

REQUIREMENTS FOR IDLE WELL TESTING AND MANGEMENT

INITIAL STATEMENT OF REASONS

The Department of Conservation, through its Division of Oil, Gas, and Geothermal Resources (Division), proposes to amend sections 1723.9 and 1760 and add sections 1752, 1772, 1772.1, 1772.1.1, 1772.1.2, 1772.1.3, 1772.2, 1772.3, and 1772.4 to the California Code of Regulations, title 14, division 2, chapter 4, subchapters 1 and 2.¹

INTRODUCTION AND BACKGROUND

The Division supervises the drilling, operation, maintenance, and plugging and abandonment of onshore and offshore oil, gas, and geothermal wells. The Division carries out its regulatory authority under a dual legislative mandate to encourage the wise development of oil and gas resources, while preventing damage to life, health, property, and natural resources, including underground and surface waters suitable for domestic or irrigation purposes. (See Pub. Resources Code, § 3106.) The Division's staff is comprised of engineers and geologists with education and experience in the field of oil and gas exploration and production. Many of the Division's staff are licensed in their fields, and most have extensive regulatory and industry backgrounds. The range and depth of expertise within the Division facilitates a thorough and comprehensive approach to regulating all aspects of oil and gas production operations, including underground injection operations associated with oil and gas production.

The Division regulates more than 28,000 idle wells statewide. It is not uncommon for wells to become idle once they are no longer financially viable to operate due to market fluctuations, operator resources, or the lack of hydrocarbon resources. Further, some exploratory wells are never productive and are essentially idle from the date that they are drilled. Existing requirements provide operators with little incentive to properly plug and abandon idle wells, and many of these wells are never returned to use. Idle wells that are not properly tested and maintained for integrity pose a range of threats to life, health, property, and natural resources, including potential contamination of groundwater, dilution of hydrocarbon resources, and emission of methane and other gases to the atmosphere.

¹ Unless otherwise specified, references in this document to a "section" are references to sections of California Code of Regulations, Title 14. Unless otherwise specified, references in this document to a "proposed section" are references to a section of California Code of Regulations, Title 14, as it would be added or amended by this rulemaking action.

The Division's current regulations do not provide for a comprehensive and regular testing regime for idle wells. Current regulations require operators to conduct a fluid level test on any well that has not produced oil or natural gas or been used for fluid injection for a continuous six-month period during any consecutive five-year period. (Cal. Code of Regs., tit. 14, § 1723.9.) The Division may require additional well tests or remedial operations if the fluid level is located above or adjacent to freshwater or potential drinking water zones. (*Id.*) Subsequent testing periods are based on fluid level in the well, the well's location in relation to freshwater zones, mitigation measures taken by the operator to prevent fluid migration, or other factors determined by the appropriate Division district deputy, upon a showing of good cause. (*Id.*)

In 2011, at the Division's request, the United States Environmental Protection Agency (US EPA) conducted an audit of the Division's Underground Injection Control (UIC) program to assess compliance with the requirements of the primacy delegation under the federal Safe Drinking Water Act. The audit found that idle wells regulation needed to be strengthened and that bonding requirements were inadequate. In 2015, the Division discussed the need to reduce the state's large inventory of idle wells and revise idle well testing requirements in its "Renewal Plan for Oil and Gas Regulation," an ongoing, four-year framework to correct past problems and to create a regulatory program for oil and gas production that ensures the environment and public health are protected.

On September 9, 2016, Governor Brown signed Assembly Bill 2729 (Williams, Chapter 272, Statutes of 2016) (AB 2729) into law. AB 2729 increased bonding requirements for new wells and increased "blanket" bond requirements for operators who have bonds covering multiple wells. AB 2729 also redefined an idle well as "any well that for a period of 24 consecutive months has not either produced oil or natural gas, produced water to be used in production stimulation, or been used for enhanced oil recovery, reservoir pressure management, or injection," and it expanded on the existing requirements for operators' management of idle wells. In addition, AB 2729 adopted Public Resources Code section 3206.1, which requires the Division to review, evaluate, and update its regulations pertaining to idle wells, including appropriate testing and remediation. It also required the Division to establish requirements for operators to submit engineering analyses for idle wells that have been idle for 15 or more years that demonstrate that the well is viable to return to operation in the future.

These proposed regulations concerning the testing, maintenance, and abandonment of idle wells and observation wells respond to the mandate of Public Resources Code section 3206.1, as well as the Division's broader mandate under Public Resources Code section 3106, by requiring more rigorous testing of idle wells and observation wells, operator evaluations of idle wells, and engineering analyses for idle wells that

have been idle for 15 or more years. By preventing wells from becoming potential conduits for contaminating groundwater, diluting hydrocarbon resources, or leaking methane into the atmosphere, the proposed regulations will protect the public health and safety, natural resources, and the environment.

SPECIFIC PURPOSE AND RATIONALE

Section 1723.9. Testing of Idle Wells.

Proposed amendments to section 1723.9 would replace the existing idle well testing requirements with a reference to section 1772.1. Proposed section 1772.1, discussed below, contains expanded requirements for testing idle wells consistent with the mandate of Public Resources Code section 3206.1. To apply these requirements to all idle wells in the state, it is necessary to move them out of Subchapter 1, which is specific to onshore operations, and into Subchapter 2, which applies to onshore and offshore operations statewide. However, section 1723.9 cannot simply be deleted because Public Resources Code section 3237 specifically refers to it. The only express testing requirement in section 1723.9 is the requirement to do periodic fluid level tests on idle wells, and that requirement continues under proposed section 1772.1.

The proposed amendments to section 1723.9 facilitate a more comprehensive and effective testing regime for idle wells and are necessary to respond to the mandate of Public Resources Code section 3206.1 to review, evaluate, and update the regulations pertaining to idle wells.

Section 1752. Wells Partially Plugged.

Public Resources Code section 3206.1, subdivision (c), provides the Supervisor with the discretion to provide a regulatory option for temporary or partial plugging and abandonment in lieu of compliance with the idle well testing regulations. Proposed section 1752 would allow operators to partially plug wells and to use less frequent testing for partially plugged wells. This allows operators to maintain well locations and wellbores for future use in areas where a local jurisdiction does not permit the drilling of new wells, or where the well is needed to hold the lease, allowing access to potential oil and gas reserves for future production.

Aligning the requirements for a partially plugged well with existing plugging requirements ensures the isolation of hydrocarbon bearing zones and reduces the risk of groundwater contamination from migration of fluids. Also, it reduces potential liability associated with properly plugging and abandoning the well should it become deserted.

Proposed **subdivision (a)** would require operators to obtain approval from the Division prior to partially plugging a well. This is necessary for the Division to provide consistent oversight and ensure that proper procedures and equipment are used in the partial plugging process.

Proposed **subdivision (b)** would specify the requirements for the partial plugging of a well.

- Proposed **subdivision (b)(1)** would require proper hole-fluids placed in the well consistent with section 1723(b). Proper hole-fluids are required to have the proper weight and consistency to prevent movement of other fluids into the wellbore and must be placed across all intervals that are not plugged with cement. This is necessary to prevent the crossflow of fluids if multiple holes develop in the casing over time, and to prevent the well from acting as a conduit for low-quality water to contaminate higher-quality water resources.
- Proposed **subdivision (b)(2)** would require all oil, gas, and disposal zones to be isolated with cement in accordance with the requirements of section 1723.1. This further prevents the possibility of fluid migration of hydrocarbons into other strata containing groundwater and vice versa.
- Similarly, proposed **subdivisions (b)(3) and (b)(4)**, require that underground sources of drinking water (USDW) and higher-quality freshwater are isolated with cement and in accordance with the requirements of section 1723.2 so as to further protect against contamination of those zones.

Proposed **subdivision (c)** would require operators to conduct pressure tests on partially plugged wells every 60 months. Although all hydrocarbon zones would be plugged and high-quality groundwater zones isolated, a casing pressure test is still necessary to ensure that no holes are developing in the casing above the uppermost plug and that the partial plugging continues to prevent crossflow between lower and higher quality water resources.

Proposed **subdivision (d)** would require operators to conduct the pressure test at a pressure of at least 200 psi above surface pressure and in accordance with the parameters specified in section 1772.1.1, discussed below. This is necessary to verify the mechanical integrity of the well. The required pressure is appropriate to use in shallow wellbores above the uppermost cement plug to determine if there is a hole in the casing that could allow crossflow.

Partial plugging of a well in accordance with these requirements will provide most of the essential environmental protections of complete plug and abandonment, and allowing

operators the flexibility to partially plug an idle well in lieu of compliance with idle well testing requirements is consistent with the mandates of Public Resources Code sections 3106 and 3206.1, subdivision (c).

Section 1760. Definitions.

A number of key terms used in the regulations require definition because they are used to convey a specific meaning, are subject to more than one interpretation, or are technical terms that are not commonly known. The proposed amendments to section 1760 are necessary to clarify the meaning of ambiguous terms, promote transparency, and support consistent application of the regulations. Proposed section 1760 is necessary to ensure that those who are subject to the Division's regulations can understand and interpret the regulations correctly and consistently.

Proposed amendments to **subdivision (j)** would incorporate the definition of an "idle well" as defined by Public Resources Code section 3008, subdivision (d), into the regulations. The incorporation is necessary to aid operators' understanding of the regulations by preventing unnecessary cross-referencing between the Public Resources Code and the California Code of Regulation. By incorporating the definition into the regulations, the Division provides a single location for operators to find the regulations concerning idle wells.

Proposed amendments to **subdivision (k)** would incorporate the definition of a "long-term idle well" as defined by Public Resources Code section 3008, subdivision (e), into the regulations. The purpose of incorporating the definition into the regulation is to aid operators' understanding of the regulations by preventing unnecessary cross-referencing between the Public Resources Code and the California Code of Regulation. By incorporating the definition into the regulations, the Division provides a single location for operators to find the regulations concerning idle wells.

Proposed amendments to **subdivision (s)** would define an "underground source of drinking water" or "USDW" as an aquifer that has not been exempted in accordance with federal regulations and either supplies a public water system or meets a specific quantity and quality threshold. The definition closely tracks the definition of the same term in Section 144.3 of Title 40 of the Code of Federal Regulations. The definition is necessary to give a specific meaning to the term, which is used elsewhere in the proposed regulations as a benchmark for protection of groundwater.

Section 1772. Idle Well Inventory and Evaluation.

Public Resources Code section 3206.1, subdivision (a), requires the Division to review, evaluate, and update its regulations pertaining to idle wells. Proposed section 1772 meets this mandate by ensuring that data about risk indicators is readily available to facilitate the Division and operators employing a risk-based approach for the prioritization of wells to be plugged and abandoned. The Idle Well Inventory and Evaluation would be required for all operators of idle wells, regardless of whether the operator intends to pay idle well fees or submit an Idle Well Management Plan under Public Resources Code section 3206.

Proposed **subdivision (a)** identifies the specific data operators would be required to submit, all of which is necessary for the Division to evaluate the comparative risk of an operator's wells:

- Proposed **subdivision (a)(1)** requires the date the well was completed, which is necessary because the age of a well can be an indicator of the potential for the well to have integrity issues.
- Proposed **subdivision (a)(2)** requires identification of any surface obstacles or impediments on the surface preventing access to an idle well. Wells in locations with impediments to surface access pose a greater risk to health, public safety, and the environment, especially in urban areas, as access for mechanical integrity testing or plugging and abandonment is difficult, or even infeasible.
- Proposed **subdivision (a)(3)** requires the history of mechanical integrity testing for the idle well with any failed pressure tests be clearly flagged, which is necessary because a history of repeated failed mechanical integrity testing can be an indicator that the well is a problem well prone to integrity issues.
- Proposed **subdivision (a)(4)** requires indication of whether the idle well penetrates a USDW. Wells that do not penetrate a USDW do not pose the same threat to higher-quality groundwater as wells that do penetrate a USDW.
- Proposed **subdivision (a)(5)** requires indication of whether the idle well indicates any pressure at the surface. An idle well with a pressure at surface has a greater risk of spill from an uncontrolled release. Maintaining a record of surface pressure over time allows the operator and the Division to identify wells that are more likely to have an uncontrolled release due to increasing or unstable pressure over time.

- Proposed **subdivision (a)(6)** requires indication of whether the idle well is a critical well, is in an urban area, or has an environmentally sensitive wellhead. “Critical well” is defined in existing regulations in section 1720, and “urban area” and “environmentally sensitive” are defined in existing regulations in section 1760. Flagging an idle well that is in one or more of these categories is necessary to identify wells that would have a greater potential impact to health, public safety, and the environment in the event of a failure either at the surface or subsurface.
- Proposed **subdivision (a)(7)** requires indication of whether the idle well is in an area that is prone to subsidence or landslides. The categorization of a well based on geologic hazards such as subsidence and landslides allows the Division to identify wells that are at risk for varying issues. Idle wells in areas of known subsidence are more likely to suffer from shearing of the wellbore which may ultimately prevent the well from being abandoned to current standards. Wells in areas prone to landslides may have their surface equipment damaged during a slide that could result in an uncontrolled release or the well may become buried and inaccessible at the surface.
- Proposed **subdivision (a)(8)** requires indication of downhole issues with the idle well that would make it difficult to either reactivate the well or plug and abandon the well. Downhole impediments may prevent the well from being abandoned to current standards. Depending on the type of impediments, this information may indicate that the well lacks mechanical integrity such as collapsed casing. Operations required to clean out a wellbore prior to abandonment would indicate higher liability associated with the plugging and abandonment of the well.
- Proposed **subdivision (a)(9)** requires indication of whether the idle well is partially plugged. Wells that meet the proposed requirements for partial plugging must be identified because they are required to adhere to different testing requirements. Additionally, wells that have been partially plugged pose less of a risk to health, public safety, and the environment as all hydrocarbon bearing zones, USDWs, and freshwaters have been isolated with cement. Wells in which the productive zone has been plugged back or otherwise isolated pose a decreased risk for cross contamination of hydrocarbons, USDWs, and freshwaters.

Proposed **subdivision (b)** would require operators to submit their Idle Well inventory and Evaluation to the Division in a digital format within one year and update it annually. Unless requested by the Division, an operator would not have to resubmit any

information that may have already been submitted in compliance with other requirements. The Division may allow additional time for the initial submission based on an operator's total number of idle wells and particular challenges faced to compile the information.

Proposed **subdivision (c)** would encourage operators with an Idle Well Management Plan under Public Resources Code section 3206 to prioritize plugging and abandonment of idle wells based on risk indicators in the Idle Well Inventory and Evaluation, as well as any other factors that may present a risk to public health or safety or to the environment. While this subdivision does not strictly require operators to prioritize plugging and abandonment of higher-risk wells, Public Resources Code section 3206, subdivision (a)(2)(B)(i) allows the Division discretion to require operators to prioritize the plugging and abandonment of specific wells under an Idle Well Management Plan, and the data compiled in the Idle Well Inventory and Evaluation would inform the Division's exercise of that statutory authority.

Proposed section 1772 will ensure that key information needed to evaluate the risk profile of each idle well is readily available to the Division and the operator. This is necessary to facilitate effective, efficient, and transparent management of idle wells, implementing the Division's statutory mandate under Public Resources Code section 3106 to prevent damage to life, health, property, and natural resources and under Public Resources Code section 3206.1 to review, evaluate, and update its regulations pertaining to idle wells.

Section 1772.1. Testing of Idle Wells.

Proposed section 1772.1 implements the Division's mandate under Public Resources Code section 3206.1, subdivisions (a)(1) to (3), to review, evaluate, and update its regulations pertaining to idle wells to include appropriate testing to determine whether the fluid level is above the base of a USDW, testing to verify the mechanical integrity of the well, and appropriate remediation of wells that lack mechanical integrity.

Proposed **subdivision (a)(1)** would require operators to conduct a fluid-level test to demonstrate whether the fluid is above the base of a known USDW within 24 months of a well becoming an idle well and every 24 months after that. A fluid-level test is a passive test in which the height of fluid in the wellbore is measured using acoustic methods. The height of the fluid column can be used to calculate the pressure of the reservoir in the completed zone(s) and may be a proxy for changing reservoir conditions. An increase in the fluid column over time may indicate an increase in reservoir pressure due to changing subsurface conditions or a hole in the casing which is allowing fluid to migrate into the wellbore. If a fluid level measurement is above the

base of a USDW, then there is risk for migration of fluid from the wellbore into the USDW, or, if the well lacks mechanical integrity, vice versa. Fluid level testing is also necessary to ensure that hydrocarbon zones are not being watered out by migration of fluid from another zone.

It is necessary to repeat the test periodically because the fluid level in a well is not necessarily constant and may vary due to several factors, including, but not limited to, production and injection in different oil zones and annual precipitation. Operators are already required to conduct fluid-level tests on idle wells on a five-year cycle, but in the Division's experience a five-year cycle is too infrequent because fluid levels can change significantly within a year or two, and a five-year testing cycle can mean that indications of potential groundwater contamination are ignored for several years. It is therefore necessary to increase the fluid level testing frequency to a two-year cycle to ensure protection of groundwater. If the operator demonstrates that the wellbore of the idle well is at least a half of a mile from any USDW, then a five-year fluid level testing cycle would still be allowed.

Proposed **subdivision (a)(2)** would require operators to conduct a casing pressure test within 24 months of a well becoming an idle well, or within 90 days of the first time that a fluid level test indicates that the fluid level in the well is above a USDW, whichever is sooner. Pressure testing is necessary because it is the most effective method of ensuring the mechanical integrity of a well, and a well that lacks mechanical integrity poses a range of threats to life, health, safety, and natural resources, including potential contamination of groundwater, dilution of hydrocarbon resources, and emission of methane and other gases into the atmosphere. If the fluid level in an idle well is above a USDW, then the idle well poses a potential threat to higher-quality groundwater and it is therefore necessary to test the mechanical integrity of the well within a relatively rapid 90-day time frame. If the fluid level is below any USDW, then the Division believes that testing a well within 24 months of it becoming idle is adequate to identify potential leaks before the well poses a threat. If the integrity of the well cannot be demonstrated, then the operator would be required to remediate the well.

A casing pressure test is an active test in which the pressure within a wellbore is intentionally increased in order to demonstrate the mechanical integrity of a well. A failed casing pressure test occurs when the wellbore is unable to maintain the applied pressure and a decrease in pressure over the time it is observed. This indicates that there is a hole or other damage to the casing that allows the migration of wellbore fluids into the surrounding subsurface and vice versa. The depth of a hole may be identified by using plugs or packers to isolate specific intervals within the well for further testing. A casing pressure test is more effective than a temperature survey or radioactive tracer survey because these passive tests may not identify smaller, slower leaks as they identify anomalies in the wellbore. A slow leak would allow the entering fluid to reach

equilibrium quicker by dispersing faster than a high volume leak because it would mix with the wellbore fluids and not provide an anomalous reading.

After initially establishing the integrity of the idle well, the required frequency of subsequent pressure testing would be based on how rigorous the previous pressure test was. How soon the next pressure test must be conducted would be a function of how much integrity assurance the last pressure test provided. Proposed **subdivision (a)(2)(A)** would require operators to repeat the test every 48 months for wells that are tested to 200 psi. Proposed **subdivision (a)(2)(B)** would require operators to repeat the test every 72 months for wells that are tested to 500 psi. And proposed **subdivision (a)(2)(C)** would require operators to repeat the test every 96 months for wells that are tested to 1,000 psi. These varying testing periods are proportional to the risk exhibited by the well. If an idle well can be successfully tested to 1,000 psi, there is significantly less concern about the near-term possibility of integrity failure than if the idle well was only pressure tested to 200 psi.

Proposed **subdivision (a)(3)** would require operators to perform a clean out tag within eight years of a well becoming an idle well to verify the current Division-permitted depth of the well. To perform a clean out tag, the operator clears any debris or other obstructions from the wellbore and contacts, or “tags” the bottom of the well. The clean out tag has several purposes in ensuring the integrity of an idle well: it verifies the total effective depth of the well, identifies the existence of any possible obstruction, and cleans out the obstruction. Wellbore shearing as a result of subsidence or junk-in-hole could prevent the well from being abandoned to current standards because the entire wellbore may not be reached. If shearing or junk occurs above the completed interval and the zone cannot not be reached for isolation with cement, then there is risk for fluid migration from the hydrocarbon zone to USDWs and freshwaters or vice versa. The goal of the clean out tag is to identify shearing before the entire depth of the wellbore becomes inaccessible and to ensure an opportunity to address the well while it can still be abandoned to standard. Additionally, it requires operators to clean any junk, debris, or sand out of the wellbore on a regular basis to ensure access to the entire wellbore.

A successful clean out tag essentially means the operators can demonstrate that the well is free of obstructions all the way down to the permitted depth. Verifying the effective depth of the idle well is necessary to indicate whether damage is developing within the wellbore, to ensure long-term idle wells are not degrading to the point that they pose a threat, and to ensure that it does not become infeasible to plug and abandon the well.

Operators are required to repeat the clean out tag every 48 months thereafter, but less frequent testing may be approved on a case-by-case basis based on positive results

from previous testing. The Division may also require more frequent clean outs if known field or geologic conditions indicate risk to the mechanical integrity of the well.

Proposed **subdivision (a)(4)** would require an operator, upon request by the Division, to conduct an ultrasonic or magnetic flux survey, or equivalent survey, to measure mechanical integrity if there is any indication that an idle well exhibits a high risk of corrosion. This is necessary because wells in some oil fields and under certain geologic conditions are subject to higher levels of corrosion than others, and ultrasonic and magnetic flux surveys are very effective methods of identifying and measuring corrosion. However, because there are significant costs associated with such testing, the proposed regulations would not require such testing on a routine basis, but instead only if there is evidence that corrosion may be occurring.

Proposed **subdivision (b)** would require operators who fail to comply with testing requirements to do one of three things: bring the well into compliance, partially plug and abandon the well, or plug and abandon the well. This is necessary to implement the express requirement of Public Resources Code section 3206.1, subdivision (d), that operators shall plug and abandon a well if the operator does not remediate the well as required by the Division's regulations implementing Public Resources Code section 3206.1.

Proposed **subdivision (c)** would require operators to give the appropriate district office 24 hours' notice, or a notice acceptable to the district office, before conducting any of the testing required under this section. This is necessary to ensure that Division staff are given the opportunity to witness the testing.

In some instances, it may be infeasible for an operator to access an idle well, either because there is a surface impediment, such as surface construction, or because the well cannot be accurately located. In those instances, proposed **subdivision (d)** would allow operators an alternative path to ensure that the idle well does not pose a threat to life, health, property, or natural resources. If the operator demonstrates that the well cannot be accessed after a diligent effort, then the operator is excused from the testing requirements and engineering analysis requirements of proposed sections 1772.1 and 1772.1.2. Within a year of that determination, the operator is required to develop a plan to monitor the idle well to ensure that well does not pose a threat and to respond to any indication that the well has become a hazard. If the operator fails to develop the plan, fails to effectively address any concerns the Division identifies with the plan, or fails to implement the plan, then the operator would be in violation of the proposed regulation and, in addition to other possible enforcement actions, the Division may reinstate the other requirements for the idle well. Subdivision (d) is necessary to provide for feasible methods to address hazards associated with inaccessible idle wells.

Proposed **subdivision (e)** would exempt idle wells that are partially plugged from the requirements of this section. Partial plugging of a well will provide most of the essential environmental protections of complete plugging and abandonment, and allowing operators the flexibility to partially plug an idle well in lieu of compliance with idle well testing requirements is consistent with the mandates of Public Resources Code sections 3106 and 3206.1, subdivision (c).

Proposed **subdivision (f)** would allow the operator to demonstrate, to the Division's satisfaction, that a wellbore is not within one-half mile of a USDW. If this demonstration is successfully made, the well does not become an idle well for an additional two years, thereby delaying all testing requirements. This is necessary to implement the express requirement of Public Resources Code section 3206.1, subdivision (b).

Proposed **subdivision (g)** would afford operators four years to bring existing idle wells into compliance with the testing requirements in proposed section 1772.1, with the expectation that at least half of the wells would be addressed within two years. This is necessary because many thousands of idle wells will need to be brought into compliance with these regulations, and operators will reasonably need several years to accomplish this.

Proposed section 1772.1 will provide a comprehensive testing regime for idle wells to ensure mechanical integrity and identify and address potential hazards, as is necessary to implement the Division's statutory mandate under Public Resources Code section 3106 to prevent damage to life, health, property, and natural resources and under Public Resources Code section 3206.1 to review, evaluate, and update its regulations pertaining to idle wells.

Section 1772.1.1. Pressure Testing Parameters.

Proposed section 1772.1.1 specifies the parameters to conduct a pressure test required under proposed section 1772.1, subdivision (a)(2). The testing parameters in proposed **subdivisions (a)(1) to (4)** are designed to ensure that the well has integrity and that small leaks that would indicate a lack of well integrity are identified. This is accomplished by specifying in regulation what constitutes a stable pressure for a passing pressure test: the pressure must be held for 30 minutes with no more than a 5 percent decline from the initial test pressure in the first 15 minutes, and no more than a 1 percent decline from the pressure after the first 15 minutes in the second 15 minutes. Consultation with the Division and approval is required before conducting a pressure test with gas or using additives other than brine, corrosion inhibitors, or biocides, because such modification could affect the efficacy of the testing parameters. The regulation specifies that the pressure gauge employed must be sufficiently accurate

(within one percent) to effectively indicate whether the well passed or failed the pressure test.

Proposed **subdivision (a)(2)** calls for a stable column of fluid that is free of excess gasses in the wellbore before commencing pressure testing, but the regulation does not specify benchmarks to determine when this has been achieved. Achieving stability before commencing pressure increases the likelihood of a passing test, and the Division will defer to the operator's knowledge of its own operating conditions in determining how long a well should sit before beginning testing.

Effective parameters for pressure testing may vary based on the specific circumstances of a well, such as the age of the well, casing thickness, and corrosion factors, and the proposed **subdivision (b)** provides that the Division may vary the parameters as necessary to ensure an effective pressure test.

These parameters were developed by Division engineers in consultation with experts from the Sandia, Lawrence Livermore, and Lawrence Berkeley National Laboratories in an effort to develop consistent and effective pressure testing parameters to be employed whenever pressure testing is required for oil and gas wells. They are based on industry standards and practices and the Division's extensive experience and expertise in supervising the pressure testing of wells. The Division has overseen countless pressure tests of injection wells under its Underground Injection Control regulations, including dozens of pressure tests of gas storage wells at the Aliso Canyon field as part of the recent well testing safety review. Because of operational pressures on idle wells, the pressure test duration under this proposed section is reduced from what the Division is requiring for operational wells.

Proposed section 1772.1.1 will provide consistent and effective pressure testing parameters that are necessary to implement the Division's statutory mandate under Public Resources Code section 3106 to prevent damage to life, health, property, and natural resources and under Public Resources Code section 3206.1 to review, evaluate, and update its regulations pertaining to idle wells.

Section 1772.1.2. Engineering Analysis for 15-Year Idle Wells.

Public Resources Code section 3206.1, subdivision (a)(4), requires the Division to review, evaluate, and update its regulations pertaining to idle wells, including requirements for operators to submit an engineering analysis for idle wells that have been idle for 15 or more years. This analysis must demonstrate to the Division's satisfaction that the idle well is viable to return to operation in the future. Proposed

section 1772.1.2 would meet this mandate by requiring operators to submit information that demonstrates the viability of wells that have been idle for 15 years or more.

Proposed **subdivision (a)** would require operators to provide an engineering analysis for wells that have been idle for 15 or more years that demonstrates that the well has access to potential oil and gas reserves and that the well has mechanical integrity. This performance standard is necessary because a well is not viable for future use unless both are true.

Proposed **subdivision (b)** specifies the minimum information operators would be required to submit in the engineering analysis to demonstrate that the well could be used to access potential oil and gas reserves. Proposed **subdivision (b)(1)** would require identification of each reservoir unit that might be accessed and the reservoir characteristics, including:

- Average porosity and permeability
- Average gross interval thickness and net pay thickness
- Original and residual oil, gas, and water saturations
- Estimated original oil and gas in-place volumes
- Estimated recoverable resources, for injection wells this includes estimated incremental oil production at the producing wells
- Areal extent of the reservoir
- Oil gravity and viscosity
- Specific gravity of gas
- Original and present reservoir temperature and pressure.

Proposed **subdivision (b)(2)** would also require the operator to submit a representative electric log to a depth below the deepest producing zone, identifying all geologic units, formations, USDWs, freshwater aquifers, oil or gas zones, and each reservoir unit to be utilized. Finally, proposed **subdivision (b)(3)** would require the operator to submit a structural contour map drawn on a geologic marker at or near the top of each reservoir unit to be utilized indicating faults, other lateral containment features, and aerial extent of the productive zone.

All of the information specified in subdivision (b) is necessary for the Division to make determinations regarding the well's access to potential oil and gas reserves, which is part of the assessment of whether a well is viable to return to operation in the future. Consistent with standard industry practices, the required information would be used by the Division to perform an independent evaluation of the proposed reservoir interval and associated production potential.

Proposed **subdivision (c)** would require operators to include in the engineering analysis a casing diagram for the idle well with the necessary construction details for the Division to assess whether future use of the well is feasible. Many long-term idle wells were constructed long ago under now outdated construction standards, and safe operation of the well may not be realistic. Specification of the construction details to be included in the casing diagrams is provided in proposed section 1772.1.3, discussed below.

Proposed **subdivision (d)** would make clear that the information required under subdivision (b) and (c) may not address all circumstances and that in some cases additional information may be needed to complete the evaluation.

Proposed **subdivision (e)** would allow operators to submit the engineering analysis under subdivision (b) one time and reference it in subsequent analyses rather than resubmitting it. This is necessary to avoid unnecessary and repetitive submissions. Many long-term idle wells are completed in the same field and have similar capabilities for productivity. This benefits operators and the Division by cutting back on paperwork, eliminating duplicative submissions, and reducing staff time spent on duplicative work.

Proposed **subdivision (f)** would require operators to submit all of the data required under this section electronically in a digital format. It also requires that all maps, diagrams, and exhibits shall be clearly labeled and shall clearly identify wells, boundaries, zones, contacts, and other relevant data, all of which is necessary for effective evaluation. Information that has previously been submitted to the Division is not required to be resubmitted, unless the Division specifically requests it.

Proposed **subdivision (g)** would provide an alternative means for operators to demonstrate that an idle well that has been idle for 15 or more years is viable for future use if it is infeasible to provide the information otherwise required under proposed section 1772.2. It is necessary to provide this flexibility in the regulation because records for some long-term idle wells may be incomplete or non-existent. Some wells drilled long ago lack the geophysical well logs or test data that is called for. Proposed subdivision (g) would allow the operator to provide alternative data to demonstrate the future viability of a well.

Proposed **subdivision (h)** would provide options to operators if the Division determines that the idle well cannot be used to access potential oil and gas reserves or does not have mechanical integrity. The operator would have 30 days to provide additional information to substantiate that the well is viable to return to use. If the Division determines that the well is not viable after the submittal of the additional information, the operator is required to plug and abandon the well within 12 months of receiving the

Division's final determination. Subdivision (h) is necessary to implement the express requirement of Public Resources Code section 3206.1, subdivision (d), that operators shall plug and abandon if the operator does not demonstrate that a well is economically viable as required by the Division's regulations implementing Public Resources Code section 3206.1.

Proposed **subdivision (i)** would afford operators four years to bring existing idle wells into compliance with the engineering analysis requirements in proposed section 1772.1.2, with the expectation that at least half of the wells would be addressed within two years. This is necessary because many thousands of idle wells will need to be brought into compliance with these regulations, and operators will reasonably need several years to accomplish this.

Proposed section 1772.1.2 will provide effective criteria and protocols to determine whether idle wells that have been idle for 15 years or more are viable for future use or should be plugged and abandoned, which is necessary to implement the Division's statutory mandate under Public Resources Code section 3106 to prevent damage to life, health, property, and natural resources and under Public Resources Code section 3206.1 to review, evaluate, and update its regulations pertaining to idle wells.

Section 1772.1.3. Casing Diagrams.

Proposed section 1772.1.3 would specify the data elements that must be included in the casing diagram required as part of the engineering analysis under proposed section 1772.1.2, subdivision (c). All of the information that would be required under **subdivisions (a) and (b)** is relevant and necessary to the Division's evaluation of whether the well is viable for future use in light of the well's construction and condition. **Subdivisions (c) and (d)** would provide additional standards clarifying the scope of information the Division deems relevant and necessary in a casing diagram. Finally, **subdivision (e)** would allow operators to submit a flat file data set containing all of the information identified in the section, in lieu of an actual casing diagram. This option, which may reduce compliance costs for some operators, is being offered because the Division can use its own electronic resources to draw casing diagrams based on the data operators submit.

Section 1772.2. Idle Well Testing Waiver Program.

Public Resources Code section 3206.1, subdivision (a)(3), requires the Division to review, evaluate, and update its regulations pertaining to idle wells, including the "appropriate remediation, as determined by the Supervisor, of idle wells if there is an indication of a lack of mechanical integrity." Public Resources Code section 3206.1,

subdivision (c), authorizes the Supervisor to promulgate regulations that “provide an option for ... well abandonment in lieu of compliance” with idle-well testing otherwise required by regulation.

Proposed section 1772.2 provides for appropriate remediation and implements Public Resources Code section 3206.1 by waiving required testing for wells that are scheduled to be plugged and abandoned in a plan approved by the Supervisor. In some cases, an operator may suspect from a well’s production history, outdated construction, or other indicia that a well would not pass mechanical integrity testing, and should be plugged and abandoned rather than repaired for future production. It would be inappropriate to test such a well. First, pressure testing might damage the well, increasing the well’s risk to public safety and the environment. Second, testing the well would not add relevant data to decide the well’s future disposition because its abandonment is already determined. Finally, testing would divert resources from the testing of wells whose safety and disposition need to be determined. An approved plan to plug and abandon the well protects people and resources better than useless testing.

Proposed **subdivision (a)** would allow an operator to comply with an approved plan to plug and abandon specified wells rather than perform unnecessary testing on those wells. This section is necessary to create the choice to plug and abandon wells, rather than meet testing requirements that provide no benefit to the public and might increase risk. This also benefits operators by allowing them to allocate resources efficiently. Further, it benefits the public and the environment by preventing possible damage to wells.

Proposed **subdivision (b)** would state the specific requirements for plans to plug and abandon wells instead of testing them. Proposed **subdivision (b)(1)** would require a list of wells stating, for each well, its API number, the date by which it is scheduled to be plugged and abandoned, any known or existing wellbore integrity deficiencies, and any prior attempts to remediate the wellbore. This subsection is necessary to identify and to provide notice to operators and to the public of the information required for the Division to evaluate the plan’s order of wells to be plugged and abandoned, and to monitor the operator’s compliance with the plan. This benefits the public, the operators, and the Division by providing for orderly submission, evaluation, and, where appropriate, approval of the plans.

Proposed **subdivision (b)(2)** would require the operator to schedule all idle wells in the plan to be plugged and abandoned within five years. This is necessary to prevent unreasonable delay in plugging and abandoning untested wells.

Proposed **subdivision (b)(3)** allows operators to modify the list of wells within the plan by providing a reason for the changes, the required information required for any idle wells to be added to the plan, and plan for addressing compliance for any idle wells to be removed from the plan. There may be any number of reasons that modification of the plan subsequent to approval by the Division would be necessary and consistent with the purpose Section 1772.2. In particular, as operators comply with the proposed regulation's requirement to test all idle wells, they may identify wells not previously scheduled for plugging and abandonment, which require plugging and abandonment more urgently than previously known. Proposed subdivision (b)(3) protects public safety and natural resources by allowing plans to change when new data indicate that a change is necessary.

Proposed **subdivision (c)** would limit the number of wells to be plugged and abandoned in lieu of testing, as a proportion of the operator's total idle well count. Under proposed subdivision (c), no more than 5 percent of an operator's total idle wells may receive waivers from testing in any one calendar year, unless approved by the Supervisor. The Supervisor's approval for additional wells must be based on either the operator's small total number of wells or a satisfactory demonstration that the operator has the necessary resources to plug and abandon those additional wells. This is necessary to prevent avoidance of necessary testing by scheduling an inflated number of wells for plugging and abandonment. The purpose of the waiver is to encourage plugging and abandonment in lieu of unnecessary testing – not to delay testing indefinitely by scheduling plugging and abandonment work than can actually be performed.

Proposed **subdivision (d)** would require operators to consider results of their Idle Well Inventory and Evaluation, as conducted in compliance with Section 1772, when they schedule the plugging and abandonment of their idle wells. This is necessary to ensure that the idle wells that pose the greatest risk to the public or to natural resources are plugged and abandoned first.

Proposed **subdivision (e)** authorizes the Supervisor to revoke the plan if the operator fails to comply with it. If the plan is revoked, the operator cannot submit another work plan for five years, unless approval is obtained from the Supervisor. This is necessary to encourage operators to prepare their plans based on the best information about their idle wells, and to act while the information is still accurate. After five years, the condition of the listed idle wells is likely to have changed, but those changes will not have been measured because their mandatory testing will have been waived under proposed section 1772.2. This subdivision is also necessary to prevent avoidance of necessary testing that might result if an operator listed more idle wells than can actually

be plugged and abandoned within a reasonable time for wells to remain untested. This protects the public and the natural resource from unnecessary risk.

Proposed section 1772.2 will protect public safety and natural resources by avoiding the risk and waste of unnecessary testing, and by promoting the plugging and abandonment of wells as an alternative to testing. This is necessary to implement the statutory mandate of Public Resources section 3206.1, subdivision (a)(1), which requires appropriate remediation of idle wells if there is an indication of a lack of mechanical integrity, and of Public Resources section 3206.1, subdivision (c), which authorizes well abandonment in lieu of testing. The addition of section 1772.2 facilitates a more comprehensive and effective testing regime for idle wells and is necessary to respond to the mandate of Public Resources Code section 3206.1 to review, evaluate, and update its regulations pertaining to idle wells.

Section 1772.3. Requirements for Observation Wells.

Proposed section 1772.3 would require operators to test and monitor the integrity of observation wells, which are by definition wells that penetrate a hydrocarbon reservoir, and therefore these non-operational wells are potential conduits between hydrocarbon zones and groundwater. As with idle wells, testing of observation wells is necessary to ensure integrity, although the risks associated with observation wells are lower due to the fact that they are regularly monitored.

If an observation well penetrates a USDW, then proposed **subdivision (a)** would require the operator to conduct a fluid level test within six months of the well becoming an observation well and every five years thereafter. As with an idle well, this is necessary to determine the fluid level in the well and whether the fluid level height is above a USDW. If the fluid level is above the USDW interface, it could indicate that the well is a possible risk to the USDW and may require a pressure test to verify mechanical integrity.

Proposed **subdivision (b)** would require operators to conduct a casing pressure test at a pressure of at least 200 psi within six months of a well becoming an observation well and every 60 months thereafter. As with an idle well, this is necessary to verify the mechanical integrity of the well casing to ensure that the observation well will not act as a conduit to other formation zones. This benefits the public and environment by preventing cross contamination of hydrocarbon fluids into freshwater zones or USDWs and the intrusion of freshwaters or USDWs into hydrocarbon zones.

Proposed **subdivision (c)** would allow operators four years to bring existing observation wells into compliance with the testing requirements of proposed section 1772.3.

Proposed **subdivision (d)** would require operators to give the appropriate district office 24 hours' notice, or a notice acceptable to the district office, before conducting any of the testing required under this section. This is necessary to ensure that Division staff are given the opportunity to witness the testing.

Proposed section 1772.3 will provide an effective testing regime to ensure that observation wells are not potential conduits for contamination of groundwater or dilution of hydrocarbon resources, which is necessary to implement the Division's statutory mandate under Public Resources Code section 3106 to prevent damage to life, health, property, and natural resources.

Section 1772.4. Verification of Production or Injection.

Public Resources Code section 3008, subdivision (d), which defines the term "idle well," provides that a well's production or injection is subject to verification by the Division. It also provides that an idle well ceases to be an idle well when it is either properly plugged and abandoned, or shown to the Division's satisfaction to have been used for a continuous six-month period. To implement Public Resources Code section 3008, subdivision (d), and in response to Public Resources Code section 3206.1's mandate to review, evaluate, and update its idle well regulations, the Division proposes to make specific some of the criteria for a satisfactory showing that a well is no longer idle.

Proposed section 1772.4 would require that an operator who reports injection or production from a well must demonstrate, at the Division's request, that the well can, and actually did, produce or inject as reported. Proposed section 1772.4 would allow the Division to require an equipment check, well test, or verifying documentation including, but not limited to:

- Operability of the production or injection equipment
- Filling of production tanks
- Field production reports
- Lease oil inventory at the beginning or end of the month
- Run tickets or automated shipping data, which includes the shipping and/or purchasing company and the volume received
- Lab data, such as gravity, water cut, and/or temperature
- Details of the methods used to allocate production to wells

- Any other documentation or means by which the Division may reasonably require an operator to verify production.

This proposed section is necessary to prevent and detect misrepresentations that a well is active. The proposed regulations are designed to eliminate non-viable wells and reduce their potential for unfunded financial liability to the state. The fees and required testing that help to ensure the safety of idle wells also creates financial incentives to plug and abandon wells that are not reasonably likely to be used for production. To prevent and detect misrepresentations, the Division must require a demonstration, including the information specified in proposed section 1772.4, that the well has been in use as reported. This benefits the public and environment by ensuring that idle wells are tested as required or are properly plugged and abandoned.

Proposed section 1772.4 will protect public safety and natural resources by making specific the criteria required for showing to the Division's satisfaction that a well has been continuously in use for six months, as described in Public Resources Code section 3008, subdivision (d), and by preventing and detecting misrepresentations about idle wells. The addition of section 1772.4 facilitates a more comprehensive and effective testing regime for idle wells and is necessary to respond to the mandate of Public Resources Code section 3206.1 to review, evaluate, and update its regulations pertaining to idle wells.

ALTERNATIVES CONSIDERED

On June 17, 2017, the Division publicly released pre-rulemaking draft regulations specific to governing idle wells, and received informal public comments. The Division also held an informal workshop in Bakersfield for interested parties on July 14, 2017. Due to significant public interest, the Division also extended the first informal comment period until August 21, 2017.

While developing the proposed regulations, the Division considered and rejected various alternative approaches. No alternative considered by the Division would be more effective in carrying out the purposes of the proposed regulations, or would be as effective but less burdensome to affected private persons and small businesses than the proposed regulations.

- The Division considered, but rejected, requiring all idle wells to be pressure tested at a pressure of at least 500 psi. Some idle wells, still in existence in the State, were drilled in the late nineteenth and early twentieth centuries. Not having been constructed to modern standards, these wells cannot withstand a pressure test at 500 psi. Requiring a pressure test beyond their capacity could

cause leaks or other threats to public safety or natural resources. To avoid unintended consequences from uniform testing requirements, the Division proposes tiered pressure-testing requirements that take well construction into consideration and allow testing pressure appropriate to each idle well.

- The Division considered, but rejected, allowing operators conducting a clean out tag to demonstrate that USDWs were protected by fluid levels rather than cleaning the well out to the Division-permitted depth of the well. The purposes of the clean out tag are to ensure that there are no obstructions in the well and to verify integrity along the entire length of the wellbore. Demonstrating that USDWs are protected by fluid levels does not meet those purposes.
- The Division considered, but rejected, requiring operators to conduct a clean out tag on an idle well within 24 months of the well becoming an idle well and every 48 months thereafter, rather than the proposal to conduct the first clean out tag within 8 years. Although wells will deteriorate with age, most wells do not deteriorate that quickly. Based on the relatively low risk of idle wells of that age, the Division determined that a clean out tag within 8 years, and every 48 months thereafter, is sufficient to protect life, health, property, and natural resources with usefulness of a clean out tag at such an early idle age. Requiring an earlier clean out tag would have only marginal value and, considering the cost to operators, would be unreasonable.
- The Division considered, but rejected, omitting the phased compliance period for testing and data submittal. If there were no compliance period, nearly 28,000 idle wells would be out of compliance for at least some testing requirements and nearly all data submittal requirements. There are not enough rigs in the state to conduct all required testing in less than four years, and the costs of compliance would be insurmountable for many operators. Based on this, the Division is proposing 48 months for operators to come into compliance with testing and engineering analyses. It is also providing 1 year for operators to come into compliance with Idle Well Evaluations.
- The Division considered, but rejected, including requirements for the securing of idle wells in public places. These requirements were based on concerns that people might be injured by unexpected moving parts of idle wells, climbing on idle tanks, or other equipment near the idle well. However, the Division determined that existing regulations adequately provide for securing all wells – both idle and active—in public places. Therefore, the Division did not include these regulations.

CONSISTENCY WITH COMPARABLE FEDERAL REGULATION OR STATUTE

The proposed regulations are not inconsistent or incompatible with federal statutes or regulations. The Division is the main regulatory body for idle wells in the state of California. On federal land, the Bureau of Land Management (BLM) and the Division both have regulatory jurisdiction. The proposed regulations for the testing and maintenance of idle wells and observation wells are more stringent than the federal counterpart and more protective of the public and environment. Federal regulations require operators to promptly plug and abandon wells newly completed or recompleted wells in which oil or gas is not encountered in paying quantities or is no longer capable of producing oil or gas in paying quantities, possibly due to casing damage, unless BLM approves use as a service well for injection or subsurface disposal. (43 CFR, § 3162.3-4, subd. (a).) Also, no wells may be temporarily abandoned for more than 30 days without BLM approval. (43 CFR, § 3162.3-4, subd. (c).) Nothing in the proposed regulations is inconsistent or incompatible with federal statutes or regulations.

ECONOMIC IMPACTS

The Department has completed a Standardized Regulatory Impact Analysis for the proposed rulemaking action, which is included in this Initial Statement of Reasons as “Attachment A.” The Department has made an initial determination that the adoption of these regulations may create a significant, but absorbable burden, on statewide operators. Small operators, however, could exit the industry if they are unable to meet the proposed requirements. However, the economic impact stemming from the costs to comply with the regulations would create positive indirect secondary impacts to statewide gross output, contract service jobs, earnings, and value added, despite the short-term possibility of downsizing or small operators exiting the industry. In the long-term, operators are expected to continue innovating both their processes and their technologies to make the extraction of hydrocarbons profitable.

DOCUMENTS RELIED UPON

The Department relied upon the following documents in proposing this rulemaking:

- Interstate Oil and Gas Compact Commission, Produce or Plug? A Study of Idle Oil and Gas Wells. <http://groundwork.iogcc.ok.gov/sites/default/files/2000%20Produce%20or%20Plug.pdf> (2000).

- Lucija Muehlenbachs, Department of Agricultural and Resource Economics, University of Maryland, Idle Oil Wells: Half Empty or Half Full? (March 2009) Abstract.
- Jacqueline Ho, Alan Krupnick, Katrina McLaughlin, Clayton Munnings, Jhih-Shyang Shih, Resources for the Future, *Plugging the Gaps in Incentive Well Policy*, (May 2016).
- Erin Waldner. Wells without Owners. <http://www.bakersfield.com/news/business/wells-without-owners/article_057fd3f5-b421-5f8e-894e-ce4ecf0caea8.html> (as of Feb. 10, 2006).
- NETL Energy Lab, Office of Fossil Energy, US Department of Energy, Methods for Finding Legacy Wells in Residential and Commercial Areas <<https://www.osti.gov/scitech/servlets/purl/1330215>> (June 16, 2016).
- Climate Program Office, National Academy of Science, USA, Direct measurements of methane emissions from oil and gas wells in Pennsylvania <<http://www.pnas.org/content/111/51/18173>> (Dec. 8, 2014).
- Dan Frosch and Russell Gold, How 'Orphan' Wells Leave States Holding the Cleanup Bag, Wall Street Journal <<https://www.wsj.com/articles/how-orphan-wells-leave-states-holding-the-cleanup-bag-1424921403>> (Feb. 25, 2015).
- James D. Walker, Horsley Witten Group, California Class II Underground Injection Control Program Review <<http://www.conservation.ca.gov/dog/Documents/DOGGR%20USEPA%20consultant%27s%20report%20on%20CA%20underground%20injection%20program.pdf>> (June 2011).
- DOGGR, Cal. Department of Conservation, Renewal Plan for Oil and Gas Regulation <<http://www.conservation.ca.gov/dog/Documents/renewal-plan2017-lrg.pdf>> (Oct. 2015).