Potential environmental and health impacts of oil and gas exploration in East Contra Costa County

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My Background

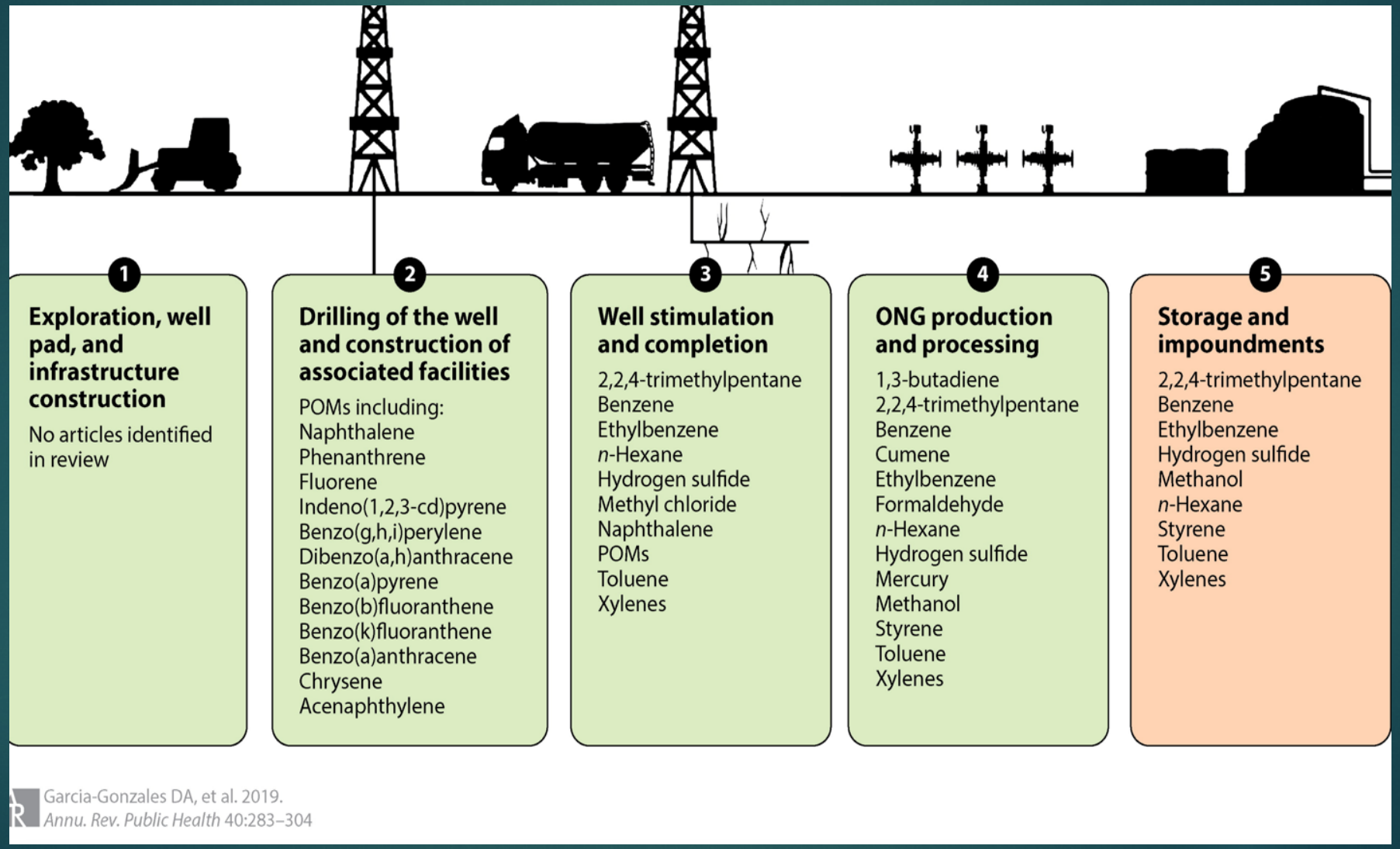
- Lived in CCC for the past 25 years
- Orthopedic surgeon
- Treat patients from all over the county
- Protecting the health of people in CCC

Climate Health Now

Group of 365 health professionals, educating people about the health risks of climate change, and encouraging renewable energy solutions

- We will speak about health impacts of oil drilling to the community of Brentwood and nearby Antioch
- Important to understand Health impacts of oil after extraction, including refining and combustion, since each step has significant and different health effects

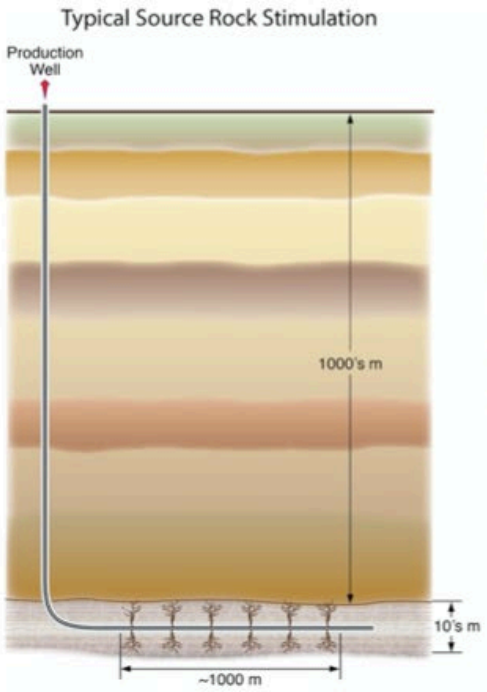
Hazardous materials associated with production of oil

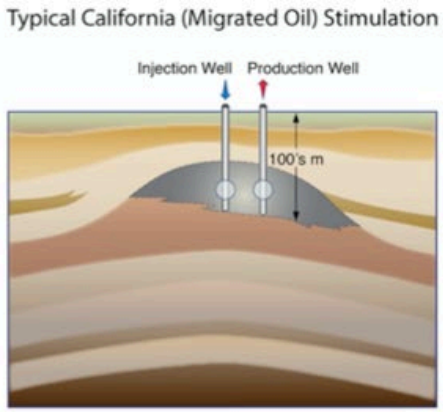


Chemical usage in oil and gas extraction

- Many if not most oil and gas wells in CA use Enhanced oil recovery: involves water flooding, steam flooding, cyclic-steam injection
- Well stimulation: (hydraulic fracturing)

Extraction techniques in California



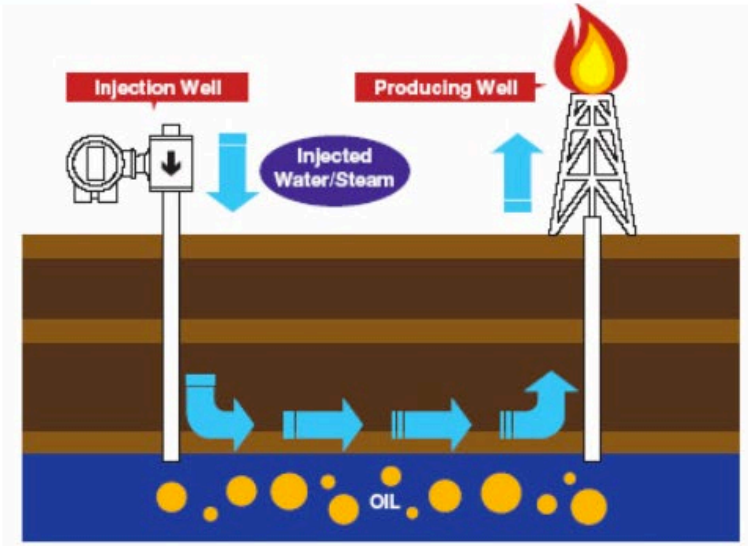


Well stimulation

(***hydraulic fracturing***, *and matrix acidizing, acid fracturing)*

Enhanced oil recovery, EOR

(water flooding, steam flooding, cyclic-steam injection)



PSE

CCST: CA council on science and technology (2015)

Potential Impacts of Well Stimulation on Human Health in California

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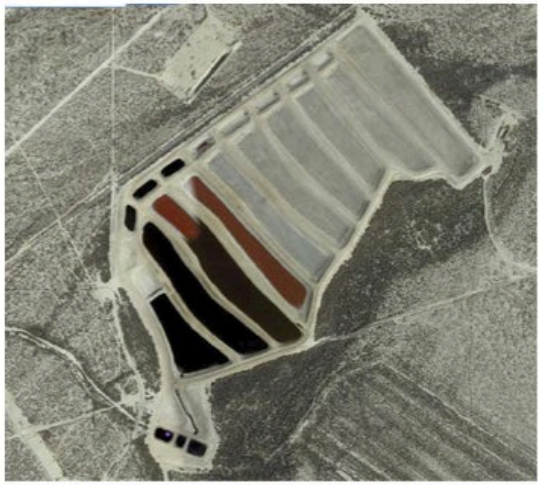
Chemical usage in oil and gas development

- 500 chemicals have been reported by oil and gas operators
- Limited information on many of these chemicals makes it difficult to assess the public health risks
- Some chemicals can be reported as "trade secrets"
- Chemical use in oil and gas development is widespread and not restricted to well stimulation
- Summary: many chemicals are used, many unknown, difficult to know potential health risks of so many chemicals

Produced water

- **D**efinition: water co-produced with oil and gas development that can contain salts, petroleum hydrocarbons, microbes, chemical additives and byproducts.
- Methods of disposal

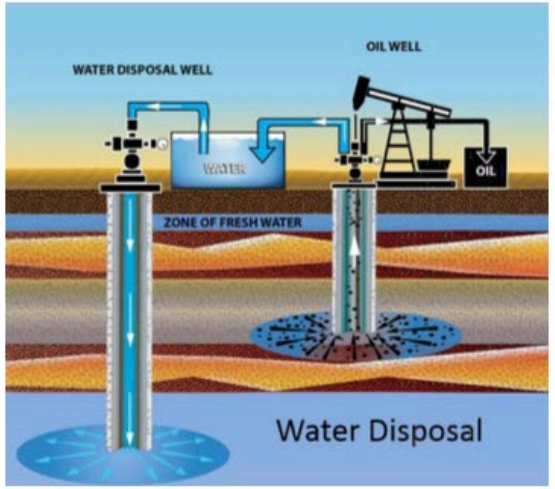
Oilfield wastewater disposal activities



Aerial image of McKittrick 1-1 from Geotracker

Unlined evaporation/percolation ponds – produced water percolates through soils to recharge aquifers with probable and confirmed groundwater contamination

Class II Underground Injection Control (UIC) – produced water is injected into aquifers for disposal



PSE

Public health effects of oil extraction

- Respiratory and neurologic problems
- Cancer
- Premature births and birth defects

Respiratory, Neurologic

- Study in South LA found rates of (physician-diagnosed) asthma among children and adults living within 1500 feet of oil and gas drilling were significantly higher than the county-wide average. (Shamasunder et al 2018)
- Colorado study showed increased acute respiratory, neurologic health effects living within ½ mile of active oil and gas wells (McKenzie, 2012, CO)

Cancer risks

- Colorado School of Public Health, 2018:

People living within 500 feet of oil/gas drilling, 8-fold higher risk of developing cancer than the US EPA threshold for acceptable risk

- Colorado, 2-fold increased risk of cancer in people living within 2500 feet of oil and gas drilling. (McKenzie, 2012)

Cancer risks

- Childhood leukemia found to be 4 times more likely for those living in areas of high well density. (McKenzie, 2017 CO)
- Living within 10 miles of a refinery had 12% higher risk of bladder cancer compared with people 21-30 miles away

Premature Birth and Birth Defects

- Stanford study of 225,000 births from mothers living within 10 km (6 miles) of oil and gas operations in the San Joaquin Valley found that women were 8-14% more likely to experience preterm birth. Preterm birth (birth prior to 37 weeks) is the leading cause of infant mortality in the U.S.

Premature Birth and Birth Defects

- Pennsylvania study showed increase incidence of low birth weight and prematurity within 2.5 km of gas well in PA (Hill 2018)
- Increased rate of Birth defects (heart, neurologic) to mothers living within 2 miles of natural gas drilling in Oklahoma (Janitz 2019)
- Increased risk of birth defects (heart, neurologic) living within 1 mile of gas well (McKenzie, 2014, CO)

Premature Birth and Birth Defects

- Increased risk of preterm birth at ½ mile from gas wells, fetal death at 2 miles (Whitworth 2017, TX)
- South Texas study of over 23,000 births found that exposure to a high number of nightly flare events was associated with a 50% higher odds of preterm birth (Cushing 2020)

Setbacks for oil and gas drilling

- We have known about health impacts of oil and gas drilling for many years
- Is there consensus on a safe distance between oil and gas production and our homes and schools?
- Simple answer is no, but the research is causing more states to increase their existing setbacks.

Setbacks for oil and gas drilling

- In September, 2020, Colorado Oil and Gas conservation Commission recently recommended a 2000 foot setback between new oil and gas drilling and all homes and schools, up from the current 500 foot setback from a residence and 1000 feet from a school or hospital.

Setbacks for oil and gas drilling

- PA grand jury in June 2020 found the current 500 foot setback of oil and gas wells "woefully inadequate", and recommended a 2500 foot setback from any home or business, and more for schools and hospitals.

Summary

- Many known and unknown chemicals used in extraction of oil and gas
- Contaminated water from extraction makes its way into the ground water
- Areas of oil extraction demonstrate elevated risks of:
  - Lung and neurologic diseases
  - Cancer
  - Birth defects/preterm births

Mission of Hazardous Materials Commission (website)

- "To protect and promote the health, safety, and well-being of Contra Costa residents as they are affected by hazardous materials and hazardous waste."
- Hazardous Materials commission has the opportunity and obligation to protect the health of the citizens of Brentwood

Our recommendations

- Due to the significant health risks to Brentwood and surrounding community, we are asking the hazardous materials commission to recommend to the CCC BOS to reject the proposed oil well in Brentwood.
- We are recommending a moratorium on oil and gas well drilling in CCC at least during the COVID-19 crisis, due to the increased health risks, especially on the respiratory system.

Our recommendations

- We are further recommending a minimum 2500 foot setback for any future oil and gas well drilling.
- Strongly consider a permanent moratorium on oil and gas well drilling in CCC