

**Joint Hearing of the Senate Natural
Resources and Environmental
Quality Committees**

**Underground Injection Control
Program**

March 10, 2015

**Dr. Mark Nechodom, Director
Department of Conservation**

**Dr. Steven Bohlen, State Oil & Gas Supervisor
Division of Oil, Gas, and Geothermal Resources**



Information requested by the Committee

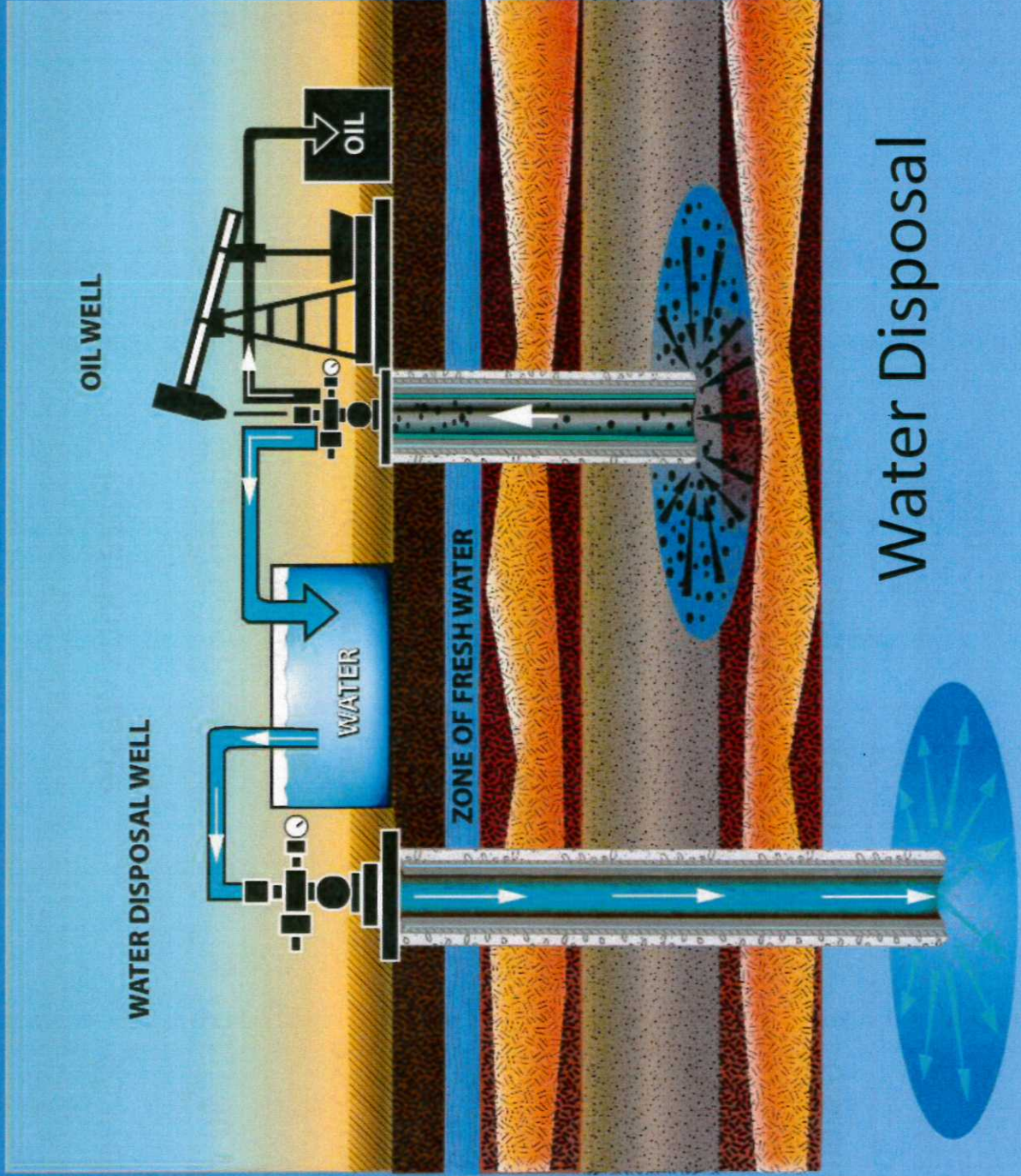
- 1) Department's role in implementing the UIC program**
- 2) History of the Department's UIC primacy**
- 3) Location of where permits have been issued for UIC wells, the affected aquifers and which are exempt by US EPA, which are not exempt, and which are of questionable or disputed exemption**
- 4) An overview of the US EPA audit of the UIC program and what DOC has done to date to come into compliance**



Underground Injection Control Well Class Inventory (2010)

Classes	Use	Inventory
Class I	Hazardous Waste	45 wells
Class II	Oil and Gas Produced Water	51,000 wells
Class III	Fluids from Mineral Extraction	212 wells
Class IV	Hazardous or Radioactive Waste into Protected Water	0 wells
Class V	Injection not in classes I-IV (e.g. geothermal, storm-water runoff)	18,047 wells
Class VI	Carbon Sequestration	0 wells

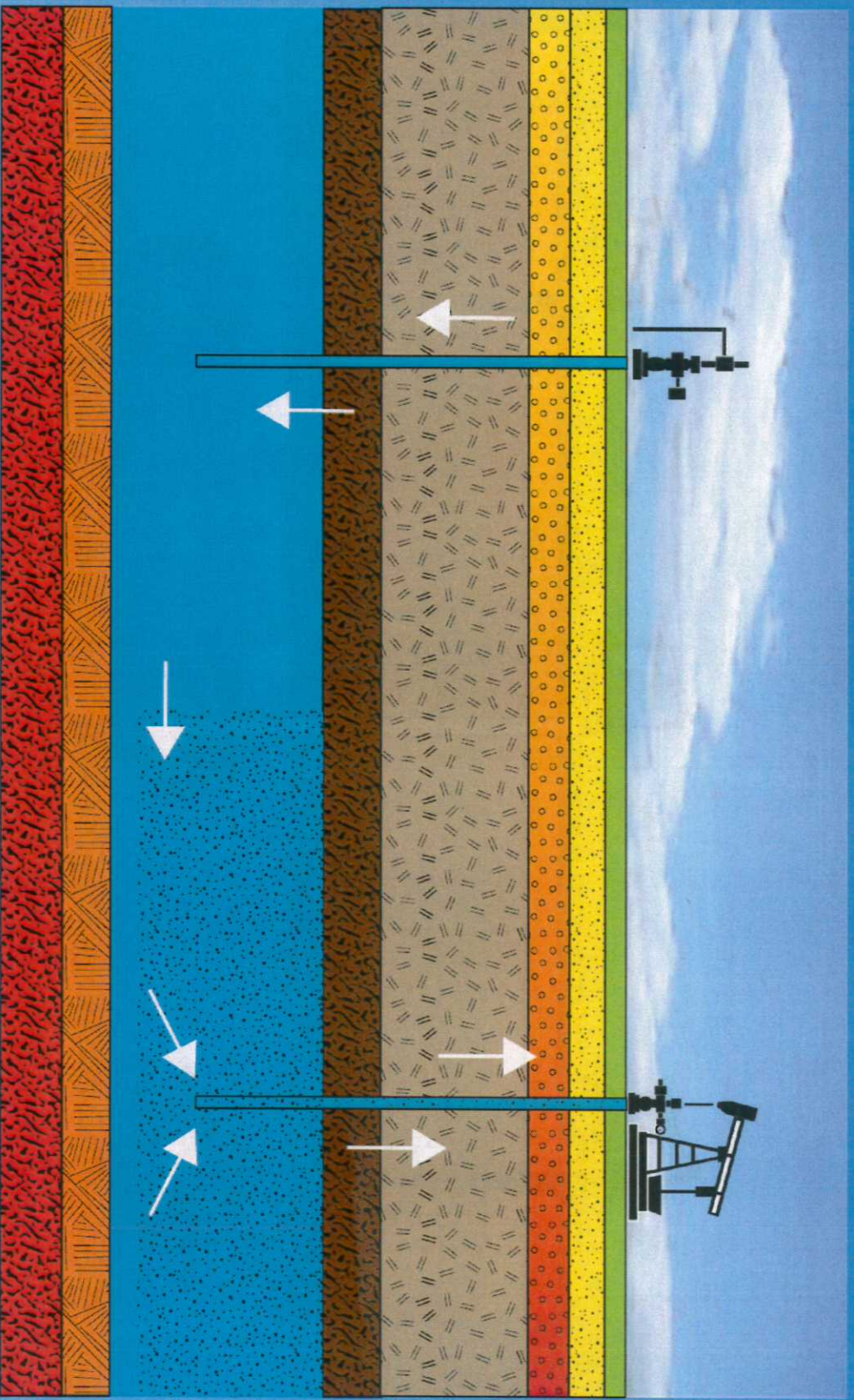
Oil Production and Class II Disposal



Water Disposal



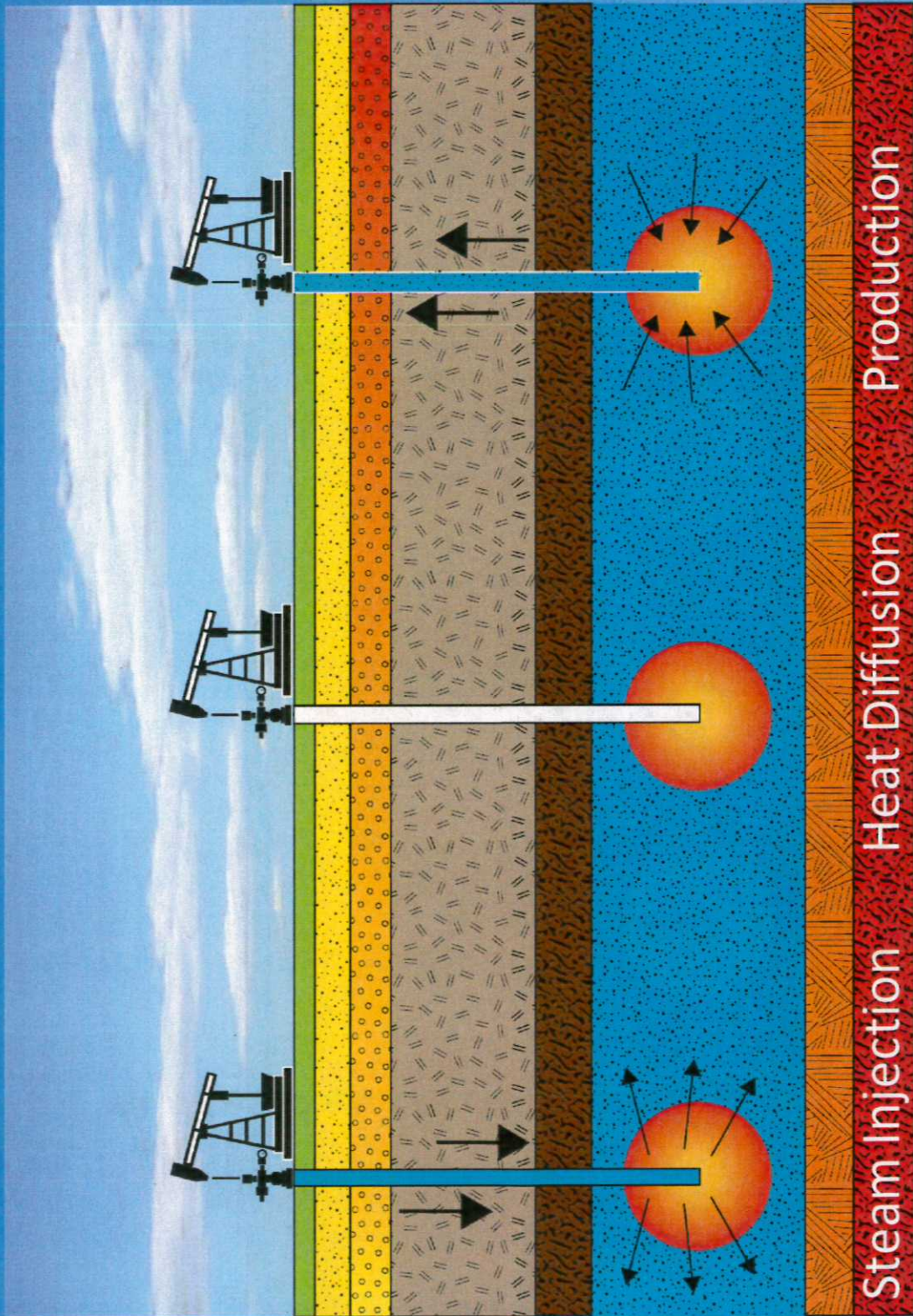
Enhanced Oil Recovery (EOR)



Water Flood



Cyclic Steam Injection and Production



Cyclic Steam

Produced Water Injection

- **TOTAL:** 3.0 Billion bbls/yr (350,000 acre-feet)
 - Enhanced Oil Recovery (EOR)
 - 2.0 Billion bbls/yr (244,000 acre-feet) (70%)
 - Water Flood - 50%
 - Steam Flood - 13%
 - Cyclic Steam - 6%
 - Water Disposal (WD): 0.8 Billion bbls/yr (105,000 acre-feet) (30%)

Fresh Water Balance

Produced Freshwater
198 Million bbls/yr (25,400 a-f)

Used for:

Well Drilling Operations: 3 Million bbls (386 a-f)
Hydraulic Fracturing: 2 Million bbls (270 a-f)
Cementing: 0.6 Million bbls (80 a-f)
Total: 5.6 Million bbls (736 a-f)

Balance: 192 Million bbls or 24,800 acre-feet

Underground Injection Control Program (UIC)

- Safe Drinking Water Act (SDWA)
- SDWA protects water with less than 10,000 TDS, aka Underground Source of Drinking Water (USDW)
- UIC Programs ensure USDWs are protected



Primacy

- U.S. EPA ensures that potential underground sources of drinking water (USDW) are not contaminated. USDW are waters with less than 10,000 mg/l total dissolved solids (TDS).
- Aquifers may be exempted from consideration as USDW if it is determined that they are not a potential source of drinking water (40 CFR 146.4). For example, if they naturally contain oil, arsenic, boron, etc.
- States apply to U.S. EPA to obtain primary enforcement responsibility, or primacy based on a showing that a state program will protect USDW. Agencies that have been granted this authority directly oversee the injection activities in their states.



EPA Audit

- Audit of the Division's IUC program was completed in July 2011.
- Audit findings:
 - Noted many areas of concern covering technical, procedural, and enforcement issues
 - Ironically did not identify aquifer exemptions as a problem.
 - Issues of particular relevance to USDW protection include well standards, area of review, inconsistent practices among Division Districts.

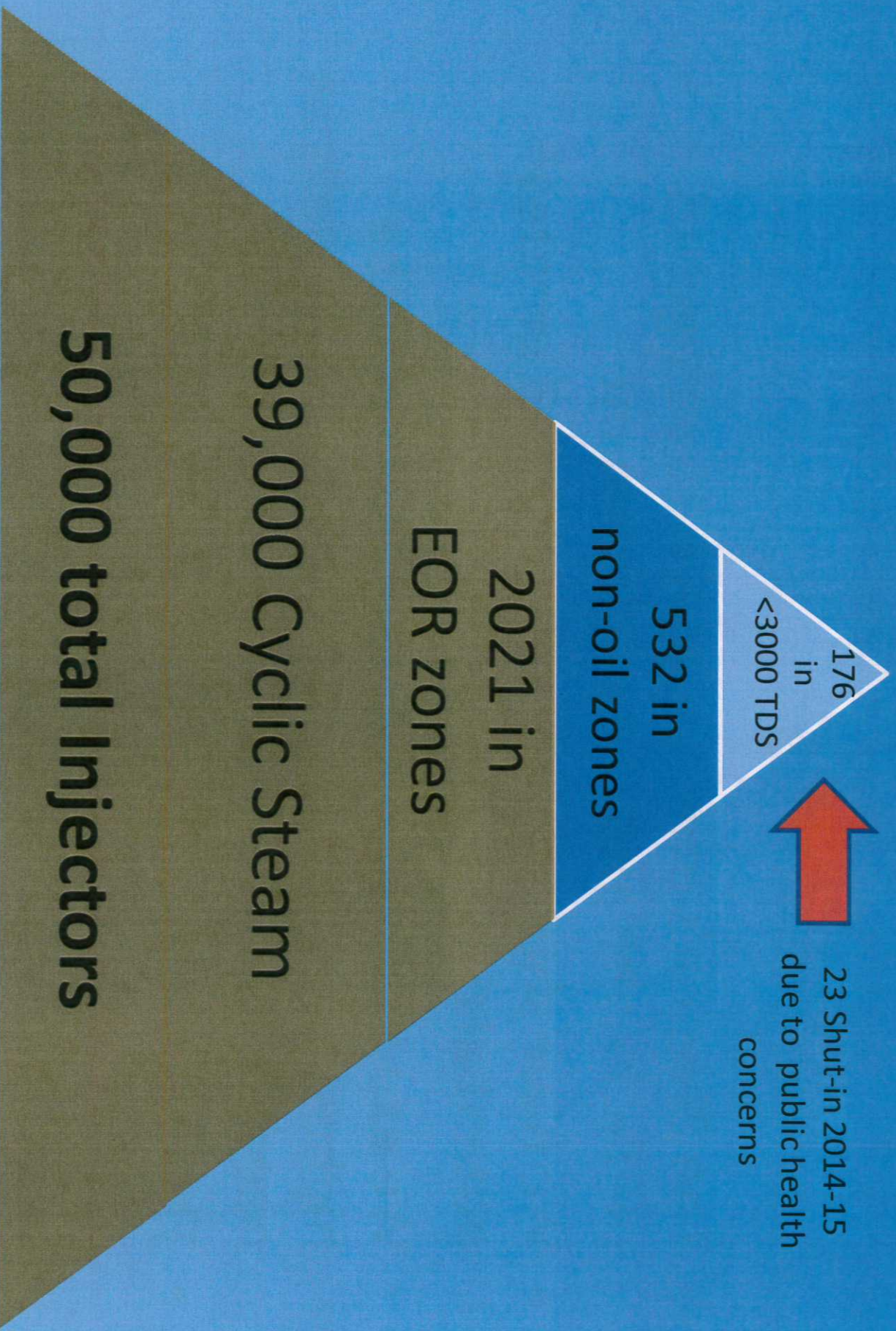


Path Forward

EPA letter of March 9, 2015 accepted the State's plan for UIC program improvements, aquifer exemption applications and schedule to become fully compliant with the SDWA by February 15, 2017.

Establishes timelines and milestones negotiated among and agreed to by EPA, the Division and State Water Board.

Includes timelines for aquifer exemption approvals or well closures, rule makings for compliance schedules and program improvements.



Public and Environmental Health

- The Division's primary goal is to safeguard public health and the environment
- We have shut-in the wells with the greatest potential risk to public health
- We expect to complete our review of the highest priority wells soon and shut-in wells as needed.
- This is part of a larger compliance schedule approved by the US EPA



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11 Disputed Aquifers

Attachment 2

Exempted 1425 Demonstration Aquifers

All oil and gas producing aquifers identified in Volumes I, II, I, II, and III of the California Oil and Gas Fields submitted in the 1425 Demonstration dated April 20, 1981 are exempted.

In addition, the following aquifers are also exempted.

<u>DISTRICT</u>	<u>FIELD</u>	<u>FORMATION/ZONE</u>
2	Ramona	Pico
2	Oat Mountain	Undiff.
2	Simi	Sespe
3	San Ardo	Santa Margarita
3	San Ardo	Monterey "D" Sand
3	San Ardo	Monterey "E" Sand
3	Monroe Swell	Santa Margarita
4	Buena Vista	Tulare
4	Kern Bluff	Vedder
4	Kern River	Vedder*
4	Mountain View	Kern River
4	Pleito	Chanac
4	Pleito	Kern River
4	Poso Creek	Santa Margarita
5	Coalinga	Santa Margarita
5	Guijarral Hills	Etchegoin-Jacalitos*
5	Helm	Tulare-Kern River
5	Riverdale	Pliocene
5	Turk Anticline	San Joaquin
6	Sutter Buttes	Klone*
6	Gas	



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<u>DISTRICT</u>	<u>FIELD</u>	<u>FORMATION/ZONE</u>
2	Ramona	Pico
2	Oat Mountain	Undiff.
2	South Tapo Canyon	Pico
2	Simi	Sespe
2	San Ardo	Santa Margarita
3	San Ardo	Monterey "D" Sand
3	San Ardo	Monterey "E" Sand
3	Monroe Swell	Santa Margarita
4	Blackwell's Corner	Tumey
4	Kern Bluff	Kern River
4	Kern Front	Kern River
4	Kern River	Santa Margarita
4	Kern River	Chanac
4	MOUND POZO	Santa Margarita
4	Round Mountain	Walker
4	Round Mountain	Olcese
4	Buena Vista	Walker
4	Kern Bluff	Tulare
4	Kern River	Vedder
4	Mountain View	Vedder*
4	Pleito	Kern River
4	Pleito	Chanac
4	Poso Creek	Kern River
5	Coalinga	Santa Margarita
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5	Helm	Tulare-Kern River
5	Riverdale	Pliocene
5	Turk Anticline	San Joaquin
6	Sutter Buttes	Koine*
6	Gas	
6	Bunker Gas	Undiff.
6	WILD GOOSE	Undiff.

*Oil and/or gas producing