



Central Valley Regional Water Quality Control Board

28 August 2020

Lauren Gentile, Environmental and
Regulatory Manager
Aera Energy LLC
10000 Ming Avenue
Bakersfield, CA 93311

CERTIFIED MAIL
7019 2970 0001 5202 3828

ORDER PURSUANT TO CALIFORNIA WATER CODE SECTION 13267

You are legally obligated to respond to this Order. Read this Order carefully.

Aera Energy LLC (hereinafter, Aera) is the operator of the injection wells identified in Attachment A of this Order; located in or near the Lost Hills, South Belridge, and North Belridge Oil Fields. The identified wells are hereinafter referred to as “injection wells subject to this Order.” Attachment A also provides public information about these wells from the California Department of Conservation, Geologic Energy Management Division (CalGEM). A publication by the United States Geological Survey (USGS)¹ revealed to the Central Valley Regional Water Quality Control Board (Central Valley Water Board) that injected fluids from injection wells completed in the Tulare Formation in portions of Lost Hills, North Belridge, and South Belridge Oil Fields have potentially migrated outside of an aquifer exempted from the protections of the federal Safe Drinking Water Act (42 U.S.C. § 300f et seq.).

As described further below, for the injection wells subject to this Order or any additional injection wells identified by Aera, Aera is required to submit technical reports containing information about (1) the injection wells, (2) the fluids injected in the wells into the aquifer, (3) the quality of the groundwater in the aquifer where fluids have been injected, (4) the lateral and vertical extent of impacts from injected fluids on groundwater quality in the aquifer, and (5) water supply wells completed in the aquifer.

¹ Gillespie et al., Groundwater Salinity and the Effects of Produced Water Disposal in the Lost Hills–Belridge Oil Fields, Kern County, California, *Environmental Geosciences*, v. 26, no. 3 (September 2019), pp. 73–96

[Link to publication –](#)

(<http://archives.datapages.com/data/deg/2019/EG032019/eg18009/eg18009.html>)

[Link to supporting data –](#)

(<https://www.sciencebase.gov/catalog/item/5b4d123ce4b06a6dd17c59ab>)

KARL E. LONGLEY ScD, P.E., CHAIR | PATRICK PULUPA, ESQ., EXECUTIVE OFFICER

The Central Valley Water Board's authority to require technical reports derives from section 13267 of the California Water Code, which specifies, in part, that:

(a) A regional board...in connection with any action relating to any plan or requirement authorized by this division, may investigate the quality of any waters of the state within its region.

(b)(1) In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region...that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The Central Valley Water Board is concerned about the potential threat to human health and potential impacts to water quality posed by the migration of injected fluids into a non-exempt aquifer that may be suitable for drinking water supply and other beneficial uses. Given the report cited above, this Order is designed to assess the cause of the migration to be sure it has adequately been resolved and any water quality impacts addressed. The technical information and reports required by this Order are necessary to assess the potential threat to human health and potential impacts to water quality. Information regarding the use of these wells and the materials injected is within Aera's control. The need to understand the potential threat to human health and potential impacts to water quality justifies the need for the information and reports required by this Order. Based on the nature and possible consequences of the discharges of waste, the burden of providing the required information, including reporting costs, bears a reasonable relationship to the need for the report, and the benefits to be obtained. Aera is required to submit this information and reports because it is the operator of the injection wells subject to this Order. If Aera and its predecessors in interest have never injected fluids into the injection wells subject to this Order, please advise Central Valley Water Board staff of this in writing as soon as possible.

Under the authority of California Water Code section 13267, the Central Valley Water Board hereby orders Aera Energy LLC to:

1. By 30 October 2020, submit a technical report in the form of a work plan that describes proposed tasks and time schedule to be completed to investigate the lateral and vertical extent of impacts to groundwater quality in the aquifer(s) from the injection of fluids in the injection wells subject to this Order or any additional injection wells identified by Aera. Aera shall implement approved tasks in accordance with the time schedule approved by the Executive Officer, as described in more detail below.

2. By 20 November 2020, for the injection wells subject to this Order or any additional injection wells identified by Aera, submit a technical report that contains the following information:
 - a. Identification of any injection wells completed within the Tulare Formation that are owned and/or operated by Aera that are not identified in Attachment A; including any injection wells that are considered to be active, idle, plugged and abandoned, or wells that were converted from an injection well.
 - b. For the fluids being injected into the injection wells an analysis of a representative sample of those fluids in accordance with the water quality analysis and reporting requirements contained in Attachment B to this Order.
 - c. Historical chemical analyses of the fluids injected into each injection well.
 - d. Analytical data for groundwater samples collected from the injection zone(s) in each of the injection wells.
 - e. Representative formation pressure data collected from the injection zone(s) in each of the injection wells.
 - f. A list and location map of all water supply wells within three miles of any injection well.
 - g. Information for each identified water supply well, including the well owner name and contact information; type of well (i.e., domestic, irrigation, industrial, etc.); whether any of the water is used for domestic purposes; status (i.e., active, idle, etc.); well construction; borehole geophysical logs; and all analytical results for any water sample(s) collected from each water supply well. Notify Central Valley Water Board staff within 24 hours upon determination that any water supply well information cannot be obtained from the California Department of Water Resources because it is confidential.
 - h. For each injection well, provide the following information. The information for items A-P shall be in spreadsheet format, labeled with the capital letters indicated. The information for items Q-T shall be in attachments:
 - A. The name of the owner and/or operator of the injection well;
 - B. API number for the injection well;
 - C. Injection well name and number;
 - D. Name of the field in which the injection well is located;
 - E. County in the which the injection well is located;
 - F. Latitude and Longitude (decimal degrees) of well head location;
 - G. Latitude and Longitude Datum, indicate "1" for North American Datum of 1983 or "2" for North American Datum of 1927;
 - H. Elevation and datum of the well head (feet above mean sea level);
 - I. Injection well total depth (feet);
 - J. Top injection depth (feet);

- K. Formation/Zone name at top injection depth;
- L. Bottom injection depth (feet);
- M. Formation/Zone name at bottom injection depth;
- N. Date injection started in the well (Day/Month/Year, xx/xx/xxxx);
- O. Total injection volume in barrels from the date injection began through 31 August 2020;
- P. Total injection volume in barrels for the 12-month period from 1 September 2019 through 31 August 2020;
- Q. Well construction diagram including all perforations, annular material, and seals;
- R. A description of the sources of fluid injected;
- S. The data maintained in compliance with California Code of Regulations, title 14, section 1724.10, subdivision (h); and,
- T. Documentation associated with each mechanical integrity test undertaken to comply with California Code of Regulations, title 14, section 1724.10, subdivision (i).

The technical reports and information required by items 1 and 2 above must be uploaded to the [State Water Resources Control Board's \(State Water Board's\) Geotracker database](https://geotracker.waterboards.ca.gov/esi/login.asp) (<https://geotracker.waterboards.ca.gov/esi/login.asp>) in an electronic format that follows the [requirements of California Code of Regulations, title 23, section 3893](http://www.waterboards.ca.gov/ust/electronic_submittal/docs/text_regs.pdf) (http://www.waterboards.ca.gov/ust/electronic_submittal/docs/text_regs.pdf). Central Valley Water Board staff has provided, in Attachment A, a unique GeoTracker identifier (Global ID number). Your state-certified laboratory will need the assigned Global ID number to upload to GeoTracker the certified analytical results for each well. GeoTracker upload instructions are also provided in Attachment A.

Based on the information submitted in the work plan and/or technical report, additional information or action may be required.

All required technical information must be submitted to the attention of:

Alex Olsen
Central Valley Water Board
1685 E Street
Fresno, CA 93706

In addition, all information is to be copied to CalGEM, to the attention of:

Uduak-Joe Ntuk, State Oil and Gas Supervisor
Department of Conservation, Geologic Energy Management Division
801 K Street
Sacramento, CA 95814-3500

Submissions pursuant to this Order need to include the following statement signed by an authorized representative of Aera:

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”

Please note that the information produced in response to this Order will be used to ascertain the extent of the migration, as well as the impacts and any necessary remedial actions. Investigative orders are iterative in nature, and subsequent orders may be narrower and more precise in scope.

All technical reports and time schedules required herein are subject to the approval of the Executive Officer. The failure to furnish the required reports by the due dates herein or in a time schedule approved by the Executive Officer, or the submission of a substantially incomplete report or false information, is a misdemeanor, and may result in additional enforcement actions, including issuance of an Administrative Civil Liability Complaint pursuant to California Water Code section 13268. Liability may be imposed pursuant to California Water Code section 13268 in an amount not to exceed one thousand dollars (\$1,000) for each day in which the violation occurs.

In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.

Any person aggrieved by this Order of the Central Valley Water Board may petition the State Water Board to review the action in accordance with California Water Code section 13320. The State Water Board must receive the petition by 5:00 p.m., within 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. [Copies of the law and regulations, and instructions applicable to filing petitions](#) are available at the State Water Board's Website or will be provided upon request (http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml).

Lauren Gentile
Aera Energy LLC

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28 August 2020

Any questions regarding this matter should be directed to Alex Olsen at (559) 445-6076
or at Alex.Olsen@waterboards.ca.gov.

Clay L. Rodgers

for Patrick Pulupa
Executive Officer

Enclosure: Attachment A, Information about the Injection Wells Subject to this Order,
Assigned GeoTracker Global Identification Numbers, and GeoTracker
Upload Instructions

Attachment B, Water Quality Sampling, Analysis and Reporting

cc by email: Julie Glavin, Environmental Advisor, Aera Energy LLC, Bakersfield,
JGlavin@aeraenrgy.com

ATTACHMENT A
Information about the Injection Wells Subject to this Order and Assigned
GeoTracker Global Identification Numbers

Table 1- Assigned GeoTracker Global ID Number- T10000016000

Injection Well API No.	Well Designation	Latitude	Longitude
03046564	WWD4-28	35.46871185	-119.71752930
03046565	WWD7-21	35.47382736	-119.71167755
03046566	WWD8-21	35.47714233	-119.71166992
03046567	WWD10-20	35.48006439	-119.73419952
03052882	373DR-18	35.49409485	-119.74580383
03054490	76JR-21	35.47545242	-119.71161652
03039613	56K-20	35.47507858	-119.73285675
03038386	WWD7-20	35.48222733	-119.73572540
03038387	WWD3-21	35.47079849	-119.71892548
03043068	WWD1-28	35.46396637	-119.70949554
03043069	WWD2-28	35.46535110	-119.71247101
03043070	WWD7-27	35.46565247	-119.70461273
03043071	WWD8-27	35.46805191	-119.70331573
03043072	WWD9-27	35.45884323	-119.70491028
03043073	WWD8-20	35.47703934	-119.72808838
03043731	WWD4-21	35.47045517	-119.71504211
03047481	WWD5-21	35.47372437	-119.71604919
03047482	WWD6-21	35.47715759	-119.71604919
03047483	WWD9-20	35.47152328	-119.72566986
03047484	WWD10-27	35.46982193	-119.70086670
03047485	WWD11-20	35.48311615	-119.73844910
03047223	WWD2R-27	35.46196365	-119.70368958
03037306	WWD6-27	35.46536636	-119.70153046
03030418	WWD1-21	35.47621918	-119.72369385
03031879	WWD2-21	35.47294998	-119.72231293
03027513	WWD2-18	35.49141312	-119.74614716
03027518	WWD1-27	35.46015549	-119.70051575
03019954	354C-28	35.46401978	-119.71523285
03019956	365G-28	35.46258163	-119.71231842
02976708	375M-28	35.46192551	-119.71076202
02976993	377K-20	35.47308350	-119.72814178
03052955	WWD5-28	35.46879578	-119.71131134
03052956	WWD6-28	35.46645355	-119.70788574

Injection Well API No.	Well Designation	Latitude	Longitude
03052957	WWD14-27	35.46363831	-119.70274353
03052958	WWD15-27	35.46996689	-119.70395660
03052959	WWD20-21	35.47180557	-119.70845795
03052343	WWD16-20	35.47380447	-119.72648621
03052344	WWD17-20	35.47532272	-119.72833252
03052345	WWD19-21	35.47346115	-119.72428131
03051431	333HR-28	35.46649933	-119.71875000
03047222	311KR-28	35.46935654	-119.72311401
03053566	338KR-27	35.45748138	-119.70231628
03049535	WWD9-21	35.47108459	-119.71125031
03049536	WWD10-21	35.47370529	-119.70783997
03049537	WWD11-21	35.47704697	-119.70822144
03049538	WWD12-27	35.46747589	-119.69924164
03049539	WWD14-21	35.47233963	-119.71363831
03049861	WWD3-18	35.49328232	-119.74342346
03049862	WWD4-18	35.49602509	-119.74343109
03049863	WWD5-18	35.49864578	-119.74342346
03049864	WWD12-20	35.47694016	-119.73088837
03049865	WWD12-21	35.47429657	-119.71930695
03049866	WWD13-20	35.47579575	-119.72613525
03049867	WWD13-21	35.47705078	-119.72039032
03049868	WWD14-20	35.48411560	-119.73454285
03049869	WWD15-21	35.47544098	-119.71369171
02976697	316K-27	35.45999908	-119.70586395
02976704	322H-28	35.46794891	-119.72093964
02986994	35J-21	35.47687149	-119.72052765
02976705	333H-28	35.46637726	-119.71855927
03030816	WWD3-27	35.46313095	-119.70599365
02976250	348L-27	35.45633698	-119.70059967
02977127	355N-20	35.47611237	-119.73277283
03015074	343DR-28	35.46472168	-119.71608734
02985640	366CR-20	35.47429657	-119.73106384
03002938	56J-21	35.47528839	-119.71596527
03002939	76J-21	35.47527695	-119.71159363
03027512	WWD1-18	35.48842621	-119.74350739
03024142	385L-28	35.46155548	-119.70919037
03025618	338K-27	35.45699692	-119.70234680

Injection Well API No.	Well Designation	Latitude	Longitude
03019302	386HC-28	35.46079636	-119.70785522
03019951	344MR-20	35.47786713	-119.73535156
03046563	WWD3-28	35.46701431	-119.71549988
03047486	WWD11-27	35.46984100	-119.70700073
03037305	WWD5-27	35.46291351	-119.69990540
03032552	WWD4-27	35.45861435	-119.69775391
03030815	WWD2-27	35.46138763	-119.70321655
03028251	WWD3-20	35.48225021	-119.73584747
02972319	55JR-21	35.47678375	-119.71640015
02947109	83D-34	35.45065308	-119.68994141
02945501	21C-27	35.46964645	-119.70446014
02945719	55J-21	35.47673798	-119.71616364
02945720	57J-21	35.47330475	-119.71613312
02945721	68X-21	35.47010040	-119.71225739
02981437	23K-27	35.46557999	-119.70463562
02978547	57JR-21	35.47337341	-119.71588135
03017912	333KR-20	35.48013095	-119.73700141
03027516	WWD1-20	35.47958200	-119.73317900
03027517	WWD2-20	35.48307800	-119.73231800
03031878	WWD6-20	35.48388800	-119.72879900
03028252	WWD4-20	35.48117700	-119.72805800
03030417	WWD5-20	35.47915800	-119.72540400
02976995	344M-20	35.47805405	-119.73526001
02976706	311K-28	35.46964645	-119.72344971
02985641	353RR-28	35.46458817	-119.71602631
03018396	57JR1-21	35.47353363	-119.71606445
03018397	58J-21	35.47112274	-119.71606445
02989392	77J-21	35.47369003	-119.71170807
02986995	75J-21	35.47684479	-119.71166229

Table 2- Assigned GeoTracker Global ID Number- T10000016006

Injection Well API No.	Well Designation	Latitude	Longitude
02937609	Dow Chanslor 5	35.51170349	-119.76284790
02968056	Dow Chanslor I-1	35.51169586	-119.76165009
02968053	Dow Chanslor H-2	35.51230621	-119.76165009

Injection Well API No.	Well Designation	Latitude	Longitude
02967876	Dow Chanslor G-1	35.51291656	-119.76222992
02966167	Dow Chanslor G-3	35.51293945	-119.76161957
02941723	Dow Chanslor 11A	35.51543427	-119.76282501
02901172	Dow Chanslor 32A	35.51524734	-119.76549530
02948503	Dow Chanslor 33	35.51050568	-119.77366638
02901168	Dow Chanslor 32	35.51169586	-119.77369690
02948502	Dow Chanslor 29	35.51178741	-119.77212524
02948501	Dow Chanslor 27	35.51052094	-119.77126312
02948500	Dow Chanslor 25	35.51298523	-119.77124023
02948499	Dow Chanslor 23	35.51177216	-119.77004242
02948498	Dow Chanslor 21	35.51052094	-119.76908112
02948496	Dow Chanslor 17	35.51174927	-119.76786804
02948497	Dow Chanslor 19	35.51295853	-119.76883698
02948494	Dow Chanslor 13	35.51295471	-119.76644897
02948493	Dow Chanslor 11	35.51172638	-119.76524353
02937751	2-36	35.53955460	-119.77539825
02937757	8-36	35.54080200	-119.77590179

Table 3- Assigned GeoTracker Global ID Number- T10000016007

Injection Well API No.	Well Designation	Latitude	Longitude
02974433	47D-12	35.50108719	-119.66304016
02975997	47P-12	35.50125122	-119.66304016
02978711	154R-12	35.50680161	-119.66278839
02978710	54R-12	35.50680161	-119.66265869
02978709	151E-12	35.51361465	-119.66280365
02978708	51E-12	35.51361465	-119.66267395
02978705	188C-1	35.51480484	-119.65531921
02978704	88C-1	35.51480484	-119.65518188
02978825	154R-1	35.52147293	-119.66283417
02988059	54RR-1	35.52152252	-119.66271973
02989129	54R3-1	35.52158356	-119.6627121
02978824	54R-1	35.52202225	-119.66270447
02978644	84D-1	35.52090836	-119.65447998

Injection Well API No.	Well Designation	Latitude	Longitude
02977813	184D-1	35.52204132	-119.65436554
02978707	151E-1	35.5288353	-119.66285706
02978706	51E-1	35.52878571	-119.66271973
02978645	81H-1	35.52885437	-119.65452576
02977814	181H-1	35.52885437	-119.65438843
02977811	151E-36	35.52880478	-119.67206573
02977810	118R-36	35.52911758	-119.67162323
02978621	18R-36	35.52920532	-119.67163849
02988058	18RR-36	35.52931213	-119.67165375
02978823	114R-36	35.53647995	-119.67179108
02978822	14R-36	35.53647995	-119.67166138
02978617	155G-36	35.53604889	-119.66175079
02978616	55G-36	35.5360527	-119.66161346
02978619	85H-36	35.53610229	-119.65454102
02978620	185H-36	35.53610611	-119.65441132
02978821	111E-36	35.54323959	-119.67173004
02978820	11E-36	35.54323959	-119.67160034
02978615	51E-36	35.54327774	-119.66275787
02978618	81H-36	35.54333878	-119.65485382
02977812	181H-36	35.54338074	-119.6544342

[GeoTracker Upload Instructions](https://www.waterboards.ca.gov/ust/electronic_submittal/)

(https://www.waterboards.ca.gov/ust/electronic_submittal/)

Work plans, and technical reports and associated data shall be uploaded in an electronic format compatible with the State's GeoTracker system. To begin the process:

- Log in or create a password
- Claim your site(s) (i.e. global ID)
- Add field point name(s)
- Upload the following:
 - Work plan/Technical report and associated data (GeoReport)
 - Laboratory report (EDF)
 - Site Maps (GeoMAP)

For more information, contact the GeoTracker Help Desk at Geotracker@waterboards.ca.gov.

ATTACHMENT B Water Quality Sampling, Analysis, and Reporting

Water Quality Sampling

All groundwater sampling is to be performed by a qualified person. A qualified person is any person with the knowledge and training in proper sampling methods, chain of custody, and quality assurance/quality control protocols. Any person conducting groundwater sampling, other than personnel from a certified laboratory, shall consult with the certified laboratory to ensure that the sampler understands and follows the proper sampling collection procedures and protocols. All procedures to sample groundwater supply wells shall be consistent with [US EPA Science and Ecosystem Support Division Operating Procedure for Groundwater Sampling \(March 2013\)](http://www.epa.gov/region04/sesd/fbqstp/Groundwater-Sampling.pdf)

(www.epa.gov/region04/sesd/fbqstp/Groundwater-Sampling.pdf)

Water Quality Analysis

Groundwater samples collected from wells and injection zones shall be analyzed by a laboratory certified by the Environmental Laboratory Accreditation Program, using current applicable EPA-approved analytical methods. The methods of analysis and the detection limits used shall be appropriate for the expected concentrations. The analytical method having the lowest method detection limit (MDL) shall be selected from among those methods which would provide valid results in light of any matrix effects or interferences. Analyze samples for the following:

- A. Total dissolved solids
- B. Metals listed in California Code of Regulations, title 22, section 66261.24, subdivision (a)(2)(A)
- C. Benzene, toluene, ethylbenzene, and xylenes
- D. Total petroleum hydrocarbons for crude oil
- E. Polynuclear aromatic hydrocarbons (including acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene)
- F. Radionuclides listed under California Code of Regulations, title 22, Table 64442, which includes Gross Alpha particle activity (excluding radon and uranium), Uranium, Radium-226, and Radium-228.
- G. Methane
- H. Stable oxygen and hydrogen isotopes
- I. Major and minor cations (including sodium, potassium, magnesium, and calcium)

- J. Major and minor anions (including nitrate, chloride, sulfate, alkalinity, and bromide)
- K. Trace elements (including lithium, strontium, boron, iron, and manganese)

Water Quality Reporting

Water quality information shall be submitted in a technical report that includes, at a minimum:

- A. Site plan with locations of well(s) sampled.
- B. Description of field sampling procedures.
- C. Table(s) of analytical results organized by well number (including API number).
- D. Copies of analytical laboratory reports, including quality assurance/quality control procedures and analytical test methods.
- E. Waste management and disposal procedures.