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A L L I A N C E

Assessment of Oil and Gas Well Ownership Transfers in CA

Introduction

The California Council on Science and Technology has outlined the economic risk to California resulting from asset retirement obligations related to the plugging, properly abandoning, and remediation of oil and gas well sites. [Their report, published in 2018](#), estimates that the net cost for and plugging oil and gas operations in California amount to at least \$9B, although this estimate does not include site reclamation and the maintenance costs associated with re-plugging wells in the future, [as plugged and abandoned wells age](#). A [recent Carbon Tracker report](#) puts the current estimate as high as \$21B when inflation is considered and site reclamation included.

Plugging just the currently orphan wells in the state is estimated to cost at least \$550M. While drilling a new well in California requires a surety bond, reports show that the bonding amounts are substantially deficient to fulfill clean-up costs. The CCST report concluded that, at the time of publication (2020), the average cost to plug and abandon a well was \$68,000, but the average bond funding available per well is only about \$1. In total, the bonded value does not even cover what is currently needed to plug known orphan wells, and the counts of orphan wells is expected to vastly increase as CalGEM completes its audit of idle wells. Bonded funds are deficient for a number of reasons, including updated bonding requirements were not adopted by California until 2018 and the ability of operators to purchase one 'blanket' bond to cover many wells at discounted rates. Operators that already carry blanket bond indemnity will not typically have to increase their bonding coverage when they acquire additional wells.

This report assesses the risk that the problem of orphan wells in California will continue to grow as a result of transfers of wells to operators who are ultimately unable to properly plug and remediate them. A major risk factor for wells becoming orphaned is the tendency of the larger operators who originally drilled wells and operated them when they were at full production volumes to divest themselves of those wells when production declines or the well becomes idle. Low production and idle wells are regularly and repeatedly sold to progressively less solvent operators. This process increases the risk that these less solvent operators will become insolvent and unable to comply with their plugging and abandonment obligations.

This report therefore explores the regulatory data to determine whether transfers of oil and gas well ownership are occurring as a result of financially healthy oil companies pursuing new investment opportunities in reservoir development, or rather a mechanism for oil and gas companies to shed well plugging and reclamation obligations. In order to assess the financial nature of well ownership transfers, CalGEM data was compiled to identify when well ownership transfers had occurred and identify both the divesting and acquiring companies. Both the divesting and acquiring companies were categorized based on several categories. These categories included whether the companies had declared bankruptcy, had divested from California exploration and production operations, had been created out of parent company divestment, and their historical production volumes reported to CalGEM. The proportions of well transfers that fall into each category are reported and discussed.

Map: <https://ft.maps.arcgis.com/apps/webappviewer/index.html?appid=571fd03f26fd4413a0347f1fe0df614f>

Figure 1. Map of CalGEM oil and gas wells that have changed ownership 1977-2022. The dataset of well transfers compiled for this report was used to map the locations of wells that were transferred between operators. The map is interactive and the date of well transfers as well as the names of divesting and acquiring operators are viewable by selecting individual wells on the map. Use the button in the bottom-right corner to expand the map to full screen.

Methods

Data Preparation

Datasets utilized included the annual [CalGEM production and injection datasets](#) (1977-2021), as well as the [AllWells.csv](#) dataset, downloaded (5/2/23), to represent 2022/current ownership, and [CalGEM weekly summary of permit notices](#). The “OilandGasWells” tables from the production and injection datasets were exported from the Microsoft Access databases and merged together (along with the AllWells.csv file) using Python v3.9.12. Duplicate American Petroleum Institute identification numbers (APIs) were removed and the ‘Operator Code’ column data was cleaned and revised to prevent duplicate operators.

The first year of reported production was identified for each well API, and the operator code listed for each well’s first year of production and each year following was compared with the operator listed in the most current (5/3/23) AllWells.csv dataset. To identify the year of transfer, operator codes reported in each production year dataset were compared to the previous year’s operator code. Changes in operator code between individual years were summed for each year. Additional fields from the annual production data were conserved, including well status for the year of ownership transfer.

Of the total (N= 238,151) unique API’s identified, about 20% (50,173) were only listed in the AllWells.csv and not in annual production reports. This contingent was not able to be screened against previous years. **The figures reported in this analysis should therefore be considered a lower bound of the estimate of the count of wells that have changed ownership.** While this subset was not screened against previous years, the dataset was screened for a list of operators known to have transferred ownership of all wells via a declared bankruptcy, via an LLC created by a separate operator to dump liabilities, or by an operator that

fully divested of California assets. Operators included California Resources Corporation and subsidiaries, Occidental Petroleum, Venoco, Greka, Rincon Island Limited Partnership, Exxon Mobil, Shell and subsidiaries, and Aera. Wells drilled after the Occidental Petroleum divestment in 2014 and continuously operated by California Resources Corp were not included in the counts of transferred wells, as they did not change ownership.

Data analysis

Wells that changed ownership were classified based on the nature of the transfer. Both the status of the divestment and the acquisition were categorized. The economic standing of each operator was considered. Knowledge of bankruptcies for larger operators was collected via SEC 10-K filings and regulatory reports, but comprehensive knowledge of all oil and gas operator bankruptcies was not possible. This report therefore likely under-reports the counts of wells that transferred ownership as a result of bankruptcies. The same goes for the 'marginal operator' counts in the acquisition category.

Divestment Categories

1. Bankruptcy - Wells that transferred ownership as a result of a bankruptcy by the parent operator.
2. Divestment - Transferred from an operating company with existing active wells to a different operator.
3. California exit divestment - Transferred from an operator that divested from California exploration and production (active or idle). An example is Aera Energy, but also includes many smaller operators.
4. Likely insolvent divestment - Wells transferred from an operator that no longer profits from active wells in California, but has unplugged idle well liabilities within the state.

Acquisition Categories

1. Marginal Operator - Wells transferred to a new operator that was created by the previous operator via an exchange of debt for credit type of divestment, such as California Resources Corporation and its subsidiaries.
2. Investment Asset - Wells transferred to a larger or similarly sized operator.
3. Investment Liability - Wells transferred to a smaller operator.

These categories were created to understand whether wells were being purchased by smaller operators more likely to orphan wells, or if the well transfers were investments by larger operators with the intention of redeveloping the wells. Operators were ranked by production to assess whether wells were transferred to larger or smaller operator. Total lifetime oil production for each operator (1977-2021) was summed using CalGEM annual production datasets. Transfers that went from a larger operator to a smaller operator were tagged as 'investment liabilities', and wells that were transferred from smaller operators to larger operators were tagged as 'investment assets'. To be conservative, exchanges among the top 10 state producers or between similarly sized operators (within 10 rank points) were categorized as investment assets regardless of rank differential. Wells transferred to the State Lands Commission and those to marginal operators that were created out of parent company divestitures such as California Resources Corp. and subsidiaries were counted as investment liabilities due to these operators' inherent risk of insolvency.

The dataset for the analysis and the python code can be found at <https://app.box.com/s/ijx43crveotebwxoomelbzz91dqq335n>

Results

As a threshold matter, to assess the frequency of this type of divestiture, California Department of Geological Energy Management's (CalGEMs) well production and injection annual summary reports were screened for changes in ownership of individual oil and gas wells. **Results show that of the nearly (N=238,151) unique oil and gas well IDs listed in the production and injection reports, a total of at least 121,726 (51.1%) wells have changed ownership between 1977 and 2022.** A significant proportion (at least 13%) of these wells have changed ownership more than one time - since 1977 there have been a total of at least 137,063 transfers of ownership for wells, as reported by CalGEM. **The vast majority of these transfers have occurred since 2010 (99.7%).** The plot in Figure 2 below shows the cumulative count of wells that have changed ownership between 1977 and 2020. The map in Figure 1 (above) shows the locations of the wells that have changed ownership.

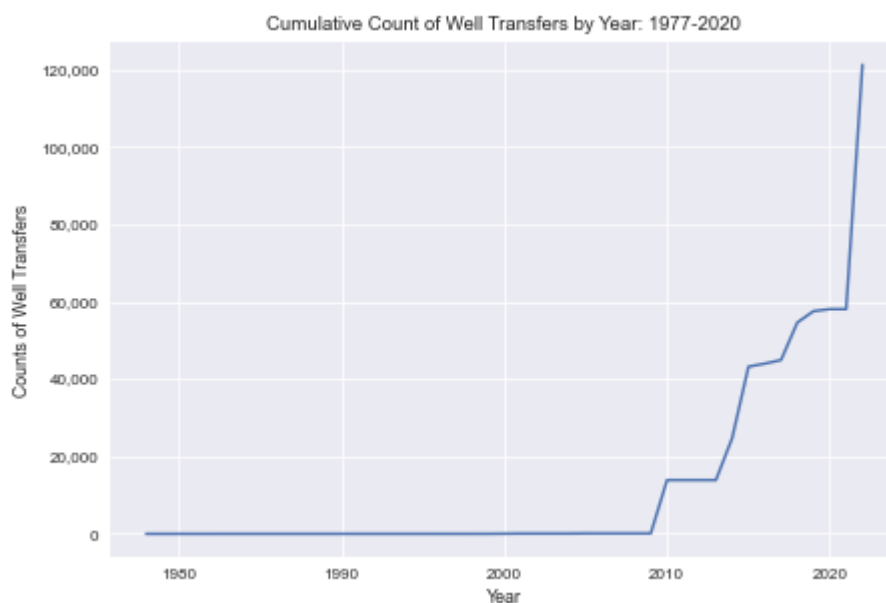


Figure 2. Cumulative Count of Unique Wells Transferred by Year, 1978-2022. The plot shows the counts of wells that changed ownership each year, according to CalGEM data. There were an additional 15,983 wells that changed ownership during this time frame, but the specific year ownership was transferred was not able to be determined. Major transfer events viewable in the plot include divestments by Berry Petroleum Co in 2010, the transfer of wells from Occidental to California Resources Corporation in 2014/2015, the bankruptcy of Venoco Inc. and Linn Energy LLC in 2016/2017, major divestments by Chevron in 2018, and the divestment of Aera Energy LLC from California in 2021.

The results of the divestment and acquisition categorization are split into two components due to the high counts of plugged wells that were transferred between operators. Data for operational wells, with statuses of active or idle at the time of transfer, is presented separately from counts of plugged well transfers. The proportions of transferred well statuses is shown

below in the pie chart in Figure 3. **Nearly half of all the wells transferred between operators were plugged wells, while just over 35% of the well transfers were for active wells.**

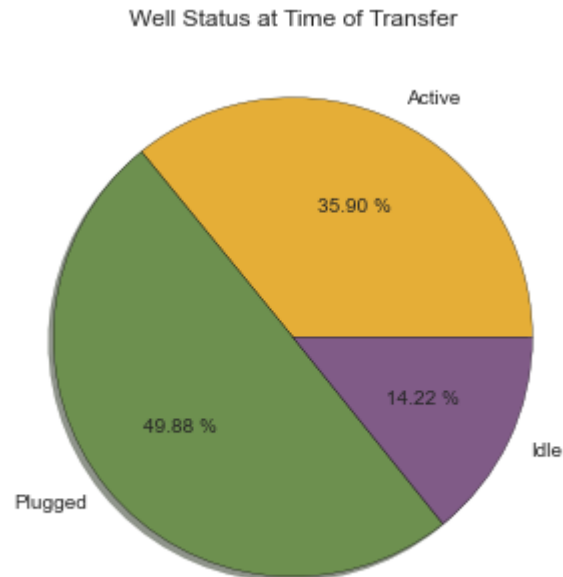


Figure 3. Pie chart of well statuses. Well statuses were identified for the year of ownership transfers, based on CalGEM annual production and injection reports. Nearly half of well transfers were for plugged wells, while active wells only accounted for about 36%.

Over a third of the well transfers were for active wells. The category “active” refers to wells that consistently produce monthly volumes of oil or gas, or inject fluids underground. However, it is important to note that the majority of active wells produce stripper or marginal volumes in California (for definitions of stripper or marginal volumes see the glossary). CalGEM production data shows that the majority of transferred active wells were stripper wells that produced less than 15 bbls/day of oil or less than 90 MCF/day of gas (97.8%), and over 91% of wells transferred produced less than 5 bbls/day. **Of the total population of wells transferred since 1977, only 2.2% produced more than 15 bbls/day, meaning that just 2.2% of wells transferred produced above the stripper well threshold.** In Figure 4 below, the data is limited to ‘active’ wells, to show the counts of actively producing wells that produced volumes of oil above stripper volumes and within additional production brackets.

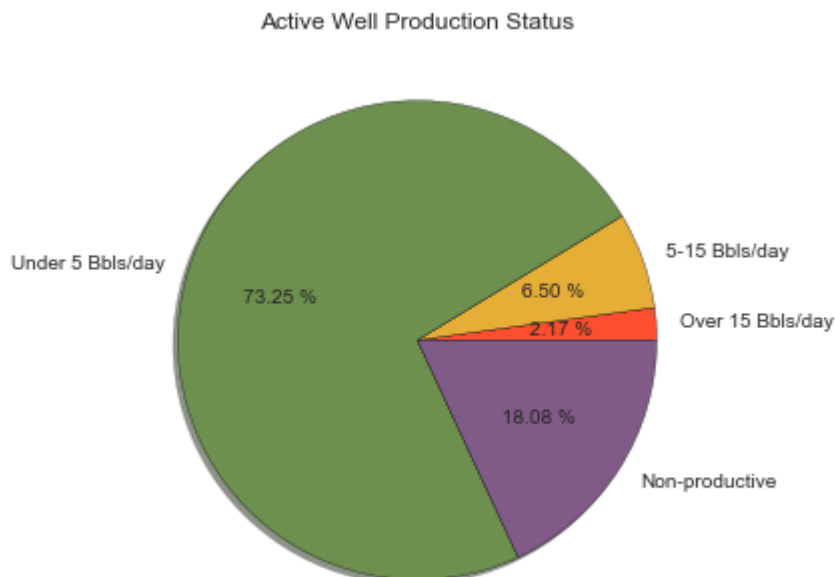


Figure 4. Pie chart of production status of active wells. Annual production volume totals were quantified for active wells the same year as the reported operator transfers. About 2% of active well transfers were for non-stripper wells (wells producing more than 15 bbls/day). Over 91% of active well transfers were for wells producing less than 5 bbls/day.

Divestments

Each data point (well transfer) was summarized in two ways in order to fully understand the flow of assets and liabilities from operator to operator. First the nature of the divestment was analyzed based on the economic status of the divesting operator. The pie chart in Figure 5 shows the results of this categorization. **The majority of well transfers were the result of California exit divestment (operators completely divesting from California exploration and production), while about 16% of transfers were between two active operators. Nearly 6% of well transfers were from operators that declared Chapter 7 bankruptcy.** Many of those wells are now the responsibility of the state lands commission to plug and remediate. A small percentage of the well transfers (0.14%) were from operators with idle well liabilities without active wells to fund remediation efforts. This included operators such as Union Oil Co. of California, Arthur McAdams, Amrich Energy, and Solimar Energy, among others.

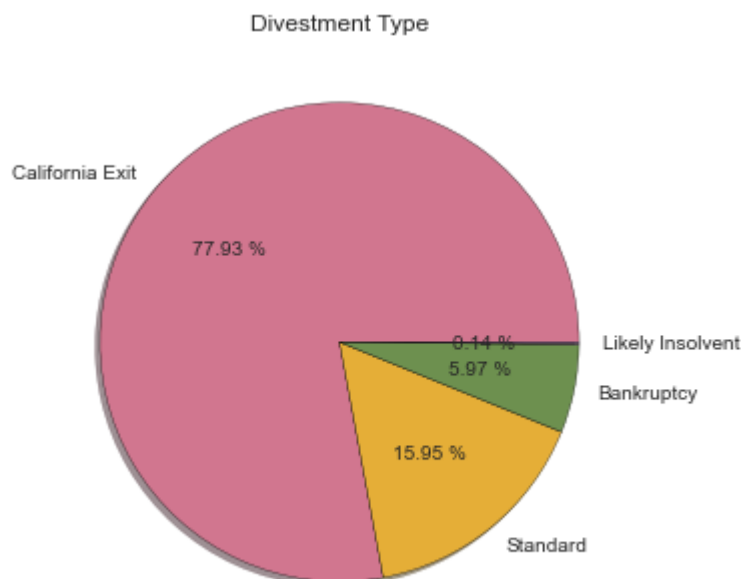


Figure 5. Pie chart of well divestments. Well divestments were categorized by the economic status of the divesting operator. Nearly 80% of divestments were from companies that shut down their operations in California. An additional 0.14% shut down production but still own idle wells in California that require plugging and site remediation.

Acquisitions

The acquisition of wells was also categorized, but by the economic status of the receiving operator. The pie chart below in Figure 6 shows the breakdown of acquisitions by categorized transfers. The majority, about 58%, of transfers were from larger operators to smaller operators, and are labeled as 'investment liabilities'. They are liabilities because while wells may still be producing, they are typically near the end of their production decline curve; otherwise they would not have been divested. As such these wells may not produce enough oil or gas to cover their own plugging and remediation costs. An additional 18% of transfers were to a 'marginal operator' - that is, oil and gas companies that are created to absorb retirement obligations, such as the spin-off of California Resources Corporation and its subsidiaries that funded the expansion of Occidental Petroleum into new oil and gas basins in Texas, Colorado, and internationally. **Only about 24% of the well transfers were acquisitions by larger or similarly sized operators.**

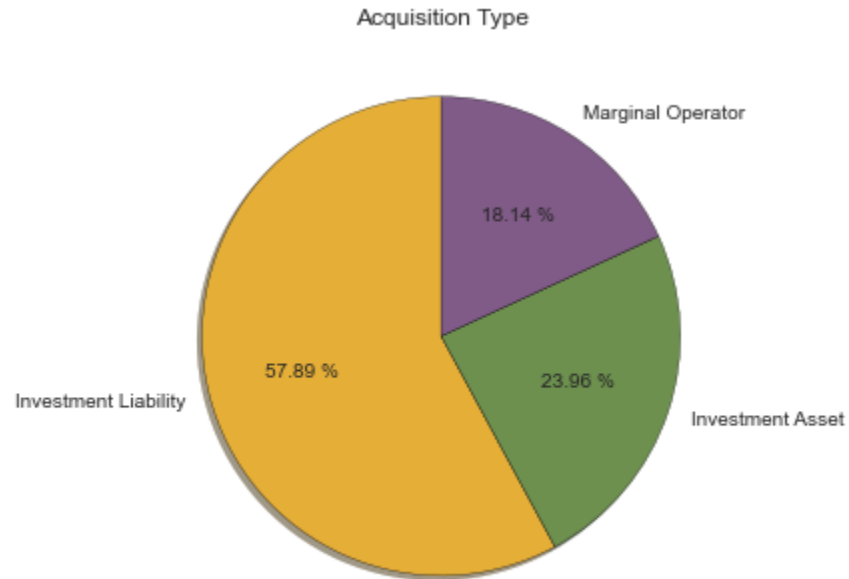


Figure 6. Pie chart of well acquisitions. Well acquisitions were categorized by the economic status of the acquiring operator.

While 'investment asset' (IA) acquisitions constitute nearly a quarter of well transfers, the majority of wells acquired by larger companies were 'idle' or 'plugged' (about 60%). Figure 7 below shows the breakdown of the 'investment asset' category by well status at the time of ownership transfer. About 40% of the IA acquisitions by larger companies were active wells, but similar to the full population sample, **the vast majority of the active wells were stripper wells (98.4%), and only 6.6% of the active IA wells produced more than 5 bbls/day.**

Well Status for Investment Asset (IA) Wells at Time of Transfer

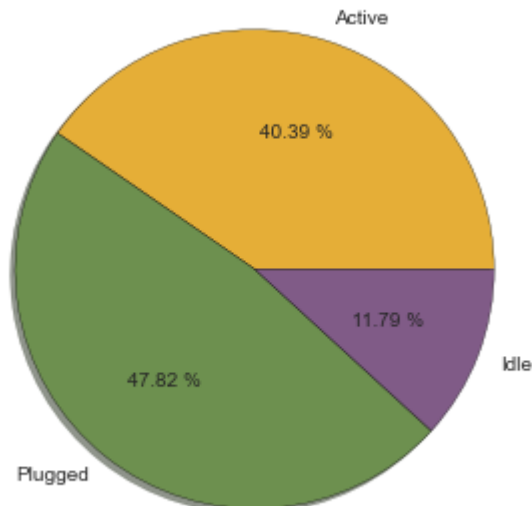


Figure 7. Well statuses of 'Investment Asset' (IA) transfers. The dataset of transfers was limited to just the subset of transfers that went from a smaller operator to a larger or similar sized operator.

Discussion

The analyses in this report confirm observation of the trend of larger operators divesting wells at the end of their productive lifespan to smaller operators. This report established that ownership transfers in the oil and gas industry tend to occur near the end of the productive life of an oil or gas well, with the transfers occurring once the majority of profit is extracted from a well. Over 96% of the transfers were either to smaller holding companies/operators, the result of a bankruptcy, or executed to facilitate the exit of a company from the California exploration and production market. These scenarios increase the risk that these wells will become orphaned, putting the financial burden of plugging and remediation costs on the taxpayers of California. The analyses further confirm the trend is growing. A total 51% of the state's oil and gas wells have been transferred from one operator to another, and the rate of transfers have grown dramatically since 2010.

The transfers of wells to California Resources Corporation (CRC) highlight the fiscal risk to the state from this trend. CRC and its subsidiaries, created to absorb bad assets and provide fresh sources of funding, make up the largest operator in the state of California. In the operator's creation by Occidental Petroleum in 2014, CRC inherited \$4.4B in debt. In 2020 CRC, California's largest oil and gas operator, filed for Chapter 11 bankruptcy. While the operator was able to restructure and continue to operate, in the event of a future Chapter 7 bankruptcy the state would be left with little recourse. Bankruptcies of Venoco Inc., Greka Oil Co., Rincon Island Limited Partnership, and Linn Energy have already opened California up to major financial obligations as the State Lands Commission takes over plugging and remediation costs.

The data also shows that numerous operators are engaged in 'insolvent divestment' - that is, the practice of operators selling off their productive wells to temporarily stave off bankruptcy, but in the process stripping themselves of the earnings stream that would enable them to fund the plugging and abandonment of idle wells. As a result, the idle wells become orphaned when avoiding bankruptcy is no longer possible, with the operators having already taken the benefit from the sales of their remaining productive wells. These likely insolvent operators include Amrich Energy Inc., Arthur McAdams, Tetra Oil Company, and Innex California Inc. to name just a few. These operators have sold all of their producing oil wells to other companies, but still own numerous idle wells. Without the oil sale profits from producing wells, these companies may not be able to afford the maintenance costs for their remaining idle wells, much less afford to plug and reclaim the idle wellsites.

An issue that has not been discussed in the literature or the media is the issue of plugged well liabilities - i.e., the inevitable cost of monitoring and sometimes repairing wells that have been plugged. While the initial cost of plugging an operational well has been discussed, the fact that operators will be liable for replugging costs in perpetuity, has not been considered. While properly plugged wells are considered environmentally innocuous, [the efficacy of a well plug is not permanent](#). Well plugs [can and do fail](#), and there are [many such events](#) that have been [covered by the media](#). While current plugging techniques are much better than the past, most of the wells plugged in California were completed decades ago and are questionable at best. The data shows that tens of thousands of potentially improperly plugged wells have transferred ownership, and California has issued at least 261 '[re-abandonment](#)' permits just since the beginning of 2020 to deal with the issue of failed well pluggings.

In addition to divesting from low producing and idle wells to shed well plugging and remediation costs, divesting from the ownership of plugged wells also sheds future liabilities that would otherwise make operators responsible for the future costs of re-plugging. All well pluggings have a discrete lifespan, regardless of whether the plugging operation was completed properly, or using improper methods (such as shoving a telephone pole down the borehole - a method reportedly common in the Los Angeles Basin). In Aera's exit divestment from California, Exxon-Mobil and Shell transferred the ownership and liabilities of over 35,700 plugged wells to the German energy investment firm IKAV.

Conclusions

Based on the results of this report that show that over half of the oil and gas wells in California have changed hands, and the vast majority at the end of their productive lifespan to smaller operators; FracTracker Alliance recommends the adoption of pre-emptive regulations to financially protect state taxpayers against the insolvency of marginal operators. Both the plugging and remediation of operational (active and idle) wellsites as well as the continued maintenance of plugged wells needs to be considered when wells are transferred from one operator to another. Existing bonding requirements for new wells need to be increased to cover the full lifespan of maintenance for wells, from plugging and remediation through lifetime maintenance of the plugged well. Additionally, existing wells need to be re-bonded at the time of transfer to address the deficits resulting from blanket bond policies and the increasing costs of well plugging and reclamation services.

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Glossary of Terms

Active oil and gas well - The category “active” refers to wells that consistently produce monthly volumes of oil or gas, or inject fluids underground, but the majority of active wells produce stripper and marginal volumes in California.

Idle oil and gas well - a well that has not been used for two years or more and has not yet been properly plugged and abandoned (sealed and closed).

Marginal oil and gas well - A marginal well definition is about economic viability, whether the extraction of oil and gas is profitable. To define a particular well as a marginal well depends on oil prices and the cost of production.

Marginal operator - For this report, marginal operators are defined as operators created parent company divestments in an exchange of debt for credit, such as California Resources Corporation and its subsidiaries. These operators are saddled with debt and are not likely solvent.

Plugged Well - A well is plugged by placing cement in the wellbore or casing at certain intervals, as specified in California laws or regulations. The purpose of the cement is to seal the well-bore or casing and prevent fluid from migrating between underground rock layers.

Stripper oil and gas well - Defined by the Internal Revenue Service as a well that produces less than 15 barrels of oil or equivalent, or less than 90,000 cubic feet (90 MCF) of natural gas per day.

Wellsite reclamation - Transforming a well site or infrastructure site back to what the land looked like before development started, and how it was used

Well re-abandonment - Plugging or reclaiming the wellsite of an already plugged well. Existing well pluggings may fail due to time and geological forces or as a result of being improperly plugged in the past.