DEPARTMENT OF CONSERVATION
Managing California's Working Lands
DIVISION OF OIL, GAS, & GEOTHERMAL RESOURCES

CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

July 15, 2015

Mr. Michael Montgomery
United States Environmental Protection Agency – Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear Mr. Montgomery:

We are continuing to forge through our review of the status of active injection wells, receive operator information concerning aquifer exemption proposals, and work on several other agreed tasks necessary to update California's Class II underground injection program.

As part of this ongoing effort, we agreed to submit the following to you by today: (1) a preliminary assessment of whether data currently supplied to us demonstrates that each of the aquifers historically treated as exempt presently meets the criteria for an aquifer exemption; (2) a plan and timeframe for addressing the closure of those injection wells for which there is insufficient evidence that the zone of injection meets the criteria for an aquifer exemption; (3) a detailed plan for Class II program improvements; and (4) an outline of our intended course of action for obtaining public comment on our aquifer exemption communications.

Each of these items is addressed, in turn, below. We conclude with updates on a variety of related items.

1. Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Attachment 1 to this letter is the Division's *Preliminary Assessment of Eleven Aquifers Historically Treated As Exempt*. It discusses, by field and formation, the following information for each aquifer: (1) the number and location of injection wells; (2) the concentration, in milligrams per liter, of total dissolved solids (TDS) that is representative for each aquifer; (3) the TDS of the injected fluids for each aquifer; (4) the depth of injection historically; and (5) volumes injected since 1983, in barrels.

One of the eleven aquifers, the undifferentiated aquifer in Wild Goose Field, may have TDS in excess of 10,000 mg/L. If so, it would not be considered a USDW and thus would require no evaluation at this juncture. As for the remaining aquifers, the Division's preliminary assessment is that most or all may not meet the criteria for an

aquifer exemption. Currently available information indicates that, aside from the undifferentiated aquifer in Wild Goose Field, the aquifers contain between 400 and 3,325 mg/L total dissolved solids, and are found at depths as shallow as 200 feet and not deeper than 3,000 feet. However, there are residual water quality questions to be resolved concerning these aquifers that may support exemptions, and we are continuing to work with operators to resolve data gaps.

Five of the eleven aquifers appear to have no wells actively injecting. The Division believes it is unlikely that any operator will endeavor to collect and present new information regarding those aquifers. The Division will likely conclude its evaluation of those aquifers sooner than it will for the aquifers in which injection is occurring. We will continue to be in regular communication and provide you with updates on our progress as we go.

The Division has been in communication with the operators that have injection wells in these aquifers to see if they have any additional information that would support a determination that an aquifer, or part of an aquifer, meets the aquifer exemption criteria. Although the Division has yet to receive complete information supporting such a determination, the Division believes it is likely that it will be receiving such information for at least one of the 11 aquifers. If information is in fact presented that the Division and State Water Board agree would support a determination that an aquifer, or part of an aquifer, meets the criteria for exemption, the Division will conduct a public process, including a joint hearing with the State Water Board. It will then submit its final determination to U.S. EPA.

Likewise, if it becomes clear that operators cannot provide information that supports a determination that an aquifer meets the criteria for exemption, the Division will deem its evaluation complete for that aquifer. At that point, the Division will issue public notice proposing a determination that the aquifer fails to meet the criteria for exemption, and allow for public comment on that proposed determination. After completing the public participation process, the Division will submit its final determination to the U.S. EPA and request that it take appropriate action as to the exempt status of that aquifer.

2. <u>Plan and Timeframes for Addressing the Closure of Injection Wells for Which There Is Insufficient Evidence That the Receiving Aquifer Meets the Criteria for an Aquifer Exemption</u>

Under the plain language of our emergency regulations and proposed permanent regulations, improper injection activity must end by the relevant deadline agreed to by our respective agencies unless the activity is within a duly-approved aquifer exemption. We fully intend to adhere to the timeframes created by these regulations. Where no exemption is obtained going forward, either because exemption criteria are not met, or because the submittal of relevant data did not occur in time for any of the

three involved agencies to reasonably act, such injection must end until an appropriate exemption is obtained. (Cal. Code Regs., Tit. 14, §§ 1760.1, 1779.1.)

If an affected operator fails to obtain an aquifer exemption by the relevant time, the operator would be in violation of the regulations, and be subject to a notice of violation and order to comply, as warranted.

Of course, injection wells can be, and have been, shut in prior to the applicable deadline under our regulations. As you know, we have been focusing our energies on identifying wells in proximity to waters of beneficial use before widening our review to other wells, and have obtained the shut in of 23 wells to date, either by order or by agreement with the operator. We are continuing to review wells in potential proximity to beneficial uses and will obtain permit relinquishments or issue shut-in orders as warranted.

3. Detailed Plan for Class II Program Improvements

The Division's current plan to address UIC Program improvements, including actions taken to date, a project by project review, rulemaking, training, monitoring and compliance and other activities is set forth in Attachment 2 to this letter, *Plan for Class II Improvements*.

4. Public Participation in Aquifer Exemption Process

Though not explicitly required at this juncture, in Attachment 3 to this letter, *Public Participation Process For Aquifer Exemption Proposals*, we generally describe for you our intended course of action for providing interested members of the public with notice of, and an opportunity to comment upon, our intention to recommend an exemption or state that exemption criteria have been met in a given case.

5. Other Matters

In our discussions, we agreed to a "soft" or "target" deadline of July 15 for the State to submit to you all applications for aquifer exemptions for wells scheduled to be shut in by October 15, 2015. As we recently discussed with you, to date we have not received adequate data to prepare an aquifer exemption application for the aquifers associated with this deadline.

Once we finish our work with those operators who submit packages, the packages will be circulated to the State Water Board and other interested administration officials. If there is agreement that an aquifer exemption application should go forward, the application will be scheduled for a 30 day notice and public comment period before it is finally sent to your agency for a final determination.

As we recently confirmed to you, we have made it clear to the operators in workshops and in our regulations that (1) the earlier their data packages get to us, the more likely they will be to obtain a final determination from US EPA prior to any deadline to shut in certain classes of wells, and (2) that where no exemption is obtained by the deadline, operations must be shut in.

We trust you will contact us with any questions or concerns, and we look forward to our further discussions of the process as we work together to improve California's Class II program.

Sincerely,

Steve Bohlen
State Oil and Gas Supervisor
Division of Oil, Gas and Geothermal Resources

Sincerely,

Jonathan Bishop
Chief Deputy Director
State Water Resources Control Board

Attachments

cc: Cliff Rechtschaffen, Senior Advisor, Governor's Office
John Laird, Secretary, California Natural Resources Agency
Matthew Rodriquez, Secretary, California Environmental Protection Agency
David Bunn, Director, California Department of Conservation

Division of Oil, Gas, and Geothermal Resources

Preliminary Assessment of Eleven Aquifers Historically Treated as Exempt

July 15, 2015

Executive Summary

The Division of Oil, Gas and Geothermal Resources has made a preliminary evaluation of whether current data support a determination that the eleven aquifers historically treated as exempt currently meet the criteria for an aquifer exemption.

The eleven aquifers historically treated as exempt, and significant relevant data for each, are as follows:

- The **South Tapo Canyon** field - the **Pico** formation (no longer being used);

  Injection Wells: 0 TDS: 1,900 ppm NaCl Depth: 0-1,000'

- The **Blackwell's Corner** field - The **Tumey** formation (no longer being used);

  Injection Wells: 0 TDS: 2,100 -2,600 mg/l Depth: 945' – 1,473'

- The **Kern Bluff** field – the **Kern River** formation (no longer being used);

  Injection Wells: 0 TDS: 400 – 900 mg/l Depth: 0-200'

- The **Kern Front** field – the **Santa Margarita** formation;

  Injection Wells: 13 TDS: 460 – 2,318 mg/l Depth: 2,197' – 2,840'

- The **Kern River** field -the **Chanac** formation;

  Injection Wells: 12 TDS: 926 – 3,325 mg/l Depth: 425' – 1,335'

- The **Kern River** field – the **Santa Margarita** formation;

  Injection Wells: 32 TDS: 490 – 1,584 mg/l Depth: 760' – 2,285'

- The **Mount Poso** field – the **Walker** formation;

  Injection Wells: 5 TDS: 1,069 mg/l Depth: 1,740' – 1,796'

- The **Round Mountain** field – the **Olcese** formation;

  Injection Wells: 6 TDS: 2,693 mg/l Depth: 710' – 850'

- The **Round Mountain** field - the **Walker** formation;

  Injection Wells: 30 TDS: 2,335 mg/l Depth: 1,890' – 2,590'

- The **Bunker Gas** field - **all aquifers** within the field that are not in a hydrocarbon producing zone (no longer being used);

  Injection Wells: 0 TDS: 1,215 mg/l Depth: 3,000'

- The **Wild Goose** field - **All aquifers** within the field that are not in a hydrocarbon producing zone (no longer being used);

  Injection Wells: 0 TDS: 2,800 -5,000* mg/l Depth: 2,700' - 3,400'

  *More recent analysis indicate TDS around 24,000 mg/l

Key portions of the above data, in spreadsheet form:

Historically Treated as Exempt Aquifers Snapshot						
Field	Formation	Number of Active Injection Wells	Total Dissolved Solids of Formation	Total Disolved Solids of Injected Fluid	Depth	Historic Volumes Injected Since 1983 in Barrels
South Tapo Canyon	Pico	0	1,900 ppm NaCl	600 ppm NaCl	1,000'	0
Blackwell's Corner	Tumey	0	2,100 - 2,600 mg/l	29,000 ppm NaCl	945' - 1,475'	2,425
Kern Bluff	Kern River	0	400 - 900 mg/l	600 mg/l	200	5,816,190
Kern Front	Santa Margarita	13	460 - 2,318 mg/l	360 - 6,400 mg/l	2,197' - 2,840'	151,820,215
Kern River	Chanac	12	926 -3,325 mg/l	491 - 2,000 mg/l	425' - 1,335'	568,987,463
Kern River	Santa Margarita	32	490 - 1,584 mg/l	491 -74,924 mg/l	760' - 2,285'	799,041,272
Mount Poso	Walker	5	1,069 mg/l	650 mg/l	1,740' - 1,796'	63,777,556
Round Moutain	Olcese	6	2,693 mg/l	1,900 mg/l	710' - 850'	160,798,008
Round Mountain	Walker	30	2,335 mg/l	1,600 - 2,900 mg/l	1,890' - 2,590'	1,529,910,014
Bunker	Undifferentiated	0	1,215 mg/l	10,675 - 11,025 ppm Chloride	3,000'	51,454
Wild Goose	Undifferentiated	0	24,349 mg/l	24,349 mg/l	2,700' - 3,400'	0

Division of Oil, Gas, and Geothermal Resources

Preliminary Assessment of Eleven Aquifers Historically Treated as Exempt

July 15, 2015

The US EPA, State Water Board, and the Division have agreed that the State will submit an evaluation of each of the 11 Historically Treated as Exempt (HTAE) aquifers with a preliminary assessment as to whether current data would support a determination that the criteria for an aquifer exemption are met.

11 HTAE aquifers historically treated as exempt are as follows:

- The **Pico** formation within the boundaries of the **South Tapo Canyon** field (no longer being used);
- The **Tumey** formation within the boundaries of the **Blackwell's Corner** field (no longer being used);
- The **Kern River** formation within the boundaries of the **Kern Bluff** field;
- The **Santa Margarita** formation within the boundaries of the **Kern Front** field;
- The **Chanac** formation within the boundaries of the **Kern River** field;
- The **Santa Margarita** formation within the boundaries of the **Kern River** field;
- The **Walker** formation within the boundaries of the **Mount Poso** field;
- The **Olcese** formation within the boundaries of the **Round Mountain** field;
- The **Walker** formation within the boundaries of the **Round Mountain** field;
- **All aquifers** within the **Bunker Gas** field that are not in a hydrocarbon producing zone and that have groundwater that has less than 10,000 TDS (no longer being used); and
- **All aquifers** within the **Wild Goose** field that are not in a hydrocarbon producing zone and that have groundwater that has less than 10,000 TDS (no longer being used).

More detail on each aquifer is set out below.

South Tapo Canyon Field, Pico Zone, Ventura District

1) Number of disposal wells permitted in the zone:
   0

2) Number of active producers:
   0

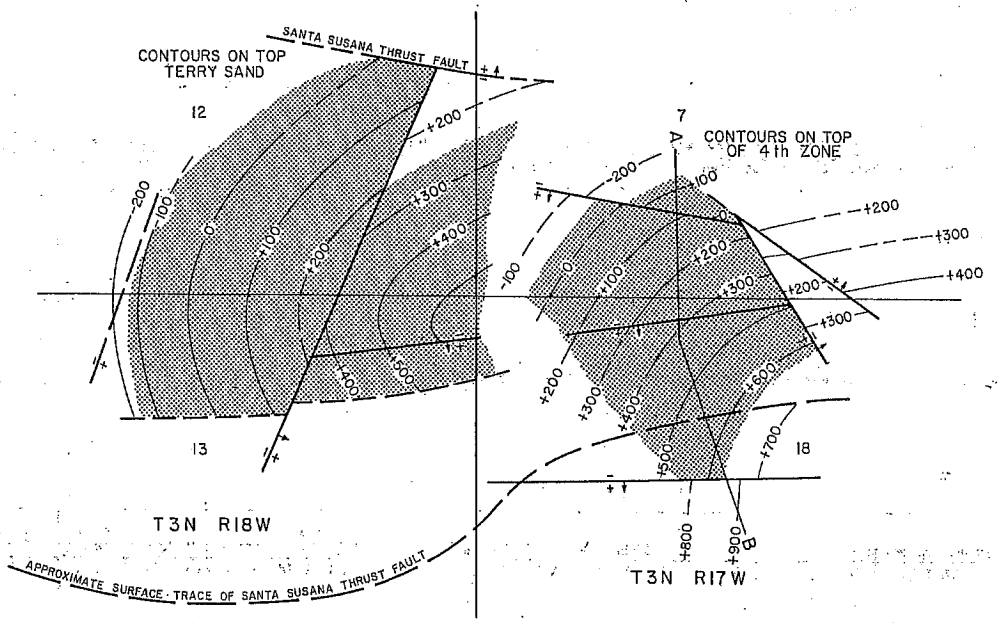
3) Depth of the zone across the field:
   At the surface on the south side of the field to 1,000' below surface depth on the north side. There are opposing thrust faults therefore, there is a wide range in zone depth across the field. Zone dips to the north across the field. This is based on the data sheet.

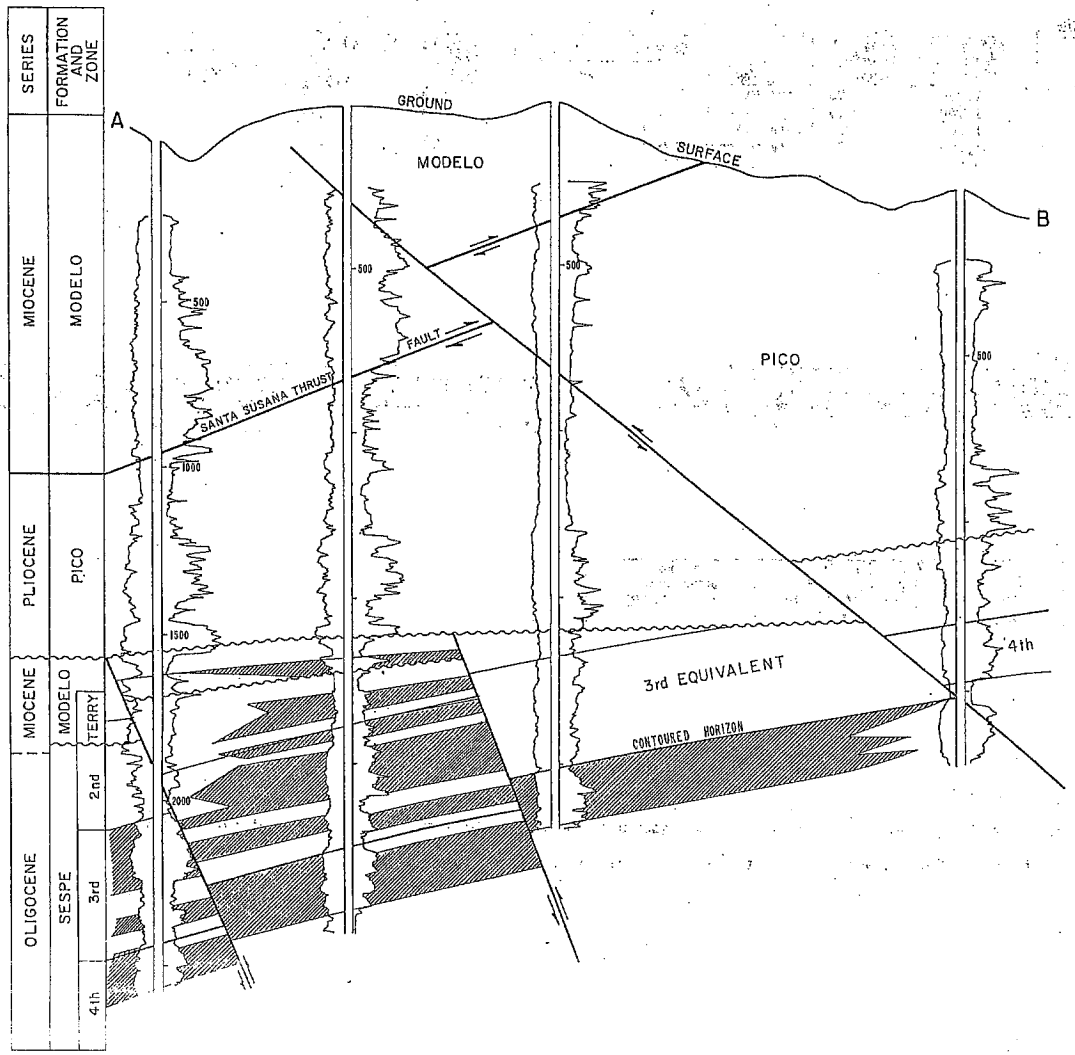
4) Volumes Injected Historically since 1983:
   None. District confirmed that there is no documentation that injection ever historically occurred in the Pico zone. The 5/17/1985 EPA letter contradicts this and indicates that injection did occur starting in 1948 and 1,903,000 Bbls was historically injected in this zone.

5) TDS of zone:
   1,900 ppm NaCl according to 5/17/1985 EPA letter

6) TDS of injection water:
   600 ppm NaCl according to the 5/17/1985 EPA letter

SOUTH TAPO CANYON OIL FIELD





LOCATION: 32 miles northeasterly of Ventura

TYPE OF TRAP: Faulted anticline

ELEVATION: 2,440

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Terry	Crown Central Petroleum Corp. "Tapo" 2	Terry and Jensen "Tapo" 2	13 3N 18W	SB	720	100	Feb 1953
2nd Sespe	Union Oil Co. of Calif. "South Tapo-Gillibrand" 11-7	Union Oil Co. of Calif. "Simi" 11-7	7 3N 18W	SB	99	411	Jul 1954
3rd Sespe	Same as above	Same as above	7 3N 18W	SB	*	*	Jul 1954
4th Sespe	Same as above	Same as above	7 3N 18W	SB	*	*	Jul 1954

Remarks: * Initial production from the 2nd, 3rd and 4th Sespe zones was commingled.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Havenstrite Oil Co. "Tapo" 1	Same	Jan 1949	13 3N 18W	SB	8,394	Llajas	Eocene

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Terry	2,200	60	Miocene	Modelo	32	*90	II
2nd Sespe	1,800	70	Oligocene	Sespe	18	1,030	II
3rd Sespe	1,880	220	Oligocene	Sespe	18	1,030	II
4th Sespe	2,200	180	Oligocene	Sespe	18	1,030	II

PRODUCTION DATA (Jan. 1, 1974)

1973 Production: Oil (bbl)	1973 Production: Net gas (Mcf)	1973 Production: Water (bbl)	1973 Proved acreage	1973 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
40,260	509	140,374	210	14	4,332,509	1,905,031	905,009	1953	50	35	240

STIMULATION DATA (Jan. 1, 1974)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 11 3/4" cem. 100; 7" combination string landed through zone and cemented through ports above zone.

METHOD OF WASTE DISPOSAL: All waste water is injected into a water-disposal well.

REMARKS: * Terry zone water is high in bicarbonates and total dissolved solids. A cyclic-steam project was started in 1964 and was discontinued in 1965 after the injection of 11,063 bbls. of water (in the form of steam).

REFERENCES: Hardoin, J.L., South Tapo Canyon Oil Field, Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 44, No. 1 (1958).

Blackwell's Corner Field, Tumey Zone, Bakersfield District office

1) Number of disposal wells permitted in the zone:
   0

2) Number of active producers:
   0

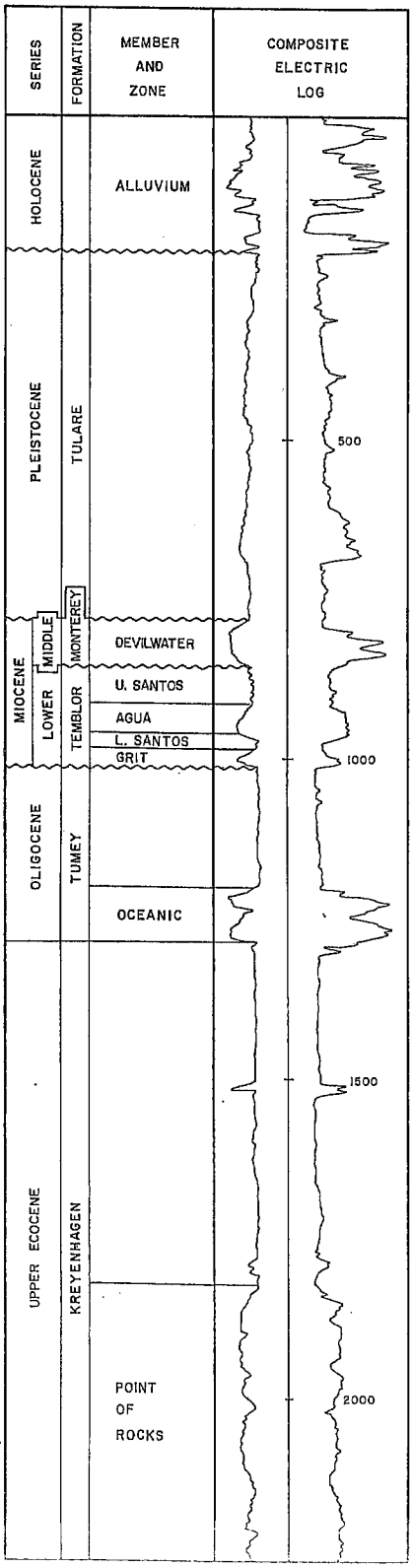
3) Depth of the zone across the field:
   945' to 1,473' below surface depth. Zone dips significantly to the Southeast across the field. Zone truncated by angular unconformity about ½ mile northwest of field.

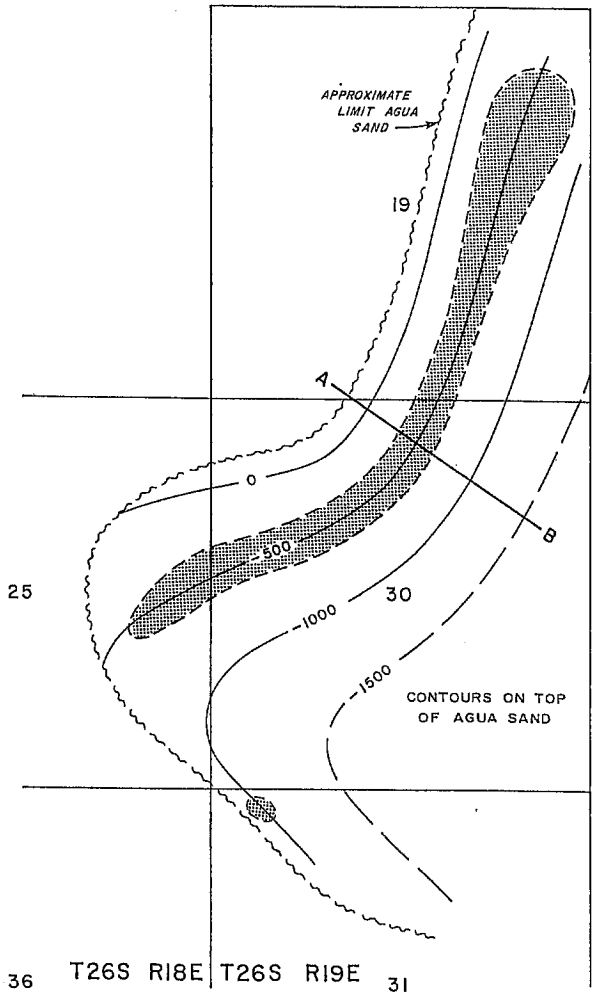
4) Volumes injected historically since 1983:
   2,425 Bbls, last injected on 5/1/1986

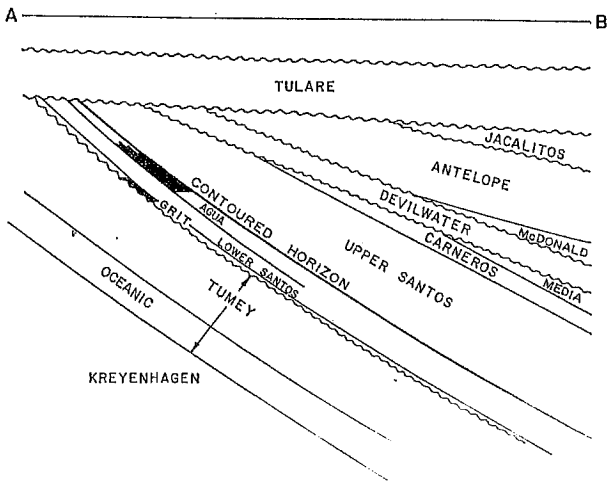
5) TDS of zone:
   Prior to injection 2,100 – 2,600 mg/l TDS (calculated) according to the 5/17/1985 EPA letter

6) TDS of injection water:
   29,000 ppm NaCl according to the 5/17/1985 EPA letter

BLACKWELLS CORNER OIL FIELD







LOCATION: 45 miles northwest of Taft

TYPE OF TRAP: Permeability barrier on an anticlinal nose

ELEVATION: 700

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production Oil (bbl)	Initial daily production Gas (Mcf)	Date of completion
Devilwater	General Crude Oil Co. Oper. "Occidental" 10	Etienne Lang "Occidental" 10-N.W. 30	30 26S 19E	MD	20	N.A.	Jun 1944
Agua	General Crude Oil Co. Oper. "Occidental" 3	Etienne Lang "Occidental" 3-N.W. 30	30 26S 19E	MD	50	N.A.	Dec 1943
Grit	General Crude Oil Co. Oper. "Occidental" 5	Etienne Lang "Occidental" 5-N.W. 30	30 26S 19E	MD	30	N.A.	Aug 1944

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
The Superior Oil Co. "O.L.C." 7	Same	Jul 1954	30 26S 19E	MD	3,224	Tumey	Oligocene

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Devilwater	700	25	middle Miocene	Temblor	13	N.A.	None
Agua	1,300	85	early Miocene	Temblor	14	790	None
Grit	1,400	5	early Miocene	Temblor	14	790	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
15,659	0	111,178	240	18	813,907	90,521	81,106	1946	63	38	250

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps.

REMARKS: Formerly known as Shale Hills Area.

REFERENCES: Karmelich, F.J., Blackwells Corner Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 37, No. 2 (1951).

Kern Bluff Field, Kern River Zone, Bakersfield District, East Side

1) Number of disposal wells permitted in the zone:
   0

2) Number of active producers:
   0

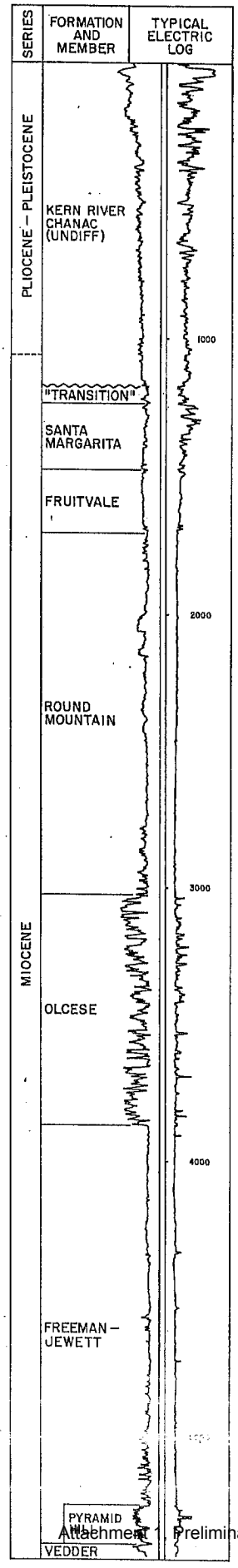
3) Depth of the zone across the field:
   Surface depth. Former WD well (API #02908849) uppermost perf is at 200' depth.

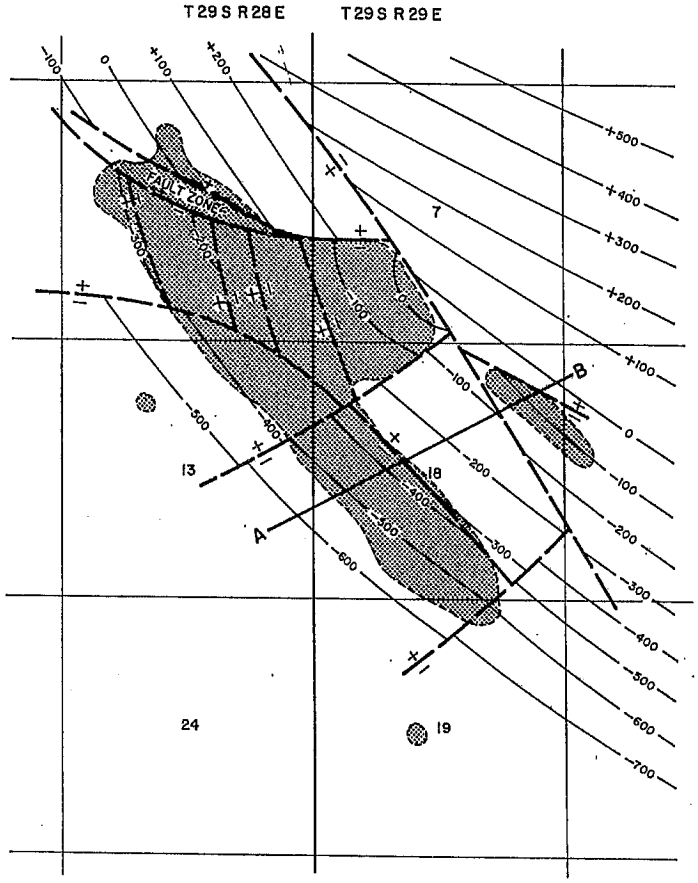
4) Volumes injected historically since 1983:
   5,816,190 Bbls, last injected on 6/1/1993

5) TDS of zone:
   400 – 900 mg/l according to the 5/17/1985 EPA letter

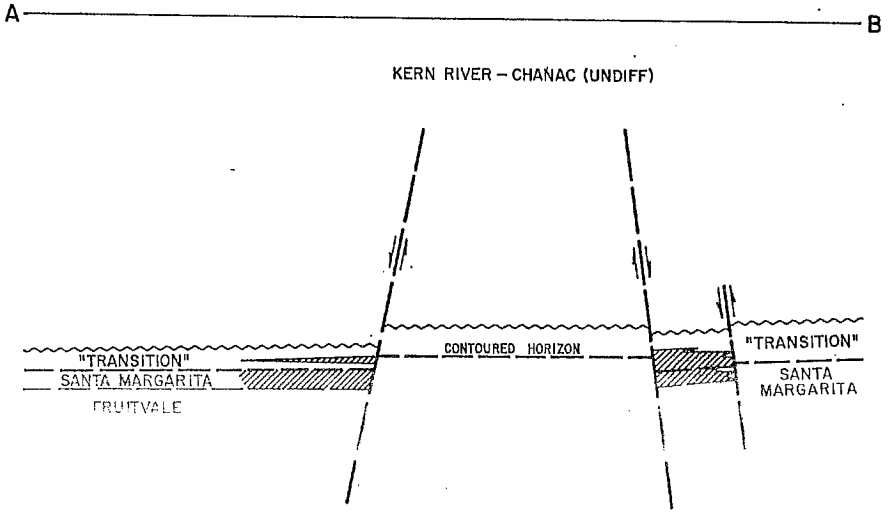
6) TDS of injection water:
   600 mg/l according to 5/17/1985 EPA letter

KERN BLUFF OIL FIELD





CONTOURS ON TOP OF SANTA MARGARITA



LOCATION: 6 miles northeast of Bakersfield

TYPE OF TRAP: Faulted homocline

ELEVATION: 800

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production Oil (bbl)	Initial daily production Gas (Mcf)	Date of completion
Transition	Shell Oil Co. "Afana" 1	Same as present	18 29S 29E	MD	18	N.A.	Feb 1944
Santa Margarita	Gulf Oil Corp. "Needham-Bloemer" 15	Oceanic Oil Co. "Needham-Bloemer" 1	7 29S 29E	MD	90	N.A.	Sep 1947

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Kernview Oil Co. "Muir" 13	Gene Reid Exploration Co. "Muir" 13	Feb 1949	18 29S 29E	MD	5,425	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Transition	740 - 1,350	30 - 80	late Miocene	Transition	14	5	None
Santa Margarita	950	55	late Miocene	Santa Margarita	14	5	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
216,477	0	3,365,718	670	131	9,410,522	0	845,373	1949	214	166	690

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1965	3,701,855	124

SPACING ACT: Applies

BASE OF FRESH WATER: 950

CURRENT CASING PROGRAM: 8 5/8" cem. above zone and across base of fresh-water sands; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Waste water is injected in disposal wells (808,148 bbls. in 1972), steam injection wells, and in unlined sumps where water quality meets Div. of Oil and Gas standards.

REMARKS:

REFERENCES: Corwin, C.H., Kern Bluff Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 36, No. 1 (1950).

Kern Front Field, Santa Margarita Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:
   13

2) Number of active producers:
   0

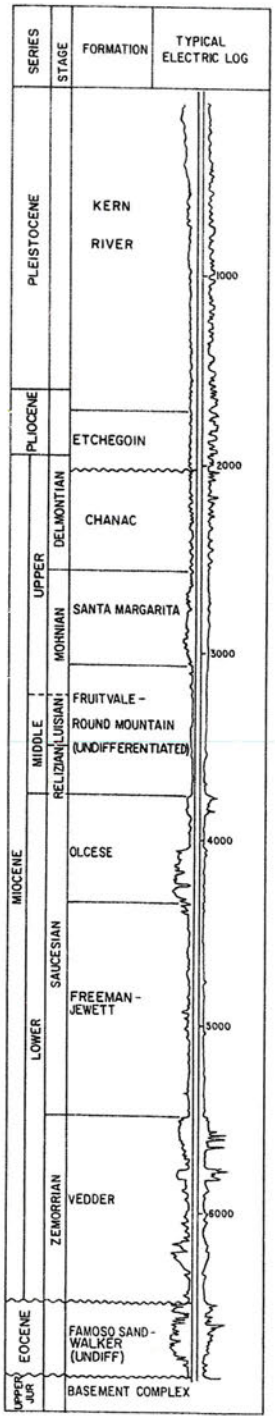
3) Depth of the zone where the injection wells are located:
   2,197' to 2,840' below surface

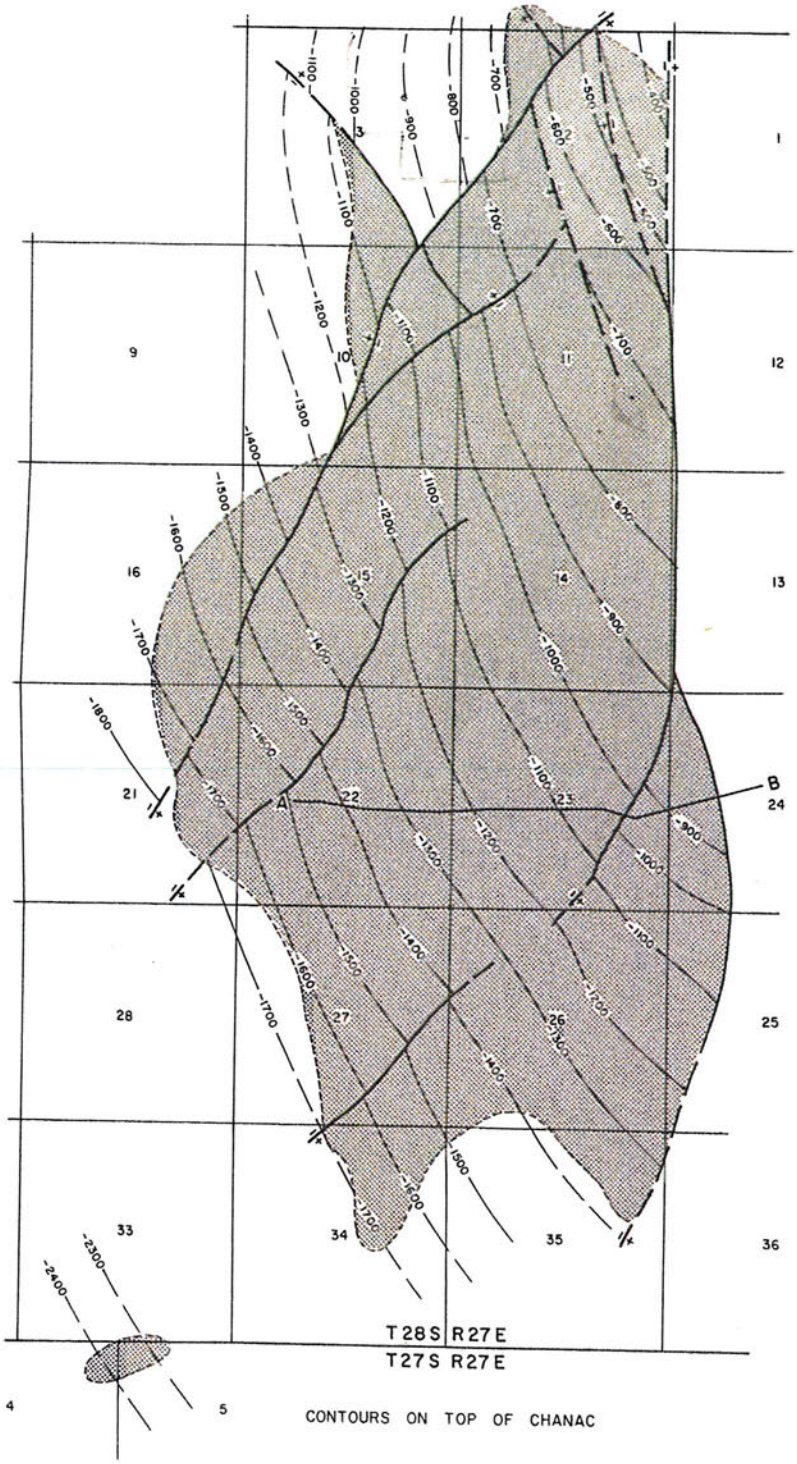
4) Volumes injected historically since 1983:
   151,820,215 Bbls injected, last injected on 3/1/2015

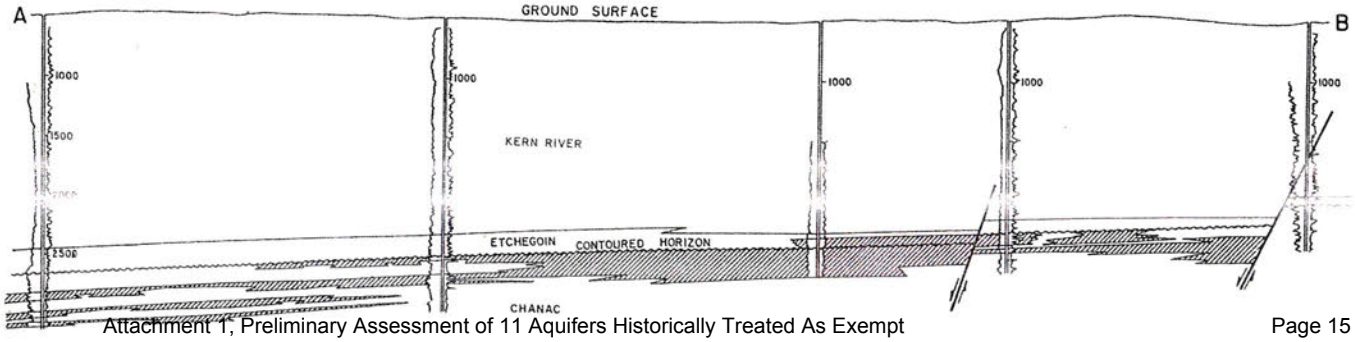
5) TDS of zone:
   460 mg/l - 2,318 mg/l TDS
   The 460 mg/l TDS sample is from the lower Santa Margarita zone in 4-4W well (029-62979) collected at a depth between 3,425'-3,255' on 12/9/1988 and the 2,318 mg/l TDS sample is from WD#1 (029-54754) well at a depth of 2,300' on 9/17/1975.

6) TDS of injection water:
   360 mg/l – 880 mg/l and 6,400 mg/l TDS.
   The 360mg/l TDS sample is from "injection wells "Movius" 3, 2 and D11 on 8/27/2010, the 880 mg/l TDS sample is from well Sec. 27 waste water to "Valley Waste KFF" on 11/2/1997 and the 6,400 mg/l TDS sample is the only high concentration sample collected from "waste water at injection well" on 4/11/2011. The 6,400 mg/l TDS sample is from project #33800012 and is most likely from the cogeneration and scrubber brine waste water. The permitted injection fluids in the Kern Front field, Santa Margarita zone consists of produced water from the Chanac, Etchegoin and Santa Margarita zones and cogeneration and scrubber brines from a plant.

KERN FRONT OIL FIELD







LOCATION: 5 miles northwest of Bakersfield

TYPE OF TRAP: Permeability variations on a faulted homocline

ELEVATION: 750

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production Oil (bbl)	Initial daily production Gas (Mcf)	Date of completion
Etchegoin	Standard Oil Co. of Calif. No. 1	Same as present	15 28S 27E	MD	10	N.A.	1912
Chanac	Standard Oil Co. of Calif. No. 1	Same as present	27 28S 27E	MD	190	N.A.	Aug 1914

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Atlantic Richfield Co. "Kramer" 1	Richfield Oil Corp. "Kramer" 1	Sep 1941	34 28S 27E	MD	7,738	Basement (slate)	Late Jur

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Etchegoin	2,265	70	Pliocene	Etchegoin	14	N.A.	None
Chanac	2,320	250	late Miocene	Chanac	15	5	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
3,148,559	293,008	25,578,898	5,000	852	128,591,808	14,667,840	4,535,059	1929	1,322	1,206	5,055

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1964	14,142,183	478

SPACING ACT: Does not apply

BASE OF FRESH WATER: 1,300

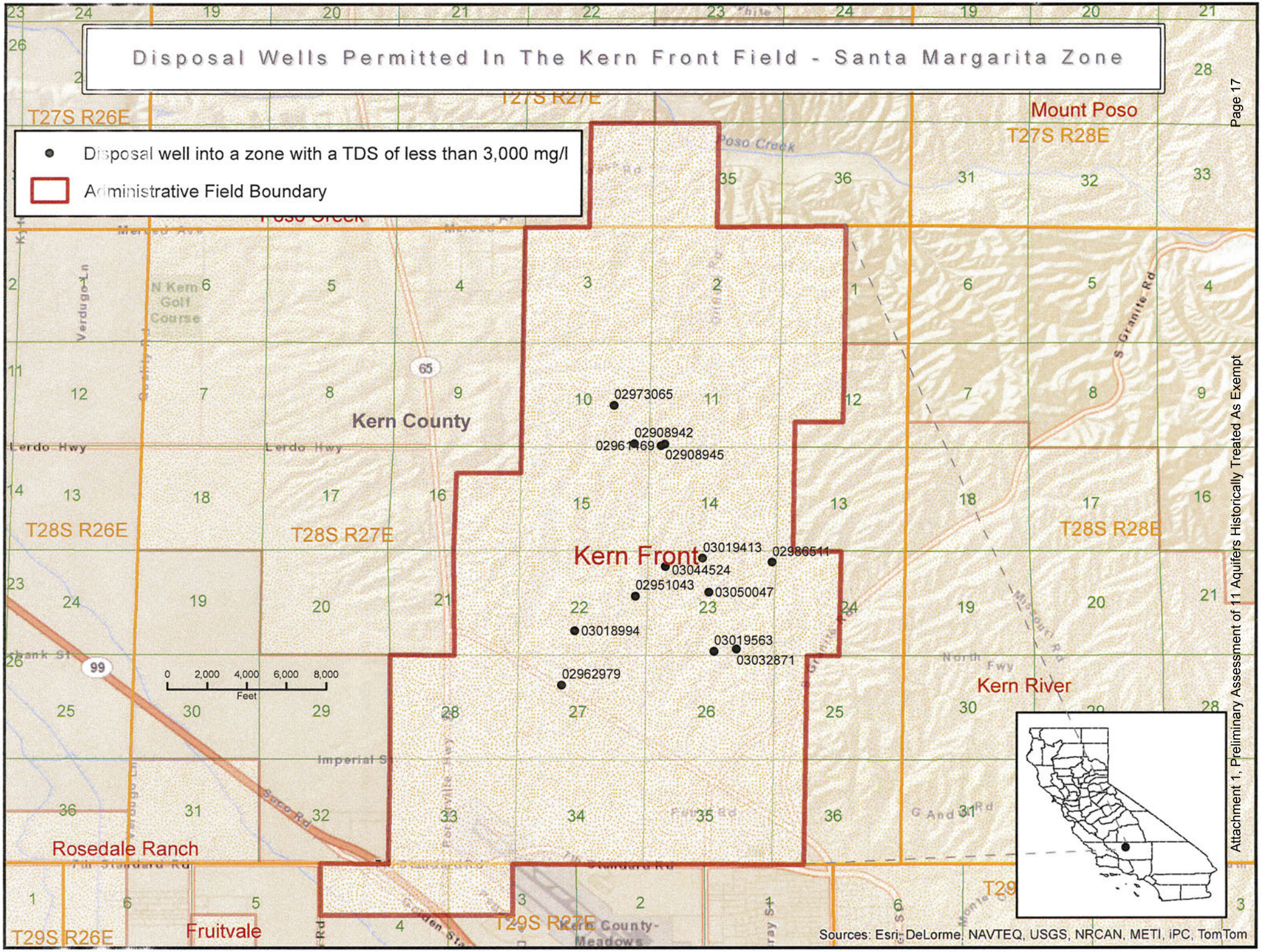
CURRENT CASING PROGRAM: 8 5/8" cem. above zone and across base of fresh-water sands; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Unlined sumps.

REMARKS: A steam displacement project was started in the Kern River - Chanac zone in 1966 and terminated after 99,587 bbls. was injected.

REFERENCES: Brooks, T.J., Kern Front Oil Field, A.A.P.G., S.E.P.M., S.E.G., Guidebook Joint Annual Meeting, Los Angeles, Calif., 1952, p. 159-161.
Park, W.H., Kern Front Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 51, No. 1 (1965).

Disposal Wells Permitted In The Kern Front Field - Santa Margarita Zone



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Kern River Field, Chanac Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:
   12 (10 of these are permitted in both the Santa Margarita and Chanac Zones in the Kern River field)

2) Number of active producers:
   0

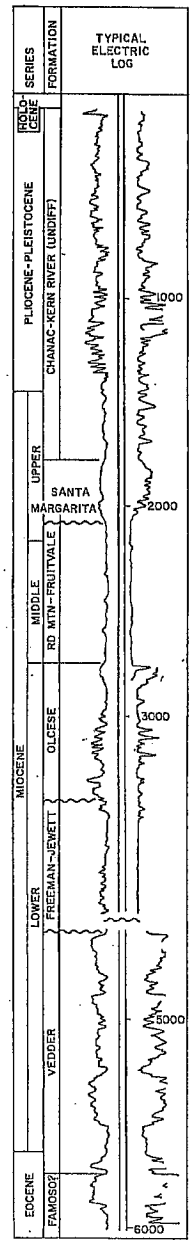
3) Depth of the zone where the injection wells are located:
   425' to 1,335' below surface. Zone dips to the Southwest across the field.

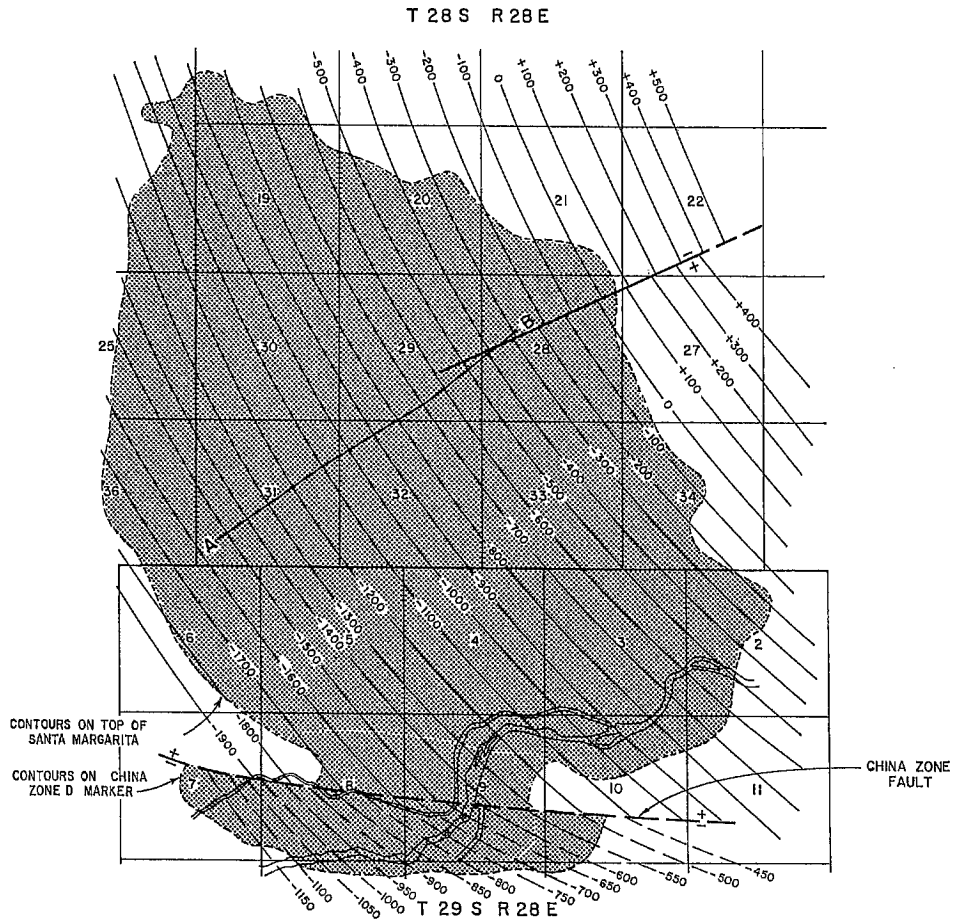
4) Volumes injected historically since 1983:
   568,987,463 Bbls, last injected on 3/1/2015

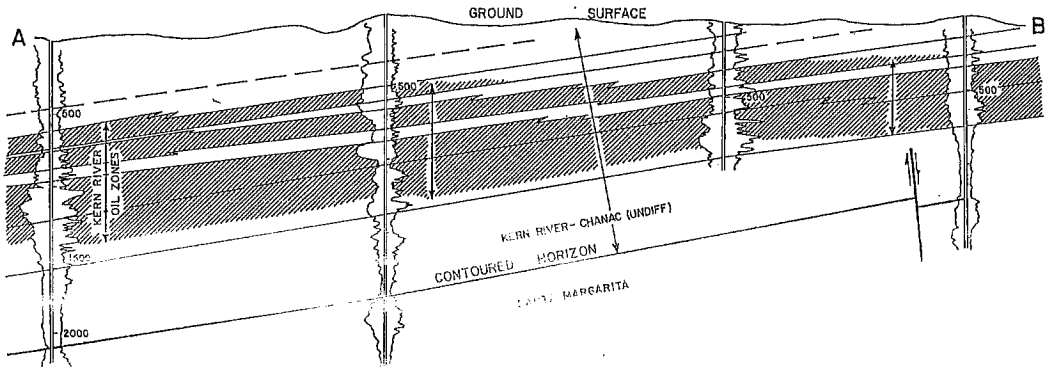
5) TDS of zone:
   926 mg/l – 3,325 mg/l TDS
   The 926 mg/l TDS sample is from well 21-4 top zone perf 1,220-1,223" (upper Chanac) on 05/22/1978 and sample 3,325 mg/l TDS sample is from "Chanac Zone KCL-10 2x" on 2/11/1987.

6) TDS of injection water:
   491 mg/l – 2,000 mg/l TDS
   The 491 mg/l TDS sample is from "Jost Plant Sec. 10, T29S/28E Waste disposal plant tank" on 11/23/1999 and sample 2,000 mg/l TDS sample is from "Cogen Disposal Water" on 11/26/1997. Permitted fluid in the Chanac zone, Kern River field consists of produced Kern River produced water from Kern River field and co-gen waste.

KERN RIVER OIL FIELD







LOCATION: 5 miles north of Bakersfield

TYPE OF TRAP: Permeability variations on a homocline

ELEVATION: 400 - 1,000

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Kern River	Elwood Brothers (no name well)	Same as present	3 29S 28E	MD	N.A.	N.A.	1899
China Zone	Westates Petroleum Co. "KCL" 1	Horace Steele and L.C. Gould "KCL" 1	8 29S 28E	MD	50	0	Sep 1947

Remarks: The discovery well was dug by hand in the spring of 1899 on what is now Chanslor-Western Oil Development Co. property. "Gassy vapors" caused the well to be abandoned without a test of its commercial possibilities. In June 1899 McWhorter Bros. drilled the first commercial well 400 feet north of the discovery well.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Standard Oil Co. of Calif. "KCL 26" 1-11	Same	Oct 1948	9 29S 28E	MD	6,986	Granite	Jurassic

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Kern River	900	700	late Pliocene	Kern River	13	5	None
China Zone	1,300	100 - 500	late Pliocene	Kern River	13	40	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
27,154,427	4,165	188,121,732	9,535	4,526	576,511,857	2,599,678	27,154,427	1972	7,942	6,978	9,850

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1961	300,849,501	5,215
Steam flood	1962	189,380,134	780

SPACING ACT: Does not apply

BASE OF FRESH WATER: 2,500

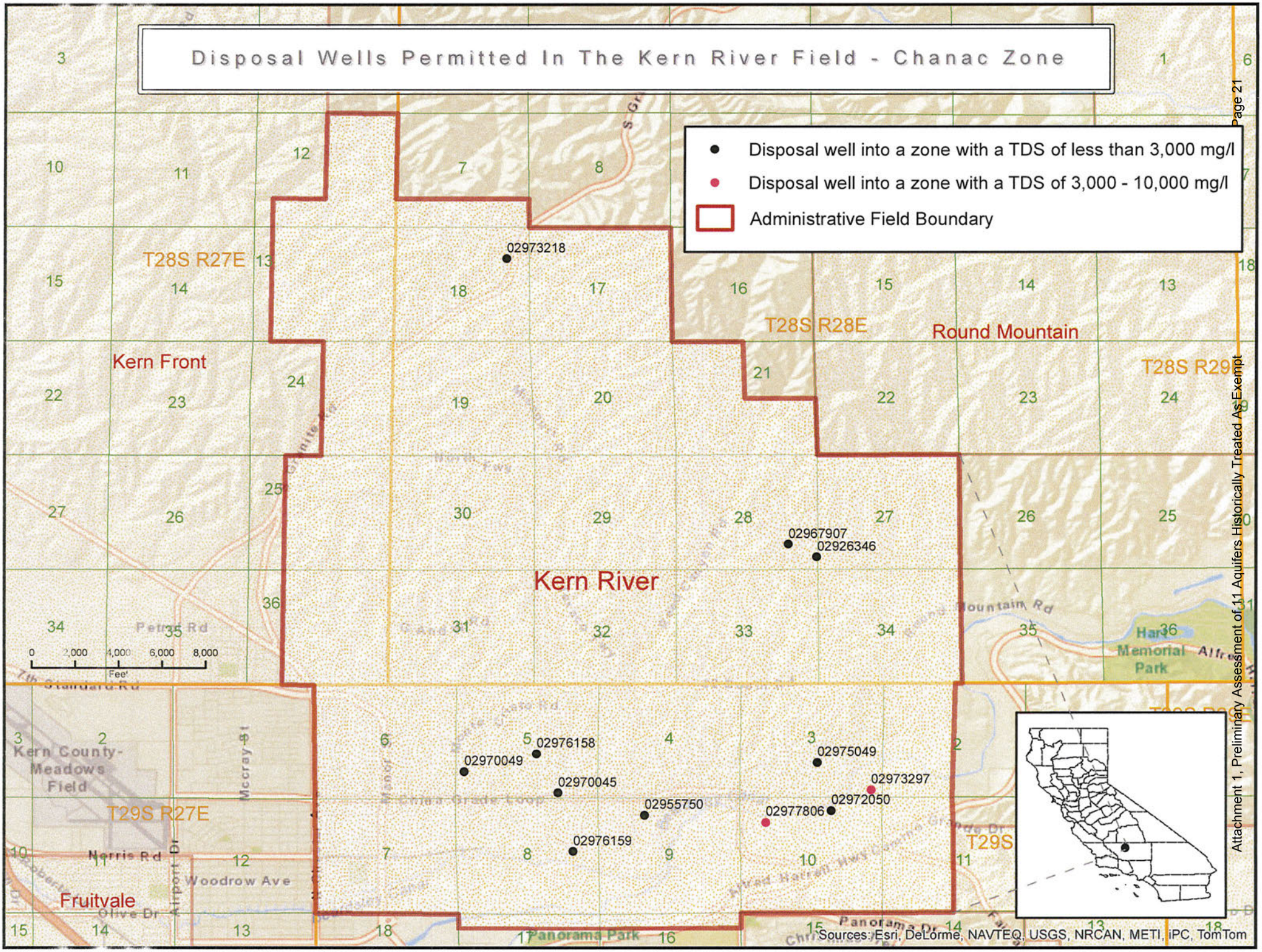
CURRENT CASING PROGRAM: 6 5/8" cem. through zone.

METHOD OF WASTE DISPOSAL: Waste water is injected into the Santa Margarita and Vedder, 12,143,578 bbls. in 1972. Waste water is also used in steam generation. The balance of the water is of a suitable enough quality that it is allowed to enter percolation ponds, irrigation canals, & the Kern River

REMARKS:

REFERENCES. Crowder, R.E., Kern River Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 38, No. 2 (1952).

Disposal Wells Permitted In The Kern River Field - Chanac Zone



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Kern River Field, Santa Margarita Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:
   32 (10 of these are permitted in both the Santa Margarita and Chanac Zones in the Kern River field)

2) Number of active producers:
   0

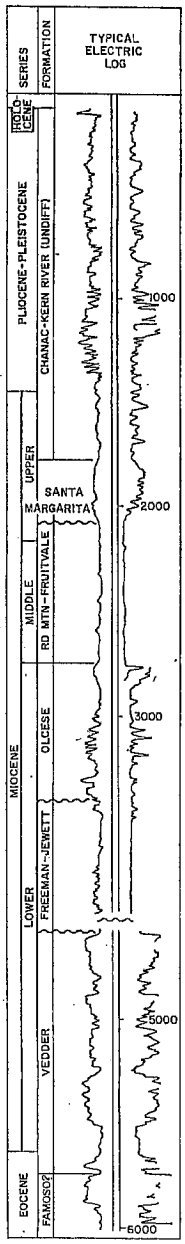
3) Depth of the zone where the injection wells are located:
   760' to 2,285' below surface. Zone dips to the Southwest across the field.

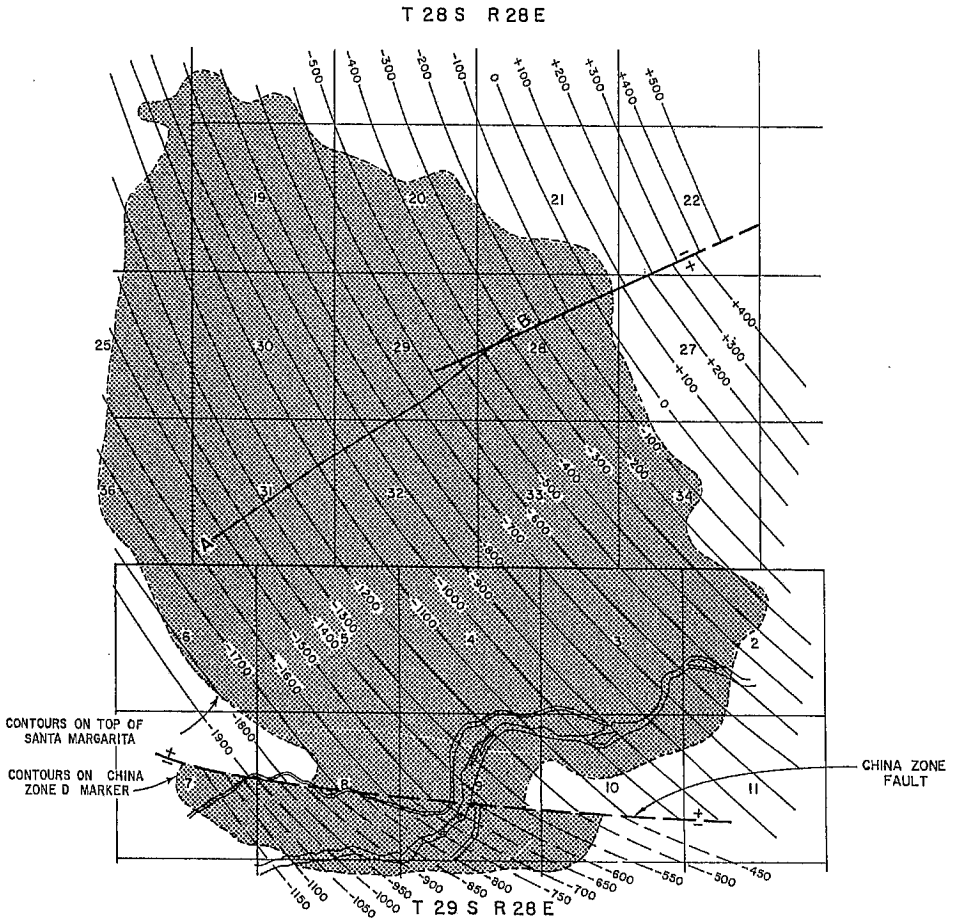
4) Volumes injected historically since 1983:
   799,041,272 Bbls, last injected on 3/1/2015

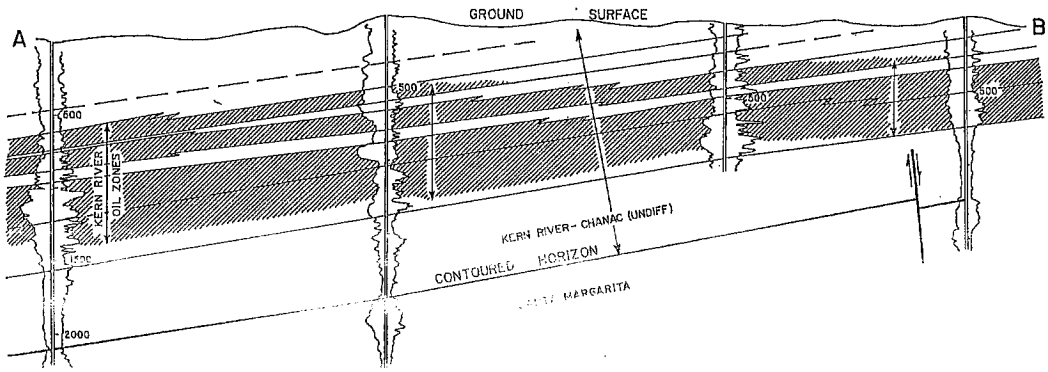
5) TDS of zone:
   490 mg/l – 1,584 mg/l TDS
   The 490 mg/l TDS sample is from "KCL – 10 Well #2X" (perf 1,068 – 1,196') on 12/30/1985 and the 1,584 mg/l TDS sample is from ""Rambler" 71 W" (perf 1,667-1,875') on 12/22/1965.

6) TDS of injection water:
   491 mg/l – 855 mg/l and 74,924 mg/l TDS
   The 491 mg/l TDS sample is from the "Jost plant Sec. 10 T29S/28E Waste Disposal Tank" on 11/23/1999, the 855 mg/l TDS sample is from the "Overland plant Sec. 28 T28S/R28E, produced water injection tank" on 11/23/1999, and the 74,924 mg/l is from the "Overland plant Sec. 28 T28S/R28E Brine Disposal Tank" (project 34000035). Permitted fluids for injection into the Santa Margarita zone, Kern River field consist of Kern River produced water, cogeneration and regeneration brine.

KERN RIVER OIL FIELD







LOCATION: 5 miles north of Bakersfield

TYPE OF TRAP: Permeability variations on a homocline

ELEVATION: 400 - 1,000

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Kern River	Elwood Brothers (no name well)	Same as present	3 29S 28E	MD	N.A.	N.A.	1899
China Zone	Westates Petroleum Co. "KCL" 1	Horace Steele and L.C. Gould "KCL" 1	8 29S 28E	MD	50	0	Sep 1947

Remarks: The discovery well was dug by hand in the spring of 1899 on what is now Chanslor-Western Oil Development Co. property. "Gassy vapors" caused the well to be abandoned without a test of its commercial possibilities. In June 1899 McWhorter Bros. drilled the first commercial well 400 feet north of the discovery well.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Standard Oil Co. of Calif. "KCL 26" 1-11	Same	Oct 1948	9 29S 28E	MD	6,986	Granite	Jurassic

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Kern River	900	700	late Pliocene	Kern River	13	5	None
China Zone	1,300	100 - 500	late Pliocene	Kern River	13	40	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
27,154,427	4,165	188,121,732	9,535	4,526	576,511,857	2,599,678	27,154,427	1972	7,942	6,978	9,850

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1961	300,849,501	5,215
Steam flood	1962	189,380,134	780

SPACING ACT: Does not apply

BASE OF FRESH WATER: 2,500

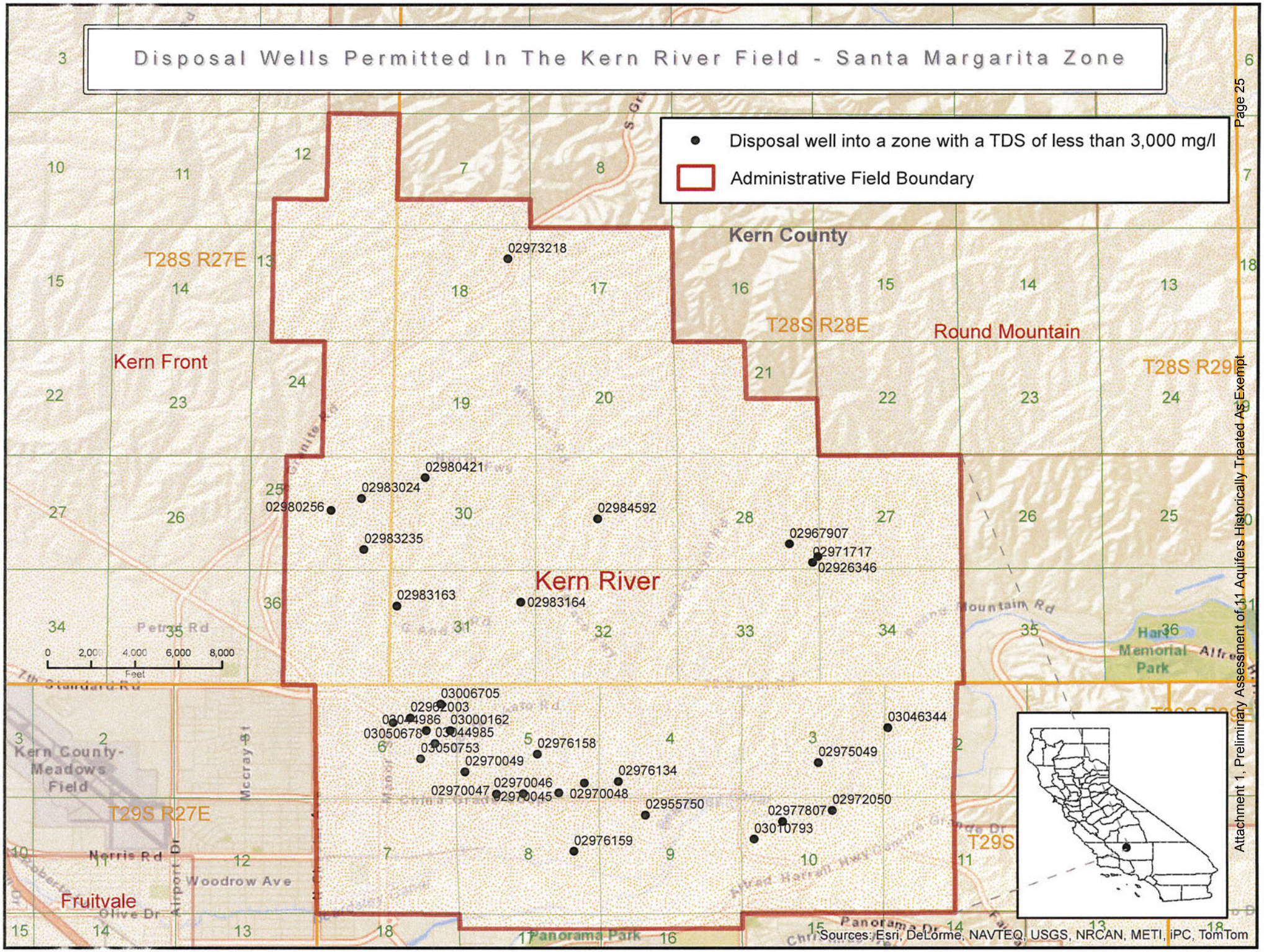
CURRENT CASING PROGRAM: 6 5/8" cem. through zone.

METHOD OF WASTE DISPOSAL: Waste water is injected into the Santa Margarita and Vedder, 12,143,578 bbls. in 1972. Waste water is also used in steam generation. The balance of the water is of a suitable enough quality that it is allowed to enter percolation ponds, irrigation canals, & the Kern River.

REMARKS:

REFERENCES: Crowder, R.E., Kern River Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 38, No. 2 (1952).

Disposal Wells Permitted In The Kern River Field - Santa Margarita Zone



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Mount Poso Field, Walker Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:
   5

2) Number of active producers in the zone:
   0

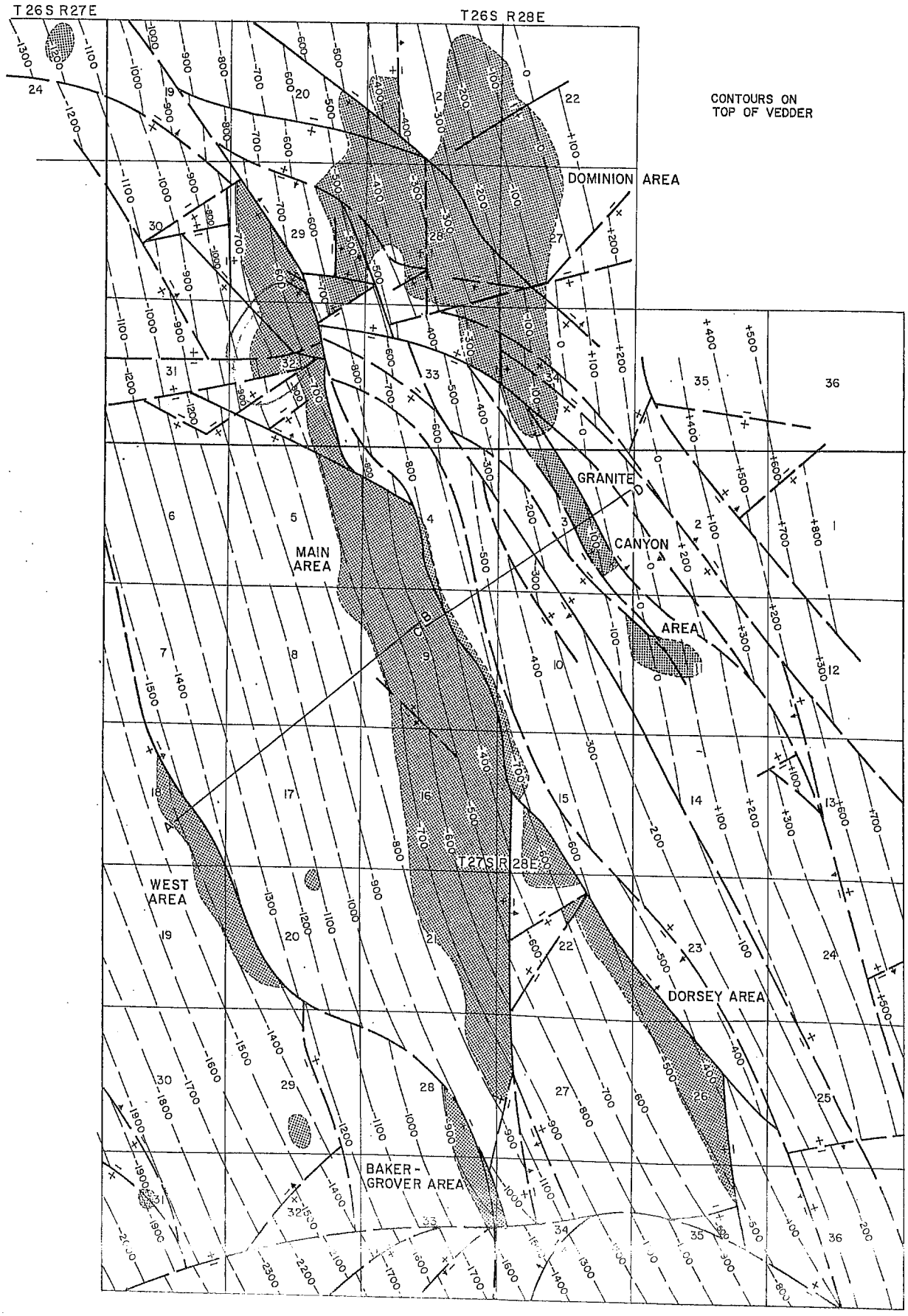
3) Depth of the zone where the injection wells are located:
   1,740' to 1,796' below surface (top of the Vedder/Walker zone). Injected only in combination with the laterally interfingered Vedder, which extends throughout the field.

4) Volumes injected historically since 1983:
   63,777,556 Bbls, last injected on 3/1/2015

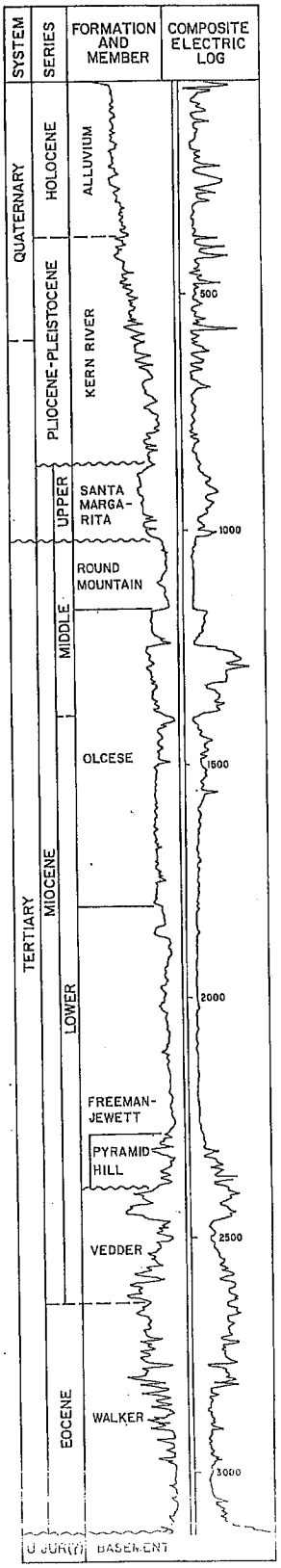
5) TDS of zone:
   1,069 mg/l TDS
   The 1,069 mg/l TDS zone sample is from "Black Foot Sump" on 05/31/1973.

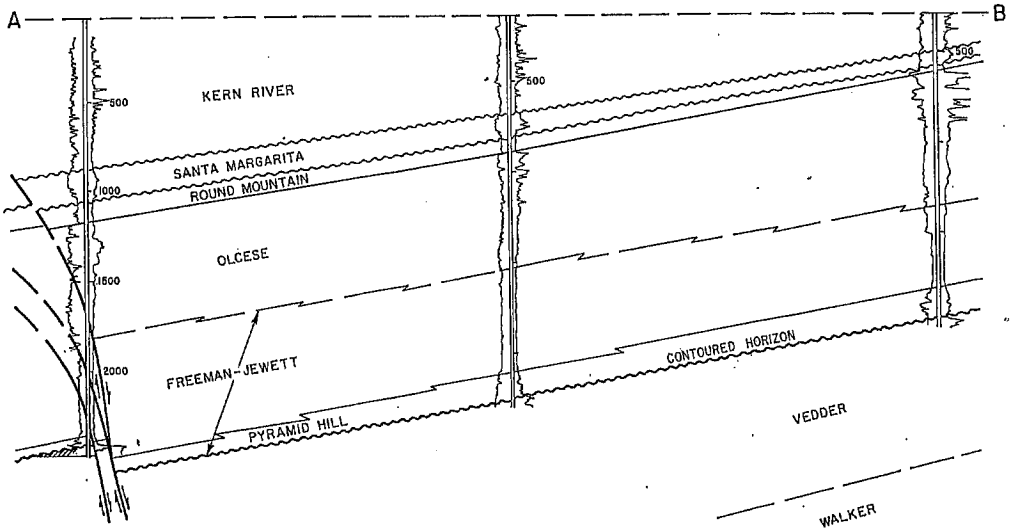
6) TDS of injection water:
   650 mg/l TDS
   The 650 mg/l TDS sample is from "Shapiro 234 Water Sample from Water Disposal" on 12/4/2008.

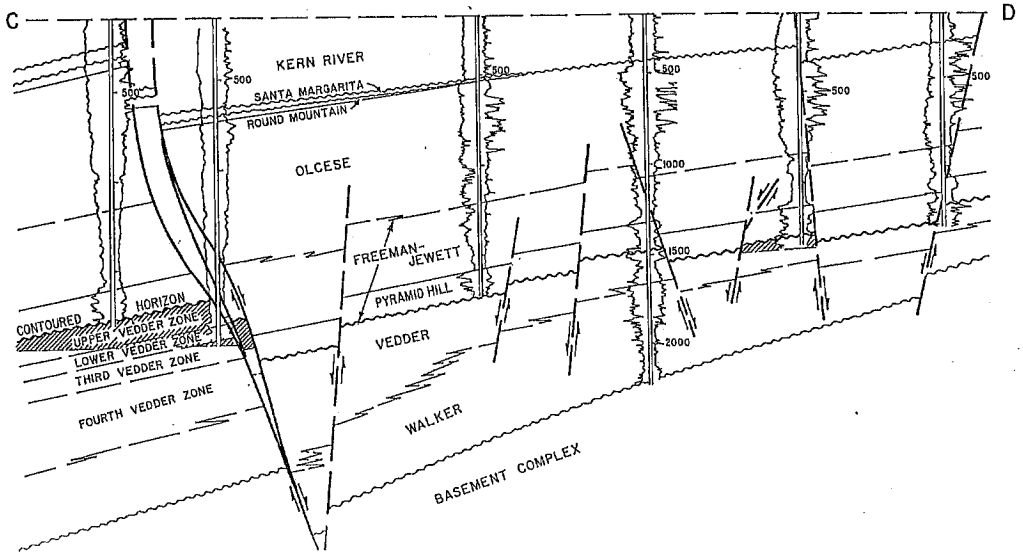
MOUNT POSO OIL FIELD



MOUNT POSO OIL FIELD







LOCATION: 13 miles northeast of Bakersfield

TYPE OF TRAP: See areas

ELEVATION: 650 - 1,450

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Pyramid Hill and Upper Vedder	Shell Oil Co. "Vedder" 1	Shell Co. of California "Vedder" 1	9 27S 28E	MD	300	N.A.	Jul 1926

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Pacific Oil and Gas Dev. Corp. "City of San Francisco" 56-32	Same	Aug 1957	32 27S 28E	MD	3,759	Walker	Eocene

PRODUCING ZONES (See areas)

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
1,830,017	728	84,316,129	3,630	532	164,558,017	1,977,245	8,427,304	1943	1,184	828	3,805

STIMULATION DATA (Jan. 1, 1973) (See areas)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: See areas.

BASE OF FRESH WATER: See areas.

CURRENT CASING PROGRAM: See areas.

METHOD OF WASTE DISPOSAL: See areas.

REMARKS:

REFERENCES: Albright, M.B., A.G. Hluza, and J.C. Sullivan, Mount Poso Oil Field, Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 43, No. 2 (1957).

LOCATION. See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted regional homocline

ELEVATION: 650 - 1,050

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production Oil (bbl)	Initial daily production Gas (Mcf)	Date of completion
Upper Vedder	Emjayco "Baker" 1	Baker-Grover Co. "Baker" 1	33 27S 28E	MD	250	N.A.	Jul 1935

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
The White Hills Oil Co. No. 1	Ralph R. Whitehill No. 1	Apr 1961	34 27S 28E	MD	2,483	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Upper Vedder	1,750	25	early Miocene	Vedder	15	190	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
9,991	0	883,158	80	4	3,700,652	0	276,899	1937	49	23	90

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: 1,100

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps (to be phased out).

REMARKS:

REFERENCES

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline; lithofacies variations

ELEVATION: 1,100 - 1,350

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Vedder	Robert B. Doe, "Dominion" 2	A. Bruce Frame "Dominion" 2	28 26S 28E	MD	435	N.A.	Dec 1928

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Glen H. Mitchell "SP" 1	Same	May 1945	33 26S 28E	MD	2,512	Schist	Late Jur

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Vedder	1,560	35	early Miocene	Vedder	15	10	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
107,317	0	4,482,093	675	74	5,735,208	0	197,189	1933	195	128	690

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1964	177,242	12

SPACING ACT: Does not apply

BASE OF FRESH WATER: No saline waters present

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Injection into the Vedder; evaporation and percolation sumps.

REMARKS:

REFERENCES:

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION. 900 - 1,250

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production		Date of completion
					Oil (bbl)	Gas (Mcf)	
Upper Vedder	Thomas Oil Co. "Dorsey" 2	R.S. Lytle "Dorsey" 2	26 27S 28E	MD	570	N.A.	Sep 1928

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth	
						Strata	Age
Emjayco "Glide" 15-1	Harry H. Magee, Opr. "Glide" 15-1	Oct 1956	15 27S 28E	MD	2,000	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic		Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
			Age	Formation			
Upper Vedder	1,500	30	early Miocene	Vedder	16	5	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production			1972 Proved acreage	1972 Average number producing wells	Cumulative production		Peak oil production		Total number of wells		Maximum proved acreage
Oil (bbl)	Net gas (Mcf)	Water (bbl)			Oil (bbl)	Gas (Mcf)	Barrels	Year	Drilled	Completed	
86,429	0	1,913,270	375	47	4,676,008	0	204,880	1958	142	76	410

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Does not apply

BASE OF FRESH WATER: Basement

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Percolation and evaporation sumps on outcrop of Round Mountain Silt; injection wells.

REMARKS: Vedder zone water contains 1.75 ppm boron.

REFERENCES:

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline; lithofacies variations

ELEVATION: 1,300

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Upper Vedder	Road Oil Sales, Inc. "SP" 2	J.J. Chevalier "Southern Pacific" 2	3 27S 28E	MD	50	N.A.	Nov 1936

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Lyle A. Garner & Assoc. "S.P." 3-1	Same	May 1952	3 27S 28E	MD	2,226	Granite	Late Jur

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Upper Vedder	1,390	30	early Miocene	Vedder	15	10	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
3,808	0	20,675	80	10	823,450	0	65,780	1949	65	30	130

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: Basement

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation sumps on outcrop of Round Mountain Silt.

REMARKS: A cyclic-steam project was started in 1967 and discontinued after 19,069 bbls. of water in the form of steam were injected. A pilot fire flood project, initiated in 1963, was terminated in 1965.

REFERENCES:

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,450

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Pyramid Hill and Upper Vedder	Shell Oil Co. "Vedder" 1	Shell Oil Co. of Calif. "Vedder" 1	9 27S 28E	MD	300	N.A.	Jul 1926
Lower Vedder [A]	Shell Oil Co. "Vedder" 6	Same as present	9 27S 28E	MD	835	N.A.	Jan 1933
Third Vedder	Unknown	Unknown	4 27S 28E or 9	MD	N.A.	N.A.	Prior to 1957
Fourth Vedder [B]	Shell Oil Co. "Glide" 6	Same as present	15 27S 28E	MD	134	N.A.	Aug 1957

Remarks: The first separate well that produced from the Pyramid Hill zone was Shell Oil Co. "Security" 3, Sec. 9, T. 27S., R. 28E. Initial production was 4 barrels per day.
[A] Commingled production from Upper Vedder and Lower Vedder.
[B] Commingled production from Third Vedder and Fourth Vedder.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Trico Industries, Inc. "USL" 6-2	Trico Oil and Gas Co. "USL" 6-2	Jul 1960	6 27S 28E	MD	2,665	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Pyramid Hill	1,600	160	early Miocene	Pyramid Hill	17	N.A.	None
Upper Vedder	1,750	140	early Miocene	Vedder	16	80	None
Lower Vedder	1,900	80	early Miocene	Vedder	16	N.A.	None
Third Vedder	1,985	120	early Miocene	Vedder	16	75	None
Fourth Vedder	2,105	50	early Miocene	Vedder	16	65	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
1,590,436	728	75,595,054	2,225	374	146,734,300	1,977,245	7,982,576	1943	641	524	2,265

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Steam flood	1963	9,351,042	11

SPACING ACT: Does not apply

BASE OF FRESH WATER: 1,000 - 1,500

CURRENT CASING PROGRAM: 8 5/8" cem. above zone and across base of fresh-water sands; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps; injection into Vedder sand.

REMARKS: A cyclic-steam project was started in 1963 and discontinued after 116,623 bbls. of water in the form of steam was injected. A water flood project was started in 1952 and discontinued after 608,470 bbls. of water was injected.

REFERENCES:

CALIFORNIA DIVISION OF OIL AND GAS

WEST AREA

MOUNT POSO OIL FIELD

Kern County

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline with permeability variations

ELEVATION: 700 - 1,075

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Upper Vedder	Thomas Oil Co. "Ring 18" 1	Dwight G. Vedder No. 1	18 27S 28E	MD	0	5,300	Dec 1943

Remarks: Gas cap was of limited volume. After being shut in for one year the discovery well was recompleted producing oil.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Pacific Oil & Gas Dev. Corp. "City of San Francisco" 56-32	Same	Aug 1957	32 27S 28E	MD	3,759	Walker	Eocene

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Upper Vedder	2,575	15 - 50	early Miocene	Vedder	16	60	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
32,036	0	1,421,879	195	23	2,888,399	0	190,765	1957	92	47	220

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

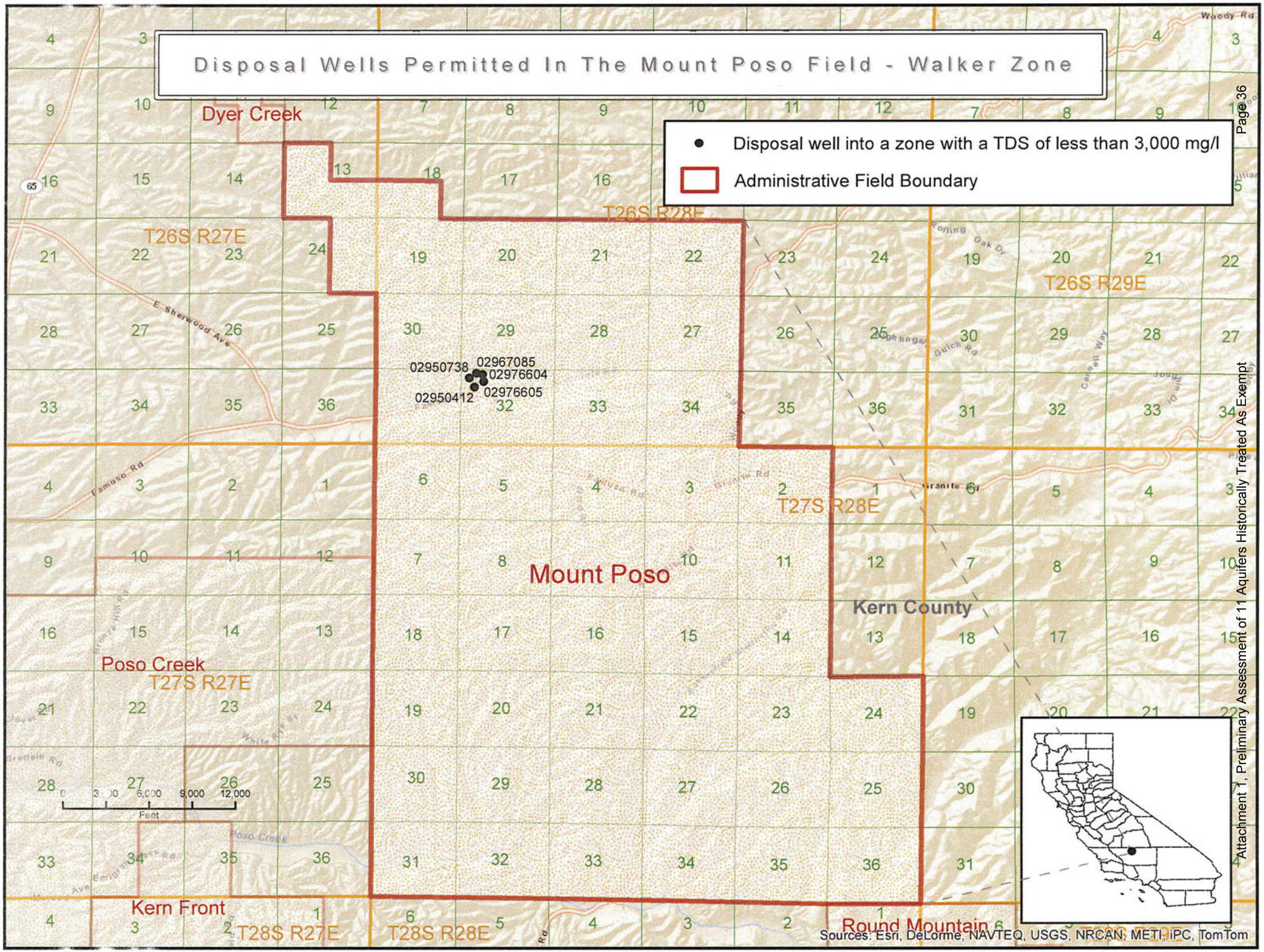
BASE OF FRESH WATER: 1,800

CURRENT CASING PROGRAM: 7" cem. above zone and across base of fresh-water sands; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps (to be phased out).

REMARKS: Vedder zone water contains 3 to 4 ppm boron.

REFERENCES:


Disposal Wells Permitted In The Mount Poso Field - Walker Zone
Disposal well into a zone with a TDS of less than 3,000 mg/l
Administrative Field Boundary
Dyer Creek
T26S R28E
T26S R27E
T26S R29E
T27S R28E
Mount Poso
Kern County
Poso Creek
T27S R27E
Kern Front
T28S R27E
T28S R28E
Round Mountain
02950738
02967085
02976604
02950412
02976605
0 3,000 6,000 9,000 12,000
Feet
Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

Round Mountain Field, Olcese Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:
   6 (4 wells are permitted in both the Olcese and Walker Zones in Round Mountain Field)

2) Number of active producers:
   0

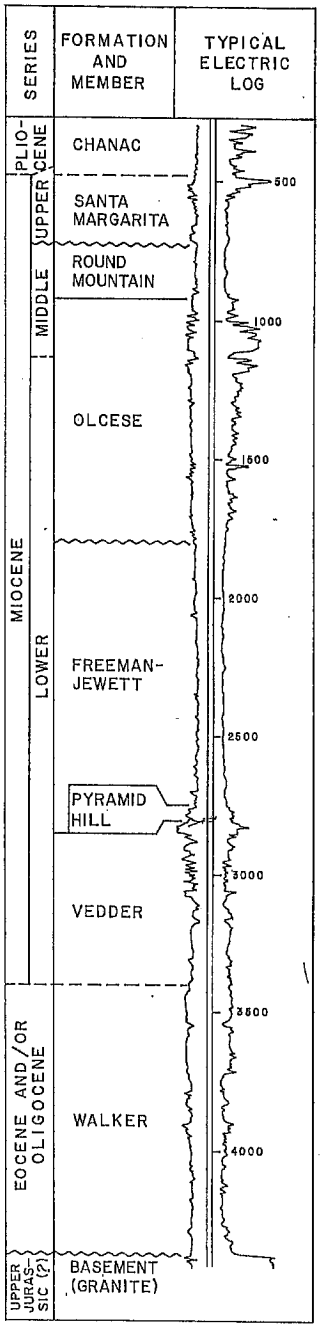
3) Depth of the zone where the injection wells are located:
   710' to 850' below surface. These zone depths are from wells API #029-18114 and API #029-18119, which are currently injecting in the Olcese zone. The remaining wells in the field (029-47441, 029-47543, 030-51960 and 030-51959) are permitted to inject in the Olcese, Freeman-Jewett, Vedder and Walker but are currently perforated in the Vedder and/or Walker zones only. For these 4 wells there are no logs available that pick the top of the Olcese zone since there is no injection there. Zone is fault bounded 1 ½ miles east of field limits, and pinches out 5 miles west of field limits.

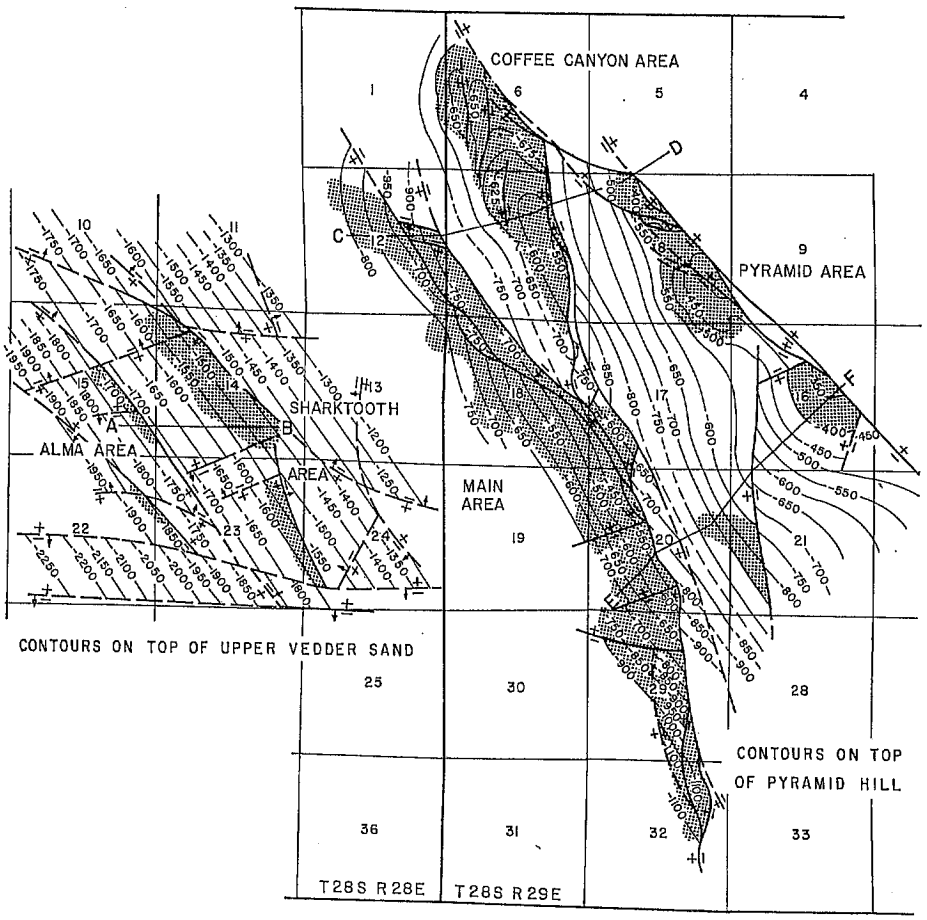
4) Volumes injected historically since 1983:
   160,798,008 Bbls, last injected on 1/1/2015

5) TDS of zone:
   2,693 mg/l TDS
   Sample collected from "water from Bishop #6 Bailer Sample at 600'" on 4/27/1974.

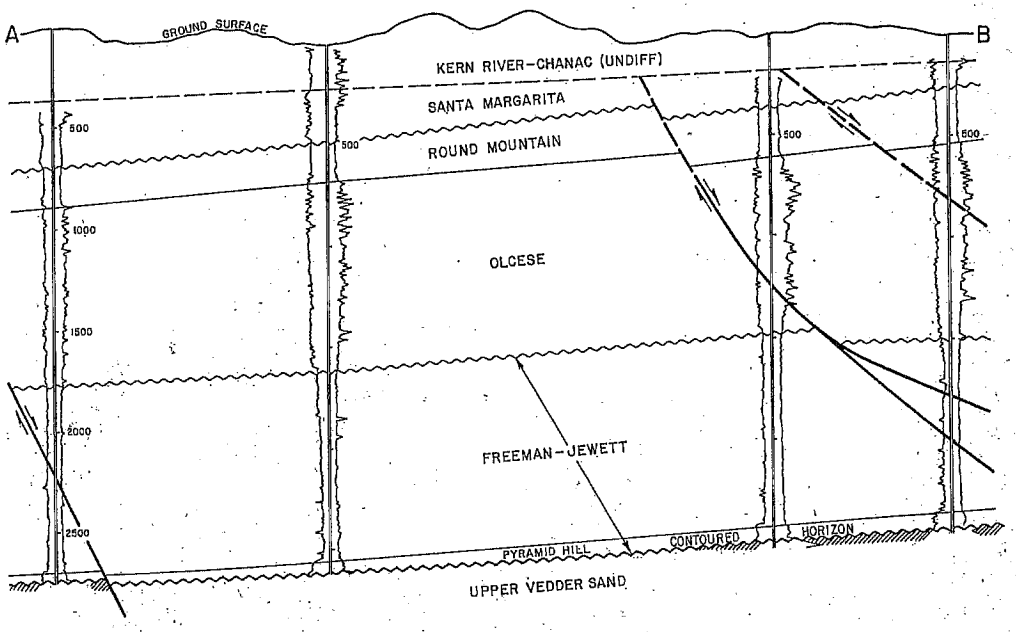
6) TDS of injection water:
   1,900 mg/l TDS
   Sample collected from "Sec. 20 produced water" (Olcese WD#342 & 343) on 2/23/2009. Permitted fluids for injection into the Olcese Zone in Round Mountain field consist of Pyramid Hill, Jewett, Freeman-Jewett and Vedder zones.

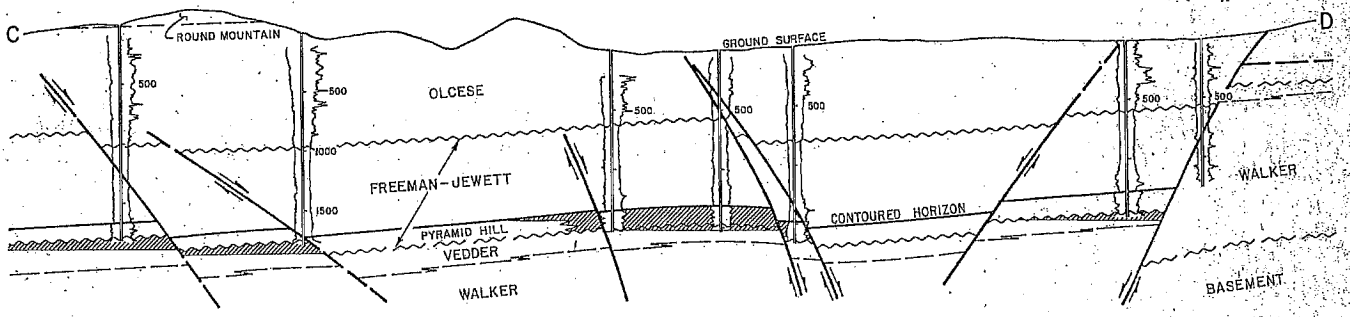
ROUND MOUNTAIN OIL FIELD

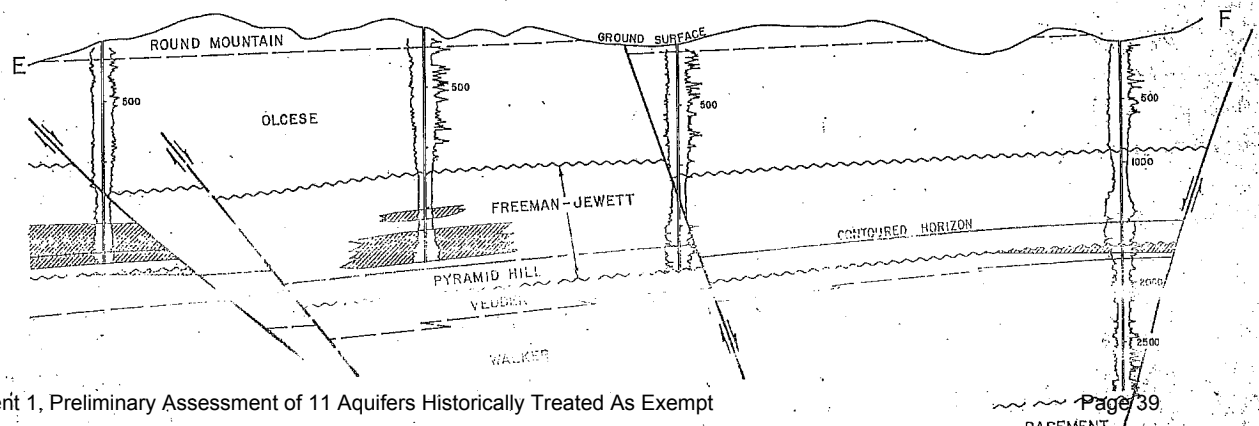




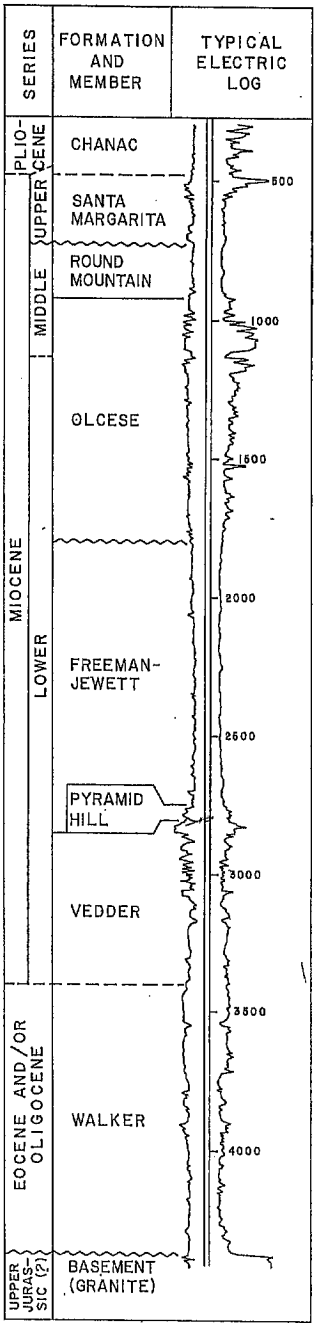
ROUND MOUNTAIN OIL FIELD

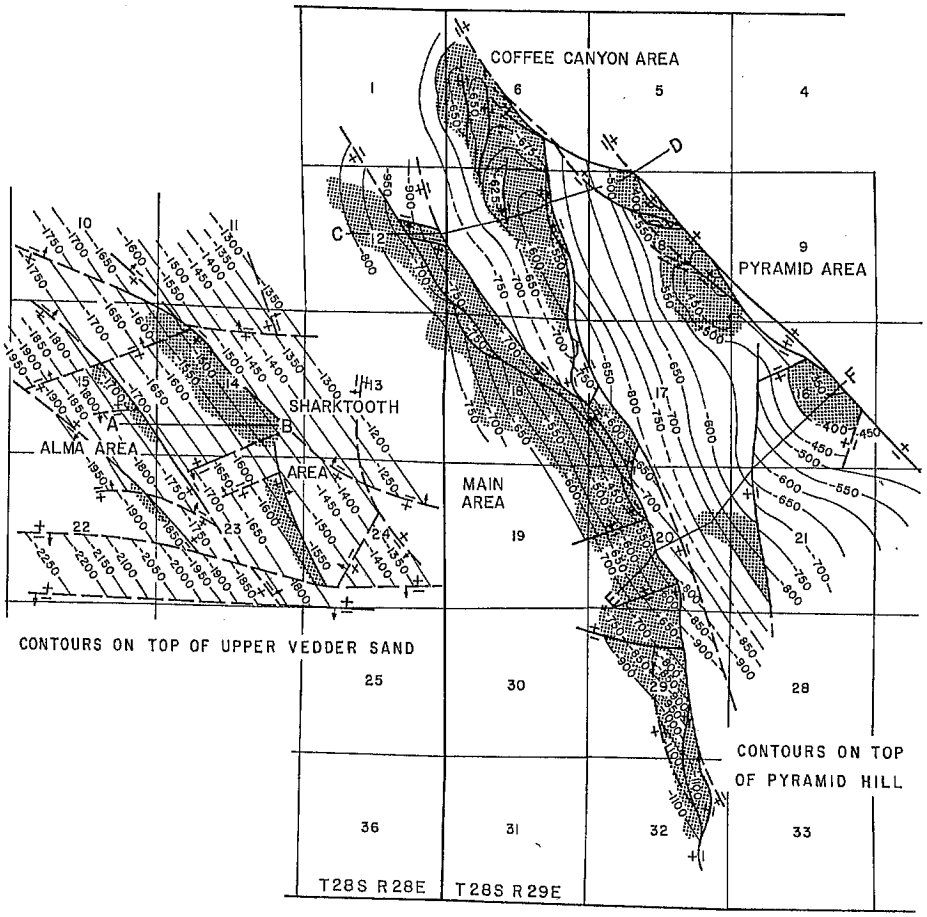






ROUND MOUNTAIN OIL FIELD





LOCATION: 14 miles northeast of Bakersfield

TYPE OF TRAP: See areas

ELEVATION: 600 - 1,500

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Jewett	Getty Oil Co. No. 2	Elbe Oil Land Dev. Co. No. 2	20 28S 29E	MD	*204	N.A.	May 1927
Pyramid Hill	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927
Vedder	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
C.C. Killingsworth "Alma" 6	Barnsdall Oil Co. "Alma" 6	Mar 1948	15 28S 28E	MD	4,418	Basement (Granite)	Late Jur (?)

PRODUCING ZONES (See areas)

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
711,406	46,635	48,630,496	2,435	292	89,199,121	1,424,213	5,453,194	1938	665	468	2,590

STIMULATION DATA (Jan. 1, 1973) (See areas)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: See areas.

BASE OF FRESH WATER: See areas.

CURRENT CASING PROGRAM: See areas.

METHOD OF WASTE DISPOSAL: See areas.

REMARKS:

REFERENCES: See areas.

CALIFORNIA DIVISION OF OIL AND GAS

ALMA AREA

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,270

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Vedder	Harold C. Morton & H.S. Kohlbush "Alma" 1	Same as present	15 28S 28E	MD	152	N.A.	Feb 1947

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
C.C. Killingsworth "Alma" 6	Barnsdall Oil Co. "Alma" 6	Mar 1948	15 28S 28E	MD	4,418	Basement (Granite)	Late Jur.

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Vedder	2,600	15	early Miocene	Vedder	13	N.A.	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
6,240	0	107,447	50	3	598,904	0	113,392	1948	47	21	80

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alma Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 42, No. 1 (1956).

CALIFORNIA DIVISION OF OIL AND GAS

COFFEE CANYON AREA

ROUND MOUNTAIN OIL FIELD

Kern County

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 690 - 1,300

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Pyramid Hill	Acacia Oil Co. "Coffee" 1	Reynolds Oil and Gas Co. No. 1	6 28S 29E	MD	*600	N.A.	Sep 1928
Vedder	Acacia Oil Co. "Lindsay" 1	Lindsay Oil Co. No. 1	6 28S 29E	MD	800	N.A.	Aug 1928

Remarks: * Production is commingled from Pyramid Hill and Vedder.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Richard S. Rheem, Opr. "Smoot-Vedder" 2	Same	May 1957	1 28S 28E	MD	2,313	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Pyramid Hill	1,500	150	early Miocene	Jewett	18	50	None
Vedder	1,650	30	early Miocene	Vedder	16	75	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
103,176	0	7,292,707	435	50	18,507,039	67,567	1,857,108	1937	133	104	475

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Water flood	1960	3,815,746	1

SPACING ACT: Does not apply

BASE OF FRESH WATER: 0 - 200

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS: A cyclic-steam injection project in the Pyramid Hill and Vedder zones was started in 1965 and terminated in 1968. Cumulative injection totals 12,200 bbls. The Pyramid Hill zone was originally known as the Elbe zone.

REFERENCES: Park, W.B., J.R. Weddle, J.A. Barnes, Main Coffee Canyon and Pyramid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 600 - 1,500

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Jewett	Getty Oil Co. No. 2	Elbe Oil Land Dev. Co. No. 2	20 28S 29E	MD	*204	N.A.	May 1927
Pyramid Hill	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927
Vedder	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Shell Oil Co. "Jewett" 3	Same	Jun 1928	29 28S 29E	MD	2,678	Walker	Eo &/or Olig

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Jewett	1,600	130	early Miocene	Freeman-Jewett	22	N.A.	None
Pyramid Hill	1,900	150	early Miocene	Jewett	18	N.A.	None
Vedder	2,000	80	early Miocene	Vedder	16	95	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
510,916	46,561	35,953,284	1,415	171	59,572,216	1,293,959	3,794,620	1938	302	225	1,465

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Does not apply

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: 4,845,286 bbl. of waste water was injected during 1972 into two disposal wells; percolation and evaporation sumps on outcrops of the Round Mountain Silt.

REMARKS: A water flood project in the Vedder zone was started in 1961 and terminated in 1963. Cumulative injection totals 872,587 bbls.

REFERENCES: Park, W.H., J.R. Weddle, J.A. Barnes, Main, Coffee Canyon, and Pyramid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 730 - 1,470

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Pyramid Hill	Thomas Oil Co. "Olcese" 2	Harp & Brown "Olcese" 2	17 28S 29E	MD	5	0	May 1944
Vedder	Crestmont Oil Co. "Olcese" 1	Eastmont Oil Co. "Olcese" 1	16 28S 29E	MD	250	N.A.	May 1937
Walker	Crestmont Oil Co. "Staley" 11	Same as present	8 28S 29E	MD	40	N.A.	Jul 1943

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Piute Holding Co. "Smith" 1	Same	Oct 1929	17 28S 29E	MD	3,110	Walker	Eo &/or Olig

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Pyramid Hill	1,250	130	early Miocene	Jewett	18	50	None
Vedder	1,390	40	early Miocene	Vedder	16	80 - 110	None
Walker	1,535	50	Eo &/or Olig	Walker	20	N.A.	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
55,714	74	1,527,767	290	37	5,692,349	6,876	378,882	1946	98	60	300

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" or 7" cem. above zone; 6 5/8" or 5" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Peak, W.H., J.R. Weddle, J.A. Barnes, Main, Coffee Canyon, and Pyramid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,300

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Vedder	G M V Oil Co. "Signal-Mills" 1	Bandini Petroleum Co. "Signal Mills" 1	24 28S 28E	MD	214	N.A.	Sep 1943

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Mobil Oil Corp. "Bradford" 1	General Petroleum Corp. "Bradford" 1	Jun 1943	15 28S 28E	MD	2,995	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Vedder	2,400	25	early Miocene	Vedder	13	N.A.	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
35,360	0	3,749,291	245	31	4,828,613	55,811	503,449	1947	85	58	270

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: None

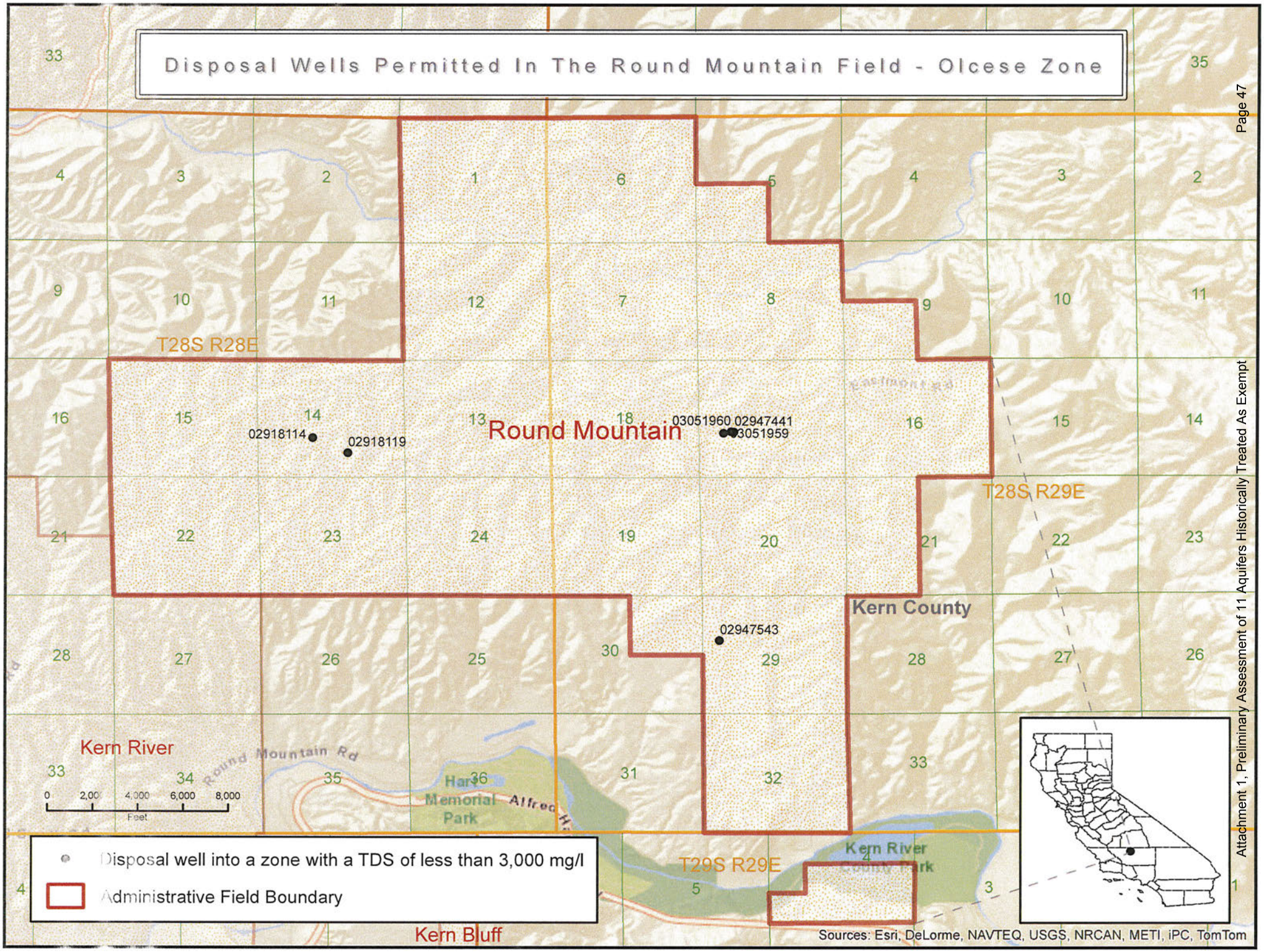
CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alma Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas. Summary of Operations--Calif. Oil Fields, Vol. 42, No. 1 (1956).

Disposal Wells Permitted In The Round Mountain Field - Olcese Zone



Round Mountain Field, Walker Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:
   30 (4 of these are permitted in both the Olcese and Walker Zones in Round Mountain Field). There are 2 gas disposal wells.

2) Number of active producers:
   4 wells (Note that although this aquifer was historically treated as exempt as a non-hydrocarbon producing formation, the Walker zone within the field has current production.)

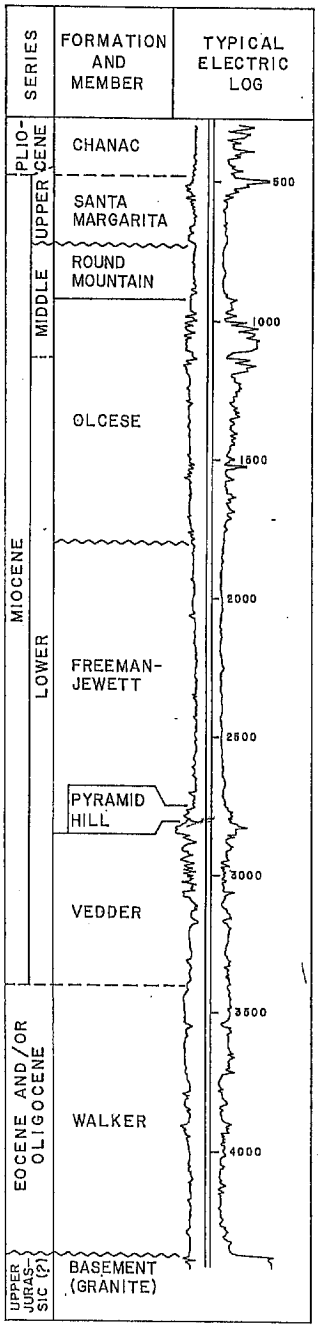
3) Depth of the zone where the disposal wells are located:
   1,890' to 2,590' below surface

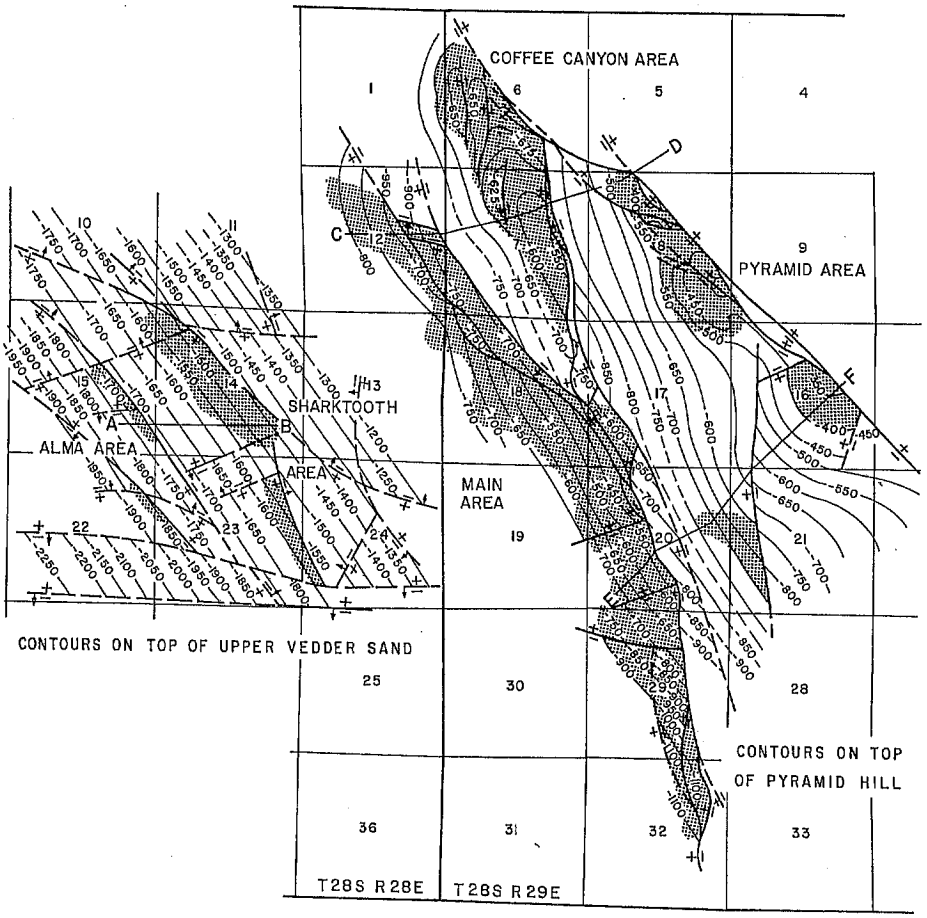
4) Volumes injected historically since 1983:
   1,529,910,014 Bbls, last injected on 3/1/2015

5) TDS of zone:
   2,335 mg/l TDS
   Sample 2,335 mg/l TDS is from "Walker zone formation water" (Round Mountain WD 1-20) on 10/17/1983.

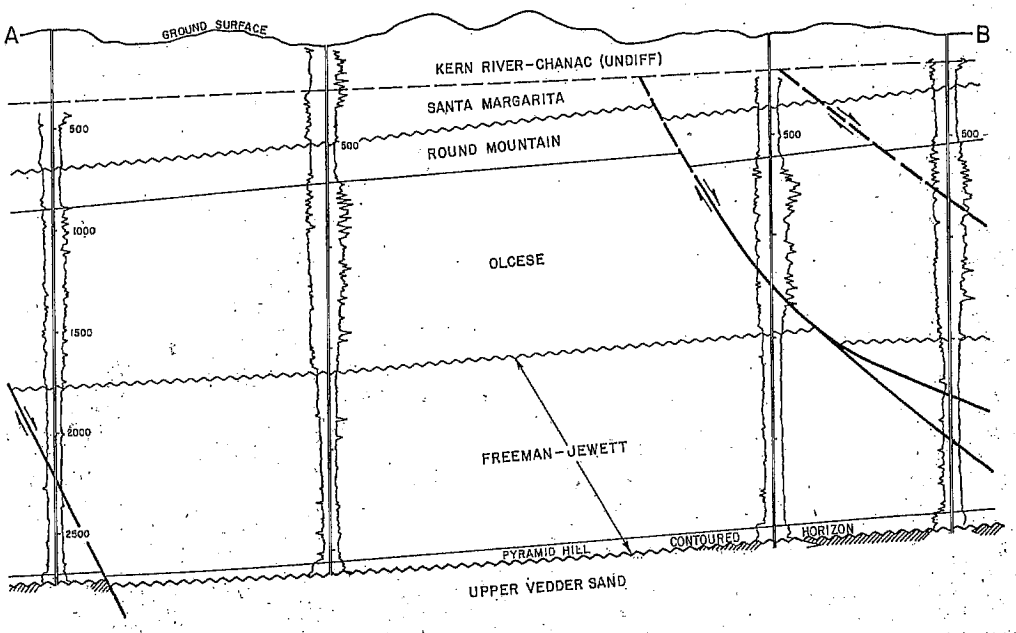
6) TDS of injection water:
   1,600 – 2,900 mg/l TDS
   The 1,600 mg/l TDS sample is from "NAM Produced water (West signal #8) on 1/1/2009 and the 2,900 mg/l TDS sample is from "18-WD7" on 9/20/2012. Permitted fluids for injection into the Walker Zone in Round Mountain field consist of Pyramid Hill, Jewett, Freeman-Jewett and Vedder zones production fluid.

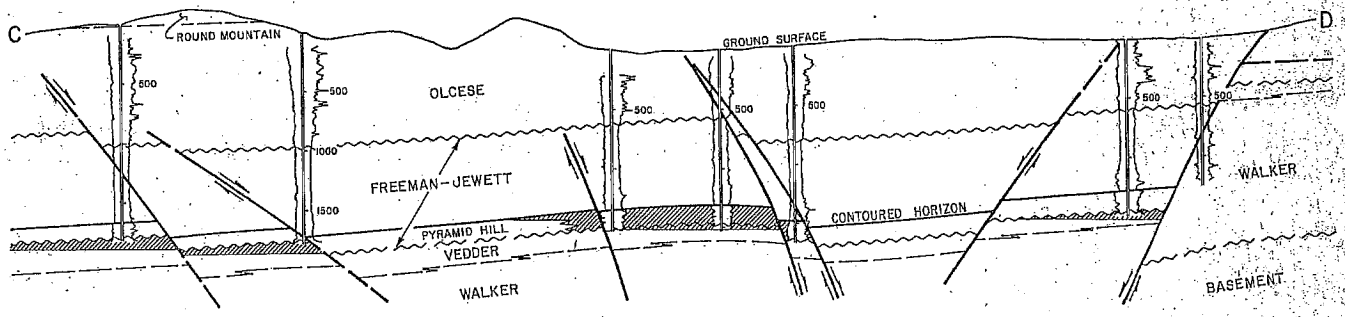
ROUND MOUNTAIN OIL FIELD

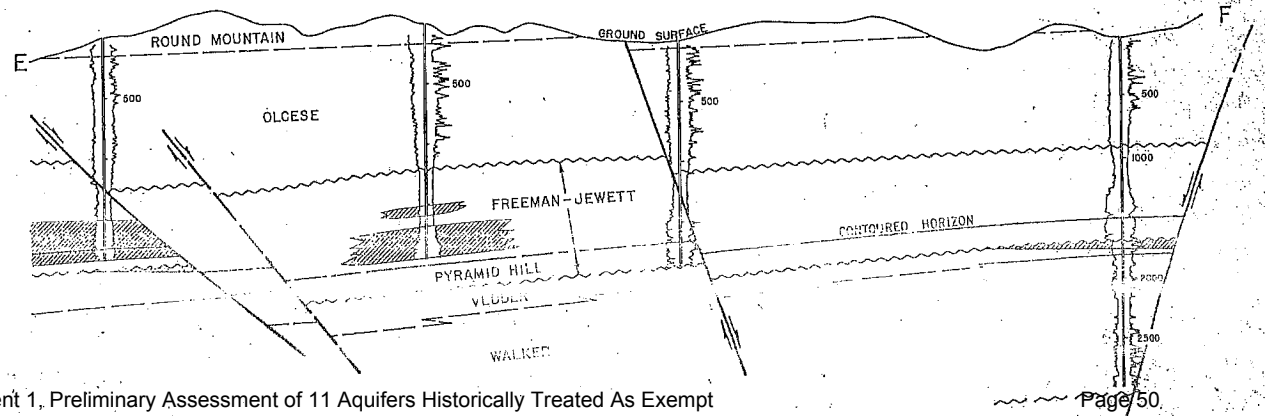




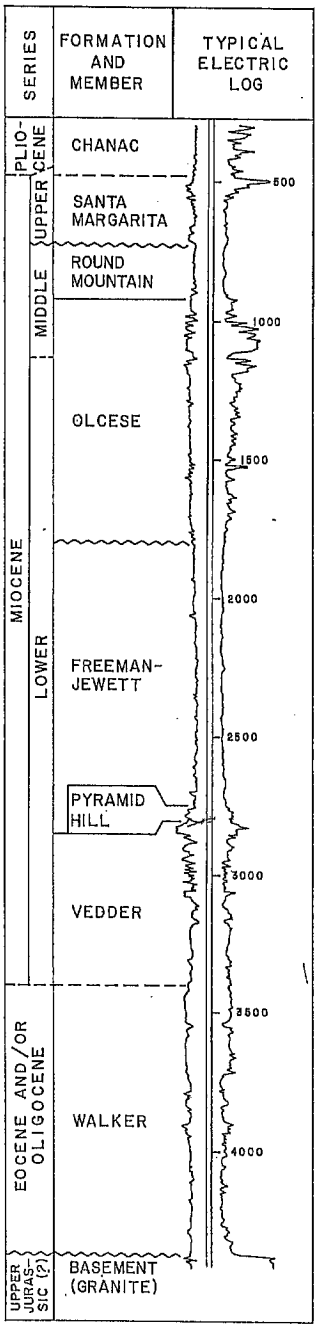
ROUND MOUNTAIN OIL FIELD

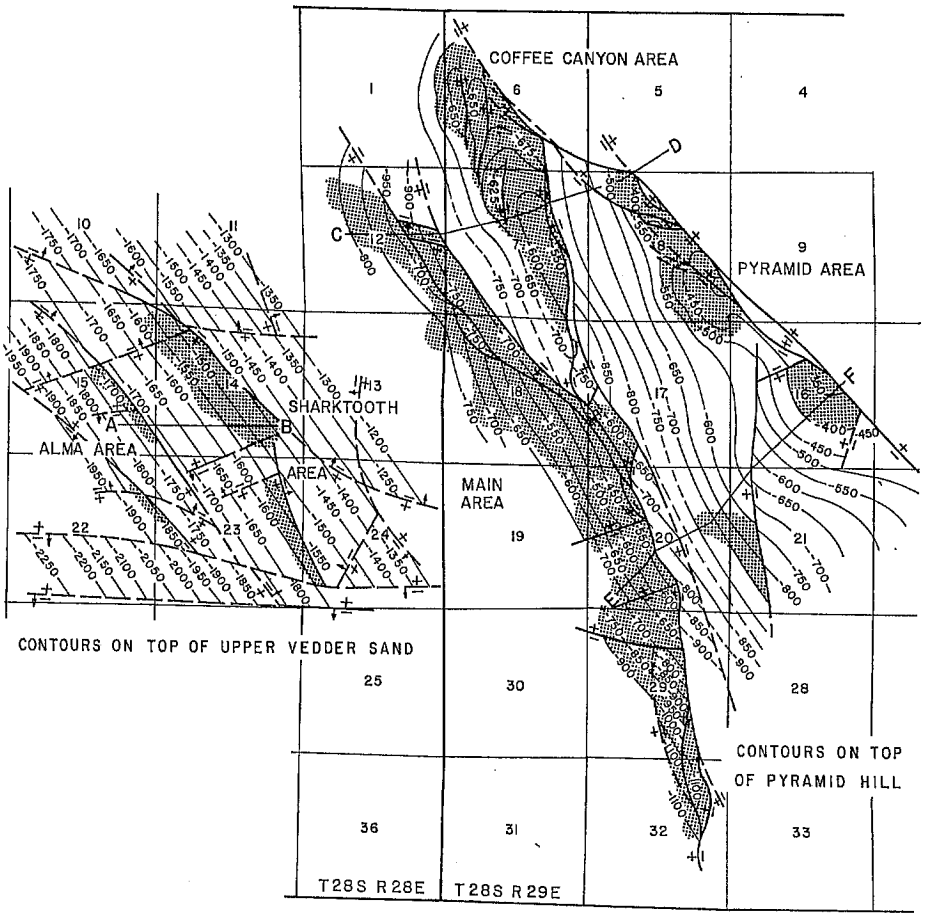






ROUND MOUNTAIN OIL FIELD





LOCATION: 14 miles northeast of Bakersfield

TYPE OF TRAP: See areas

ELEVATION: 600 - 1,500

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Jewett	Getty Oil Co. No. 2	Elbe Oil Land Dev. Co. No. 2	20 28S 29E	MD	*204	N.A.	May 1927
Pyramid Hill	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927
Vedder	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
C.C. Killingsworth "Alma" 6	Barnsdall Oil Co. "Alma" 6	Mar 1948	15 28S 28E	MD	4,418	Basement (Granite)	Late Jur (?)

PRODUCING ZONES (See areas)

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
711,406	46,635	48,630,496	2,435	292	89,199,121	1,424,213	5,453,194	1938	665	468	2,590

STIMULATION DATA (Jan. 1, 1973) (See areas)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: See areas.

BASE OF FRESH WATER: See areas.

CURRENT CASING PROGRAM: See areas.

METHOD OF WASTE DISPOSAL: See areas.

REMARKS:

REFERENCES: See areas.

CALIFORNIA DIVISION OF OIL AND GAS

ALMA AREA

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,270

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Vedder	Harold C. Morton & H.S. Kohlbush "Alma" 1	Same as present	15 28S 28E	MD	152	N.A.	Feb 1947

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
C.C. Killingsworth "Alma" 6	Barnsdall Oil Co. "Alma" 6	Mar 1948	15 28S 28E	MD	4,418	Basement (Granite)	Late Jur.

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Vedder	2,600	15	early Miocene	Vedder	13	N.A.	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
6,240	0	107,447	50	3	598,904	0	113,392	1948	47	21	80

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alma Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 42, No. 1 (1956).

COFFEE CANYON AREA

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 690 - 1,300

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Pyramid Hill	Acacia Oil Co. "Coffee" 1	Reynolds Oil and Gas Co. No. 1	6 28S 29E	MD	*600	N.A.	Sep 1928
Vedder	Acacia Oil Co. "Lindsay" 1	Lindsay Oil Co. No. 1	6 28S 29E	MD	800	N.A.	Aug 1928

Remarks: * Production is commingled from Pyramid Hill and Vedder.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Richard S. Rheem, Opr. "Smoot-Vedder" 2	Same	May 1957	1 28S 28E	MD	2,313	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Pyramid Hill	1,500	150	early Miocene	Jewett	18	50	None
Vedder	1,650	30	early Miocene	Vedder	16	75	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
103,176	0	7,292,707	435	50	18,507,039	67,567	1,857,108	1937	133	104	475

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Water flood	1960	3,815,746	1

SPACING ACT: Does not apply

BASE OF FRESH WATER: 0 - 200

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS: A cyclic-steam injection project in the Pyramid Hill and Vedder zones was started in 1965 and terminated in 1968. Cumulative injection totals 12,200 bbls. The Pyramid Hill zone was originally known as the Elbe zone.

REFERENCES: Park, W.H., J.R. Weddle, J.A. Barnes, Main, Coffee Canyon, and Pyramid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

MAIN AREA

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 600 - 1,500

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Jewett	Getty Oil Co. No. 2	Elbe Oil Land Dev. Co. No. 2	20 28S 29E	MD	*204	N.A.	May 1927
Pyramid Hill	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927
Vedder	Same as above	Same as above	20 28S 29E	MD	N.A.	N.A.	May 1927

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Shell Oil Co. "Jewett" 3	Same	Jun 1928	29 28S 29E	MD	2,678	Walker	Eo &/or Olig.

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Jewett	1,600	130	early Miocene	Freeman-Jewett	22	N.A.	None
Pyramid Hill	1,900	150	early Miocene	Jewett	18	N.A.	None
Vedder	2,000	80	early Miocene	Vedder	16	95	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
510,916	46,561	35,953,284	1,415	171	59,572,216	1,293,959	3,794,620	1938	302	225	17465

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Does not apply

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: 4,845,286 bbl. of waste water was injected during 1972 into two disposal wells; percolation and evaporation sumps on outcrops of the Round Mountain Silt.

REMARKS: A water flood project in the Vedder zone was started in 1961 and terminated in 1963. Cumulative injection totals 872,587 bbls.

REFERENCES: Park, W.H., J.R. Weddle, J.A. Barnes, Main, Coffee Canyon, and Pyramid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 730 - 1,470

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Pyramid Hill	Thomas Oil Co. "Olcese" 2	Harp & Brown "Olcese" 2	17 28S 29E	MD	5	0	May 1944
Vedder	Crestmont Oil Co. "Olcese" 1	Eastmont Oil Co. "Olcese" 1	16 28S 29E	MD	250	N.A.	May 1937
Walker	Crestmont Oil Co. "Staley" 11	Same as present	8 28S 29E	MD	40	N.A.	Jul 1943

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Piute Holding Co. "Smith" 1	Same	Oct 1929	17 28S 29E	MD	3,110	Walker	Eo &/or Olig

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Pyramid Hill	1,250	130	early Miocene	Jewett	18	50	None
Vedder	1,390	40	early Miocene	Vedder	16	80 - 110	None
Walker	1,535	50	Eo &/or Olig	Walker	20	N.A.	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
55,714	74	1,527,767	290	37	5,692,349	6,876	378,882	1946	98	60	300

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
---			

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" or 7" cem. above zone; 6 5/8" or 5" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Park, W.H., J.R. Weddle, J.A. Barnes, Main, Coffee Canyon, and Pyramid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,300

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial daily production: Oil (bbl)	Initial daily production: Gas (Mcf)	Date of completion
Vedder	G M V Oil Co. "Signal-Mills" 1	Bandini Petroleum Co. "Signal Mills" 1	24 28S 28E	MD	214	N.A.	Sep 1943

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Mobil Oil Corp. "Bradford" 1	General Petroleum Corp. "Bradford" 1	Jun 1943	15 28S 28E	MD	2,995	Vedder	early Mio

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Oil gravity (°API) or Gas (btu)	Salinity of zone water gr/gal	Class BOPE required
Vedder	2,400	25	early Miocene	Vedder	13	N.A.	None

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Oil (bbl)	1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Average number producing wells	Cumulative production: Oil (bbl)	Cumulative production: Gas (Mcf)	Peak oil production: Barrels	Peak oil production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
35,360	0	3,749,291	245	31	4,828,613	55,811	503,449	1947	85	58	270

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
--			

SPACING ACT: Applies

BASE OF FRESH WATER: None

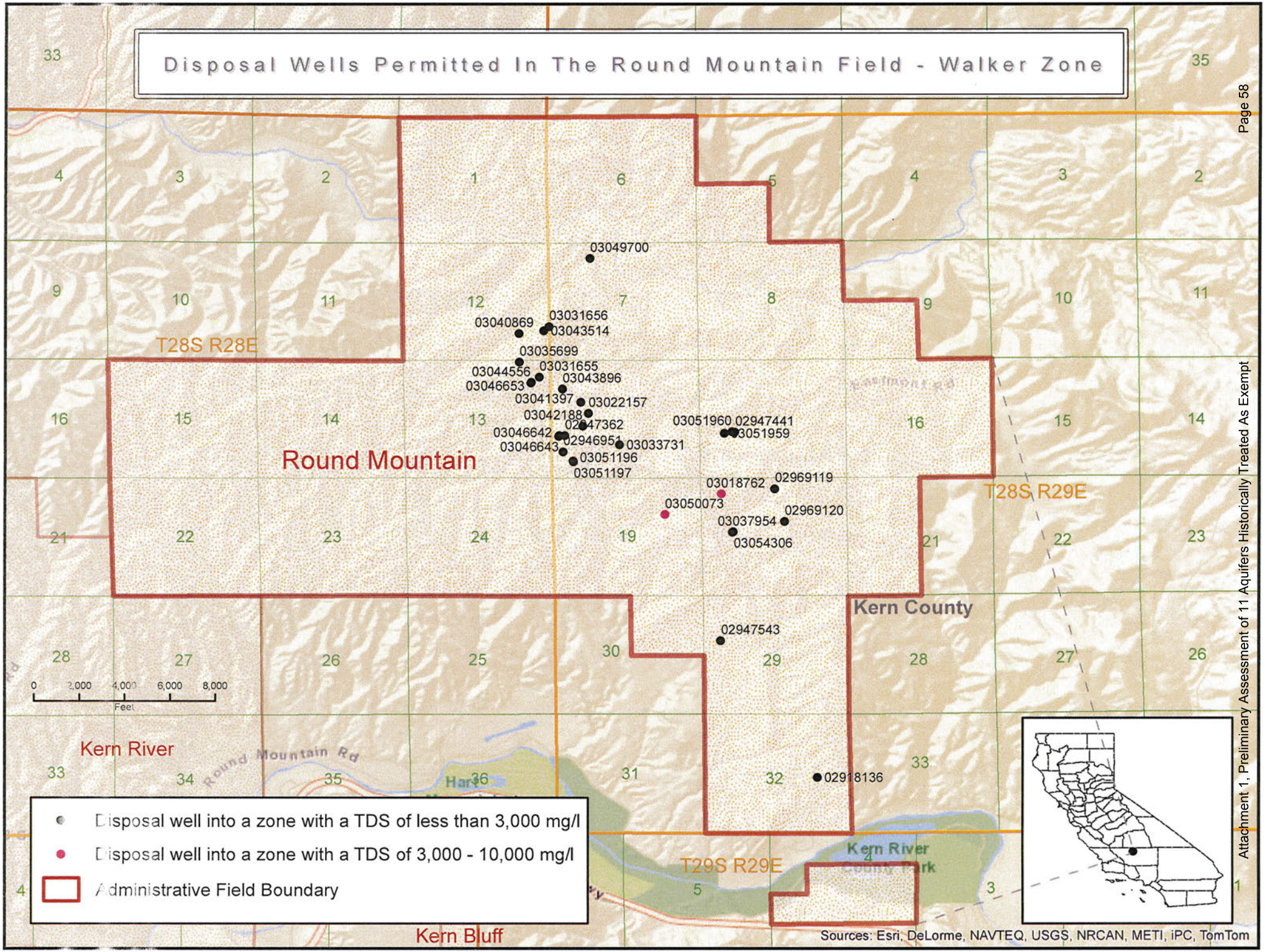
CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alma Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas. Summary of Operations--Calif. Oil Fields, Vol. 42, No. 1 (1956).

Disposal Wells Permitted In The Round Mountain Field - Walker Zone



Bunker Gas Field, Undiff. (Post Eocene) Zone, Sacramento District Office

1) Number of disposal wells permitted in the zone:
   0

2) Number of active producers:
   0

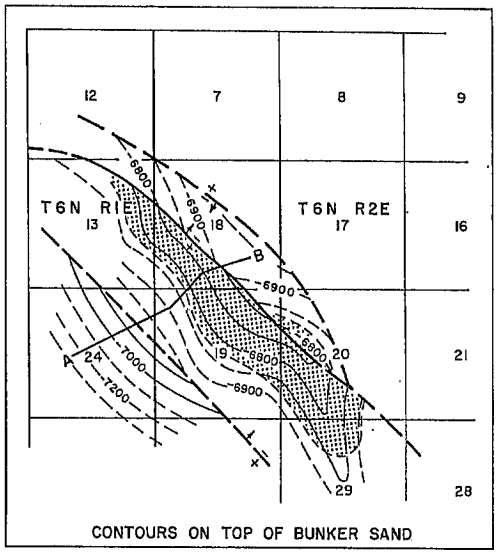
3) Depth of the zone across the field:
   3,000' below surface

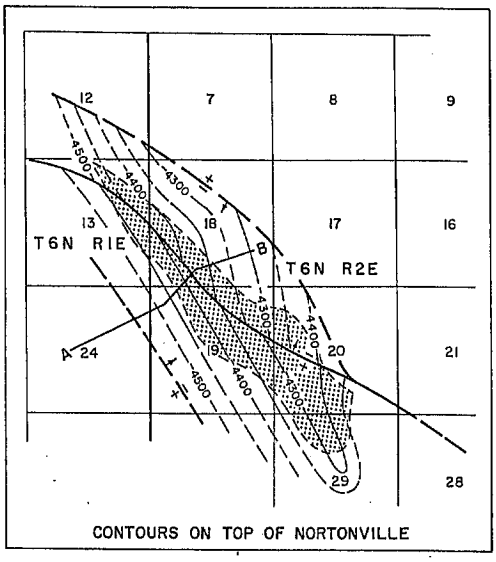
4) Volumes injected historically since 1983:
   51,454 Bbls, last injected on 11/1/1985. WD well API #095-00016 was P&A on 12/9/1986.

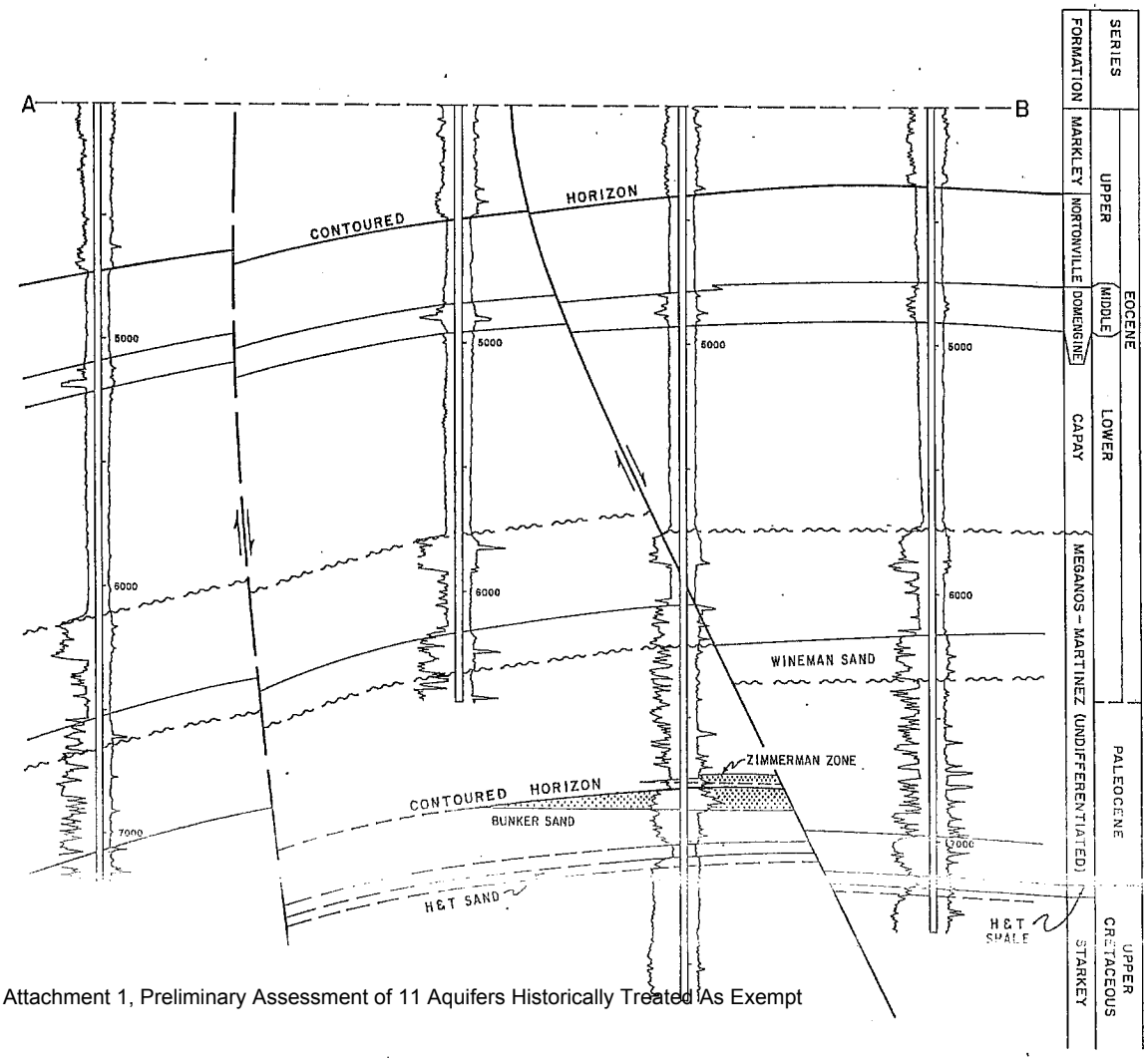
5) TDS of zone:
   1,215 mg/l TDS
   Sample collected from "BGZU" 601 well on January 16, 1974.

6) TDS of injection water:
   10,675 – 11,025 ppm Chloride
   Sample collected from "Bunker B-2 Zone" on April 26, 1973.

BUNKER GAS FIELD







LOCATION: 22 miles southwest of Sacramento

TYPE OF TRAP: Faulted anticline

ELEVATION: 25

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial production: Daily (Mcf)	Initial production: Flow pressure (psi)	Initial production: Bean size (in.)	Date of completion
Zimmerman	Amerada Hess Corp., Unit Oper. "BGZU" 901	Amerada Petroleum Corp., Oper. "Zimmerman" 1	29 6N 2E	MD	3,890	2,250	9/32	Aug. 1961
Bunker	Amerada Hess Corp., Unit Oper. "BGZU" 701	G.E. Kadane & Sons "Main Prairie Gas Unit A" 1	20 6N 2E	MD	3,425	2,250	1/4	Jun 1960

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Amerada Hess Corp., Unit Oper. "BGZU" 702	G.E. Kadane & Sons "Maine Prairie Gas Unit A" 2	Jan 1962	19 6N 2E	MD	10,098	Winters	Lt Cret

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Gas (btu)	Salinity of zone water gr/gal	Original zone pressure (psi)	Class BOPE required
Zimmerman	6,780	15	Paleocene	Martinez	1,075	4	2,930	IV
Bunker	6,845	25	Paleocene	Martinez	1,075	2	2,975	IV

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Maximum number producing wells	Cumulative gas production (Mcf)	Peak gas production: (Mcf)	Peak gas production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
3,073,729	6,704	810	8	53,141,694	10,457,830	1963	22	10	850

SPACING ACT: Applies

BASE OF FRESH WATER: 2,500 - 3,100

CURRENT CASING PROGRAM: 9 5/8" or 7" cem. 600; 4 1/2" cem. through zones and across base of fresh-water sands.

METHOD OF WASTE DISPOSAL:Disposal into sumps at well sites.

REMARKS: Commercial gas deliveries began in October 1961. 1972 condensate production 11,256 bbl.; cumulative condensate production 233,716 bbl.

REFERENCES: Hunter, W.J., Bunker Gas Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 47, No. 1 (1961).

Wild Goose Field, Undiff. Zone, Sacramento District Office

1) Number of disposal wells permitted in the zone:
   0 (only contains gas storage wells in this zone)

2) Number of active producers:
   0

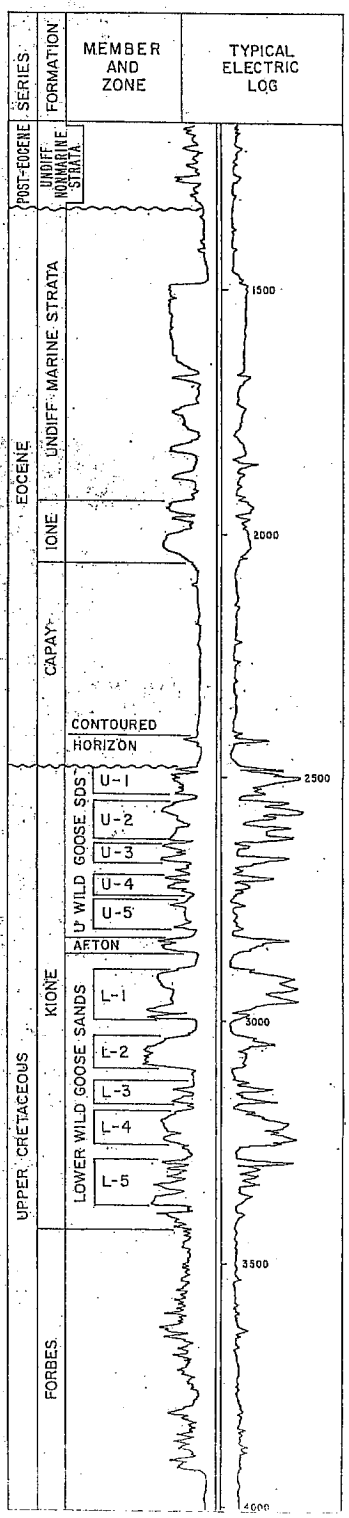
3) Depth of the zone across the field:
   2,700' – 3,400' below surface.

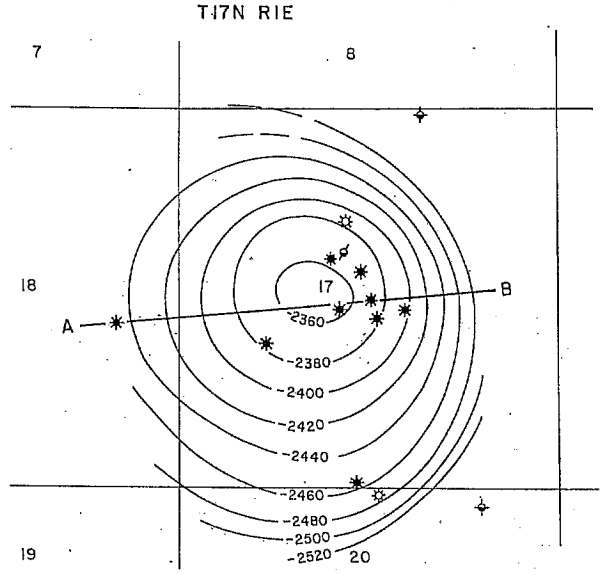
4) Volumes injected historically since 1983:
   None, only contains gas storage wells

5) TDS of zone:
   24,349 mg/l TDS
   Geochemical Analysis of Kione L4 sample provided in UIC Project File.

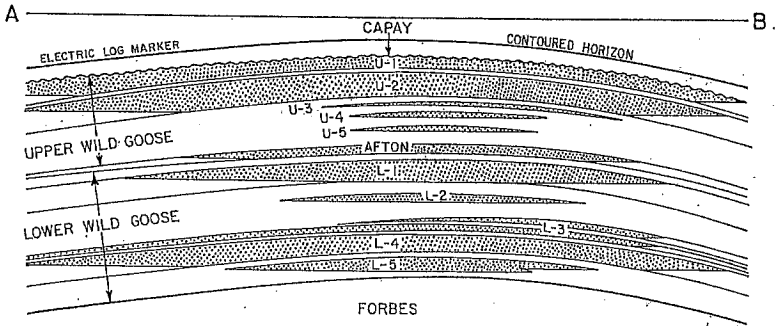
6) TDS of injection water:
   24,349 mg/l TDS
   Geochemical Analysis of Kione L4 sample provided in UIC Project File.

WILD GOOSE GAS FIELD





CONTOURS ON ELECTRIC LOG MARKER IN CAPAY



LOCATION: 10 miles northwest of Colusa

TYPE OF TRAP: Dome

ELEVATION: 65

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial production: Daily (Mcf)	Initial production: Flow pressure (psi)	Initial production: Bean size (in.)	Date of completion
Hangtown (Sub Capay)	Exxon Corp. "Wild Goose Gas Unit 1" 6	Humble Oil & Rfg. Co. "Wild Goose" 6	17 17N 1E	MD	4,000	940	24/64	Sep 1963
Upper Wild Goose	Exxon Corp. "Wild Goose Gas Unit 1" 4	Honolulu Oil Corp. "Honolulu-Humble Wild Goose" 4	17 17N 1E	MD	7,340	880	36/64	Jul 1953
Afton	Exxon Corp. "Wild Goose Gas Unit 1" 6	Humble Oil & Rfg. Co. "Wild Goose" 6	17 17N 1E	MD	*4,840	1,040	24/64	Sep 1963
Lower Wild Goose	Exxon Corp. "Wild Goose Gas Unit 1" 1	Honolulu Oil Corp. "Honolulu-Humble Wild Goose" 1	17 17N 1E	MD	4,020	1,370	24/64	Aug 1951

Remarks: * Commingled production from Afton and Upper Wild Goose. Honolulu Oil Corp. tested this zone in open hole at a maximum rate of 2,980 Mcf per day in "Honolulu-Humble Tule Goose" 1 (now Exxon Corp. "Wild Goose Gas Unit 1" 7) during July 1952.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	B & M	Depth (feet)	At total depth: Strata	At total depth: Age
Exxon Corp. "Wild Goose Gas Unit 1" 11	Humble Oil & Rfg. Co. "Wild Goose Country Club" 7	Aug 1967	18 17N 1E	MD	7,004	Dobbins	Late Cret

PRODUCING ZONES

Zone	Average depth (feet)	Average net thickness (feet)	Geologic: Age	Geologic: Formation	Gas (btu)	Salinity of zone water gr/gal	Original zone pressure (psi)	Class BOPE required
Hangtown (Sub Capay)	2,400	10	Lt Cretaceous	Kione	N.A.	N.A.	1,105	IV
Upper Wild Goose	2,500	200	Lt Cretaceous	Kione	800	1,780 - 3,250	1,200 - 1,310	IV
Afton	2,850	30	Lt Cretaceous	Kione	N.A.	N.A.	1,335	IV
Lower Wild Goose	2,900	250	Lt Cretaceous	Kione	805	1,800 - 2,650	1,345 - 1,500	IV

PRODUCTION DATA (Jan. 1, 1973)

1972 Production: Net gas (Mcf)	1972 Production: Water (bbl)	1972 Proved acreage	1972 Maximum number producing wells	Cumulative gas production (Mcf)	Peak gas production: (Mcf)	Peak gas production: Year	Total number of wells: Drilled	Total number of wells: Completed	Maximum proved acreage
1,382,761	0	340	9	99,229,200	8,248,811	1961	16	11	360

SPACING ACT: Applies

BASE OF FRESH WATER: 1,050

CURRENT CASING PROGRAM: 9 5/8" cem. 500; 5 1/2" cem. through zones and across base of fresh-water sands.

METHOD OF WASTE DISPOSAL: Water is injected into Exxon Corp. disposal well.

REMARKS: Commercial gas deliveries began in November 1951.

REFERENCES: Hunter, G.W., Wild Goose Gas Field: Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 41, No. 1 (1955).

Attachment 2:

Plan for Class II Program Improvements

Introduction

Since at least the time of the US EPA's 1983 delegation of primacy to the Division of Oil, Gas and Geothermal Resources (Division), the Division's largest regulatory endeavor has been its Class II underground injection control (UIC) program. Significant improvements to this plan will, by necessity, require significant changes in all aspects of the Division – leadership, staffing, training, data management, establishment of metrics, internal review and monitoring against standards. Organizational change of this magnitude is profound, affecting every employee action every day. The Brown Administration, the Department of Conservation and the Division have committed to this organizational restructuring, of which this Plan for Class II UIC Program Improvements is an important – but not sole -- piece.

Given the years of work and level of resources required, it is critical to know what the target is. This plan should be understood in the context of this vision for the Division:

> The Division will become a modern, efficient, collaborative, science-driven agency that intelligently and consistently regulates State oil and gas activities using modern field tools integrated with advanced data management systems that allow for oversight of a greater number of activities. Safety and training will become integrated cultural norms. The Division will be much better connected with oil and gas-related research activities in industry, academia, and national laboratories so that it can see regulatory challenges coming in advance and apply regulations from an elevated platform of understanding. The Division will perform its duties with integrated collaboration of other State agencies to reduce the environmental impact of oil and gas development. Internal monitoring and compliance will be routine and fully integrated with all that we do so that Division performance can be measured objectively. The Division will be paperless and have instant access to data and information, and hence be able to support all stakeholder groups. Likewise, stakeholder groups will be able to routinely observe Division activities and retrieve information of interest. The Division will have more effective communications capabilities and be more comfortable engaging stakeholder groups.

BACKGROUND AND OVERVIEW

Injection wells have been an integral part of California's oil and gas operations for over 50 years. Currently, over 50,000 oilfield injection wells are operating in the state. Injection wells are used to increase oil recovery and to safely dispose of waste fluid produced with oil and natural gas. About 70-75 percent of California's oil production is the result of enhanced oil recovery (EOR) methods such as steam flood, cyclic steam, water flood, and natural gas injection, all of which involve some sort of injection activity.

Most of the oil and gas fields in the state are mature and require EOR to be productive. Each year more responsibility rests with the Division's Underground Injection Control (UIC) Program to deal with the enhanced recovery of the resource. This includes new methods and techniques developed by the industry to produce the oil and gas. The increased use of injection, such as cyclic steaming, also presents new public health and safety risks, especially in fields with older wells. These risks include groundwater contamination, reservoir fluids leaking to the surface, and fires and blowouts caused by the migration of oil and gas. Urban encroachment on or around older oil and gas wells raises additional issues and concerns.

The Horsley Witten audit, conducted at the request of the Division for the US EPA, was completed and sent to the Division in September 2011. The following issues were outlined in the audit:

- Additional plugging and cementing requirements to protect underground sources of drinking water (USDW)
- More in-depth evaluation of the zone of endangering influence (ZEI)
- Requirements for waste fluid disposal
- Changes to requirements for pressure gauges and/or monitoring of zone pressure
- Well construction and cementing
- Annual project reviews
- Standard Annual Pressure Test (SAPT) requirements
- Well monitoring requirements instead of the SAPT
- Mechanical integrity surveys and testing
- Inspections and compliance/enforcement practices and tools
- Idle well planning and testing program
- Financial responsibility requirements
- UIC staff qualifications
- Cyclic steam injection well testing requirements

In addition to the US EPA audit, the legislature has been involved with several UIC issues and has noted other areas that need to be addressed in regulation. These include:

- H2S/Waste Gas Disposal
- Freshwater usage relating to EOR projects
- CO2 EOR Projects

Additional areas of concern relating to the Division's UIC program include:

- Production from shallow diatomite formations
- Surface expressions
- Aquifer exemption process

- Well construction standards
- Injection relating to formation fracturing pressure

ACTIONS TAKEN TO DATE

The Division first identified issues with its UIC Program in 2009. Division management began a review of then-current practices in regards to approving injection projects, annual project reviews, and the evaluation of wells within the Area of Review (AOR). At the conclusion of the Division's self-assessment, it developed a general plan to work with the administration and Legislature to increase the number of staff so that several deficiencies in the program could be addressed proactively. 17 positions (PYs) established in the FY 2010-2011 budget were spread throughout the Division to add staff to the UIC program to ensure project applications were reviewed according to both the program specifications outline in the Primacy application to the US EPA and in accordance with State statutes and regulations. In addition, Division management also put in place a Letter of Expectations to remove any confusion regarding how injection project applications were to be evaluated. These expectations were issued in May 2010 and revised in November 2010. The Letter of Expectations was mentioned and supported in the Horsley Witten Report.

As the Division continued to monitor its performance and the pace of program improvements, the Division recognized that additional resources were needed to reach improvement goals and therefore requested and received additional staff in FY 2011-2012. Most of these positions were added to the UIC program to provide additional staff to conduct an adequate UIC project application review. Several PYs were used to form an internal monitoring and compliance group to dig deeper into the UIC project files to provide a more refined evaluation of the Division's internal adherence to UIC requirements. Once established, the Monitoring and Compliance Group began an assessment of the Division's activities in District 1 (Los Angeles Basin) regarding past and current work regarding UIC project approvals, area of review and zone of endangerment assessments, project monitoring and annual reviews.

To meet the objectives listed in the Letter of Expectations, Division management executed an internal strategy to explain and train staff regarding the requirements for an UIC project approval, and how existing projects were to be reviewed, remediated and monitored to move UIC projects to full compliance.

As these activities were underway, Division management recognized the need to address the emergence of cyclic steam enhanced oil recovery as not only a rapidly evolving technology but one that was being employed to produce a major fraction of the state's oil. Further, the Division set in motion steps to deal with the mismatch between existing regulations and the realities in the state's oilfields. Of greatest concern was cyclic steam production from shallow diatomite formations as this type of production was rapidly emerging, and the state's regulations were inadequate to properly regulate these activities and ensure protection of USDWs.

Moving Forward and UIC Assessment

Even though there has been consistent recognition by several top leaders within the Division that the UIC program has had significant deficiencies, Division plans and actions for UIC improvement have been less effective than needs demand. In part, the mismatch between plan objectives and results have been caused by numerous management changes. Furthermore, it was not fully understood that fundamental problems with the lack of consistent business processes, poor record-keeping and the lack of modern data management tools were only some of the root causes of the Division's lack of performance in the UIC program. Hence, until recently, a coherent plan addressing broad, fundamental foundational problems was not developed. This spring, with the strong support of the Brown administration, the Division requested and received 23 additional positions to address deficiencies in a number of areas – capacity in program leadership, monitoring and compliance, data management and geographic information systems, emerging technologies, and environmental review. Furthermore, as part of the overall plan, the Division requested and received funding for a modern data management system designed for the oil and gas regulatory environment. Further changes will be forthcoming in the weeks ahead to better align the Division for significant performance improvements.

The Division has already started its UIC program evaluation and will continue the following efforts:

- Identifying gaps in UIC Program compliance and develop a corrective action plan
- Hiring qualified personnel to fill retirement and new position vacancies
- Providing technical and regulatory training for UIC staff
- Increasing management oversight of UIC staff
- Increasing accountability for technical work
- Conducting outreach to the public regarding state and federal mandates
- Conducting outreach to the oil and gas industry to raise awareness of changes in Division regulatory approaches and monitoring
- Pursuing and implementing electronic data systems development

California is moving forward to meet the changing regulatory imperatives with respect to technology, demographics, and more aggressive oversight of oil and gas production. To reiterate, the target is to evolve the Division to a modern, efficient, collaborative, science-driven agency that intelligently and consistently regulates State oil and gas activities using modern field tools integrated with advanced data management systems that allow for oversight of a greater number of activities. Safety and continuous training and improvement will become integrated cultural norms. The Division will be much better connected with oil and gas-related research activities in industry, academia, and national laboratories so that it can see regulatory challenges coming in advance and apply regulations from an elevated platform of understanding. The Division will perform its duties with integrated collaboration of other State agencies to reduce the environmental impact of oil and gas development. Internal monitoring and compliance will be routine and fully integrated with all that is done so that Division performance can

be measured objectively. The Division will be able to support all stakeholder groups because it will be paperless and have instant access to data and information. Hence stakeholder groups will be able to routinely observe Division activities and retrieve information of interest. The Division will have more effective communications capabilities and be more comfortable engaging the constellation of stakeholder groups.

Such profound organizational renewal will consume several years and require constant, focused attention. This work plan is an important initial piece of that renewal. The UIC plan is designed to strengthen the current UIC Program through new regulations, consistent, ongoing training, enhanced compliance oversight, and an evaluation of existing projects and UIC operations.

Assessment by Monitoring and Compliance Unit

The Division has conducted a partial assessment of the Division UIC Program by sampling and reviewing program activities and compliance oversight in one of its District offices. In the development of the assessment, the Division considered the following concerns to help develop a priority list:

- Risk to the public
- Risk to health and safety
- Risk to property
- Risk to natural resources
- Risk of litigation

Based upon known conditions at the time of the assessment, the injection projects located in the Cypress District (Division – District 1) appeared to have the highest priority. The District has around 800 injection projects, which includes over 2,000 injection wells.

The assessment was designed to give greater insight into the range of shortcomings in the Division's UIC program. The UIC program standards that should be used are listed in both California's Primacy application and the federal regulations associated with the Safe Drinking Water Act and Class II injection wells. The assessment has:

- Evaluated a representative sampling of old projects that are in fields that were discovered in the 1930's and 1940's to determine if appropriate Area of Reviews (AOR) were completed and to determine if possible conduits for the injection fluid are present
- Evaluated a representative sampling of recent projects to determine if appropriate AORs were completed and to determine if possible conduits for injection fluid are present
- Evaluated a representative sampling of the records for annual project reviews to determine if they were performed and documented adequately to determine if the project is in compliance with the project approval

- Evaluated a representative sampling of the Division's UIC monitoring program to determine if adequate Mechanical Integrity Testing (MIT) surveys were conducted, evaluated, and documented to ensure mechanical integrity of the injection wells
- Evaluated a representative sampling of the Division's UIC monitoring program to determine if the Maximum Allowable Surface Pressures (MASP) are determined correctly and monitored to ensure compliance with the project approval
- Evaluated if the Division's UIC staff are appropriately educated and trained and have the necessary tools to enforce the Safe Drinking Water Act in regards to Class II wells
- Evaluated if the Division has enough staff and resources to adequately enforce the Safe Drinking Water Act in regards to Class II wells

A draft report that lists the results of the assessment in our Cypress district office has been prepared and is under final administration review.

Bonding

The State has already addressed some of the financial responsibility requirements. Effective January 1, 2014, the State has increased its bonding amounts to address the rising costs to remediate problem wells that become the responsibility of the State. These changes also affect the number of wells that may be covered by a blanket bond. What is not clear, pending further review, is the magnitude of the state's financial liabilities and whether the incremental changes heretofore are sufficient to address long-term needs.

DIVISION'S NEXT STEPS

Individual Project Evaluation

The Division will undertake improvements to its administration of the UIC Program through a series of actions including increasing program leadership talent, enhancing field monitoring of compliance with regulations, a series of rulemakings on priority topics, and a project-by-project review of each UIC project to assess the status of the project with respect to compliance with UIC regulations, testing requirements and adherence to limitations placed on the project in project approval letters. This plan will be informed based upon the findings of the partial assessment of the UIC program already conducted. The Division will take the following steps to ensure all injection projects are in compliance with State law and the Primacy agreement with the US EPA:

1. District staff will review all of the active injection projects in the State and determine what, if any, data are missing to fully evaluate the injection project and ensure the protection of Underground Sources of Drinking Water (USDW). Any data that need to be updated because of changes or modifications to the original approval, will be identified and collected, and the project files organized and

prepared to meet two goals: improved, consistent regulatory oversight and efficient uploading of project data into the coming new data management system.

2. As this project-by-project review is underway, Division staff will meet with operators to discuss the list of deficiencies and develop a compliance schedule for all issues. Operators will be given no more than 6-12 months to supply the Division with the missing or updated data. Depending on the data requests, this timeline may be greatly reduced. Based on the project-by-project review, projects could be terminated or modified.

3. Division staff will evaluate the data submitted and require operators to make changes to ensure the project is still viable. Projects will be modified or cancelled based on this analysis.

4. All projects will be evaluated by the District office and sent to Sacramento for review and concurrence by the program director prior to being approved.

5. Projects may require a new Project Approval Letter (PAL) with additional conditions and/or reporting requirements to ensure compliance.

6. All projects will be reviewed to assess containment of injection fluids. The Division will work closely with the State Water Quality Control Board on the evaluation of fluid containment and the adequacy of the required zone of endangering influence and area of review.

7. All injection data will be entered or verified in the State's databases. Because existing databases may not have the capacity to manage all the data required, the Division will implement a temporary database until the Division's data management system is developed and implemented.

8. All required mechanical integrity tests will be confirmed and verified.

9. Once every year thereafter, the projects will be evaluated to ensure the projects are operated in compliance with the PAL and all testing and monitoring requirements have been met in compliance with UIC regulations.

Project-by-Project Review Schedule

The project-by-project review process will be time consuming and demand significant investment if staff time. In the Cypress and Bakersfield districts, this effort will be very significant. Even though with the implementation of the Letter of Expectations, project applications and project files have improved, many of the injection projects were evaluated and approved under a less stringent process. Many of the Districts have had District policies in place that fell short of directives in the primacy application, statutes, and regulations. The time to complete this review will vary based upon the following:

- Number of projects in each District
- Number of injection wells in the project
- Number of wells within the AOR (project area)
- Amount and type of data missing from the project file
- Current status of the project

Division leadership expects that a review of this depth could require as much as a week (5 working days) to evaluate what is missing from a project file. Such a review can be complicated and complex since the data provided needs to be relevant and accurate, and requires comparison with the project application.

All projects are not equal in size or complexity, and based upon the project status and number of injection projects by District, the following is an estimate of time needed for initial review to evaluate existing data, identify gaps and the develop a list of compliance deficiencies:

District 1 (Cypress)
Number of projects: 817 (X 40 hours) = 32,680 hours

District 2 (Ventura)
Number of projects: 322 (X 40 hours) = 12,880 hours

District 3 (Orcutt)
Number of projects: 255 (X 40 hours) = 10,200 hours

District 4 (Bakersfield)
Number of projects: 1342 (X 40 hours) = 53,680 hours

District 5 (Coalinga)
Number of projects: 195 (X 40 hours) = 7,800 hours

District 6 (Sacramento)
Number of projects: 43 (X 40 hours) = 1,720 hours

The Division is mindful that review of all projects will not consume a full 40 hours. Some projects are no longer active, so the District staff will prioritize the projects based upon

their status. Based upon these numbers it is estimated to take anywhere from six to 18 months to complete this first phase. Phase II -- developing a compliance schedule required of operators and certifying the completion of requirements-- will consume, in total, approximately an additional 12-18 months. Therefore, the overall time to fully complete the project review, certify remedial work, and move the program into full regulatory compliance is estimated to be three years.

The Division anticipates that the review and compliance process can be completed in different districts on different schedules. Beginning October 1, 2015, the Division has developed the following schedule:

Districts 3 and 6, review complete within 7 months, compliance certification within 18 months (18 months start to finish);

Districts 2 and 5, review complete in 9 months, compliance certification in 24 months (24 months total).

District 1, review complete in 10 months, compliance certification in 28 months (28 months total).

District 4, review complete in 16 months, compliance certification in 36 months (36 months total)

A very significant unknown in this review will be the amount of time needed for joint Division and Water Board assessment and validation of containment of injected fluids. Furthermore, demands on staff time for aquifer exemption data review and preparation for the implementation of the new data management system will be significant and will have to be orchestrated to meet these timelines. Once an initial assessment of file status in each of the Districts is complete, the Division can develop a more refined assessment of schedule.

Aquifer Exemptions

The Division continues to evaluate wells that have been permitted to inject into non-exempt aquifers, according to the compliance schedule agreed upon by the Division, State Water Board, and US EPA. The Division, working with the State Water Board, is continuing to evaluate potential impacts to water supply wells and, where precautionary measures are needed, ordering wells to cease injection if there is a potential impact to any water supply well. In addition to the well evaluation, the Division and State Water Board are working with operators to obtain additional data on aquifers to determine if the State will pursue aquifer exemption applications to the US EPA. The State continues to meet its obligations to the compliance schedule and acknowledges that a failure to receive approval from the US EPA on proposed aquifer exemptions will result in additional injection well closures.

Staffing

As noted above, the Division has recently received 23 additional positions to augment the Division's program. Ten positions will be deployed to the district offices to enhance field presence and the review of UIC projects. Five positions will be added to the GIS/Data Management Unit to ensure data quality and support to the district staff evaluating UIC project applications and reviews. Three positions will be added to the California Environmental Quality Act (CEQA) Unit to ensure compliance with project approvals and environmental reviews associated with the approvals. Four positions will be added to the Monitoring and Compliance Unit, which will increase capacity to the current Monitoring and Compliance Unit to ensure there is consistency throughout the Division and that all districts are fully implementing the UIC program. We have also added one position to the legal staff to assist with rulemakings, litigation, and other legal issues associated to UIC issues.

The Division is also assessing its organizational structure, workload, and supervisory oversight requirements of the organization and is preparing to make adjustments to be more effective and to better assimilate the additional staff. These adjustments, based upon identified priorities, will be announced soon.

Compliance Monitoring

This work plan includes utilizing the Division's Monitor and Compliance Unit to verify District staff are following statutes, regulations, and policies in the regulating of the UIC projects. This unit is separate from the UIC Program and therefore can provide objective analysis of the adequacies of the UIC Program improvements. This unit is comprised of one Senior Oil and Gas Engineer to oversee the unit, seven Engineers, and one Associate Government Program Analyst. This team will provide the necessary resources to assist with the improvement plan implementation and execution, and then continued monitoring to ensure Division statutes, regulations, and policies are followed. This unit is providing feedback to the Technical Services Manager, UIC Program Manager, and the Chief Deputy to ensure accountability.

Training

The Division is seeking a Technical Training Coordinator to evaluate training needs of the Division's technical staff. As we move to fill this position, the Division is also moving to put in place training contracts and training requirements for staff to complete, prior to going into the field and evaluating UIC project applications. The Division is also in the process of developing a training plan that clearly outlines the necessary training requirements for each level of engineer as well as a list of skills, knowledge, and abilities for each level of engineer. This plan is also expected to be ready by autumn, 2015.

In addition to specific training courses, the Division will continue its meetings of engineers in the Districts. The Division has had two such meetings in the last year.

These meetings are designed to develop team work and share important information regarding different aspects of the work district engineers perform. They provide a forum to share findings regarding investigations of injection activities the Division has undertaken and provide guidance as to how to monitor and identify issues before problems occur.

Business Process

The Division lacks clear and consistent business process. To deal with this challenge, the Division has contracted for assistance with:

1. Identification of the various permitting processes throughout the Division
2. Identification of common relevant steps in each the process
3. Recommendations of statewide processes for our permitting

Along the way, the contract will ensure that legislative mandates are being captured in our existing processes. Much of the work done for this will also contribute to essential preparations for the implementation of our data management project.

Phase 1 of the contract will require 90 days. The contractor is now traveling to District offices to interview employees who have a part of the UIC program.

Data Management System

The Division has already begun working with the California Department of Technology to evaluate our current systems and to develop a plan to meet the Division's future data management needs. This plan will include looking at a data management system that captures all the required data and a method for either the Division to push data to an US EPA-wide data management system or a method for EPA to download data. The State employs a "Stage/Gate" model process to assess business needs and processes and develop deliverables and project completion schedules. The entire process of assessment to delivery of a complete system could take 3-4 years including the uploading of legacy data.

Rulemaking

The Division has identified an ambitious list of regulatory goals to be accomplished by rulemaking action. This list of regulatory goals is based on the Division's own evaluation of its UIC Program, concerns raised in the review prepared by the Horsley Witten Group, input from stakeholders, and input from other regulatory agencies. In addition, these regulatory goals dovetail with issues related to the UIC Program that were identified by the California Council on Science and Technology in the independent

scientific assessment of well stimulation treatments in California that it conducted pursuant to Senate Bill 4 (Pavley 2013).

These regulatory goals each relate to the Division's UIC Program, but some issues – such as well construction standards and idle well management – are actually broader in scope than just injection regulation. Because these rulemaking goals are likely to be more than could be effectively addressed at one time, the Division will undertake its rulemaking efforts around these goals in two phases. The regulatory goals to be addressed in these two phases of rulemaking are as follows:

Phase 1

- *Clarify standards for ensuring zonal isolation of injection projects*
- *Expressly define the quality of water to be protected when constructing wells*
- *Codify best practices for well construction*
- *Establish permitting and regulatory requirements specific to cyclic steam operations*
- *Establish requirements specific to cyclic steam in diatomite, including a regulatory framework for responding to surface expressions and clarification regarding injection above fracture gradient*
- *Clarifying process and standards for establishing maximum allowable surface pressure for injection operations*

Phase 2

- *Codify requirements for ongoing project review*
- *Establish requirements for securing idle wells and standards for well abandonment*
- *Elaborate on existing idle well testing requirements*

Generally, these rulemaking goals will be accomplished through a process of (1) identifying interested parties and engaging with stakeholders to solicit concerns and suggestions; (2) drafting proposed regulations and informally soliciting input on the draft regulations; and then (3) commencing formal rulemaking to adopt proposed regulations.

The Division has already started this process for Phase 1 of its rulemaking effort. The Division has circulated a notice identifying the Phase1 regulatory goals and encouraging people to identify themselves as interested parties for the rulemaking effort. In the near future, the Division will be sending notice to interested parties of workshops to be conducted this fall throughout the state, in order to provide an opportunity to provide

input on how to best accomplish the regulatory goals identified. The Division's goal is to informally circulate draft regulations in November 2015, commence formal rulemaking in January 2016, and complete the rulemaking process for the Phase 1 rulemaking effort by winter of 2016.

Although the Division has already begun giving consideration to Phase 2 regulatory goals, the Division will not begin working in earnest to pursue the Phase 2 rulemaking effort until formal rulemaking for the Phase 1 rulemaking effort is near completion. Accordingly, the Division estimates that the Phase 2 rulemaking effort will not begin until fall of 2016, and will not be completed until winter of 2017.

Conclusion

The job of meeting the many goals laid out here is indeed a substantial one. But with the continued support and effort of those involved, doing the job well will result in a modern and responsive regulatory unit that is able to meet the challenge of helping to shepherd our oil and gas resources in a way that will, to the greatest extent possible, both protect public health and the environment and maintain California's significant oil production economy.

Attachment 3: Public Participation Process For Aquifer Exemption Proposals

The purpose of this document is to explain the public participation process that the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division) will follow before submitting an aquifer exemption proposal to the US Environmental Protection Agency (U.S. EPA). The Division will not submit an aquifer exemption proposal to U.S. EPA without concurrence from the State Water Board and the appropriate Regional Water Quality Control Board (collectively Water Boards) that the proposal is appropriate, and the Division will not submit a proposal for public comment unless the Division and the Water Boards agree that the proposal merits consideration.

- **Public Notice and Comment**

    - Timing. Public notice and opportunity to comment will be provided after the Division and the Water Boards make an initial determination to request U.S. EPA approval of a new aquifer exemption, but before any final proposal is submitted to U.S. EPA.

    - Newspaper Publication. The Division will publish notice of proposed aquifer exemptions in at least one newspaper. The most appropriate newspaper will be determined on a case-by-case basis, but generally will be the most widely-circulated, daily-issue newspaper in the county where the aquifer is located. Notice may be published in a second newspaper, if deemed necessary to target a wider audience or more local community. All notices will be published for three consecutive days, beginning (but not necessarily ending) on a weekday.

    - Length of Notice and Comment Period. The Division will accept public comment for a period of at least 30 days beginning on the first day notice is published in the newspaper. If substantial changes are made to the proposed exemption after the close of the initial notice and comment period, the Division will reopen a supplemental, 15-day notice and comment period beginning on the first day the supplemental notice is published in the newspaper.

    - Website. The Division will establish a webpage within its current website to hold all notices, information submitted in support of exemptions, public comments, and other materials on which the Division relies. The notices will direct readers to the webpage for more information, which will more fully inform the public and enable a meaningful opportunity to comment.

    - List Serve. The webpage for aquifer exemptions will allow individuals to join a list serve for receiving email notification of all future aquifer

exemption proposals. Email notification will be sent on the same day notice is published in the newspaper, or as soon as possible thereafter.

- Outreach. On the same day notice is published in the newspaper, or as soon as possible thereafter, the Division will email or mail notice to the following:
  - Director of the Water Management Division, U.S. EPA Region IX;
  - Chairperson of the State Water Resources Control Board;
  - Chairperson of the Regional Water Quality Control Board(s) with jurisdiction over the area in which the aquifer is located;
  - The Board of Supervisors of the county(s) in which the aquifer is located, and any other local officials identified as likely to be interested;
  - State Senators in the following committees: Agriculture; Energy, Utilities and Communications; Environmental Quality; Natural Resources and Water;
  - State Assembly Members in the following committees: Agriculture; Natural Resources; Water, Parks & Wildlife; and
  - Industry associations and non-governmental organizations identified as likely to be interested;

- **Public Comment Hearings**
  - Schedule and Notice. A joint public comment hearing will be held with a designee from the State Water Board for the purpose of providing an opportunity for people to provide oral comments. The initial notices for a proposed aquifer exemption will specify the date of the hearing date, which will always be at least 30 days from the date of the notice.
  - Location. Hearings will be held at a location convenient for the parties involved or in Sacramento.
  - Consolidation. The Division and State Water Board will set aside one day every month (or every other month, depending on the rate of proposals under review) for holding a public hearing on proposed aquifer exemptions. Several aquifer exemption proposals will normally be considered at each hearing, with each proposal allocated a separate time slot. The number of exemption proposals at issue in a hearing will depend on readiness of the proposals and their relative complexity.
  - Requests for U.S. EPA Participation. The Division and State Water Board may elect to request U.S. EPA's participation at the hearing. Requests for

U.S. EPA participation will be made at least 10 days prior to the date of the hearing.

- Conduct. Public hearings will be conducted as follows:
  - Division staff will provide a brief introduction regarding each aquifer exemption;
  - The purpose of the public comment hearings is to receive public input – the Division and State Water Board will receive public comments but will not necessarily answer questions or debate issues;
  - All attendees will be provided an opportunity to provide oral or written statements, though the Division and State Water Board may impose reasonable limitations on oral presentations;
  - Hearings will be recorded by an audio/video recording device, or by a stenographer; and
  - If an attendance list or similar document is posted or circulated at the hearing, the document will state that signing-in is voluntary and that all persons may attend regardless of whether they sign-in.

- **Outcome**
  - Notice of Substantial Changes. As noted above, the Division will reopen a 15-day supplemental notice and comment period for substantial changes made to the proposed exemption following close of the initial comment period.
  - Decision and Response to Comments. If the Division and the Water Boards elect to submit an aquifer exemption proposal to U.S. EPA, it will prepare a document that (1) announces the decision, (2) provides a concise statement of the basis for the decision, and (3) summarizes the substantive comments received (including oral comments received at a hearing) and the disposition of those comments. This document will be included in the submittal to U.S. EPA.
  - Submission to U.S. EPA. In the unlikely event it takes the Division longer than one year from the date of initial notice to submit an aquifer exemption to U.S. EPA, the Division will consider whether there are any changed circumstances that may reasonably require a new round of notice and comment.