



# WELL STIMULATION TREATMENT ANNUAL REPORT

**Program Assessment**  
**JULY 30, 2023**

**Reporting Period: January 1, 2022, to December 31, 2022**  
**Prepared Pursuant to Senate Bill 4 (Ch. 313, Stats. of 2013)**

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## ACRONYMS, ABBREVIATIONS & UNITS

ADSA	Axial Dimensional Stimulation Area
BBLS	barrels
CalGEM	California Geologic Energy Management Division
CAP	Corrective Action Plan
CAS	Chemical Abstract Service
CARB	California Air Resources Board
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
DOF-OSAE	Department of Finance – Office of State Audits and Evaluations
EIR	Environmental Impact Report
FT	feet
IWSTN	Interim Well Stimulation Treatment Notice
LLC	Limited Liability Corporation
µg/L	micrograms per liter
mg/L	milligrams per liter
pCi/L	picocuries per liter
PRC	Public Resources Code
RF	Recovered Fluid Sample
SB 4	California State Senate Bill 4 (Pavley, Ch. 313, Statutes of 2013)
SOP	Standard Operating Procedure
SRIA	Standardized Regulatory Impact Assessment
TVD	True Vertical Depth
UIC	Underground Injection Control
WST	Well Stimulation Treatment
WellSTAR	Well Statewide Tracking and Reporting System

## 1.0 EXECUTIVE SUMMARY

This annual report satisfies the legislative reporting requirements of Senate Bill 4 (SB 4) [Pavley, Ch. 313, Statutes of 2013] implemented to regulate WST activities in California. Public Resources Code (PRC) section 3215(c) requires reporting on annual WST programmatic activities. This report is for the period of January 1, 2022, to December 31, 2022. There were no WST permits issued and no stimulations conducted during this period. However, this report includes data collected since the initial implementation of interim SB 4 regulations beginning on January 1, 2014, and the permanent SB 4 regulations adopted July 1, 2015. WST data presented in this report are derived from operator disclosures (post-WST job reports) submitted to CalGEM per the requirements stated in PRC section 3160(b)(2). Operators have one year from the date of the WST permit to begin stimulation and 60 days from the completion of the well stimulation to submit the WST disclosure form to CalGEM (PRC sections 3160(d)(4) and 3160(g)).

As defined in PRC section 3157(a), "well stimulation treatment" means a treatment of a well designed to enhance oil and gas production or recovery by increasing the permeability of the formation. Well stimulation is a short-term and non-continual process conducted for the purpose of opening and stimulating channels for the flow of hydrocarbons. WSTs include, but are not limited to, hydraulic fracturing, acid fracturing, and acid matrix stimulation. WSTs first became regulated in California with the passage of SB 4, which was signed into law on September 20, 2013. On January 1, 2014, interim WST regulations were issued pending the development of permanent regulations. On July 1, 2015, permanent WST regulations went into effect, and in September 2016, CalGEM issued its first WST permits under the permanent WST program.

In 2022, there were no WST permits issued or stimulations completed. Therefore, no 2022 WST data are included in this report.

CalGEM's WST Unit conducted its first enforcement actions against two operators in 2021. In that reporting period, CalGEM issued two civil penalties to two operators (California Resources Elk Hills, LLC [CRC] and Aera Energy LLC [Aera]) for the violation of WST permit conditions related to air monitoring requirements set by CARB for WST activities completed in 2019. CalGEM also issued a civil penalty in 2022 (Civil Penalty Order No. 1240) to Aera for violations of WST permit conditions related to air monitoring requirements for WST activities completed in 2018 and 2020. CalGEM received a total of \$200,000 in fines for these violations, including \$160,000 from Aera in response to Order No. 1240.

## 2.0 INTRODUCTION

A well treatment stimulation (WST) is a treatment of a well designed to enhance oil and gas production and recovery by increasing the permeability of geologic formations containing oil and gas. Hydraulic fracturing is a type of WST, as well as acid fracturing (hydraulic fracturing where acid is the primary WST fluid) and acid matrix stimulation (an acid treatment of a formation at low pressure that does not create fractures). However, stimulations that include acids are rarely completed in California and have only been performed 20 times (of 2,243 stimulations) since the beginning of the WST program in 2014. The last recorded acid fracturing stimulation was completed in August 2018.

Hydraulic fracturing is the most common type of WST used in California. The hydraulic fracturing process involves injecting a mix of fluids (primarily water), sand (proppant), and chemical additives at high pressure into an oil or gas reservoir. WSTs do not include steam flooding, water flooding, or cyclic steaming, which are Enhanced Oil Recovery (EOR) techniques. Instead, WST is a well completion technique typically completed before using the well to extract oil. Compared to EOR injections, WSTs are short-term, discrete injection operations designed to increase reservoir permeability.

WSTs became regulated in California with the passage of SB 4, which was signed into law on September 20, 2013. On January 1, 2014, interim WST regulations were issued pending the development of permanent regulations. On July 1, 2015, permanent WST regulations went into effect, with new WST permit application requirements, including requirements for review by multiple state and local government agencies, neighbor notifications, CEQA review, advanced notification for witnessing by regulatory agencies, seismic monitoring, and submission of a comprehensive post-stimulation report including recovered fluid sampling. In September 2016, CalGEM issued its first WST permits under the permanent WST program.

Since the permanent WST program was started in 2015, CalGEM issued a total of 777 WST permits, with a total of 710 stimulations completed. There has been no record of incidents, spills, or casing integrity losses related to any of the WSTs performed. In addition, no report of seismic events related to the stimulations has been recorded.



## 2.1 About the California Geologic Energy Management Division

CalGEM prioritizes the protection of public health, safety, and the environment in its oversight of the oil, natural gas, and geothermal operations in California. To do that, CalGEM uses science and sound engineering practices to regulate the drilling, operation, and permanent closure of energy resource wells. CalGEM also regulates certain pipelines and facilities associated with production and injection.

When CalGEM was established in 1915 (then known as the Department of Petroleum and Gas), the initial focus of regulation was the protection of oil and gas resources in the state from production practices that could harm the ultimate level of hydrocarbon recovery. Early CalGEM regulations included well spacing requirements and authority to limit production rates. In 2019, CalGEM's mission focus changed to prioritize the protection of public health and safety, environmental quality, and the reduction and mitigation of greenhouse gas emissions associated with the development of hydrocarbon and geothermal resources to meet the energy needs of the state.

CalGEM operates out of three districts to best serve the needs of the state: Northern, Central, and Southern (**Figure 1**). Each district has its own office(s) where staff are available to assist the public and stakeholders. CalGEM districts have been responsible for all field oversight of WST operations, including witnessing pre-WST pressure tests and chemical spot-checks during stimulation. District duties have also included a review of the 72-Hour Notification form and a final review of all relevant well logs prior to the start of the treatment.

### Contact Information

For more information about WST, visit:

<https://www.conservation.ca.gov/calgem/Pages/WST.aspx>

For questions regarding the content of this report, contact the Department of Conservation's Public Affairs Office at [pao@conservation.ca.gov](mailto:pao@conservation.ca.gov).

Figure 1: CalGEM District Locations Map



### 3.0 WELL STIMULATION TREATMENT DATA REVIEW

This section documents and discusses WST data relative to the entire period of WST regulation (beginning January 2014).

#### 3.1 Permitting and Completions

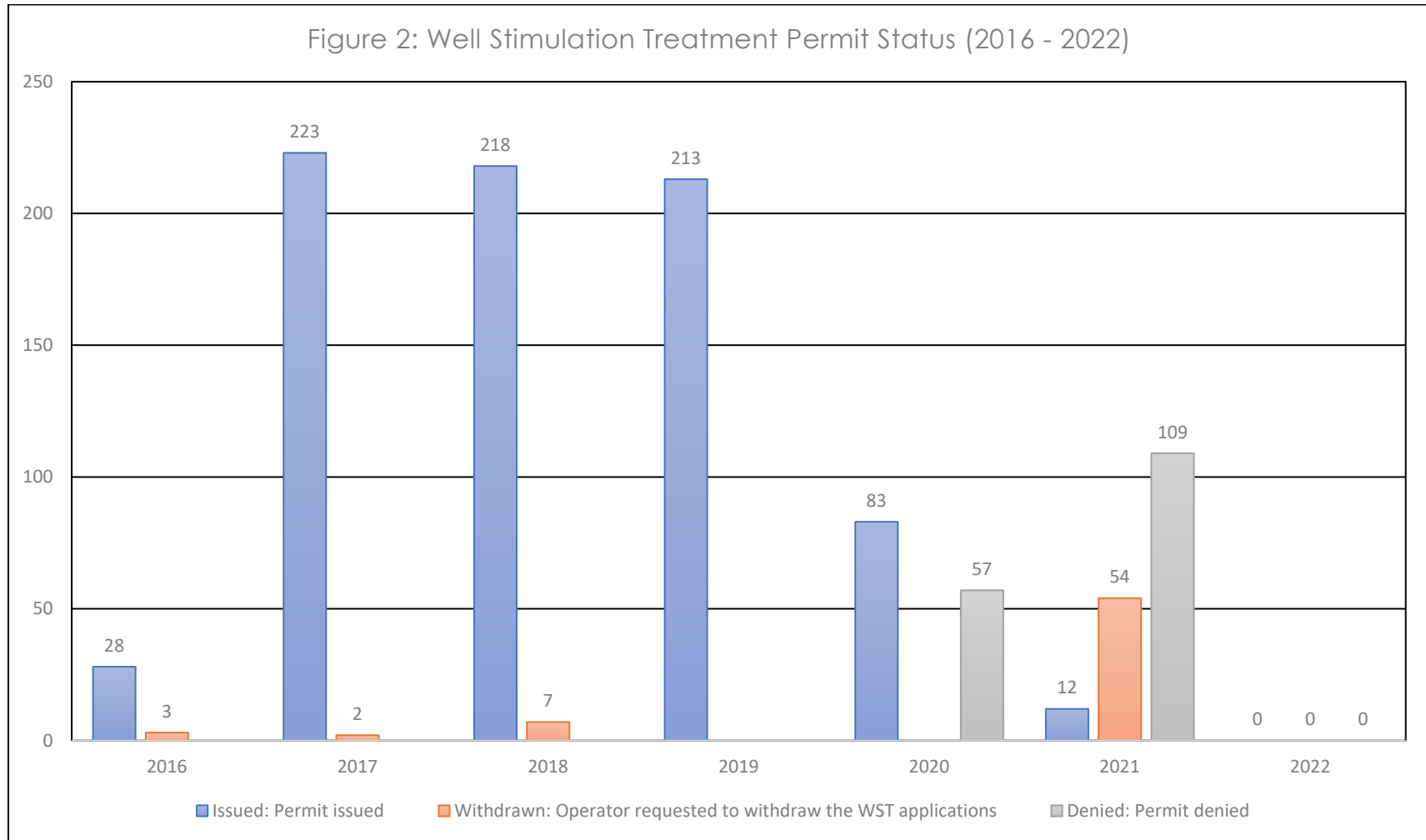
In 2022, there were no WST applications received, permits issued, or stimulations completed. No new wells were stimulated during this reporting period, which represents the first time that no stimulations have been completed in a calendar year since the implementation of the WST regulations in 2014.

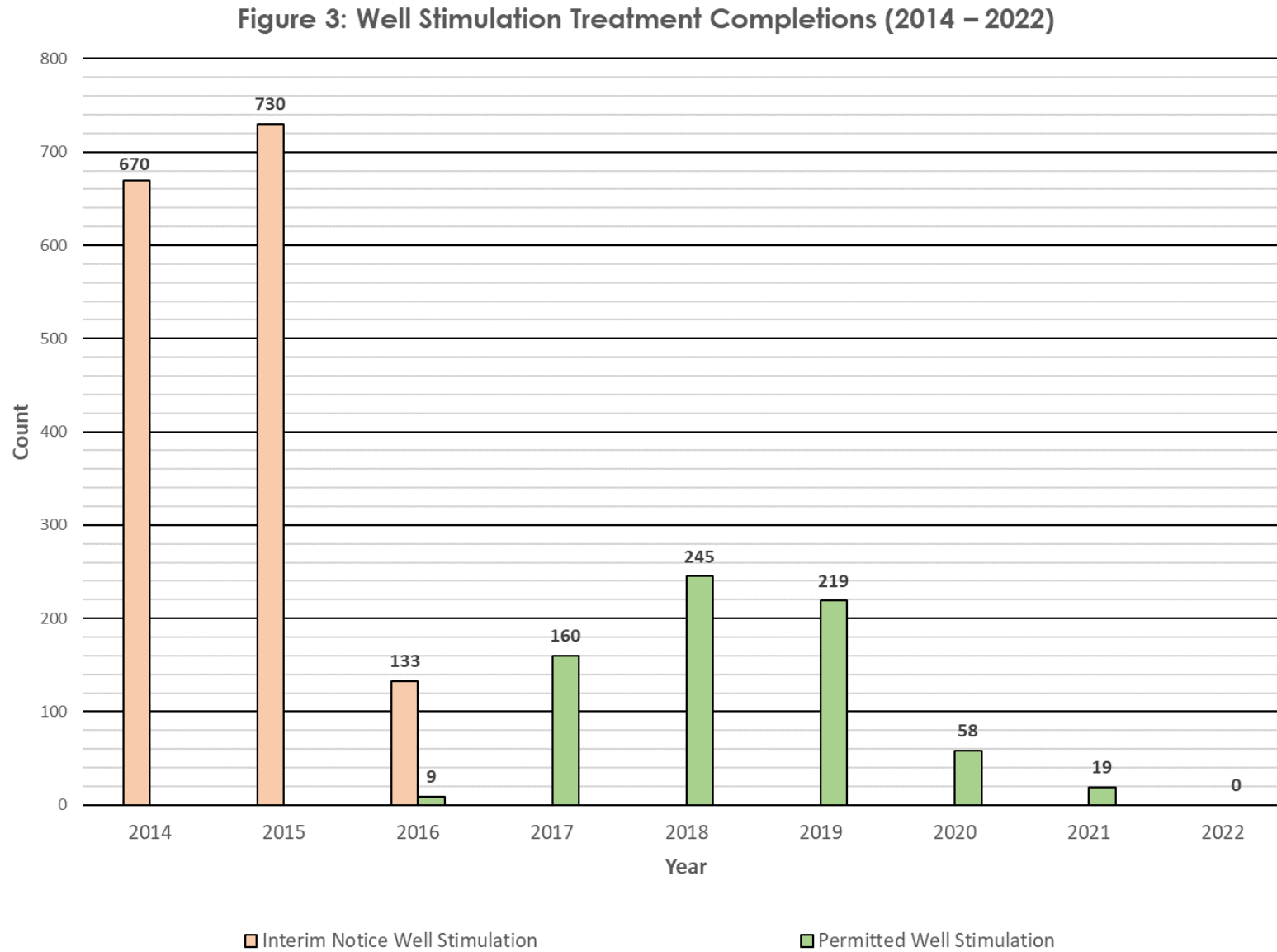
Since CalGEM started collecting WST data in 2014, the highest number of stimulations completed occurred in 2015, with 730 stimulations (all performed under Interim Well Stimulation Treatment Notices [IWSTNs]). Under the permanent regulatory period, the largest number of stimulations completed annually under a WST permit was 245 in 2018. Overall, the number of wells stimulated annually has fluctuated throughout the regulated period but has decreased significantly since implementing the WST regulations in 2014.

A total of 2,243 stimulations have been completed since the implementation of WST regulations in 2014. A total of 1,533 stimulations (68.3% of the total) were completed under IWSTNs between January 2014 and June 2016. A total of 710 stimulations have been completed under permits issued during the permanent WST program, which went into effect July 1, 2015. The first permit under the permanent WST program was issued in September 2016.

**Figure 2** depicts permits issued annually from 2016 to 2022. This chart also includes counts of permits that have been canceled by operators or denied by CalGEM.

**Figure 3** depicts counts of well stimulations performed annually from 2014 to 2022 based on whether the stimulation was performed under an IWSTN or WST permit.

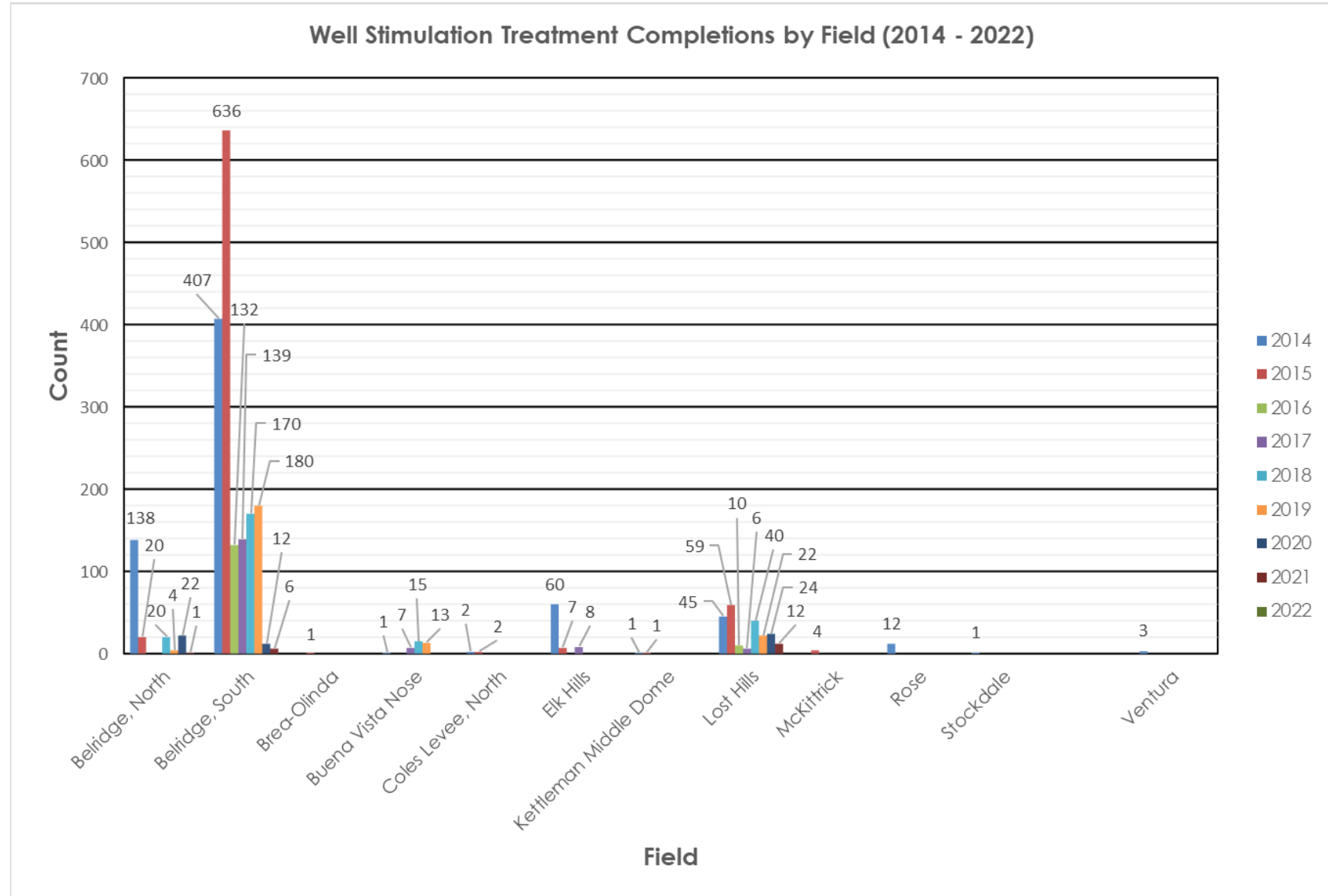
**Figure 2: Well Stimulation Treatment Permits: (2016 – 2022)**

**Figure 3: Well Stimulation Treatment Completions (2014 – 2022)**

### 3.2 Well Stimulation Treatment Locations

In 2022, no stimulations were completed in any of the oil fields in western Kern County, located within CalGEM's Central District.

**Figure 4** graphically depicts the number of stimulations completed between 2014 and 2022. As shown, the number of oil fields where WSTs have been completed has decreased since the implementation of SB 4 regulations.

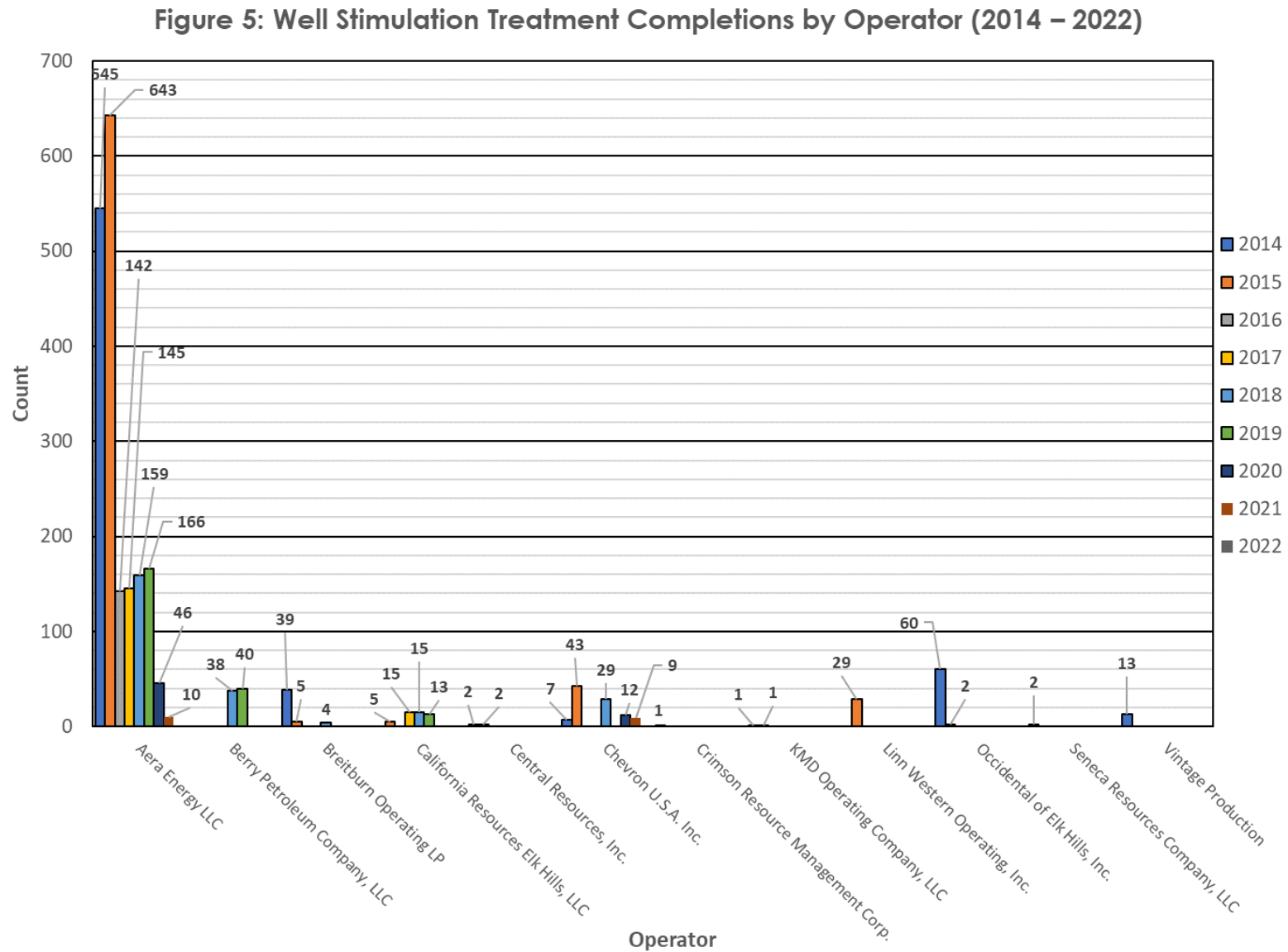
**Figure 4: Well Stimulation Treatment Completions by Field (2014 – 2022)**

### 3.3 Well Stimulation Treatment Operators

No operator completed any WST operations during the 2022 reporting period.

**Figure 5** depicts the number of stimulations completed by each operator annually since 2014, with Aera performing the most significant number of stimulations year over year. On average, Aera accounted for more than 83% of stimulations completed since 2014. The number of operators with completed stimulations since the WST regulation started has decreased from nine, in 2014, to two in 2021 and none in 2022.



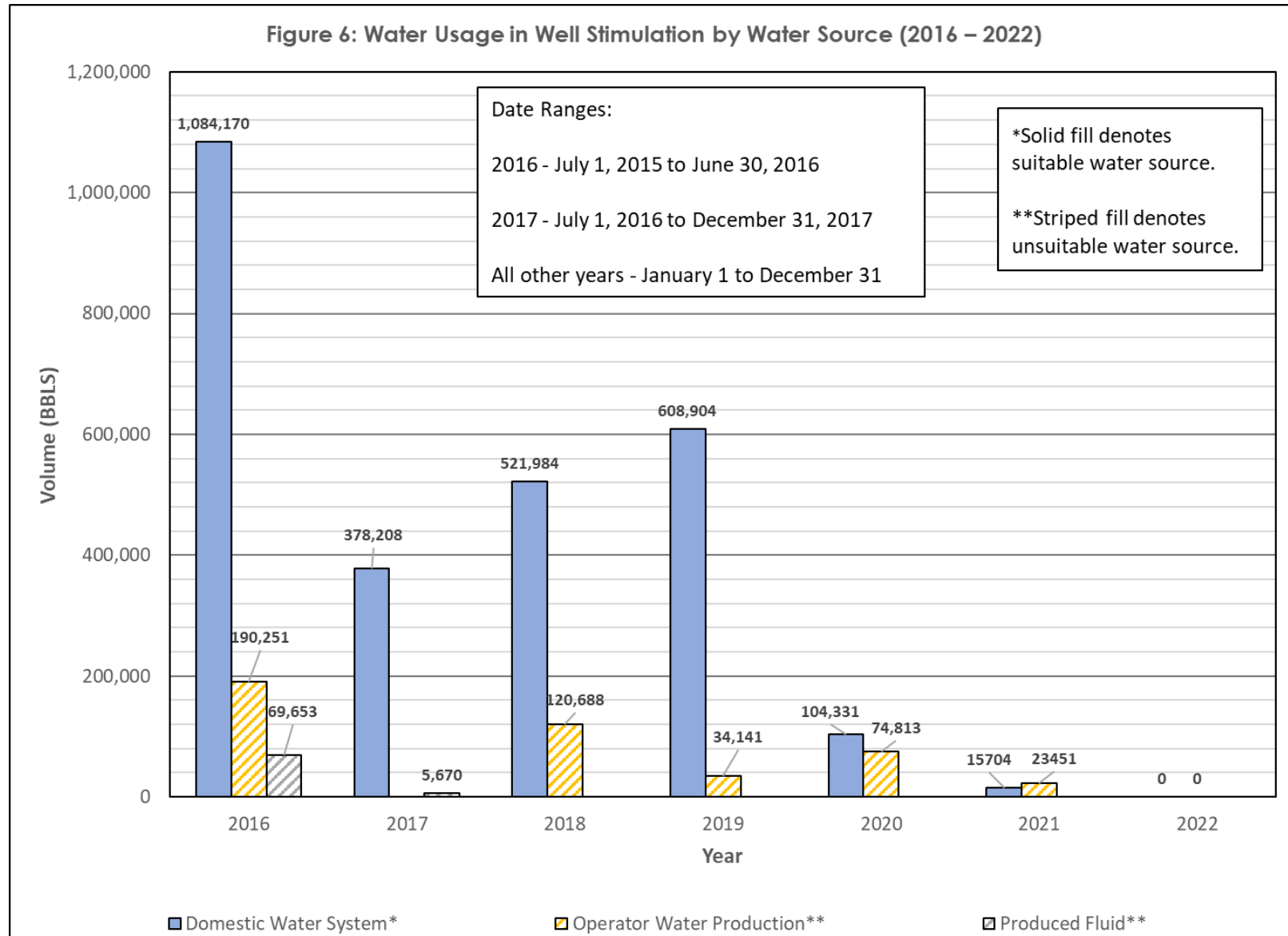
**Figure 5: Well Stimulation Treatment Completions by Operator (2014 – 2022)**

### 3.4 Base Fluids

This section discusses the sources, volumes, and suitability for domestic or irrigation purposes of water used for WST. No WST was completed during this reporting period; therefore, no relevant data is available for obligatory reporting of base fluid sources or composition.

#### **3.4.1 Base Fluid Sources**

**Figure 6** illustrates the volumes of base fluids used in prior well stimulations by water source. The fluid volumes displayed for prior years are the total volumes reported in CalGEM's annual reports. Note that the 2016 and 2017 reports covered periods greater than one calendar year, as detailed in the chart.

**Figure 6: Water Usage in Well Stimulation by Water Source (2016 – 2022)**

### **3.5 Additive and Chemical Usage**

No WST was completed during this reporting period; therefore, no relevant data is available for obligatory reporting of additive and chemical usage.

### **3.6 Recovered Fluids**

No WST was completed during this reporting period; therefore, no relevant data is available for statutory reporting of recovered fluid.

### **3.7 Stimulation Dimensions**

In 2022 there were no WST permits issued, or WSTs completed, therefore no relevant data is available for obligatory reporting of stimulation dimensions.

### **3.8 Stimulated Formations/Zones**

During this reporting period, no WST was completed, therefore no relevant data is available for statutory reporting of stimulated formations/zones.

## **4.0 NEIGHBOR NOTIFICATIONS**

In 2022 there were no WST permits issued, or stimulations completed, therefore no relevant data is available for obligatory reporting of neighbor notifications.

## **5.0 SEISMIC MONITORING**

There has been no report of any seismic activities related to WST under the permanent WST program. In 2022, there were no WST permits issued, or WSTs completed, therefore no relevant data is available for obligatory reporting of seismic monitoring.

## **6.0 ENFORCEMENT**

CalGEM's enforcement office works to identify, confirm, and respond to violations, and to bring violators into regulatory compliance. Enforcement actions may include issuing notices of violation, taking civil or criminal enforcement action, and assessing violation penalties. In February 2022, CalGEM issued a civil penalty order of \$160,000 to Aera for violations of air monitoring permit conditions committed in 2018 and 2020. This assessment was paid by Aera on March 8<sup>th</sup>, 2022.

### **6.1 Well Stimulation Treatment Witnessing**

In 2022, there were no WST permits issued, or stimulations completed, therefore no reportable data is available.

### **6.2 Chemical Spot-Checking**

In 2022, no WST was completed, therefore no chemical spot checks were performed.

## **7.0 REPORTS OF INCIDENTS/EVENTS**

No WST was completed during this reporting period; therefore, there were no incidents or events.



## **APPENDICES**

## APPENDIX A – REFERENCES/DATA SOURCES

The following were used as data sources for this report:

CalGEM Statutes and Regulations (January 2023):

<https://www.conservation.ca.gov/index/Pages/California-Geologic-Energy-Management-Division-Statutes-and-Regulations.aspx>

Well Statewide Tracking and Reporting System (WellSTAR):

<https://wellstar-public.conservation.ca.gov/>

CalGEM WST Unit's *WST Tracker.xlsx*. This is an internal Excel workbook developed by WST unit staff specifically to track the progress of requests to perform WSTs, through notices/applications, actual stimulations, and disclosing of stimulations.

CalGEM Inland District's *WST\_Tracking1.xlsx*. This is an internal Excel workbook developed by Central District staff to schedule and track staff witnessing WST-related operations.

## APPENDIX B – STATUTORY REQUIREMENTS FOR ANNUAL REPORT

As defined in PRC section 3157(a), "Well stimulation treatment" means a treatment of a well designed to enhance oil and gas production or recovery by increasing the permeability of the formation. Well stimulation is a short-term and non-continual process for the purpose of opening and stimulating channels for the flow of hydrocarbons. WSTs include but are not limited to hydraulic fracturing, acid fracturing, and acid matrix stimulation.

The data presented in this report are derived from operator disclosures submitted to CalGEM per the requirements stated in PRC section 3160(b)(2). Operators have one year from the date of issuance of a WST permit to begin a stimulation and 60 days from the completion of the well stimulation to submit the WST disclosure form to CalGEM (PRC sections 3160(d)(4) and 3160(g)).

PRC section 3215(c)(1)-(8) requires that the report address the following items:

1. Aggregated data detailing the disposition of any produced water from wells that have undergone WST.
2. Aggregated data describing the formations where wells have received WSTs, including the range of safety factors used and fracture zone lengths.
3. The number of emergency responses to a spill or release associated with a WST.
4. Aggregated data detailing the number of times trade secret information was not provided to the public in the preceding year by county and company.
5. Data detailing the loss of well and well casing integrity for wells that have undergone WST in the preceding year. Data detailing the loss of well and well casing integrity in the preceding year for all wells shall also be provided for comparative purposes. The cause of each well and well casing failure, if known, shall also be provided.
6. The number of spot-check inspections conducted pursuant to PRC section 3160(l), including the number of inspections where the composition of well stimulation fluids was verified and the results of those inspections.
7. The number of WSTs witnessed by CalGEM.

8. The number of enforcement actions associated with WSTs, including, but not limited to, notices of deficiency, notices of violation, civil or criminal enforcement actions, and any penalties assessed.

PRC section 3215(c) also calls for the inclusion of "aggregated data of all the information required to be reported" under PRC section 3160, consisting of the provisions described under PRC section 3160(b)(2)(A)-(G):

- A. The date of the WST.
- B. A complete list of the names, Chemical Abstract Service (CAS) numbers, and maximum concentration, in percent by mass, every chemical constituent of the WST fluids used.
- C. The trade name, the supplier, concentration, and a brief description of the intended purpose of each additive contained in the WST fluid.
- D. The total volume of base fluid used during the WST and the identification of whether the base fluid is water suitable for irrigation or domestic purposes, water not suitable for irrigation or domestic purposes, or a fluid other than water.
- E. The source, volume, and specific composition and disposition of all water, including, but not limited to, all water used as base fluid during the well stimulation treatment and recovered from the well following the well stimulation treatment that is not otherwise reported as produced water pursuant to PRC section 3227. Any repeated reuse of treated or untreated water for well stimulation treatments and well stimulation treatment-related activities shall be identified.
- F. The specific composition and disposition of all WST fluids, including waste fluids, other than water.
- G. Any radiological components or tracers injected into the well to evaluate the WST need to be properly recovered. A description including the recovery method, the recovery rate, and specific disposal information for recovered components or tracers should be provided.
- H. The radioactivity of the recovered well stimulation fluids.

- I. The location of the portion of the well subject to the WST and the extent of the fracturing or other modification, if any, surrounding the well induced by the treatment.

## APPENDIX C – GLOSSARY

TERM	DESCRIPTION
<b>Acid Fracture Stimulation</b>	The combined use of acid and fracturing to increase the permeability of (stimulate) a portion of rock or sediment formation intercepted by a well.
<b>Acid Matrix Stimulation</b>	The use of acid to dissolve mineral material to increase the permeability of (stimulate) a portion of rock or sediment formation intercepted by a well.
<b>Additive</b>	One or more substances added to a base fluid to make up a WST fluid.
<b>Base Fluid</b>	A liquid (or potentially a gas) into which additives are mixed, to make up a WST fluid.
<b>Base Fluid Source</b>	The source or origin of a base fluid.
<b>Base Fluid Suitability</b>	The suitability of water base fluid for domestic use (e.g., human or livestock consumption) or irrigation (e.g., agricultural use).
<b>California Code of Regulations (CCR)</b>	The official compilation and publication of the regulations adopted, amended, or repealed by state agencies pursuant to the Administrative Procedure Act. WST is regulated within title 14, sections 1751 through 1789 of the California Code of Regulations.
<b>Chemical Abstract Service Registry Number</b>	A unique identification number assigned by the Chemical Abstract Service (CAS) for every chemical compound or mixture of chemical compounds described in scientific literature.
<b>Class II (Injection) Well</b>	Class II wells in California are approved and regulated by CalGEM for the injection of fluids produced as byproducts of the recovery or production of oil or gas, or for storage of hydrocarbons pursuant to CalGEM's UIC program. See <i>Underground Injection Control (UIC)</i> .
<b>Confidential Well</b>	A temporary well status approved by CalGEM to protect certain information about a well from disclosure to public and presumably competing operators.
<b>Constituent</b>	A chemical used in a WST additive or base fluid; a chemical component of a WST fluid.

TERM	DESCRIPTION
<b>Diatomite</b>	A rock of very high porosity and usually low permeability that may contain oil or gas. Diatomite is found within the Monterey Formation and other petroleum-bearing rock formations in California and elsewhere.
<b>Directionally Drilled Well</b>	A well that has been intentionally constructed away from vertical, on or close to a pre-planned pathway. Some directionally-drilled wells are curved upward during drilling to be finished as horizontal wells.
<b>Disclosure</b>	The electronic report of a WST submitted to CalGEM under WST regulations.
<b>Disposition</b>	Term used in WST statutes for the management or disposal of water or other wastes from WST operations.
<b>District</b>	An administrative regional CalGEM office.
<b>Gas</b>	Natural gas. Natural gas consists of methane and other simple hydrocarbon molecules that are gasses rather than liquids at room temperature and pressure. Natural gas is present both dissolved in oil and in pore space above oil, within the Earth.
<b>Hydraulically Fracture Stimulation</b>	Refers to the intentional, short-term injection of fluid at sufficient pressure to break apart rock to enhance the permeability of (stimulate) a portion of rock or sediment formation intercepted by a well.
<b>Measured Depth</b>	The distance along the actual path of wellbore, from the ground surface, drilling mat, kelly bushing, drill floor, or other aboveground reference point used during drilling. Measured depth can be thought of as the total length of drill pipe in the ground to reach the end of a wellbore, no matter how curved and twisted the well bore path may be from the reference point.
<b>Monterey Formation</b>	The name used in much of California for a portion of the Miocene-aged, fine-grained sedimentary rock (i.e., commonly shale) deposited and still present along the margin of the Pacific Ocean.

TERM	DESCRIPTION
<b>Neighbor Notification</b>	The requirement and process to notify landowners and occupants of parcels of property located within specified distances of a well where a WST is to be performed. The notification allows landowners or occupants to request that ground or surface waters that are suitable for drinking or irrigation be sampled and tested to assess possible impact from WST.
<b>Notice of Violation</b>	Written notification made to an oil or gas well operator from the State Oil and Gas Supervisor of violation of a regulation or statute. A Notice of Violation is commonly the first formal correspondence to an operator preceding an Order or other potential enforcement action.
<b>Notice to Operators</b>	A written clarification, transmission of, or request for information made by CalGEM to oil and gas well operators about a specific topic.
<b>Notification</b>	The process of providing information about an upcoming action, an opportunity, or an action taken, made in writing, to a party. See <i>Neighbor Notification</i> for one example of a notification required by SB 4.
<b>Operator</b>	A party that owns or has legal responsibility for the maintenance and operation of an oil or gas well or other well that falls within the jurisdiction of CalGEM.
<b>Permeability</b>	The property of or rate at which a solid can or does transmit oil, water, air, or other fluids. See <i>Porosity</i> .
<b>Porosity (Pore Space)</b>	The presence within and amount of a solid that is void (potentially empty) space. Pore space within rocks and soil is filled with oil, water, air or other gasses or fluids. See <i>Permeability</i> .
<b>Pressure Testing</b>	The requirement implemented July 1, 2015, that an operator notify CalGEM of and record pressure tests of all well casings and tubings to be used in a WST operation. See <i>Zonal Isolation</i> and <i>Well Integrity</i> .



TERM	DESCRIPTION
<b>Produced Water</b>	Water that is extracted from beneath the ground surface as a byproduct of oil or gas production. In mature oil fields such as those common in California, most of the fluid that is pumped from the ground is produced water. In California, most produced water is naturally salty.
<b>Public Resources Code (PRC)</b>	One of 29 groupings of California statutes (laws). The Public Resources Code contains key statutes affecting oil and gas resources, wells, and operations. SB 4 added language primarily to the PRC to give CalGEM greater authority and responsibility to regulate WST.
<b>Recovered Water or Fluid</b>	Fluids (e.g., water, oil, and gas) that come out (either naturally or by pumping or other assistance) of an oil or gas well after WST and prior to the routine production or other stabilized use and flow of fluids from a well. SB 4 requires operators to chemically test and provide information to CalGEM about recovered fluids.
<b>Rulemaking Process</b>	The procedure used by any component of the Executive Branch (of the State of California government) in adopting regulations and rules that will have the force of law. CalGEM followed both the emergency rulemaking process and regular rulemaking process in implementing SB 4.
<b>Senate Bill 4 (SB 4)</b>	California State Senate Bill 4 (Pavley, Chapter 313, Statutes of 2013) was passed by the Legislature and signed by Governor Jerry Brown in September 2013 to better regulate WST.
<b>Spot-Check (Inspection)</b>	The term used in SB 4 to describe a visit by CalGEM staff to a WST operation for the specific purpose of comparing the additives, chemicals, and base fluid at the WST location with the information about the additives, chemicals, and base fluid that was supplied in the Notice.
<b>Stage</b>	A subset or smaller portion of the total interval or portion of a well that is stimulated. A typical WST has several to more than ten stages that are performed in rapid succession in a single effort.

TERM	DESCRIPTION
<b>Trade Secret</b>	The withholding of certain information about one or more WST additives from the public and presumably competitors. SB 4 allows an operator to request trade secrecy from CalGEM through a rigorous and formal process.
<b>True Vertical Depth</b>	The straight-line extent of a well vertically down into the Earth, calculated without regard to actual twists, curves or intentional deviations of the well bore. It is measured from the ground surface, drilling mat, kelly bushing, drill floor, or other aboveground reference point used during drilling.
<b>Underground Injection Control (UIC)</b>	CalGEM has responsibility and authority to regulate the injection of any fluid into the ground via any oil or gas or other well under its jurisdiction. CalGEM's UIC regulations and authority conform to and were granted by federal authority in compliance with the federal Safe Drinking Water Act of 1974. See "Class II well."
<b>Wellbore</b>	A hole that is drilled to aid in the exploration and recovery of natural resources including oil, gas, or water.
<b>Well (Casing) Integrity</b>	The reliability of a well to perform its functions. This includes intact and functioning casing and cement that can durably resist all foreseeable changes (such as pressures, corrosive fluids or earth settlement or lateral shift) in conditions within and outside the well and ensure zonal isolation. See <i>Zonal Isolation</i> .
<b>Well Stimulation</b>	The brief and intentional application of pressure, chemicals, or other method to rock or sediment intercepted by a well, to increase the rock or sediment permeability to enhance oil or gas production, or potentially to increase water production or the ability of rock or sediment to accept injection water or other fluid.
<b>Well Stimulation Treatment (WST)</b>	Any treatment of a well designed to enhance oil and gas production or recovery by increasing the permeability of the formation. WSTs include, but are not limited to, hydraulic fracturing treatments and acid well stimulation treatments.
<b>Witnessing (Inspection)</b>	The term used in SB 4 to describe a general or all-purpose visit by CalGEM staff to a WST operation to observe, monitor, or verify any regulated or required aspect of the WST.

TERM	DESCRIPTION
<b>Zonal Isolation</b>	The principal of constructing, verification-testing, and maintenance of a well to ensure that fluids are not migrating along or inside a well from one zone to another. Zones of concern that are protected from contamination of one another include oil or gas-bearing zones, zones of abnormally high pore pressures, zones of fresh water, zones of water of actual or potential beneficial use, zones of saline water, and zones of water contaminated by human activity.

## CALGEM DIVISION CONTACT INFORMATION

### HEADQUARTERS

715 P Street, MS 1803  
Sacramento, CA 95814  
Phone: (916) 445-9686  
Fax: (916) 319-9533

### NORTHERN DISTRICT

#### Sacramento Office

715 P Street, MS 1804  
Sacramento, CA 95814  
Phone: (916) 322-1110  
Fax: (916) 445-3319

#### Orcutt Office

195 S. Broadway, Suite 101  
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Fax: (805) 937-0673

#### Ventura Office

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