


**VENTURA COUNTY
AIR POLLUTION CONTROL DISTRICT**

Memorandum

TO: Mike Villegas
Air Pollution Control Officer

DATE: October 19, 2015

FROM: Tyler Harris 
Air Quality Engineer

SUBJECT: CALIFORNIA RESOURCES CORPORATION (CRC) APPLICATION TO
RENEW CUP 3344 – INDIRECT GREENHOUSE GAS (GHG) EMISSIONS
AND GHG SIGNIFICANCE THRESHOLDS

As requested by the Ventura County Planning Department staff, Ventura County Air Pollution Control District (VCAPCD) staff calculated estimates of the greenhouse gas (GHG) emissions increase for Ventura County Conditional Use Permit (CUP) 3344, which is a proposal for 19 new oil wells.

VCAPCD staff used assumptions provided by Planning Department staff and detailed in a Greenhouse Gas Emissions Technical Report prepared by InterAct (InterAct Report) at the request of CRC for the project (October 2015). The InterAct Report stated the project included 18 new oil wells, so VCAPCD recalculated emissions based on the correct project description of 19 new oil wells.

Using the site-specific assumptions provided, I estimated the proposed wells will each emit 5.64 metric tonnes (MT) of methane and 0.664 MT of CO₂ per year. It should be noted the statewide average methane emissions from oil wells is approximately 1.27 MT per year, so this estimate is over four times the statewide average.

GHG emissions are calculated in carbon dioxide equivalents (CO₂e) for emissions inventory and regulatory purposes. The United States Environmental Protection Agency (USEPA) and California Air Resources Board (CARB) currently use a global warming potential (GWP) of 25 pounds CO₂e per pound of methane for inventory and regulatory purposes. Therefore, direct GHG emissions from the proposed 19 oil wells will increase 2,691 MT CO₂e per year if the project is approved and fully implemented.

The InterAct Report also included information on the indirect GHG emissions from the generation of grid electricity used to power the proposed oil well pumps. Using the assumptions in the InterAct Report and correct number of proposed oil wells, I estimated the indirect GHG emissions increase as 5,968 MT CO₂e per year.

However, these indirect emissions are covered under California's Cap and Trade (C&T) Regulation. The cap and trade program is part of the state of California's compliance with Assembly Bill 32, the Global Warming Solutions Act of 2006. All GHG emissions from entities covered under C&T should be considered fully compliant with the California Environmental Quality Act (CEQA) and fully mitigated.

The C&T program has undergone full CEQA review and survived multiple court challenges. The C&T program's GHG emissions cap is required by law to be the maximum technically feasible and cost-effective emissions reductions. In addition, all increases in GHG emissions at covered entities fall under the cap and so must be offset elsewhere for the whole program to maintain compliance. The cap also decreases with time, forcing additional emissions reductions from all covered GHG sources.

It is therefore appropriate to consider GHG from grid electricity used at a source to be fully mitigated and such indirect GHG emissions should not be considered when determining the significance of climate impacts from a project. Only the 2,691 MT CO₂e per year direct GHG emissions increase from the proposed project should be considered when determining if the proposal will have a significant impact on the environment.

Ventura County and VCAPCD have not adopted significance thresholds for GHG to determine if a project will cause significant adverse impacts related to a CEQA global climate change analysis. However, a few air districts and one neighboring county have adopted significance thresholds for CEQA GHG analyses. The most restrictive by far is the threshold adopted by Santa Barbara County which has adopted a significance threshold of 1,000 MT CO₂e per year. The most common CEQA GHG significance threshold is 10,000 MT CO₂e per year, which has been adopted by the South Coast and Sacramento Metropolitan Air Quality Management Districts, and Santa Barbara County and San Luis Obispo County Air Pollution Control Districts.

In contrast to these stringent thresholds, CARB has set the threshold for inclusion in the GHG Cap and Trade Program at 25,000 MT CO₂e per year facility-side, and USEPA has set a regulatory applicability threshold for GHG at an increase of 75,000 MT CO₂e per year. Antelope Valley APCD and Mojave Desert APCD have both adopted 100,000 MT CO₂e per year as their CEQA significance threshold.

While Ventura County regulatory agencies have not formally adopted greenhouse gas thresholds, they have used the threshold of 10,000 MT CO₂e per year to evaluate the significance of some previous projects in approved CEQA documents. Therefore, I recommend maintaining consistency with previous projects and comparing the GHG emissions increase from this proposal to the 10,000 MT CO₂e per year threshold. Since the estimated GHG increase from this project is 2,691 MT CO₂e per year, the impact is not significant.

GREENHOUSE EMISSIONS TECHNICAL REPORT

In Support of California Resources Corporation Application to Renew CUP 3344

Prepared for:



270 Quail Court, Suite 201
Santa Paula, CA 93060

Prepared by:

InterAct

4567 Telephone Rd., Suite 203
Ventura CA 93003

Contact: U. Micovic

Office: 805-658-5600, Cell: 805-218-4774

October 2015

1.0 Background

California Resources Corporation (CRC) has applied to the County of Ventura to renew Conditional Use Permit (CUP) 3344, because the previously approved CUP was expiring. The previously approved CUP contained allowance for 36 oil and gas wells, 18 of which have not been drilled at the time the permit expired. However all 36 wells, including the undrilled wells, have been approved through the California Environmental Quality Act (CEQA) review and approval process by the County (1978 and 1984 CEQA Documents).

It is understood that the previous CEQA evaluations have not addressed Greenhouse Gas (GHG) emissions from project because at the time the GHG was not part of the required evaluation. This report is prepared to demonstrate that the GHG emissions from the proposed project are below the current CEQA threshold and therefore the project does not have a significant impact to the Air Quality.

2.0 Greenhouse Gas (GHG) CEQA Threshold and Impacts Evaluation

GHG emissions are measured in terms of carbon dioxide (CO₂) equivalents (CO₂e). The current Ventura County CEQA threshold for GHGs is 10,000 Metric tons per year (MT/year) of CO₂e incrementally added by a proposed project. This threshold is also approved by the Ventura County Air Pollution Control District (VCAPCD).

Under CEQA, the existing operations or conditions are considered a baseline for a proposed project. Additional impacts from the proposed project activities are evaluated against the approved CEQA threshold. If impacts are below the threshold, the project impacts are deemed as less than significant under CEQA.

3.0 Estimation of the Greenhouse Gas (GHG) Emissions from Project

The CUP 3344 renewal project proposes drilling and operation of a maximum of 18 new oil and gas wells. The proposed project will not add any operational facilities; it does not propose additional operational traffic, nor traffic from routine maintenance. The wells will use electricity to power the pumping units that are needed to pump the oil and gas to the surface. It is assumed as a worst case scenario that each pumping unit would be a 150 horsepower (HP) motor.

Therefore, the only source of GHG emissions from the project would be from the additional wells: fugitive emissions of gas and indirect emissions due to electricity consumption by the pumping units.

3.1 GHG Emissions from Fugitive Leaks

Emissions from oil and gas wells occur through fugitive leaks in the valves and connections that are part of wells construction. Those well emissions are in the form of produced gas escaping through the minute leaks that are inherent to valves and connections and are accounted for and permitted by VCAPCD. Produced gas from an oil and gas well has methane (CH₄) as the majority compound. It also has Reactive Organic Compounds (ROCs) regulated by the VCAPCD, and it has carbon dioxide (CO₂). Methane and CO₂ are GHGs that have Global Warming Potential (GWP). GWP of CO₂ is assigned a value of one (1). The US EPA identifies methane as a GHG and assigns it a GWP of 25 times that of CO₂ (<http://www3.epa.gov/climatechange/glossary.html#M>):

“Methane (CH₄): A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide (CO₂). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion. The GWP is from the IPCC's Fourth Assessment Report (AR4)”

Knowing how much methane and CO₂ are emitted from fugitive leaks of the proposed wells, we can estimate the GHG emissions from those proposed wells and thus from the proposed project.

The VCAPCD dictates that emissions of ROCs from an oil and gas well be estimated at 2 lbs/day (see Attachment 1). As a worst case scenario, it is assumed that ROC portion in the produced gas is 5% (although it is typically higher). As a worst case scenario, it is assumed that there is 85% methane in the produced gas (for comparison, Santa Barbara APCD lists a worst case scenario of methane portion in produced gas at 84%), although gas analyses from the CRC leases typically have much lower percentage of methane. As a worst case scenario, it is assumed that there is 10% of CO₂ in the produced gas. Therefore, knowing emissions of ROCs from the wells, we can calculate emissions of methane and CO₂ from those wells

Emissions of the GHG from the project are estimated as follows:

$$\text{CH}_4 = (\text{ROC}) \times (\text{CH}_4 \text{ at } 85\% \text{ of total emissions}) / (\text{ROC at } 5\% \text{ of total emissions})$$

$$\text{CO}_2 = (\text{ROC}) \times (\text{CO}_2 \text{ at } 10\% \text{ of total emissions}) / (\text{ROC at } 5\% \text{ of total emissions})$$

$$\text{GHG Emissions} = [(\text{Emissions of CH}_4) \times (\text{GWP of } 25)] + (\text{Emissions of CO}_2)$$

3.2 Indirect GHG Emissions from Electricity Consumption

As a worst case scenario, it is assumed that each well will be equipped with a pumping unit with a 150 HP electrical motor (the majority of wells operate with 50 HP motors). The likely electricity supplier to the proposed project is So Cal Edison, which lists its current electricity GHG emissions as 705 CO₂e Emissions from Delivered Electricity Rate (lbs/MWh) (https://www.sce.com/wps/wcm/connect/68145014-2eba-40c2-8587-6482ce056977/CRR_08202013.pdf?MOD=AJPERES&ContentCache=NONE).

Thus electricity related GHG emissions from the 18 proposed wells would be:

$$\begin{aligned} &705 \text{ lbs/CO}_2\text{e per MWh} \times 18 \text{ wells} \times 150 \text{ HP/well} \times 0.746 \text{ HP/kWh} / 1000 \text{ kW/MW} \times 8700 \text{ hrs/yr} = \\ &= 5,654 \text{ MT CO}_2\text{e/year} \end{aligned}$$

3.3 Total GHG Emissions

The emissions factors, calculations, references and assumptions are shown in Figure 1 below. It is demonstrated that the combined emissions of methane CO₂ equivalents and CO₂ from the proposed project are below the CEQA threshold for GHGs and thus the project GHG impacts are less than significant.

4.0 Evaluation Preparer

This evaluation is prepared by Uliana Micovic of InterAct. Her credentials are presented in Attachment 2.

Figure 1 Project Worst Case GHG Emissions Estimates

Fugitive Leaks Emission Factors and Percentages

Oil & Gas Well ROC EF, lbs/day-well*	ROCs % in produced gas	Methane % in produced gas	CO2 % in produced gas	Number of Wells**
2.00	5%	85%	10%	18

Methane (CH4) Emissions from Fugitives

Methane emissions, lbs/day/well	Methane emissions, all wells, lbs/day	Methane Emissions tons/year	Methane Emissions, MT/year	CH4 Global Warming Potential (CO2e)****	Methane CO2e Emissions, MT/year
34.00	612.00	111.69	101.54	25.00	2538.41

Carbon Dioxide (CO2) Emissions from Fugitives

CO2 Emissions, lbs/day/well	CO2 Emissions, all wells, lbs/day	CO2 Emissions, tons/year	CO2 Emissions, MT/year	CO2 Global Warming Potential ****	CO2e Emissions, MT/year
4.00	72.00	13.14	11.95	1.00	11.95

Indirect GHG Emissions from Electricity

HP of a well motor	HPs for Motors on all wells	HP-hours per year	kWh/year from all Motors	MWh/year from all Motors	CO2e Emissions, MT/year
150.00	2700.00	23,652,000	17644392	17644	5,654.23

GHG Emissions (Fugitive Leaks + Indirect from Electricity)

GHG Total Emissions (CO2e of CH4) + (CO2), MT/yr	CEQA Threshold for CO2e, MT/yr	Project Below threshold?
8,205	10,000	Yes

Factors and Coefficients

2 lbs/day	* Emission Factor for ROCs from Oil & Gas Well Reference: VCAPCD PEETS	365 days/yr
18 ** Number of new Wells on CUP 3344		2,000 lbs/ton
84% *** SBCAPCD Definition of ROG		2,200 lbs/Metric Tonne or lbs/MT
25 **** Methane Global Warming Potential http://www3.epa.gov/climatechange/glossary.html#C		0.746 kWh is equal to 1 hp-hr
		705 lbs/MWH (per SCEdison)

ATTACHMENT 1

VCAPCD PEETS Emissions Factors

PEETS Emission Factors

SCC 31000122	Crude Oil Well	Pounds per Well-Day	Date of Change
Reactive Organics		2	7/30/1997
VCAPCD factor			

ATTACHMENT 2
Uliana Micovic Credentials
as an Air Quality Engineer

POSITION

Regulatory Services Manager / Sr. Air Quality Engineer

EXPERIENCE

Management of regulatory, permitting / compliance projects for oil and gas production facilities and drilling projects, with emphases on land use, air quality, water use, and health risk.

Over 17 years of experience in project management, permitting, compliance, and environmental analysis for the oil and gas industry. CEQA / NEPA specialist, concentrating in air quality, greenhouse gases, water quality, safety, and health risk assessments for oil and gas and other industrial projects. Experienced in injection well applications and Well Stimulation notices for hydraulic fracturing projects. Knowledgeable in the local, state, and federal air and water quality control rules and policies, and emission control technologies, land use issues and permitting strategies. Hands-on compliance with a variety of regulatory requirements, including special and conditional use permits, and CEQA mitigation measures. Additionally, 6 years of experience in analytical laboratory analysis requirements & methods (air and water quality and oil fingerprinting).

REPRESENTATIVE EXPERIENCE

Air Quality Evaluations, Permitting and Compliance

Preparation of Air Quality Impact assessments for Oil and Gas and other projects, including Greenhouse Gasses (GHGs):

- 2002 Tranquillon Ridge Project EIR (Nuevo).
- Paredon Project EIR (Venoco)
- Draft Elwood Full Field Development EIR (Venoco)
- Draft Carpinteria Field Development EIR (POOI)
- Draft EMT Lease Extension EIR (Venoco)
- Nacimiento Water Project EIR

Internal verifications of GHGs emissions for oil and gas facilities.

Analysis of various air quality control districts' regulations with respect to emissions control technologies for fuel burning and oil storage equipment.

Health Risk Assessments (HRA's) of oil production facilities.

Strategy development on meeting regulations with the best economic outcome for the client. Analysis of facility equipment, its installation schedule and sizing with the goal of minimizing or avoidance of emissions offsets payments. Comparative cost vs. emissions analysis for various Best Available Control Technologies (BACT).

Evaluation of drilling emissions, and preparation of Drilling Emission Reduction & Monitoring Plans. Emission Reduction Credits (ERCs) applications, budgeting & procurement.

Federal Permits (Title V, Part 70) permitting/compliance, permit application preparation, permit modifications.

Various Compliance Plans development and compliance: Inspection and Maintenance (I&M) Programs and Operator Management Plans for fugitive emissions and engines. Source Test Plans. Meter calibration and maintenance plans.

Meteorological station design per the EPA and SCAQMD requirements. Met data analysis and validation per the EPA's data quality assurance requirements.

CEQA / NEPA Projects

As Project Manager, managed all aspects of permit applications requiring CEQA, assisted clients in strategizing and agency communications.

As Principal Investigator, conducted CEQA / NEPA environmental analyses of oil and gas, and other industrial projects. Conducted air quality analysis (including GHGs), developed emission inventories and emissions reduction measures. Prepared Health Risk Assessments (HRA) according to the toxic emissions regulations. Performed noise propagation modeling, noise & vibration measurements and analysis (including drilling rig vibration analysis). Developed mitigation measures to decrease industrial noise, noise from traffic and project noise, as well as development of traffic mitigation measures, fire protection and safety measures for oil and gas and industrial projects. Prepared Conditional Use Permit applications. Prepared Hazards consequence analyses, and fault tree analyses. Performed process safety, hazards/risk assessments.

Oil and Gas Production Facilities and Drilling projects in California

Management/leading role in land use permitting of various projects, including air quality, conditional use and special use permit applications, permit modifications/renewals, zoning clearances, agency communications, CEQA review and mitigation measures issues and compliance; preparation of compliance plans and operator training materials, environmental documents audits/review in behalf of oil and gas operators.

Oil and Gas Facilities in the Gulf of Mexico

Permitting of decommissioning and removal of offshore platforms and pipelines (W&T, Louisiana). Regulatory and environmental due diligence review of an onshore gas plant and associated off- and onshore pipelines to assess liabilities for the future abandonment and removal (Yellowhammer Gas Plant, Alabama).

Industrial Projects in California

Conducted technical studies and development of SOPs as part of a comprehensive Risk Management Program (RMP) for 14 water and sewer treatment facilities that use chlorine and/or sulfur dioxide. Interacted with operating personnel to define operating tasks and with maintenance personnel to improve the procedures in the computer-based maintenance system. Participated in development of Process Safety and RMP programs for several other water treatment and refrigeration facilities that use anhydrous ammonia.

Developed risk management programs according to California Accidental Release Program and US EPA RMP. Coordinated and monitored a technical validation & testing program of a cutting edge hazardous materials remediation technology.

Analytical Laboratory Experience

Improvement / development of adsorbents manufacturing methods. Scale-up to production in accordance with ISO 9000. Development of SOPs and QC/QA methods. Design (materials flow, operation logistics) of an adsorbents manufacturing facility (2000 sq. ft.). Development of gas chromatography and gas purification equipment. Development of GC and GC/MS applications for U.S. EPA, USP, & ASTM methods. Market and customer database analysis; customer relations; promotional literature development.

PROFESSIONAL HISTORY

InterAct (formerly Pacific Management Tech. Inc. & Fairweather Pacific) 2007 – present
Staff Engineer, Marine Research Specialists (MRS), (formerly Arthur D. Little) 1998 – 2007
Research Engineer, Supelco (Analytical laboratory supplies manufacturer) 1994 – 1998

EDUCATION AND TRAINING

MS, Chemical Engineering, Michigan Technological University, Houghton, MI – 1993

BS, Chem. Eng., Mendeleev Institute of Chemical Technology, Moscow, Russia – 1991

PASSPORT industrial facility safety training

Fundamentals of Project Management, Fred Pryor Educational Resources, Inc.

Thermal Hazards Evaluation and Pressure Relief Design, Arthur D. Little, Inc.

Business Writing Course, Fred Pryor Educational Resources, Inc.

Marketing Management Certificate, Pennsylvania State University

Fundamentals of Glass Technology, Center for Professional Advancement

Business Environment Laws, Pennsylvania State University

OTHER**Professional Affiliations**

Member of American Institute of Chemical Engineers (AIChE) since 1993

Presentations

"Oilfield Produced Water – Overview", EUCI Webinar, March 2015.

"Performing Well Integrity Reviews for Injection and Hydraulic Fracturing Permit Approval", at State Lands Commission "Prevention First" Conference, Oct 2014.

"Examining How to Streamline the Process for Attaining a UIC Permit to Allow Continued Production", at California Water Management 2014 Conference.