



Inspection Report

**Air Resources Board
Enforcement Division**

Zynergy in Kern Bluff Field 20220601

Lead Inspector Signature (Leng Mut)	Date
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Inspection Date: June 1, 2022

Purpose of Inspection

On May 17, 2022, San Joaquin Valley Air Pollution Control District (SJVAPCD) responded to a complaint in the Morningstar community in Bakersfield, that the oil wells in Kern Bluff field near residents were leaking methane at high levels. On May 19, 2022, California Air Resources Board (CARB) enforcement staff received two emails from community groups informing CARB of a well leak complaint to SJVAPCD. In response to these emails, CARB staff inspected the wells identified in the emails on June 1, 2022.

CARB Staff Present at Inspection

- Leng Mut, Air Resources Engineer
- Ron Oineza, Air Resources Engineer
- Juan Osornio, Air Resources Supervisor I
- Regina McDoniels, Air Pollution Specialist

Other Agency Personnel Present at Inspection

- Jonathan Pineda (CalGEM)
- Clarissa Price (SJVAPCD)

Site Information (Organization Detail)

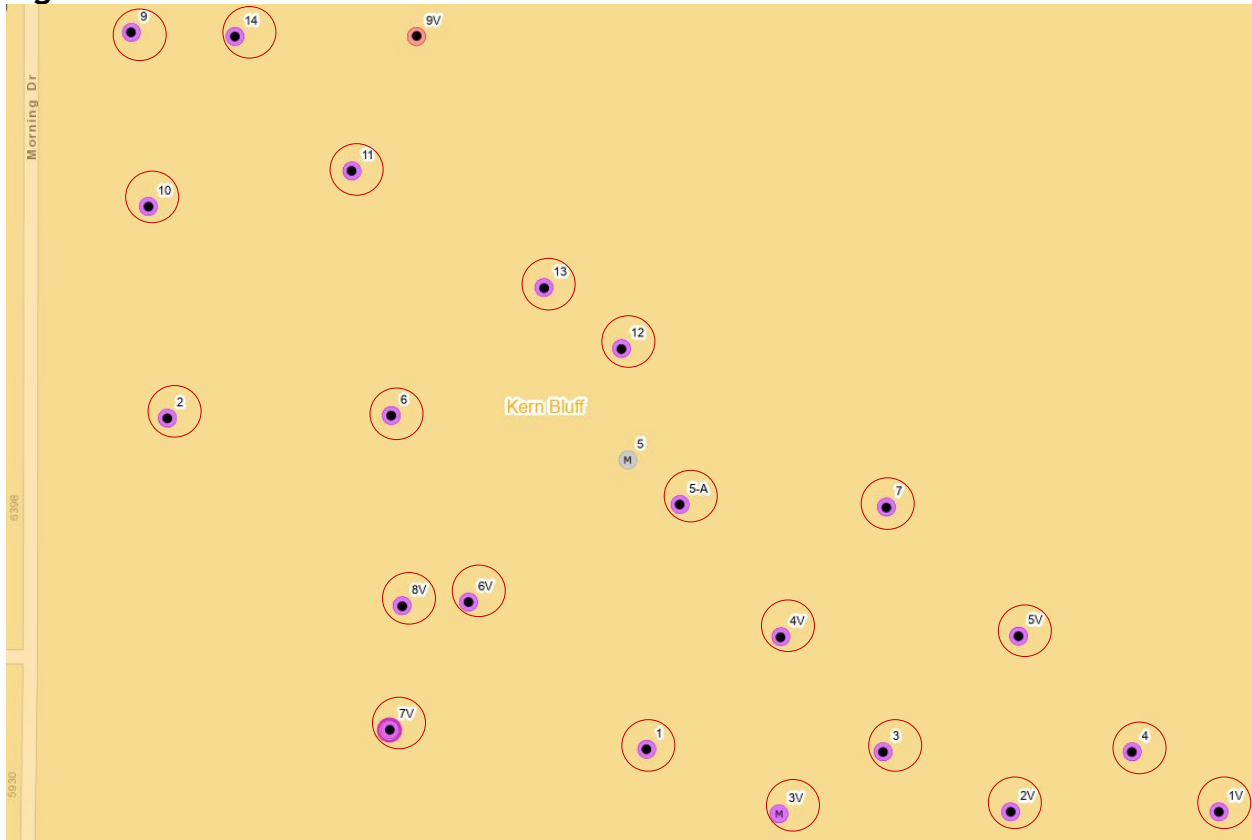
Operator: Zynergy, LLC
Agent Name: Andrew Sanders
Lease Name: Afana
Oilfield Name: Kern Bluff
Bakersfield, CA 93306
County: Kern

CalEnviroScreen Score: 49% (CalEnviroScreen 4.0)

Description of Inspection

On June 1, 2022, CARB, along with the California Geologic Energy Management (CalGEM) and SJVAPCD, conducted an onsite inspection of 21 idle wells. The 21 idle wells CARB inspected on June 1, 2022, are shown in purple and circled on the map in Figure 1, below (map source: Well Finder).

Figure 1



During the inspection, inspectors measured methane leak concentrations from the wells using Method 21- (Method 21 - Volatile Organic Compound Leaks) approved equipment: a Detecto-Pak Infrared (DP-IR) and a Toxic Vapor Analyzer (TVA). CARB staff used a DP-IR to measure leak concentrations, and SJVAPCD staff verified the leaks with a TVA. This testing showed that of the 21 wells inspected, 4 wells were leaking above 50,000 ppm (>50,000 ppm). Methane has a lower explosive limit (LEL) of 50,000 ppm, this is the lowest concentration of methane in air that can produce flash of fire in presence of oxygen and an ignition source.

Table 1 gives the following information about the 21 wells CARB inspected on June 1: (1) the American Petroleum Institute (API) number; (2) the well number; (3) the methane leak concentration of each well measured by CARB and SJVAPD, in parts per

million; and (4) the number of years each well has been idle, based on information from Well Detail.

Table 1: Zynergy Idle Wells Inspection Results - June 1, 2022

API Number	Well Number	Methane (ppm)	Years Idle (years)
402908871	1	4,000	34
402908872	2	0	34
402908873	3	>50,000	12
402908874	4	0	34
402908876	6	1,000	34
402908877	7	>50,000	34
402908879	9	>50,000	12
402951203	10	0	34
402951204	11	300	34
402951205	12	0	34
402951206	13	0	34
402965568	14	0	34
402968857	1V	0	33
402968858	2V	100	33
402968859	3V	0	15
402968860	4V	0	33
402960119	5-A	0	12
402973711	5V	>50,000	33
402973933	6V	200	29
402973934	7V	200	23
402973935	8V	0	15

To understand what other volatile organic compound (VOC) gases may be emitting from the wells besides methane, CARB staff took two gas samples and measured the methane flow rates from 2 of the leaking wells for analysis. Table 2 (below) gives the following information: (1) the well number, (2) the methane leak concentrations, (3) the calculated methane leak flow rates in kilogram per day (kg/day), (4) the VOC concentrations measured by a handheld device, in parts per billion (ppb), and (5) the locations where samples were taken. An analysis of the individual VOCs found is provided later in this report.

Table 2: Gas Sampling Information - June 1, 2022

Well Number	Methane (ppm)	Methane Leak Flow Rate (kg/day)	VOC (ppb)	Gas Sample Location
3	50,000	10.4	2,000	Open well
7	50,000	9.7	300	Capped well

CARB took one of the gas samples from Well 3 after the contractor removed a wellhead to repair the leaks. CARB took the other gas sample from Well 7, which was leaking from outside the casing. These wells are 350 feet apart. Well 3 (open well) emitted a higher concentration of VOC than Well 7.

CARB laboratory analyzed the two gas samples for benzene, toluene, ethylbenzene, and xylene (BTEX) using a Gas Chromatograph with Photoionization Detector (GC-PID). Based on the GC-PID retention time, no BTEX were detected in both samples.

In addition, the Department of Toxic Substances Control (DTSC) analyzed the samples using the EPA Method TO (Toxic Organics)-15 and the Office of Environmental Health Hazard Assessment (OEHHA) reviewed the results and assessed the health risks. OEHHA compared the concentration data to acute and chronic cancer as well as noncancer health guidance values (HGVs) and determined the cancer risk for isopropylbenzene and tert-butanol. OEHHA found that none of the compounds exceeded the noncancer HGVs.

DTSC's analysis detected isopropylbenzene in Well 3's (open well) well-gas sample at a level of 3.26 ppbv, which would represent roughly 0.1% of all VOCs measured coming from the well (3.26 ppbv isopropylbenzene / 2000 ppbv VOC). DTSC's analysis also detected tert-butanol in the Well 3 (open well) well-gas sample at a level of 1.98 ppbv. Isopropylbenzene and tert-butanol are listed as carcinogenic compounds by California's Proposition 65 program and the US Environmental Protection Agency, respectively. Concentrations of these pollutants in the well are 10 to 100 times higher than in ambient air in the San Joaquin Valley and are consistent with recent literature on these pollutants in well gas (Lyman et al.).

Taken together, these results show that almost all the gas inside Well 3 is methane. Using the estimated flow rate of methane per day (10 kg), and VOC concentration of 2,000 ppb we calculate a mass VOC emission rate from Well 3 of roughly 0.4 grams of VOC released per day. Since the measured VOC concentrations were taken within the well, the concentrations of the pollutants in nearby communities coming from these wells would likely be diluted by a factor of 10 or more. Based on these results, we do not expect emissions from Well 3 to pose a significant public health risk. However, these results do identify a toxic air contaminant [isopropylbenzene] in well gas, which will be further evaluated in future enforcement efforts.

On July 8, 2022, CalGEM reported to CARB that Zynergy's contractors had repaired all the leaking wells identified in Table 1 ("Update on Bakersfield Idle Wells").

Works Cited

"CalEnviroScreen 4.0." *California Office of Environmental Health Hazard Assessment*, 20 Oct. 2021, <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40>.

Lyman, Seth N., et al. "Emissions of Organic Compounds from Produced Water Ponds I: Characteristics and Speciation." *Science of the Total Environment*, vol. 619–620, Elsevier BV, Apr. 2018, pp. 896–905.
<https://doi.org/10.1016/j.scitotenv.2017.11.161>.

"Method 21 - Volatile Organic Compound Leaks." *U.S. Environmental Protection Agency*, 4 Oct. 2021, <https://www.epa.gov/emc/method-21-volatile-organic-compound-leaks>.

"Organization Detail." *WellSTAR, CalGEM*, 2022, <https://wellstar-public.conservation.ca.gov/Entity/Organization/Detail/14039>.

"Update on Bakersfield Idle Wells." *CalGEM*, 8 Jul. 2022, <https://www.conservation.ca.gov/index/Pages/News/State-Oil-and-Gas-Supervisor-Issues-Statement-on-Two-Bakersfield-Long-Term-Idle-Wells.aspx>.

"Well Detail." *WellSTAR, CalGEM*, 2022, <https://wellstar-public.conservation.ca.gov/Well/Well/Detail?api=0402908871#>.

"Well Finder" *CalGEM*, n.d., <https://maps.conservation.ca.gov/doggr/wellfinder/#openModal/-118.91037/35.40602/18>. Accessed 23 Jun. 2022.