant with the directives of the NOV and applied for the requisite Emergency Permits. An Oil Drilling and Production Plan was submitted on February 15, 2013 to permit expansion of oil production and permit the 85 seep cans. All costs incurred from this action are borne by the applicant.

**Attachments:**

Attachment A: October 8, 2013, Board of Supervisors Agenda Letter and Emergency Permits.

12EMP-00000-00006; 12EMP-00000-00008; 12EMP-00000-00009; 12EMP-00000-00012; 13EMP-00000-00001; 13EMP-00000-00002; 13EMP-00000-00002; and 13EMP-00000-00003

Attachment B: Map - PCEC Leases, Well sites, Wells and Emergency Permit Seep Cans.

Attachment C: Map - PCEC Leases, Wells, PCEC/SME Proposed Project Areas

**Authored by:**

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