CALIFORNIA'S EVOLVING APPROACH TO REGULATING PRODUCED WATER

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LITTLE ROCK, ARKANSAS

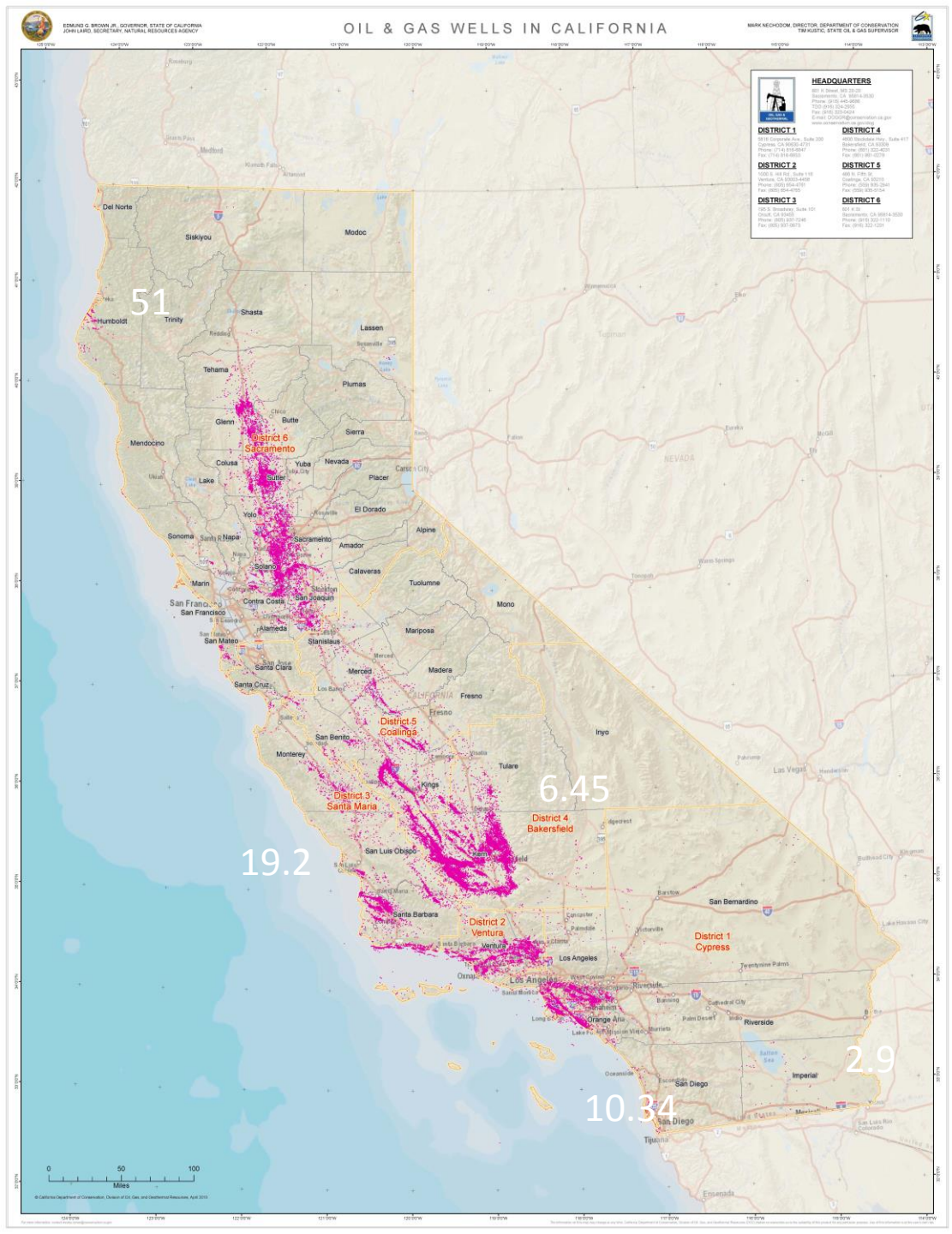
KEN HARRIS

CA STATE OIL AND GAS SUPERVISOR

OUTLINE

- Where is produced water an issue in the state?
- Overview of CA water use
- How did produced water get to be controversial?
- Challenges to using produced water
- Current efforts to address the challenges

- Geology
- Geography
- Hydrology
- Weather Patterns
- Land Use
- Agriculture
- Population
- Infrastructure



CA PRODUCED WATER NUMBERS

- In 2015, the 509,414,038 bbls (65,660 ac-ft) of water.
- In 2015, the State injected 3,126,476,189 bbls (402,981 ac-ft)of fluid, most of which was for enhanced oil recovery (EOR). This is close to six times the amount that was produced.
- Estimate is industry used 337,000 ac-ft of additional water.
- Nearly 50,000 Class II injection wells in California, of which about 1,300 are for disposal. Most of the injection wells are cyclic steam wells.

PRODUCED WATER IN CONTEXT OF CALIFORNIA'S WATER USE

- Surface Water 76,725 ac-ft/day
- Groundwater 39,897 ac-ft/day
- Conservation saved 1.9 million ac-ft June 2015 –July 2016
- Recycling of treated wastewater *(lightly used water)*
  - According to the California Department of Water Resources, over 525,000 acre-feet of wastewater is recycled each year. About half of that (48%) is used for agricultural irrigation. Another 20% is used for landscape irrigation, and about 12% is used for groundwater recharge.
- Desalination
  - Poseidon Water - Claude "Bud" Lewis Carlsbad Desalination Plant is a 56,000 acre-feet per year (AFY)) seawater desalination plant.
- Oil field produced water west side. (9,125 AFY)

THE START OF THE CONTROVERSY RE: PRODUCED WATER

- Fracked wells and produced water are linked in the public mind
- Threat of contamination from hydraulic fracturing (*Gas Land*)
- DOGGR failure to acknowledge fracking was occurring in the state
- Lack of information on fracking
- DOGGR was mired in controversy , regulations behind the industry
- Lack of understanding about the chemical characteristics of produced water
  - Some produced water is very fresh (500 mg/l TDS)
- Long standing drought in California and over pumping of groundwater

THE START OF THE CONTROVERSY RE: PRODUCED WATER (CONT.)

- Threat of contamination from oil and gas development
- Unregulated sumps in California (Water Board) (originally 800 unpermitted)
  - Produced water pits/sumps designed for water recharge
  - Some sumps/pits designed for disposal
- Aquifer Exemptions – injection into non exempt zones

VIDEO OF DISPOSAL OF FRACKING FLUIDS INTO UNLINED PIT

https://www.youtube.com/watch?v=mxb671gbmkY

CURRENT CONTROVERSIES

- Concerns that freshwater is being used for EOR - 300,000 acre feet
- Continuing drought conditions
- Overdrafting of groundwater
- Subsidence due to over drafting
  - South Belridge has experience over 27 feet of subsidence from oil and gas production
- Food safety (Cawelo Water District)
  - Water re-use for non-consumption crops
  - Water re-use for consumption crops

CHALLENGES TO USING OF PRODUCED

- Statutory
  - Clean Water Act
  - Safe Drinking Water Act
  - Porter Cologne Act (California Water Code)
- Regulatory (CA Specific)
  - WST Regulations
    - “Fluids shall be stored in containers and shall not be stored in sumps or pit
    - State Water Board Policies
- Other
  - Lack of date on chemicals used in fracking and oil production and their fate and transport
  - Food safety concerns regarding the use of produced water to irrigate edible crops
  - Public Trust

LEGISLATIVE RESPONSE: SB 4, PAVLEY. OIL AND GAS: WELL STIMULATION

- SB 4 signed into law September 20 13
- the state board shall develop model groundwater monitoring criteria to be implemented either on a well-by-well basis for a well subject to well stimulation treatment, or on a regional scale.
- (d) The state board, in consultation with the Department of Conservation, Division of Oil, Gas, and Geothermal Resources, shall seek the advice of experts on the design of the model groundwater monitoring criteria.
- Requires disclosure of chemicals use during fracking (states version of FrackFocus)
- DOGGR Well Stimulation Regulations required by SB 4
  - (4) Fluids shall be stored in containers and shall not be stored in sumps or pits.

SB 1281, PAVLEY. OIL AND GAS PRODUCTION: WATER USE: REPORTING

- Singed into law September 25, 2014
- Well owners must file state with State Oil and Gas Supervisor disposition of produce water
- Supervisor must collect source and volume of water that make up the composition of any injected fluid or gas
- It also requires the statement to include additional information, including the treatment of water, and the use of treated or recycled water in oil and gas field activities
- Information is reported quarterly
- Link to Summary Reports http://www.conservation.ca.gov/dog/SB%201281/Pages/SB_1281DataAndReports.aspx

CURRENT EFFORTS TO ANSWER THE QUESTIONS

- State Water Board's USGS Contract
  - chemical analysis of produced water from historically fracked well
  - Fracking flow back
- DOGGR's Department of Toxic Substance Control Contract
  - Toxicity of produce water and identification of hazardous waste in oil field operations
- DOGGR's Office of Environmental Health Hazard Assessment Contract
  - Toxicity of chemicals used in fracking
- DOGGR is working with Western States Petroleum Association
  - WSPA has generated a matrix of chemicals the chemicals used, consumer uses, toxicity studies etc.
- Central Valley Water Board Food Safety Task Force
  - http://www.waterboards.ca.gov/centralvalley/water_issues/oil_fields/food_safety/index.shtml

NEXT STEPS

- In early 2017 Central Valley Water Board will adopt 3 permits (WDRs) for use of produced water
  - Draft permits contain prohibition for use of water from fracked wells
  - Permits may contain TSOs (time schedule orders) for operators to come in compliance
- Agencies –DOGGR, SWB, CVWB, CARB, DTSC, OHHEA forming work group to coordinate all of the studies
- Continue to work with the industry to conduct the studies
- Initial results expected early 2017
- Ultimately what is learned from the studies will dictate next steps

USEFUL WEBSITES

- Division of Oil, Gas, and Geothermal Resources
- http://www.conservation.ca.gov/dog
- State Water Board
- http://www.waterboards.ca.gov/water_issues/programs/groundwater/sb4/
- Central Valley Regional Water Quality Control Board
- http://www.waterboards.ca.gov/centralvalley/water_issues/oil_fields/index.shtml

- Ken.Harris@conservation.ca.gov
- 916.323.1777